

**Series:**

Boundaries of Consciousness: The Wasan Conversations

**Editors:**

Almuth Sellschopp, Helga Breuninger, Katharina Poggendorf-  
Kakar and Sudhir Kakar

**Forthcoming:**

Seriously Strange: On Anomalous Phenomena

On Death and Dying

Creativity and Imagination

# On Dreams and Dreaming

*Edited by*

SUDHIR KAKAR

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## VIKING

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## Foreword to the Series 'Boundaries of Consciousness'

On *Dreams and Dreaming* is the first volume of a series on 'Boundaries of Consciousness', which plans to explore the uncharted territory at the edge of our current psychological knowledge. Some of this territory extends into what has been called spirituality or the sacred, and scholars of religious studies and philosophers are as much a part of these conversations as are psychologists and psychoanalysts. The present volume is the fruit of a symposium held at Wasan Island in Lake Muskoka in Ontario, Canada, in August 2009. It will be followed by further symposiums on the paranormal or anomalous phenomena in 2010 and on death and dying in 2011.

Wasan Island is for me a special place where people who want to interact without distractions can meet and learn from each other. A heart-shaped island covered with trees, in the middle of Lake Muskoka in Canada, it lends itself to being a retreat for groups who want to venture into new experiences as well as into an exciting group process.

Wasan Island protects and inspires such learning processes that take place between creative opening and concentrated cooperation, between an ambitious orientation on results and a group dynamic that is typical of the island. For ten years now, the Breuninger Foundation has invited personalities from science, industry, culture and international organizations to Wasan Island during the summer months.

In 2008, we began, with Sudhir Kakar and Almuth Sellschopp, a series of meetings bringing together individuals with high academic reputations in the fields of theology, philosophy, medicine, history and psychotherapy. The intention was to give them the opportunity to present their latest findings from their areas of expertise, to discuss them critically in a protected space, and to locate the findings within a wider, public context.

This concern goes back to my father, the founder of the foundation, Heinz Breuninger, a man who was a model of openness in dialogue and a readiness to get involved, without prejudice, in contradictions.

His main focus was universal history, and under the direction of Rolf-Peter Sieferle the Breuninger Foundation has made a name for itself with the 'Europäische Sonderweg'—European Special Way.

I try to connect my personal scientific upbringing and studies as an economist and psychologist, my socialization within a business family and my situation as a European, to my many years of spiritual experience—the practice of yoga and meditation, and an intense intellectual engagement with Eastern philosophies—without getting stuck in esotericism.

The meetings are not only about a high-level, detailed imparting of knowledge but about embedding this knowledge in a dialogue within a small circle: a shared search for ways

between difference of views (diversity) and commonness within a framework whose format differs markedly from most academic events. Whereas most academic seminars are concerned with approval or rejection, the differences between positions in the Wasan conversations are valued and controversial viewpoints and dissent are expected to have space to develop.

Wasan Island can then be understood as an 'experimental field' in which—as in the following report on the dream seminar—timeless and contemporary, Western and Eastern views of the truth (a definite logic as against the acknowledgement of contradictions) meet.

Thanks to its unique spiritual strength, stemming from its indigenous native American past, Wasan Island is particularly suitable as a location for this project. To this is added a boundary situation that originates from the island itself: its spatial configuration, and a fixed time frame. Paradoxically perhaps, this allows an opening, a movement towards unity, a step beyond the borders of individuality and autonomy. The processes of the symposiums allow the participants to present their position authentically and without fear, to engage with the position of the other without prejudice and without evaluation, and without the feeling that dissent will be edged out. This results in a very fruitful learning climate.

Two important elements of the Wasan conversations should be mentioned: on the one hand, it regularly happens during the course of the symposium that 'world famous' scientists from widely different fields become people who display an interest in dialogue beyond their immediate presentation, and who use the island situation with its various opportunities—at the dock, at dinner and afterwards—to carry their discussions further. This experience makes the Wasan offer of free spaces

outside the formal meetings, in groups and among individuals, so important.

Another element is the transfer that takes place, often of very complicated experiences, 'back into the world'. This transfer should, in the understanding of the Foundation, be commensurate with the outcome of the event and its capacity to apprehend reality—always with the 'humanistic chance' of returning to Wasan Island to assimilate the continually developing process of understanding experience, and to continue the dialogue.

The project 'Boundaries of Consciousness', with Sudhir Kakar as project leader, comprises four successive seminars. His personality embodies a style of leadership that has the courage, liveliness and spontaneity to look for new balances between psyche and spirituality, and thereby to protect boundaries and construct barriers in the face of potential abysses. Gently sensitive, I see him as an experienced mountain guide on the glaciers of new psycho-spiritual territory, focused on bringing into awareness the barriers of consciousness between subject and object, opposite and yet related, and always aware of the crevasses that lie in wait for the unwary.

My wish is for the reader to encounter the individual contributions with the same curiosity, openness and tolerance that are such a feature of the conference atmosphere on Wasan Island.

Helga Breuninger

## Introduction

This volume is the product of an unusual symposium that brought together a distinguished philosopher, a highly regarded Freudian psychoanalyst, a leading Jungian analyst and some of the world's foremost scholars of dream studies to reflect on the phenomena of dreams and dreaming which have fascinated human beings through the ages and across all cultures. Beginning with a personal introduction to the subject of dreams, the contributors, from North America, Europe and India, discuss one or other or both these questions in their highly original ways before ending with reflections on the wider implications of their contributions. Another eminent psychoanalyst summarizes the discussions that followed the presentations.

The diversity of viewpoints and the wealth of ideas is the potential strength of any volume of collected essays by different authors. The potential weakness of such an undertaking is this very multiformity that can bewilder a reader searching for a coherent framework that holds the diverse contributions together, a reader who is curious to know 'how it all hangs

# Possible Worlds, Possible Selves: Dreaming and the Liberation of Consciousness

*Tracey L. Kahan*

'Cognitive scientists, in particular, would do well to consider their bias toward waking cognition as the "pinnacle" of cognitive achievement. It is possible that dreaming cognition and consciousness surpass that of waking precisely because there are unlimited possible worlds and possible selves that can be represented in dreaming.'<sup>1</sup>

## **Beginnings**

Many dream scholars come to the study of dreaming by way of curiosity about their own dreams and sleep. In my case, it was sleepwalking that brought me to the threshold of dream studies. When I was a child—between the ages of seven and ten—I regularly walked in my sleep, typically around my bedroom or into the living room. Sometimes I would awaken in the den guest bed, wondering how I arrived there. My mother would explain that an hour or so after she had

seen me to bed, I had wandered into the living room (where she and my father held their nightly conversations) and asked to sleep in the den. I had no recollection of making these requests. Occasionally, I would sleepwalk down the street; a neighbour would find me on their doorstep and escort me home. Eventually, my nocturnal ramblings led my parents to put a lock high on the hall door so I could not leave the house. Ironically, it was these episodes of sleepwalking that initiated me as an explorer of the dream world—an *oneironaut* (to use Stephen LaBerge's term).<sup>2</sup> My sleepwalking episodes were preceded by the same (or similar) brief dream of running after a huge soap bubble suspended several feet off the ground and trying to catch it with a giant wand.<sup>3</sup> With time, I came to recognize (during sleep) that the occurrence of this image indicated that I was about to sleepwalk. Sometimes I had no recollection whatsoever of the sleepwalking episode. Other times I could observe myself get out of bed and move about but I was unable to control my behaviour. Occasionally, I could persuade myself (again, during sleep) that I did not need to get out of bed and walk around and thus restrain myself from getting up. This intentional regulation (during sleep) of my sleepwalking was an early experience of *multiple levels of awareness*.<sup>4</sup> I was a participant in an imagined experience (the dream of the soap bubble) and sometimes also in an actual experience (the sleepwalking episode). I was also an observer in that I could sometimes watch myself sleepwalking; it was also from an observer perspective that I recognized the soap-bubble dream as a trigger of my sleepwalking and eventually came to use this awareness to set (and fulfil) the intention of remaining in my bed. As I recall, I continued to have this dream for several years after I stopped sleepwalking, around age ten. I do not remember having the dream after the age of twelve or thirteen.

This capacity to maintain dual perspectives (participant and observer) also proved helpful in transforming another recurring childhood dream: of being chased by a tiger. In my efforts to flee, I would sometimes become so frightened that I would wake up (a typical nightmare experience—that is a high-anxiety dream from which one awakens).<sup>5</sup> Other times, I could adopt an observer perspective in the dream and set intentions for my participant self regarding how better to escape the tiger. An early such escape strategy was to hop repeatedly, with each hop taking me progressively higher until I was beyond the tiger's reach. In later episodes, I would run to the edge of a mountain or cliff, extend my arms as one would in a swan dive, push off and glide to safety. Finally, I was able to flee by simply raising my arms and intending to fly up and away. My intentions were not always fulfilled, however; if I failed to take flight and found the tiger upon me, I would again awaken in fright.

Because I found the sensation of flying in my dreams exhilarating and unlike anything I had experienced in my waking life, I began to experiment with flying whenever I thought I might be dreaming. Flying also became my preferred method of determining whether my current experience was a dream or an actual experience, a process termed *state testing*.<sup>6</sup> When I wondered if I was dreaming, I would try and fly. If I could fly, I knew I was dreaming; if I was unable to fly, I assumed I was awake. Of course, in the latter case, my state testing often failed because an inability to fly did not necessarily mean I was awake!

Thus was my experience of multiple levels of awareness, intentionality and self-regulation in dreams launched, along with a now decades-long interest in what is possible in

dreams and in how dreams may both reflect and expand our waking capacities.

### The Relationship of Dreaming to Waking

Theories of the dreaming-waking relationship vary dramatically. Historically, the dominant view was that the dreaming mind is dissociated from the waking mind. William James, for example, asserted that a hallmark of the waking mind is the ability to reflect upon or evaluate ongoing experience (what Farthing termed reflective awareness) and that dreaming lacks this capacity.<sup>7</sup> In a similar vein, Freud theorized that dreaming entails a regression to earlier developmental stages and to primary processes characterized by magical thinking, loss of ego control and irrationality.<sup>8</sup> Many of the subsequent and highly influential dream theories that emerged from studies of dreaming in the sleep laboratory incorporated this 'deficiency' view of the dreaming mind without further investigation. Hence few dream researchers, with the notable exception of Sheila Purcell, Alan Moffitt and their colleagues took up the task of testing these claims empirically.<sup>9</sup>

In contrast to theories built upon the presumed dissociation between dreaming and waking, continuity theories of dreaming emphasize the carryover of waking experiences and cognitive skills into dreaming.<sup>10</sup> The best-known version of continuity theory was originally proposed by Calvin Hall.<sup>11</sup> Hall proposed that the content of one's dreams reflects the dreamer's waking-life interests, personality, activities and emotional concerns. A great deal of evidence has accrued in support of this claim.<sup>12</sup>

Continuity theory has also served as a framework for investigating the cognitive skills involved in dream generation.

The basic proposal is that the same structures and processes involved in the construction of waking experience are involved in the construction of dreaming experience.<sup>13</sup>

Variations in cognition across dreaming and waking also occur. For example, consistent similarities and differences in high-order cognition have emerged across the several studies I conducted with Stephen LaBerge wherein we obtained roughly comparable samples of dreaming and waking experiences. Participants were interrupted during their dreaming and waking experiences and asked to write a narrative report of the experience. Participants also completed two questionnaires to assess the incidence of particular phenomenological features of the experience.<sup>14</sup> Across studies, a consistent pattern of results has emerged. Several high-order cognitive skills were reported with comparable frequency for waking and dreaming experiences (e.g., focused attention and internal commentary—commenting to oneself about an ongoing event). Other cognitive skills showed greater variation across dreaming and waking experiences. For example, choice and reflecting on one's own feelings were more often attributed to waking than to dreaming experiences whereas reflecting on the external environment was more often attributed to dreaming than to waking experiences.<sup>15</sup>

In short, the empirical evidence to date does not justify characterizing the phenomenology of dreaming and waking as wholly continuous or discontinuous across states or, for that matter, within states.<sup>16</sup> A more nuanced conceptualization of the relationship between dreaming and waking experience is needed.<sup>17</sup> Under what conditions do we see a strong relationship between one's dreaming and waking experience and cognitive skills; under what conditions are these continuities less likely to be observed? What factors influence



the extent of the overlap between dreaming and waking? The investigative enterprise suggested by these questions is critical to theories of dream function and also to general theories of consciousness and cognition; they go to the heart of how (and why) dreams are generated.

### Dreaming 'Continues' Waking Experiences and Cognitive Skills

Waking-to-dreaming continuity, whether one focuses on similarities in the content of waking and dreaming experience or similarities in the operation of the cognitive or perceptual systems in waking and dreaming, is but one aspect of the reciprocal relationship between waking and dreaming. Continuity theory also has been invoked to account for ways in which dreaming experiences carry over into waking (dreaming-to-waking transfer).

One type of dreaming-to-waking transfer that has been well documented, both through anecdotal reports and in empirical research, concerns insights or solutions to problems in waking that arise in *dreams*.<sup>18</sup> The anecdotal literature is rife with reports of dreams in which one improved an existing skill or gained insight in resolving a scientific problem or artistic challenge.<sup>19</sup> Also, there is the evidence offered by noted dream researcher Rosalind Cartwright, from her work with individuals going through a divorce, in support of the claim that an important function of dreaming is emotional problem-solving.<sup>20</sup>

Another type of dreaming-to-waking 'transfer' occurs when a dream experience provides a lived experience of a 'possible' self or world that has not yet manifested in one's waking life—and wherein this experience results in a shift in one's waking cognition, perception, affect or behaviour.

A simple example are the novel sensations that occur in dreams such as breathing underwater or flying. I recall an early dream experience of breathing underwater, which happened to be in a lucid dream. I found myself under the surface of the ocean. Concerned that I was drowning, I grew fearful. However, when I realized I was dreaming, I relaxed and became curious. I recall wondering what it would be like to breathe underwater. I inhaled the water and found it viscous, glutinous—like inhaling and exhaling jello.<sup>21</sup>

Here, the sensations in dreaming differ dramatically from those of waking and, of course, could never occur in actual waking experience. Assuming that the dream and the associated sensations are recalled, one may consciously appreciate that the range of sensations available to human experience is much greater than previously assumed.

A more complex type of dreaming-to-waking transfer is possible when a dream involves multiple perspectives. For example, consider a dream in which a woman says cruel things to her lover while simultaneously evaluating this behaviour (in the dream). This dream involves dual perspectives: the first person, participant perspective of the person in the experience who is interacting with the lover, and the third-person, observer perspective of the one who is evaluating the participant's experience. Because the observer has stepped away from the dream drama (so to speak), the observer's perspective is potentially broader than that of the participant (who is caught up in experience). The observer may, for instance, evaluate whether the participant's comments to the lover are achieving the desired effect (e.g., allowing the participant to feel better about herself even while she is causing the lover to suffer). From this more dispassionate perspective, the observer may direct the participant to alter her behaviour; for

example, towards more compassionate words and gestures. If the participant does change her comments to the lover from cruel to kind, she may gain insight into her capacity to alter how she behaves in difficult situations. Again, assuming the dream experience is remembered upon awakening, this lived experience of a shift in one's perspective has the potential to transform one's waking self understanding.

### Ernest Rossi on the Importance of Multiple Levels of Awareness in Dreaming

Ernest Rossi, in his theory of dreaming and psychological growth, emphasizes the transformative potential of this type of dreaming-to-waking transfer when he declares: 'Dreaming provides us with an opportunity to facilitate the evolution of our consciousness and the creative change and transformation of our behaviour and personality' (emphasis added).<sup>23</sup>

Dreaming is, according to Rossi, 'an endogenous process of psychological growth, change, and transformation'<sup>24</sup> (emphasis added). Of course, Rossi is not the only theorist to argue that dreams can transform one's waking self-understanding and behaviour. Dream scholar Madhu Tandan notes that dreams '[permit] access to realms beyond the sensible world.'<sup>25</sup> Tandan, as well as Kelly Bulkeley and Don Kuiken and his colleagues describe dreams that have transformed how an individual (or group) may shift their perspective of how the world is 'constructed'.<sup>26</sup> As Buddhist scholar Serinity Young notes: 'Dreams can reveal to an individual insights so powerful that the concerns or realities of waking life are lost in the blinding light of this new awareness. Such a dream shapes their reality, shapes their understanding of the waking world.'<sup>27</sup>

What is unique to Rossi's approach is his assertion that dreaming can facilitate psychological growth only if one

develops multiple levels of awareness in the dream: 'Self-reflection, an examination of one's thoughts, feelings or behaviour, mediates the phenomenological shift from a state of being, represented by a self-image in the dream, to an expansion of awareness.'<sup>28</sup>

Or, as Rossi states in one of his core hypotheses: 'Self-reflection facilitates a change in self-perception' [Hypothesis 4].<sup>29</sup> Rossi's emphasis on high-order cognitive processes in dreaming as critical to personal transformation/psychological development is radical for several reasons.<sup>30</sup> First, the dreaming process itself is seen as having transformative potential. Contrary to the theories of Freud and Jung, for example, the application of a system of dream interpretation to the dream content is not the critical element in personality or behavioural change. Second, Rossi's emphasis on the capacity for multiple levels of awareness during dreaming contrasts with the view asserted by many other dream theorists that dreaming is inherently non-reflective and lacking in volition.<sup>31</sup> In Rossi's terms, multiple levels of awareness permit the development of new points of view or new frames of reference,<sup>32</sup> a necessary step in effecting psychological change: 'A person who is firmly fixed in one state of being, a person who exists in one dimension of awareness, cannot even see or think about himself.'<sup>33</sup>

'One needs to seek out and experience different levels or dimensions of awareness within one's phenomenal world. When one is caught in the emotional turmoil of conflict one might learn to experience one's identity at another level of awareness and thus resolve the turmoil at the lower level'<sup>34</sup> ['One must learn to use a vantage point on one plane of awareness to resolve problems on another.' op. cit.]

Rossi then discusses the conditions necessary for psychosynthesis, defined as 'the integration of two or more states of being or awareness to create a new aspect of identity': '(T)he breaking out of the limitations of an old frame of reference ... results in the generation of conflict with the older views and norms that made up the individual's identity. To resolve these conflicts, the individual must now consciously engage himself in the psychosynthesis of broader patterns of meaningfulness and identity' (emphasis added).<sup>35</sup>

According to Rossi, 'The dreamer must have some form of awareness within the dream of the significance of the synthesis of the different self-images, otherwise the union between them is strictly a function of the autonomous process, it is not under the dreamer's control'<sup>36</sup> (emphasis added).

Personality transformation occurs in the dream, not solely or primarily as a result of waking reflection upon the dream as would occur in psychotherapy or dream analysis: 'The dreamer must actively participate within the dream to integrate the new.'<sup>37</sup>

Thus, although waking analysis or reflection upon the dream may help promote the full integration of one's prior and new frames of reference, such post-dream analysis is not a prerequisite for this psychosynthesis.

As evidence of this transformative potential of dreaming and the necessity of multiple levels of awareness in dreaming for this transformation, Rossi describes a series of dreams reported by one of his clients (Davina): 'One of Davina's earliest dreams (Dream 6) ended with a stark white figure that looked like her melting into her, but there was no awareness within the dream of the significance of this union or any effort on her part to bring it about. She does not report any changes in herself as a result of this dream. In a later dream

(Dream 10), however, she was very much aware that her domestic and passionate sides were "both in need of each other's talents" and she made an active effort to synthesize them ("we hugged, embraced, shook hands").'<sup>38</sup>

What conditions promote psychosynthesis in the dream? We now face several important questions related to the transformative potential of dreaming. First, under what conditions is psychosynthesis most likely to occur within a dream? Must one have already well-developed waking skills in reflective awareness, self-monitoring or self-regulation? Must one set a waking intention related to cognitive-behavioural change that he or she carries into the dream experience? Must one be willing to change their cognition and behaviour (e.g., when one's old frames of reference aren't 'working'). And, perhaps, most important, does it matter whether the psychosynthesis occurs during the dream or during waking?

With respect to the general capacity for higher-order cognition in dreaming, it is notable that (even) ordinary dreaming may be characterized by the same range and similar incidence of high-order cognition<sup>39</sup> including when compared with comparably sampled waking experience.<sup>40</sup> Other studies have shown that these high-order cognitive skills can be further developed via waking intention, attention, practice and increased motivation to work with dreams.<sup>41</sup>

Individual and cultural differences are likely to emerge as among the strongest influences on the degree of overlap in the features of 'typical' dreaming and waking experience.<sup>42</sup> There are cultural variations in how closely related dreaming and waking experiences are and in how consequential dreaming is assumed to be for waking experience. Many indigenous cultures see dreaming as pointing towards the future—certain

people (e.g., shamans) are invested with the responsibility, practices and authority to translate the dream into prescriptions for future behaviour.<sup>43</sup>

With respect to individual difference factors likely to contribute to variations in the strength of the relationship between dreaming and waking experience, dream scholars would do well to consider:

- individuals' interest in dreaming and motivation to recall or to explore their dreams; the greater the interest, the higher the dream recall frequency, the more complete the dream reports and assessments, and the greater the likelihood of completing the research.<sup>44</sup>
- whether individuals have cultivated the skills of focused attention, especially in monitoring their subjective experience and in noticing the phenomenal qualities thereof; how *motivated/interested* they are in their subjective experience.<sup>45</sup> Purcell et al., for example, found that those who experienced lucid dreams during the study reported greater carry-over of dreaming to waking.<sup>46</sup>
- whether the investigation concerns ordinary dreaming or the more unusual forms of dreaming, variously described as 'intensified'<sup>47</sup> (e.g., nightmares, lucid dreams), 'impactful' dreams<sup>48</sup> (e.g., existential dreams), or 'archetypal ("big")' dreams.<sup>49</sup>
- whether the dreamer is reporting dreams in the context of a psychotherapeutic process that includes/values dream interpretation as an aspect of cognitive-behaviour change.<sup>50</sup>

The influence of these (and other) individual difference factors argues for studying dreaming in the context of the

dreamer's waking life, including his or her experience (and interest in) dreaming, dream recall, dream analysis and, of course, in relation to the individual's waking experience.

### Extending Rossi's Model of Dreaming and Psychosynthesis

Why might it matter whether the insight (shift in frame of reference) occurs in dreaming or in waking? Several studies show that we often do not question unusual events in our dreams and that our reality-testing skills are not fully engaged during dreaming.<sup>51</sup> This greater willingness to accept the unusual could allow one to become fully immersed in, explore and experience novel selves or worlds beyond what is available during waking.<sup>52</sup> On the other hand, the transformative potential of dreaming may be more profound in lucid dreaming, where one is aware that the experience is occurring within a dream.<sup>53</sup> In a lucid dream, one may 'test' the hypotheses about what is possible and thereby experience greater potentialities for the self and the world while also gaining insight into the constructed nature of the self and the world.<sup>54</sup>

What of the evidence? As we well know, interest in dreaming has inspired widely contrasting, even contradictory theories of dream construction, function and meaning. For those of us working within the scientific paradigm, theorizing is only part of the investigative enterprise; the other critical activity is the empirical testing of hypotheses derived from theory.<sup>55</sup> Thus, we are now compelled to take up the question of what would constitute valid evidence for Rossi's (or other theorists') claims concerning dream process or function.

Like many dream theorists working within a clinical framework, Rossi uses a series of dream reports from one of

his clients (Davina) as evidence for his model of psychological transformation. For a scientifically oriented epistemology, however, case studies alone are not sufficient as evidence of hypothesized psychological change processes. What additional data sources are required to confirm the validity of Rossi's claims regarding the transformative potential of multiple levels of awareness in dreaming? We already have taken note of research showing that ordinary dreaming includes high-order cognition, including reflective awareness, and that these skills may be further developed through the application of waking intention and attention to dreaming. However, it is much more difficult to obtain empirical evidence of the time-course of these insight and integrative processes to establish that psychosynthesis (the integration of new with old frames of reference) occurs during dreaming. Identifying the factors critical to cognitive-behavioural change is difficult under the best of conditions; tracking these change processes in dreaming is even more daunting given the methodological challenges inherent in the study of dreaming, not the least of which include: a) disagreements among investigators in how to define 'dreaming';<sup>56</sup> b) the lack of control over the stimulus to dreaming;<sup>57</sup> c) the fact that our primary data source (the dream report) is an indirect, incomplete and typically a solely linguistic representation of a multi-modal experience itself;<sup>58</sup> d) the considerable disagreement on which level(s) of analysis to emphasize (or privilege): phenomenological, behavioural, neurophysiological.<sup>59</sup>

### Potential Contributions from Cognitive Neuroscience

Recent work in cognitive neuroscience suggests that it may be possible to track psychological/behavioural change processes

via obtaining converging measures of phenomenology, behaviour and neurophysiology. A converging measures approach requires that we make at least two a priori assumptions. First, it must be possible to sample and describe subjective experience in valid and reliable ways.<sup>60</sup> Second, we must assume that 'there is a physical counterpart to every subjective or psychological event'.<sup>61</sup> With respect to the latter assumption, we are not required to reduce the subjective experience of dreaming, for example, to neurophysiology, as some would have us.<sup>62</sup> As noted by Cacioppo and Tassinari, it is instead that 'physiological responses are of interest to the extent that they may provide an index of a psychological process or state'.<sup>63</sup>

Much of the research in cognitive neuroscience utilizes a converging measures approach. An individual's verbal report of subjective experience under particular stimulus conditions (e.g., seeing, remembering, imagining, performing a task) is correlated with the changes in brain activation associated with the tasks, as revealed through brain imaging techniques such as functional magnetic resonance imaging (fMRI), evoked-potential mapping, or the more recently developed transcranial magnetic stimulation (TMS) technique.<sup>64</sup>

This converging-measures approach permits investigators to map, in close to real time, the relationship between dynamic neurophysiological processes, behavioural responses and, where human participants are involved, verbal reports. Recent studies using this converging measures approach have demonstrated the dramatic degree to which cortical structures and processes can be altered through experience ('experience-dependent plasticity').<sup>65</sup> In other words, learning can alter the response properties of individual neurons in the primary visual cortex,<sup>66</sup> hippocampus,<sup>67</sup> or inferotemporal (IT) cortex.<sup>68</sup> Learning also alters the response properties of groups of neurons in areas

such as the fusiform face area (FFA) of the IT cortex<sup>69</sup> and the motor cortex.<sup>70</sup>

Zipser et al., for example, used single-cell recording of individual neurons in V1 (primary visual cortex) of macaque monkeys to demonstrate that individual neurons responded to a line in an array only when that line was perceived as part of a figure.<sup>71</sup> This differential response when the line was part of a figure (i.e., was meaningful) versus when the line was not part of a figure (i.e., not meaningful) occurred even when features that defined the figure (edges/boundaries) occurred outside that cell's receptive field. This is termed 'contextual modulation'—when stimulation outside of a neuron's receptive field (which normally causes no response) affects the firing that occurs when stimulation is presented within the neuron's receptive field'.<sup>72</sup> Contextual modulation occurs via feedback from higher areas of the visual cortex; that is, through top-down processes.<sup>73</sup> Thus, 'perception is created by the nervous system both by "feed forward" processing that sends signals from lower areas like V1 towards higher areas and also by feedback that sends signals from higher-level areas to earlier areas in the visual system'.<sup>74</sup> Studies of experience-dependent plasticity and contextual modulation are important to our discussion of the transformative potentialities of dreaming because they demonstrate the importance of top-down processes (context, expectation, meaningfulness, prior experience) in shaping neurophysiological responses.<sup>75</sup> Especially provocative for theories of dreaming are studies showing that imagination and disciplined thought (e.g., meditative practice) alone can alter brain processes and structures in a manner analogous to waking experience.<sup>76</sup>

### Looking to the Future

What the converging measures approach as practiced in cognitive neuroscience offers to the study of dreaming is the possibility of tracking, for example, the shift from singular to multiple levels of awareness and perhaps even to insight/integration of new and old frames of reference. Imaging techniques used in the study of waking cognition and emotion are sufficiently refined to demonstrate that awareness modifies the skill-learning benefits of sleep,<sup>77</sup> that expectancy (of emotional versus neutral stimuli) impacts the deployment of attention,<sup>78</sup> and that re-experiencing (episodic memory) and pre-experiencing (episodic future thinking) an event rely on similar neural mechanisms.<sup>79</sup>

With the advent of quality, cost-effective portable polysomnography (PSG) systems, it is now possible for investigators to acquire sleep data for sleep staging or spectral analysis without compromising the participant's sleeping patterns or comfort over-much. Recent research on lucid dreaming reinforces the likelihood of identifying a reliable marker of self-reflective awareness of state (lucidity).<sup>80</sup> Notwithstanding the fact that highly skilled lucid dreamers may themselves be more focused on personal or spiritual transformation than the 'typical' dreamer, researchers could more confidently map the psychophysiological and phenomenological changes associated with the development of multiple levels of awareness and insight.<sup>81</sup>

For example, how important is the setting of a waking intention to the process of transformation that Rossi describes? Intention and attention and a great deal of practice seem to be critical features in studies demonstrating experience-dependent plasticity.<sup>82</sup> Yet, many have reported single, impactful dream

experiences that shifted their self-understanding/self-in-world understanding sufficiently that they bring that insight into waking.<sup>83</sup>

### Conclusion

Research in cognitive neuroscience is now revealing that plasticity is an intrinsic property of the human nervous system,<sup>84</sup> and that even our thoughts and imagination, when well-practised, shape and re-shape the characteristics of our brains and neural functioning.<sup>85</sup> The next leap is towards empirical support of the claim that dreaming experience offers similar opportunities to transform current patterns of neural and behavioural responses towards more adaptive current and future functioning. Gautama Buddha is said to have declared: 'With our thoughts, we create the world.' To this we would now add: 'With our dreams, we create the world.'

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### Possible Worlds, Possible Selves: Dreaming and the Liberation of Consciousness

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