The Impossibility of Isolation:
Cognitive Neuroscience and Depth Psychology Perspectives on Consciousness and Dreaming

by
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I certify that I have read this paper and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a product for the degree of Master of Arts in Counseling Psychology.

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Abstract

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Utilizing hermeneutic and heuristic methodology, this thesis analyzes contrasting theories of consciousness, sense of self, and dreaming from cognitive neuroscience and depth psychology. Specifically, this thesis focuses on the theory of modular consciousness from cognitive neuroscience and the concept of self-states from relational psychoanalytic theory. The analysis of overlap between these theories explores possible neurological mechanisms for multiplicity of consciousness as described in depth psychology. The author's personal experience of a lucid dream is explored as communication between self-states and is put forward as evidence in support of the multiplicity of consciousness.

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Thank you to my mom and my mother-in-law, who together made it possible for me to receive this degree and write this thesis. Mom, thank you for your strength and your profound empathy. I did not really understand everything you had done for me until giving birth to Rowan, but now I am slowly catching on. Thank you for giving me life. Thank you also for the 2 years of monthly visits when you took care of Rowan solo while I was in school. I wonder if he will remember the Cajun Kitchen and the Santa Barbara Zoo and all the shopping trips? Even if he doesn't remember explicitly, your consistent and loving care will always be in the fabric of who he is. Alison, thank you for raising the most wonderful partner, father, and human being I can imagine. Thank you for your adventurous, playful, and caring nature, and for moving to Jackson to take care of Rowan when I started my practicum! Through many of the hours that I worked on this thesis, you played on the floor with Rowan, took him on the bus to the library, and explored outside. Shane and I are so lucky to have two such lovely people for mothers, and to have you be such a big part of Rowan's life. Thank you to Rowan's two nanas, I could not have done this without you both!

Dedication

To Shane and Rowan, my two favorite people. I love you both and I am so proud of our family. Shane, you are my best friend and my comrade in facing the abyss: this whole experience of being conscious can be anything from existentially terrifying to awe-inspiringly beautiful and I am so lucky to have you as a partner through it all. I never feel alone with you.

Rowan, I am so lucky to be your mother. You are my greatest accomplishment and I love learning who you are as I see you grow! You are currently a wonderful, hilariously funny, sweet, and curious toddler. I am excited for the possibility that some day you may want to read this thesis and debate it with me! Or maybe you won't, that is okay too! Even if I am not physically present, I am always a part of you: a reassurance that you are deeply loved, that you deserve kindness and happiness, and that others are fortunate to be with you! I hope I am still singing you this song when you are much older:

You're the cutest baby that I ever did see—

You're the cutest baby in history!

Your name is baby Rowan and I'd like to say:

I love you more and more every single day!

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Chapter I
Introduction

Area of Interest

Before deciding to study psychology, I had a lucid dream that disrupted my sense of reality. In this dream—or nightmare, rather—a recently deceased friend told me that I was dreaming. She implored me to notice how real everything seemed, just as real as when I was awake. This hyperreality, she explained, was because there was nothing in existence outside of me: I was creating everything. When I woke, I would be waking into another reality that I created. There was no other consciousness aside from mine.

This dream sparked my interest in the nature of consciousness and dreaming. Although initial insights about my dream were produced from my academic training in depth psychology (and, more specifically, through Jungian dream analysis), my prior training is in biology. Coming from a scientific background, the esoteric and mystical language used in depth psychology to discuss the nature of consciousness was initially off-putting. The language of depth psychology lacked the comforting concreteness that science offers. I found it difficult to reconcile the two different approaches for making sense of the human mind—both approaches felt valid, yet neither felt complete. Thus, I am interested in synthesizing cognitive neuroscience and depth psychology theories of consciousness and exploring each of these approaches to better understand dreaming.

Guiding Purpose

There is a dearth of communication between depth psychology and cognitive neuroscience, two rich approaches to understanding the human mind. Emerging cognitive

neuroscience theories of the sense of self are similar to depth psychology models of the self as composed of many autonomous entities or self-states. A primary goal of this thesis is to highlight these similarities and thus stimulate interest in further discussion between both disciplines. While depth psychology views dreaming as evidence of the multiplicity of self, dreaming remains poorly understood within the field of cognitive neuroscience. Thus, this thesis also endeavors to place cognitive neuroscience and depth psychology in communication to encourage cognitive neuroscientists to revisit dreams from a new perspective. Finally, this thesis is intended to provoke introspective analysis in the reader. I hope that people who read this thesis are prompted to entertain new ideas, to question their assumptions about consciousness, and to revisit their own dreams with curiosity.

Rationale

There are branches of therapy that are medicalized and focused tightly on measurable symptoms and manualized approaches to symptom remission. In these branches, there may be no room for understanding dreams as important material produced by the client. Given the emphasis on science-based practice in these types of therapy, it seems important to consider the implications of emerging cognitive neuroscience studies that conceptualize consciousness similarly to the way that the self has been understood in depth psychology. Perhaps dreamwork can be integrated more widely into therapeutic practice when it is couched in cognitive neuroscience terms. Contextualizing dreamwork in cognitive neuroscience theory will enable its integration across different modalities of therapeutic practice, thereby broadening the reach of depth psychology practices that I have found so personally healing and transformative.

Methodology

Statement of research problem and question. There is little research that explores the synthesis of depth psychology and cognitive neuroscience to produce a more thorough understanding of dreams and their relationship to the phenomenon of consciousness. How can depth psychology and cognitive neuroscience approaches to the nature of consciousness be synthesized in a way that contributes to a more comprehensive understanding of dreaming?

Research Methodology. Hermeneutic and heuristic methodologies are used in this thesis. Hermeneutic methodology "places concepts in dialogue with one another to look for deeper meaning" (Pacifica Graduate Institute [PGI], 2017, p. 53). By facilitating communication between cognitive neuroscience and depth psychology, this thesis endeavors to find insight into the nature of consciousness and the significance of dreaming. However, consciousness and dreaming are inherently personal. Heuristic methodology "encourages relationship and connectedness rather than detachment" to a research subject by including the researcher's own experience (PGI, 2017, p. 53). As both consciousness and dreaming can only be experienced within the mind, research on these subjects lends itself to introspective analysis. Thus, combining heuristic and hermeneutic methodologies produces the most well-rounded exploration.

Ethical Considerations

In this thesis, I collect data from publicly available scholarly sources as well as from my own personal experience. No other living participants are used. The dream central to my exploration involves a person from my life who is now deceased; she has been anonymized out of respect for her inability to consent to the inclusion of her identity. Because this material is psychologically activating for me, I have guarded my

own wellbeing during the research process. I have been attuned to my own emotions while writing and researching, and I have sought out personal therapy to both deepen and monitor this process. Finally, because this thesis deals with existential issues like questioning the nature of reality, reading this material could be triggering for some readers.

Overview of Thesis

This thesis consists of four parts. In Chapter II, literature from the fields of cognitive neuroscience and depth psychology is introduced. This literature review focuses on the modular consciousness theory as articulated by cognitive neuroscientist Michael Gazzaniga (2018; 2019) and the theory of self-states from relational psychoanalysts Philip Bromberg (1996; 1998; 2006; 2011) and Donnel Stern (2011), though additional theorists enrich the enquiry. Literature from cognitive neuroscience and depth psychology on the phenomenon of dreaming is also explored. Chapter II lays out the raw data for the inquiry to come. Chapter III presents an analysis of this researcher's dream about solipsism and synthesizes this personal experience with cognitive neuroscience and depth psychology models of consciousness as reviewed in Chapter II. This thesis makes an argument for the relevance and profundity of dreamwork from both a medicalized perspective and a depth-oriented view. Chapter IV summarizes the findings of this thesis and explores new questions and research directions that this investigation suggests.

Chapter II
Literature Review

Of the many men whom I am, whom we are,
I cannot find a single one.

P. Neruda, 1967, as cited in Vogel, 1987, p. 97

This literature review seeks to answer two questions: What is the nature of consciousness? What is the nature of dreaming? There is much debate on these topics, but one thing most researchers agree about: No one knows what is really going on. Thus, this literature review narrows in on a more manageable question: What has been written by cognitive neuroscientists and depth psychologists about consciousness and about dreaming?

Cognitive Neuroscience and the Sense of Self

In the textbook *Cognitive Neuroscience: The Biology of the Mind*, cognitive neuroscience is defined as the study of "how the functions of the physical brain can yield the thoughts and ideas of an intangible mind" (Gazzaniga, Ivry, & Mangun, 2019, p. 4). Over the course of several hundred years, many scientists (and an even greater number of human and animal subjects) worked to bring forward a large body of evidence describing the structure and function of the nervous system. Scientists have elucidated how the nervous system works at a cellular level, they have described the complex anatomy of the nervous system, and they have discovered that different parts of the brain are involved in different mental functions (Gazzaniga et al., 2019).

Physical damage to brain structures leads to specific neurological deficits (Gazzaniga, 2018). For example, physicians Aninda Archarya and Michael Wroten

(2019) described how a stroke affecting Broca's area leads to expressive aphasia. Affected individuals understand the speech of others and know what they want to say, but they have an impaired ability to translate their mental images into words. The frustrating experience of a word being at the tip of your tongue is the experience for every word a person with Broca's aphasia wishes to say. Thus, it is apparent that Broca's area in the frontal lobe of the dominant hemisphere is involved in connecting mental representations to their linguistic counterparts (Archarya & Wroten, 2019). In a similar manner, damage to every different brain region has been studied and has led to an understanding of which regions control which functions (Gazzaniga, 2018). Consciousness, however, is often preserved even with widespread brain damage. An individual may have an altered personality, any of a variety of deficits in function, and yet still be alert and aware of his or her own existence. Thus, according to the father of modern cognitive neuroscience, Michael Gazzaniga (2018), despite thousands of years spent trying to track down a specific seat of consciousness in the brain, it appears that there may be no such thing.

One problem in attempting to find a specific seat of consciousness in the brain is the issue of the slippery term "consciousness" itself, which has a variety of different definitions (Gazzaniga, 2018). One definition (that is rather irreverent for a dictionary) is as follows:

> Consciousness. The having of perceptions, thoughts, and feelings; awareness. The term is impossible to define except in terms that are unintelligible without a grasp of what consciousness means. Many fall into the trap of equating consciousness with self-consciousness—to be conscious it is only necessary to be aware of the external world. Consciousness is a fascinating but elusive phenomenon: it is impossible to specify what it is, what it does, or why it evolved. Nothing worth reading has been written on it. ("Consciousness," 1998, p. 95)

Neuroscientists Antonio Damasio and Kaspar Meyer (2008) distinguished between "core consciousness" (awareness or present-moment experience) and "extended consciousness"

(a sense of self that extends from past to future), arguing that the entirety of consciousness is composed of layers that build upon each other. Similarly, cognitive psychologist Steven Pinker (1997) proposed separating the concept of consciousness into three domains: self-knowledge, access to information, and sentience. Pinker defined self-knowledge as information an organism knows about itself, access to information as the ability to have a mental experience without the need for awareness of individual neurons, and sentience as subjective experience (*qualia* in the parlance of neuroscientists) (pp. 134–135).

Anatomically, the phenomenon of consciousness (with all of its components), primarily depends on the brainstem, thalamus, and cerebral cortex. Gazzaniga et al. (2019) summarize the anatomical correlates of consciousness as follows:

> Core consciousness depends on the functions of the brainstem and thalamus. It occurs when an organism is alive, awake, alert, and solely aware of the current moment and place. It is the foundation for increasingly complex levels of consciousness. Extended consciousness depends on the cerebral cortex to provide an organism with an elaborate sense of self, to gradually build up from memories and expected future experiences, and to place the self in individual historic time. (p. 608)

The specific definition or component of consciousness that this thesis explores further is extended consciousness: the sense of self, self-knowledge, or identity. Damasio and Meyer (2008) elaborated on the distinction between the self of core consciousness and the self of extended consciousness:

> The sense of self which emerges in core consciousness is the "core self", a transient form of knowledge, recreated for each and every object with which the organism interacts. The traditional notion of self, however, is associated with the idea of identity and personhood, and corresponds to a more complex variety of consciousness we call extended consciousness. The self that emerges in extended consciousness is a relatively stable collection of the unique facts that characterize a person, the 'autobiographical self'. The autobiographical self depends on memories of past situations. Those memories were acquired because core consciousness allowed the experience of the respective situations, in the first place. (p. 6)

There is no one location in the cerebral cortex that produces extended consciousness or an autobiographical self. Indeed, damage to a region of the cerebral cortex can cause loss of a specific ability, but not a loss of consciousness itself (Gazzaniga et al., 2019). There is no known condition where core consciousness continues to function but extended consciousness is entirely absent: In both transient global amnesia and advanced Alzheimer's disease extended consciousness is significantly impaired, but some level of self-recognition remains (Damasio & Meyer, 2008).

Gazzaniga et al. (2019) emphasized that "the vast majority of mental processes that control and contribute to our conscious experience happen outside of our conscious awareness. . . . we are conscious only of the content of our mental life, not what generates that content" (p. 610). In a striking example of complex unconscious processing, individuals with damage to their visual cortex can experience blindsight. They have no direct conscious access to visual information in the affected part of their visual field—they do not experience sight in this region. Yet they are able to respond accurately to stimuli in the blind part of their visual field, despite feeling that this task is impossible (Gazzaniga et al., 2019). Their sense of self and their present-moment experience involve blindness, yet they have access to information without the experience of this information. In one case study from neuroscience researchers Beatrice de Gelder et al. (2008), a patient who had brain damage to both visual cortices could not experience sight at all. Despite being unable to consciously access any visual information, the patient was asked by researchers to walk down a long hallway without a cane. Unbeknownst to the patient, the hallway was littered with barriers placed by the researchers. The patient was able to skillfully navigate around all the barriers but had no conscious awareness of why he was moving in such a complex manner (de Gelder et al., 2008).

Similarly, Gazzaniga et al. (2019) described indicators of "subconscious processing" in patients with hemispatial neglect (a condition involving damage to one hemisphere at regions involved in awareness of one side of the visual field):

> In one study of right-sided neglect patients, a picture of a fruit or an animal was quickly presented to the right visual field. Subsequently, a picture of the same item or of an item in the same category was presented to the left visual field. In another condition, the pictures presented in each field had nothing to do with each other. All patients in the study denied that a stimulus had been presented in the left visual field. When the two pictures were related, however, patients responded faster than they did when the pictures were different. The reaction time to the unrelated pictures did not increase. In short, high-level information was being exchanged between processing systems, outside the realm of conscious awareness. (p. 612)

The lessons neuroscientists glean from these kinds of examples are that many perceptual and cognitive processes occur outside of conscious awareness and that these subconscious processes happen at the level of the cerebral cortex. Pinker (1997) characterized this fluctuating access to information as the "spotlight of attention" (p. 139). Humans can move information into and out of awareness by turning attention to it or away from it, guided by emotional salience of the incoming information. Pinker conceptualized that the sense of self or "I" is able to direct information as it comes into awareness.

An everyday example of the movement between conscious and unconscious processing is learning to ride a bike. At first, acquiring this new skill takes intense conscious awareness of the motor activity involved. Once a memory of how to ride a bike is established, however, the body motion involved becomes largely unconscious—it feels automatic (Gazzaniga et al., 2019). However, even when processing is occurring at a largely unconscious level, people still feel a sense of ownership over the processing: Despite consciousness not being involved, people would certainly say "*I* was riding that bike." Neuroscientist and philosopher Benjamin Libet (1996) developed the backward

referral hypothesis as an explanation for this phenomenon after decades of research. His experiments indicated that conscious awareness of a neural event is delayed by about 500 milliseconds after the onset of the event and that people are unaware of this time gap. Studies using functional magnetic resonance imaging have shown that a decision is encoded in brain activity up to 10 seconds before it enters conscious awareness (Soon, Brass, Heinze, & Haynes, 2008). Thus, complex decision-making, perception, and processing occur without apparent conscious awareness and then are retroactively assigned a sense of personal agency. Libet (1996) argued that this delay allows for error detection and correction. Studies by neuroscientists William Gehring and Robert Knight (2000) indicated that the lateral prefrontal cortex is necessary for this conscious error detection and correction process.

Humans generally describe their experience of consciousness as being comprised of a single, cohesive self. Yet, cognitive neuroscience has demonstrated that brain processing is actually modular and largely unconscious. Gazzaniga et al. (2019) summarized this paradox as follows:

> The brain's modular organization has now been well established. The functioning modules do have some kind of physical instantiation, but brain scientists cannot yet specify the exact nature of the neural networks. It is clear that these networks operate mainly outside the realm of awareness, each providing specialized bits of information. Yet, even with the insight that many of our cognitive capacities appear to be automatic domain-specific operations, we feel that we are in control. Despite knowing that these modular systems are beyond our control and fully capable of producing behaviors, mood changes, and cognitive activity, we think we are a unified conscious agent—an "I" with a past, a present, and a future. With all of this apparent independent activity running in parallel, what allows for the sense of conscious unity we possess? (p. 620)

The answer to this question appears to be a brain system located in the left hemisphere called the interpreter, which itself functions outside conscious awareness. The interpreter module produces a continuous narrative to explain experiences bubbling up to the level

of consciousness and to produce a cohesive sense of self. It produces a consistent story using the information at its disposal (Gazzaniga, 2018).

However, this narration process can lead to surprising explanations if the interpreter is missing key pieces of information (Gazzaniga et al., 2019). For example, Gazzaniga et al. (2019) described Capgras' syndrome, in which there is a disrupted connection between the visual stimuli of familiar people and the emotional arousal such people generally cause. Due to brain damage, a person with Capgras' syndrome looking at a loved one can see him or her but experiences no rush of love (Gazzaniga et al., 2019). The interpreter module's best explanation for this phenomenon is that something must be off with this person: A doppelganger has replaced them, or perhaps an alien—this person must be an imposter and cannot be their true loved one (Gazzaniga et al., 2019). Gazzaniga and Miller (2008) summarized the functioning of the interpreter module as "the glue that keeps our story unified and creates our sense of being into a coherent, rational agent" (p. 266).

Another facet of the modern neuroscientific understanding of consciousness is that the subjective quality of the consciousnesses produced by the two hemispheres of the brain are strikingly different from one another (Gazzaniga, 2018; Taylor, 2008). The two hemispheres of the cerebral cortex are connected by the corpus callosum and use this structure to relay information between one another (Gazzaniga et al., 2019). In certain types of brain injury, and in a surgical procedure where the corpus callosum is severed, the two hemispheres can become disconnected. Individuals with disconnected hemispheres are referred to in scientific literature as "split-brain patients" (Gazzaniga, 2018). Gazzaniga et al. (2019) described the different experience of consciousness in each disconnected hemisphere as follows:

> The right cannot make inferences, so it has limited awareness. It deals mainly with raw experience in an unembellished way. The left hemisphere, though, is constantly—almost reflexively—labeling experiences, making inferences as to cause, and carrying out a host of other cognitive activities. The left hemisphere is busy differentiating the world, whereas the right is simply monitoring it. (p. 621)

Likewise, Jill Bolte Taylor (2008), a neuroanatomist who suffered a left hemispheric stroke, described her conscious experience of right hemisphere activity in her TED Talk *My Stroke of Insight*:

> And I look down at my arm and I realize that I can no longer define the boundaries of my body. I can't define where I begin and where I end. Because the atoms and the molecules of my arm blended with the atoms and molecules of the wall. And all I could detect was this energy. Energy. And I'm asking myself, "What is wrong with me, what is going on?" And in that moment, my brain chatter, my left hemisphere brain chatter went totally silent. Just like someone took a remote control and pushed the mute button and—total silence. And at first I was shocked to find myself inside of a silent mind. But then I was immediately captivated by the magnificence of energy around me. And because I could no longer identify the boundaries of my body, I felt enormous and expansive. I felt at one with all the energy that was, and it was beautiful there. (paras. 17–18)

In general, the left hemisphere is specialized for written and spoken language and the right hemisphere has only a minor ability to communicate in words when the two hemispheres lose connection, as in split-brain patients (Gazzaniga & Miller, 2008). As noted by Gazzaniga and Miller (2008), however, "the right hemisphere does have a limited capacity for reading and is able to read whole words (ideographic lexical/semantic access)" (p. 264). Overall, the two hemispheres have "redundant knowledge structures"—for example, each hemisphere can encode and retrieve memories—but there are distinctive ways that each hemisphere is specialized (Gazzaniga & Miller, 2008, p. 265). The right hemisphere lacks the language abilities of the left hemisphere, and thus split-brain patients are not able to verbally relay information presented only to the right hemisphere. However, "the right hemisphere's visual representations are much sharper and its perceptions of space are much keener than the

left hemisphere's" (Gazzaniga & Miller, 2008, p. 268). For this reason, split-brain patients are able to relay information presented only to their right hemispheres through visual representations like drawings (Gazzaniga, 2018).

As the right hemisphere of split-brain patients is unable to communicate verbally, what this half of the brain actually experiences when completely separated from the left hemisphere remains unknown. Gazzaniga and Miller (2008) speculated that the right hemisphere is relatively "impoverished":

> With a muted and severely limited language ability, does the right hemisphere have the same unified conscious experience as the left hemisphere? We speculate that it does not have it to the same extent as the left hemisphere since the interpreter appears to be specialized to the left. However, recent work has suggested that the right hemisphere has some limited interpretative ability as well. Paul Corballis has postulated the existence of a "right hemisphere interpreter" that is more "visually intelligent" than the left and is dedicated to constructing a representation of the visual world. (p. 268)

Notably, research on individuals who have experienced a severance of the corpus callosum indicates that after losing connection to one another, the two hemispheres do not have any sense that something is missing (Gazzaniga, 2018; Gazzaniga & Miller, 2008). Likewise, in many other types of cortical brain injury, the person suffering from the deficit has no sense that anything is wrong (Taylor, 2008; Gazzaniga et al., 2019). Neuroscientists Michael Gazzaniga and Michael Miller (2008) argued that the inability to detect a deficit once a particular cortical brain region is obliterated indicates that extended consciousness functions in a modular manner:

> If a particular module is impaired or loses its inputs, it alerts the whole system that something is wrong. For example, if the optic nerve is severed, the patient will notice immediately that they are blinded. But if the module itself is removed, as in the case of cortical blindness, then no warning signal is sent and the specific information processed by that specialized system is no longer acknowledged (out of sight, out of mind—so to speak). This creates the peculiar phenomenon that has been observed in a variety of neurological patients that deny that anything is wrong with them despite the clearly observable effects of the brain injury. (p. 262)

The loss of a cortical module causes a complete inability to conceptualize what it was like to have the module in the first place. In the example of hemispatial neglect, a condition resulting from damage to the temporoparietal junction and posterior parietal cortex, people lose awareness of one side of visual space. On themselves and on others, they cannot process information about half of the body. Thus, they cannot learn about their condition by observing it in other people. Gazzaniga and Miller (2008) quoted a patient's experience:

> For example, one patient explained that, "I knew the word 'neglect' was a sort of medical term for whatever was wrong but the word bothered me because you can only neglect something that is actually there, don't you? If it's not there, how can you neglect it?" (p. 263)

The patient felt bothered by the term *neglect* because from her perspective there was nothing she was ignoring. For outside observers, she was obviously unable to recognize anything in one half of her visual field, but for her, there was no other half. Individuals who have lost a cortical module also lose the ability to remember what the experience of having that module was like:

> For example, a neglect patient may draw a picture of their home, but the picture they draw will only include the right side of their house. How can their denial of the left side be reconciled with their memory of the left side of their house? It turns out that the neglect syndrome not only affects their current perceptual awareness but also their memory representations as well. Previous studies have demonstrated that the retrieval of a memory entails activation of the same perceptual circuits that were directly activated during the encoding of the original event. Although the information regarding the left visual field remains encoded in visual hemineglect patients, they neglect that information in the realm of memory just as they do in their current perceptual awareness. (p. 263)

In the model suggested by Gazzaniga (2018) consciousness is not produced by a single specialized neuronal network, but rather is the result of many brain modules, each with the capacity to produce consciousness. Therefore, consciousness is not unified. Whenever the activity of a particular module has sufficient salience, it produces a

conscious experience. The activity of each module is stitched together across time to produce the illusion of a seamless, unified conscious experience. Gazzaniga described this process through metaphor:

> Consciousness is not the product of a special network that enables all of our mental events to be conscious. Instead, each mental event is managed by brain modules that possess the capacity to make us conscious of the results of their processing. The results bubble up from various modules like bubbles in a boiling pot of water. Bubble after bubble, each the end result of a module's or a group of modules' processing, pops up and bursts forth for a moment, only to be replaced by others in a constant dynamic motion. Those single bursts of processing parade one after another, seamlessly linked by time. (pp. 404–405)

Gazzaniga (2018) integrated the neuroscientific evidence previously discussed in this section to produce this theory of modular consciousness. He noted complex unconscious processing, the lack of an identifiable seat of consciousness, and his observations of split-brain patients as evidence of the modular nature of consciousness. In Gazzaniga's model, each brain module has the ability to produce a conscious experience as a result of its processing. There is not a single consciousness taking in information from each module. Rather, each module can independently produce a conscious experience and these experiences are linked together across time by the unconscious processing of the interpreter module (Gazzaniga, 2018).

Cognitive Neuroscience and Dreaming

Like consciousness, dreaming is a phenomenon that no one fully understands. William Dement, a pioneering researcher who codiscovered the connection between rapid eye movement (REM) and dreaming, had a career studying sleep that spanned over fifty years and led to no certain conclusions. He quipped that "the only reason we need to sleep that is really, really solid is because we get sleepy" (as cited in Max, 2010). No one knows why sleeping or dreaming occur, but it is known that a total lack of sleep is deadly. Although it is unclear why extreme sleep deprivation is lethal, animal studies and

people afflicted by fatal familial insomnia indicate that sleep must occur for survival. Likewise, rapid eye movement sleep (which corresponds with dreaming in humans) is highly evolutionarily conserved, occurring universally in mammals and birds (Max, 2010). The necessity of sleep for survival and the evolutionary conservation of sleep and dreaming indicate that these phenomena are important, even if no one yet understands why.

Typical dreams are reported as "complex, temporally unfolding hallucinatory episodes that can be as vivid as waking experiences" (Tononi, 2008, p. 96). The complexity of dreams is such that "the median word count of REM sleep reports is even higher than that of wakefulness reports, whether quiet or active"—people use more words for their descriptions of dreams than they do for their descriptions of waking life (p. 96). In terms of the subjective experience of dreaming, studies of dream reports revealed that dreams tend to be distinguished from waking consciousness by the following factors: The dreamer is disconnected from the external environment, the dreamer is producing a simulated world internally, the dreamer experiences reduced voluntary control and reflective thought, dreams are often forgotten, and emotional content of dreams is greater than that of waking life (Tononi, 2008). Neuroscientist and sleep expert Giulio Tononi (2008) wrote that "with the exception of lucid dreaming, the dreamer has no control on what he is going to dream, and is largely a passive spectator" (p. 100). He concluded that this constitutes a "prominent reduction of voluntary control, whether of action, thought, or attention" (p. 102). The dreamer instead experiences "a severe impairment of the ability to pursue goals effectively, to analyse situations intelligently, to question assumptions, to reason properly, and to make appropriate decisions" (p. 102). Additionally, Tononi (2008) explained that dreams utilize "hundreds of primary

conceptual metaphors that map onto common experiential categories" (p. 99)—dreams utilize symbols to stand for complex concepts. Thus, cognitive neuroscientists understand dreams as hallucinatory experiences in a complex, symbolic, simulated internal world (Tononi, 2008). The dreamer largely lacks the capacity to analyze and reflect on the contents of this internal world while in the dream (with the exception of lucid dreaming), and thus experiences the dream world as a passive agent (Tononi, 2008).

In lucid dreaming, the dreamer is aware of the fact that they are dreaming. Tononi (2008) wrote that "under such circumstances, the dreamer is able to remember the circumstances of waking life, to think clearly, and to act deliberately upon reflection, all while experiencing a dream world that seems vividly real" (p. 103). There are even fewer firm conclusions to be had about lucid dreaming than typical dreaming, however some researchers theorize that "the deactivation of the dorsolateral prefrontal cortex that is generally observed during REM sleep may not occur during lucid dreams" (p. 103). The dorsolateral prefrontal cortex is involved in complex mental functions including self-reflection (Tononi, 2008). Thus, lucid dreaming involves the same complex, hallucinatory sensory experience as a typical dream, but without impairments in the ability to reason, analyze, and have self-awareness.

In physiological terms, the brain during sleep is active; most aspects of sleeping neural activity are similar to those found during wakefulness (Tononi, 2008). However, during dreaming the primary sensory cortices have low activity (thus one experiences little sensory information coming from the outside world), the dorsolateral prefrontal cortices are relatively inactivated (thus one has a reduced capacity for reflection), and limbic regions and association areas at the temporo-parieto-occipital junction are activated (thus one produces a sensation- and emotion-rich internal experience) (Tononi,

2008). Psychology professor G. William Domhoff (2018) developed a position he called the neurocognitive model of dreaming in which he suggested that dreams are an accidental byproduct of the same brain functions that produce mind-wandering or imaginative thought. Domhoff (2018) explained dreams as creating an imaginative version of daily experience, drawing on memory in the context of partial disconnection from the external world to produce the vivid nighttime experiences humans all share.

Cognitive neuroscientists have described the factors that separate dreaming experience from waking consciousness and they have revealed the brain regions involved in sleep and dreaming (Tononi, 2008). However, despite dreaming being a universal human phenomenon that takes up a significant portion of the human lifespan, no one yet knows why we dream. A prominent theory in cognitive neuroscience is Domhoff's neurocognitive model, in which dreaming is an accidental byproduct of the brain's capacity to imagine (Tononi, 2008). However, this theory is unconvincing in the context of dreaming's universality and evolutionary conservation. It seems unlikely that dreaming would occur across all species of mammals and birds and occur every night among neurotypical humans and yet be a mere accidental byproduct of another brain feature (Max, 2010).

Depth Psychology and the Sense of Self

While cognitive neuroscience has utilized brain imaging and the deficits that appear with brain damage to produce models for how consciousness functions, depth psychology has produced such theories based on introspective exploration and the presence of extraordinary phenomena like dreams, hallucinations, and other psychological symptoms. Depth psychology encompasses various psychological approaches and theories that are "concerned with the phenomenon of the unconscious"

("Depth Psychology," 2019). The view of human behavior as driven by factors that the individual is unaware or unconscious of stems from the work of psychiatrists Sigmund Freud and Carl G. Jung. Because their foundational ideas have spawned many modern iterations, it is worthwhile to review their original concepts of how the mind was structured.

Jung (1954/1975) defined the unconscious as:

> Everything of which I know, but of which I am not at the moment thinking; everything of which I was once conscious but have now forgotten; everything perceived by my senses, but not noted by my conscious mind; everything which, involuntarily and without paying attention to it, I feel, think, remember, want, and do; all the future things that are taking shape in me and will sometimes come to consciousness: all this is the content of the unconscious (p. 142 [*CW* 8, para. 382])

Jung's concept of the unconscious suggested that there was much more happening in the mind than an individual could be aware of at any given moment. Jung envisioned memories, sensory experiences, symbolic representations, thoughts, and unknowable mental activities swirled together in the depths of the mind, influencing behavior and consciousness, but only occasionally becoming known to the ego. Jung used the term *ego* to mean the consciousness or awareness that generally has voluntary control of the body, the entity that is referenced when a person uses words like "I" or "me" (Jung 1954/1975, pp. 167–168 [*CW* 8, para. 430]).

Jung's work was dedicated to exploring the world of the unconscious. He described the unconscious as divided into two layers: the personal unconscious comprised of sensory experiences and thoughts an individual has about their personal experience which are forgotten or repressed and thus out of conscious awareness, and the collective unconscious encompassing inherited or instinctual patterns of understanding that are shared across all of humanity (Jung, 1948/1975a, pp. 104–105 [*CW* 8, para.

270]). Within the collective unconscious, Jung described the existence of archetypes. He wrote that "archetypes are typical forms of behavior which, once they become conscious, naturally present themselves as *ideas and images*, like everything else that becomes conscious" (1954/1975, p. 171 [*CW* 8, para. 435]). He suggested that particular images and ideas have reoccurred across cultures and times due to the universally inherited nature of archetypes. For example, the archetype of the mother has existed across human cultures and times, each different group elaborating a specific cultural vision of this archetype that is vital to the evolution of our species.

Jung also described the idea of a complex, defined by Jungian psychotherapists Andrew Samuels, Bani Shorter, and Fred Plaut (1986) as "a collection of images and ideas clustered around a core derived from one or more archetypes and characterized by a common emotional tone" (p. 56). Jung likened his term *complex* to the concept of personality fragments forwarded by Pierre Janet, a psychotherapist contemporary of Jung who studied trauma and dissociation.

> We have to thank the French psychopathologists, Pierre Janet in particular, for our knowledge today of the extreme *dissociability* of consciousness. Janet and Morton Prince both succeeded in producing four to five splittings of the personality, and it turned out that each fragment of personality had its own peculiar character and its own separate memory. These fragments subsist relatively independently of one another and can take another's place at any time, which means that each fragment possesses a high degree of autonomy. My findings in regard to complexes corroborate this somewhat disquieting picture of the possibilities of disintegration, for fundamentally there is no difference in principle between a fragmentary personality and a complex. (Jung, 1948/1975b, p. 79 [*CW* 8, para. 202])

What Jung and Janet suggested was revolutionary: Not only were there parts of the mind inaccessible to the ego, what humans generally perceive as the totality of themselves, but these unconscious parts may have their own awareness and autonomy. On this subject, Jung (1954/1975) wrote: "If the unconscious can contain everything that is known to be a

function of consciousness, then we are faced with the possibility that it too, like consciousness, possesses a subject, a sort of ego" (p. 137 [*CW* 8, para. 369]).

Ultimately, Jung's (1916/1960) vision of psychotherapy was guided by the concept of the transcendent function: the idea that there can be a "collaboration of conscious and unconscious data" (p. 69 [*CW* 8, para. 167]) that brings "together opposites for the production of a third: the transcendent function" (p. 73 [CW 8, para 181]). When the ego understands itself as only a portion of the mind, new possibilities for psychological functioning open up. In the terms of archetypal psychologist James Hillman (1989), a relativized ego can have a new relationship to the world of the unconscious and unexpected pathways to healing emerge.

In the hundred years since Jung started writing about the unconscious, theorists have built upon his ideas in many different ways. The rest of this section will focus on theorists from the relational psychoanalysis movement, a spoke within the umbrella of depth psychology. Relational psychoanalysis centers on relationships (both internally between aspects of a person and externally between people) as fundamental to psychological functioning. With this focus, relational psychoanalysis seeks to facilitate internal relationship dynamics wherein opposites can coexist rather than striving for dominance in a battle for unification (Ringstrom, 2014).

Relational psychoanalysts Bromberg (1996; 1998; 2006; 2011) and Stern (2011) articulated a model of consciousness and the sense of self that stems from their studies of trauma and dissociation. These theorists suggested that while an individual generally perceives herself or himself as a single, unified self, this is in fact "an acquired, developmentally adaptive illusion" (Bromberg, 2011, p. 677). Bromberg (1996) described this model as moving away from Jung's concept of a conscious/unconscious

distinction, and "towards a view of the self as decentered, and the mind as a configuration of shifting, nonlinear, discontinuous states of consciousness in an ongoing dialectic with the healthy illusion of unitary selfhood" (p. 281). Stern (2011) expanded on this definition:

> Today, increased attention is being paid to the normal multiplicity of states of consciousness. This is evoking a conceptual shift toward a view of the mind as a configuration of discontinuous, shifting states of consciousness. These states are understood to have varying degrees of access to perception and cognition because many domains of dissociated self-experience have only weak or nonexistent links to the experience of "I" as a communicable entity. (p. 638)

Bromberg (2006) and Stern (2011) described the mind as composed not of a single self or ego floating atop a deep unconscious well, but rather as being a network of many self-states, each conscious in its own right. These self-states are recruited to control motor functioning, and thus behavior, depending on environmental circumstances: A different self-state is required for a viscous fight between rivals than the self-state required for gentle play with a toddler. Bromberg (2011) wrote of the switch between self-states as "a transition . . . from one state of consciousness to another" where "the new structure acts to reorganize behavior and resist changes to other states" and is characterized by a shift in "affect . . . access to memory . . . attention and cognition . . . regulatory physiology . . . and sense of self" (p. 677).

Varying levels of dissociation mark the distinctions between different self-states. In general, the different self-states share much of the same sensory experience, memory, and other aspects of cognitive functioning. However, it is adaptive for survival of the whole organism for the self-states to be restricted from accessing all of the information the entire brain contains (Bromberg, 2006). The self-state activated during a violent confrontation likely does not have immediate access to memories of childhood play and imagination, the sensory experience is altered by the fight-flight-freeze response, and the

thoughts do not wander from anger and fear for immediate survival. There is dissociation between the different self-states, such that no single self-state has access to the entirety of experience. Psychiatrist John Beahrs (1982) wrote that

> state of consciousness, schema, mood, role, system, ego state and alter personality all refer to some level of . . . mental unit. Separated by a boundary from others, each unit has characteristic features defining its identity and finite persistence over an extended period of time. Dissociation, then, is *the process of forming and maintaining the boundary of said unit*. (pp. 61–62)

As dissociation is at the core of the theories of extended consciousness advanced by relational psychoanalytic theorists, it may be useful here to clarify the definition of dissociation. In the text *Dissociation and the Dissociative Disorders*, dissociation is defined as "a disruption in the normal integration of the psychological faculties or functioning of a given consciousness" (Dell & O'Neil, 2011, p. xx). This disruption is further clarified to be any alteration of "experience of body, world, self, agency, intentionality, thinking, believing, knowing, recognizing, remembering, feeling, wanting, speaking, acting, seeing, hearing, smelling, tasting, touching, and so on," where the vast majority of such intrusions "do not involve amnesia" but rather are "consciously experienced at the moment of their occurrence" (p. xx). The idea that dissociation is a psychological process that interferes with "the normal integration of the psychological faculties" (p. xx) is almost an inversion of the concept of self-states, one that stems from the view that there is, indeed, a central, unified conscious experience which can be interrupted. In contrast, Bromberg (2011) defined dissociation as

> a basic process that allows individual self-states to function optimally (not simply defensively) when full immersion in a single reality, a single strong affect, and a suspension of one's self-reflective capacity is exactly what is called for. . . . As a normal process, dissociation also includes the ability to defend against trauma by disconnecting the mind from its capacity to perceive that which is too much for selfhood and sometimes sanity to bear. (p. 677)

Far from considering dissociation an aberrant psychological symptom, relational psychoanalysts view dissociation as a central feature underlying the mind's capacity to switch into different self-states and thus adapt to the environment. The self-state present during a violent fight must know, perceive, and remember things the self-state active during gentle play does not, and vice versa.

To understand the mind's structure of shifting self-states bounded by the process of dissociation, Bromberg (2006) quoted a metaphor from Hippolyte Taine, a 19th-century philosopher:

> One can . . . compare the mind of a man to a theatre of indefinite depth whose apron is very narrow but whose stage becomes larger away from the apron. On this lighted apron there is room for one actor only. He enters, gestures for a moment, and leaves; another arrives, then another, and so on. . . . Among the scenery and on the far-off backstage there are multitudes of obscure forms whom a summons can bring onto the stage . . . and unknown evolutions take place incessantly among this crowd of actors. (as cited in Bromberg, 2006, p. 3)

Bromberg incorporated modern-day terminology by writing that Taine's metaphor:

> is in harmony with my view of mental life as a nonlinear, self-organizing repatterning of self-state configurations that produce shifting representations of "me." From this vantage point, normal dissociation, a mind-brain mechanism that is intrinsic to everyday mental functioning, attempts to assure that the mind selects from the "multitudes of obscure forms whom a summons can bring onto the stage" of selfhood, that self-state configuration which is most immediately adaptive within the constraints of affective safety. I see this process as an ongoing system, an evolutionarily derived psychodynamic that is mediated at the brain. (p. 3)

This conceptualization of the sense of self (or rather, the multiplicity of self) stems from relational psychanalysis's emphasis on relationships. Psychoanalyst Stephen Mitchell (1991) clarified the origin of this school of thought as follows:

> The key transition to postclassical psychoanalytic views of the self occurred when theorists began thinking . . . of the repressed not as disorganized, impulsive fragments but as constellations of meanings organized around relationships, and they began to conceive of the id as involving a way of being, a sense of self, a person in relation to other persons. M. Klein, Fairbairn, Jacobson, Loewald, and Kernberg, each in their own way and in their own language, portray the id as a

> person or collection of persons in passionate relationships to other persons or parts of persons. Fairbairn's ego and object units are . . . versions of the person himself, and they embody active patterns of experience and behavior, organized around a particular point of view, a sense of self, a way of being, which underlie the ordinary phenomenological sense we have of ourselves as integral. Because we learn to become a person through interactions with different others and through different interactions with the same other, our experience of self is discontinuous, composed of different configurations, different selves with different others. (pp. 127–128)

In Bromberg's (2011) words, "Every human being has a set of discrete, more or less overlapping schemata of who he is" and "each schema is organized around a core self-other configuration" (p. 640). There is no "me" that exists in total isolation. There is only a "me" in relation to the existence of others:

> This configuration of meaning develops early in life through reciprocal patterns of interactions with significant others that establish the internal templates for attachment behavior. These internal templates are core ways of being with an other that come to organize the self-meaning of "who one is." They provide the basis of self-continuity that assures stability and sometimes sanity in the face of psychological stress. Because continuity of self-meaning is the underpinning of mental stability, each human mind is dedicated to preserving its pattern of attachment at any cost. From this frame of reference, psychological trauma can be defined as the precipitous disruption of self-continuity through the invalidation of these early attachment patterns of interaction that give meaning to "who one is." (p. 641)

Under nurturing circumstances in early development, "relatively unlinked self-states, each coherent in its own right," are able to share enough information with one another that an illusion of unity is created (Bromberg, 2011, p. 677). However, in lives marred by trauma, the phenomenon of typical dissociation is expanded to both wall-off trauma from certain self-states while simultaneously preserving other self-states that are "vigilantly 'on-alert' to preempt trauma by holding a perception of reality in which potentially unbearable psychic pain is always around the next corner" (Bromberg, 2011, p. 677). Thus, survivors of trauma who experience more obvious signs of dissociation and multiplicity of self provide a window into the nature of consciousness. Such

survivors make it easier to see the multiplicity of self that is otherwise less detectable, but still existent, in typical individuals.

Depth Psychology and Dreaming

In contrast to the prominent theories in cognitive neuroscience, dreams are considered highly significant by depth psychologists. Jung was heavily invested in the exploration of dreams as a means of gaining insight into unconscious processes. He wrote that "the most readily accessible expression of unconscious processes is undoubtedly dreams. The dream is, so to speak, a pure product of the unconscious" (Jung, 1916/1960, p. 65, [*CW* 8, para. 152]). Depth theorists have analyzed, interpreted, explored, and tended dreams in a wide variety of methods, for the purposes of gaining personal insight, seeking to understand the functioning of the mind, and helping clients heal (Aizenstat, 2009; Bromberg, 2006; Hall, 1984; Hillman, 1979). Depth theorists unite in the understanding that dreams are important psychological experiences and are of value in psychotherapy.

In his book *Awakening the Dreamer*, Bromberg (2006) wrote:

> I start from the fact that a dream, in its essence, is a nonlinear reality and must be related to as such—not as a kind of story or a kind of movie, but as a real space in which the patient has been. If we accept that the dreamer is inside his dream (inside a separate psychic reality), then not only is our way of approaching dreams in psychoanalysis changed, but also everything that takes place between ourselves and our patients is experienced differently. (p. 40)

Bromberg (2006) encouraged accepting dreams in the way that they are experienced by the dreamer. While in the dream state, dreams feel utterly real. Memories of dream locations and events exist for people in the same way that memories of past locations and events exist. In a similar style, depth theorists Stephen Aizenstat (2009) and James Hillman (1979; 1989) promoted tending dreams as living images, as real locations and figures with their own autonomy and experiences.

Bromberg (2006) also advanced a theory for the utility of dreaming in the context of a mind organized into multiple self-states:

> If . . . a dream is the most familiar special case of the more general phenomenon of dissociation, the normal self-hypnotic capacity of the human mind, then dreaming might be considered among the most routine day-to-day dissociative activities of the mind—its nocturnal function being an adaptational effort to cope with minimal levels of affectively disruptive not-me experience without interfering with the waking illusion of central consciousness. One of its manifestations in psychoanalysis is to contain and hold, as a separate reality, unprocessed affective experience that is not safely containable at that moment within the "I" that defines the analytic relationship for the patient. In other words, the use of a dream in analysis might, at one level, be thought of as a transitional experience that allows the potential linking of self-states that are hypnoidally disconnected and permits the voices of other self-states to be heard and to find access to the dynamic structure that the patient defines as "me." The process through which all this takes place is one that I feel is not adequately described by the phrase “dream interpretation.” (pp. 38–39)

In the same way that typical dissociation was described in the preceding section as an adaptive mechanism delineating between different self-states, here Bromberg wrote of dreaming as a dissociative phenomenon that allows emotionally charged material to be dealt with safely. If a certain experience cannot be integrated into the adaptive illusion of a unitary self without threatening the sense of cohesion, it is instead shuttled into a dream, an alternative method of communication. Here, the self-state the patient identifies with as “the dreamer” or “me” can have a means of contact with other self-states that are experienced as “not-me” states. Dreams provide an alternate reality without real world consequences—a space where self-states can share information symbolically without threatening the waking illusion of unity.

Summary

This literature review surveyed research from cognitive neuroscience and depth psychology on consciousness and dreaming. The first section narrowed in on extended consciousness or the sense of self as the subject of the literature review. The first section

also identified prominent themes from cognitive neuroscience study on the sense of self: there is no single identifiable seat of consciousness in the brain, the brain has a modular organization, and much mental processing occurs unconsciously (Gazzaniga, 2018). These findings gave rise to Gazzaniga's modular consciousness theory in which "each mental event is managed by brain modules that possess the capacity to make us conscious of the results of their processing" (p. 404). The second section discussed research on dreaming from cognitive neuroscience. In this field, dreaming has been described by the qualities that distinguish it from waking consciousness and the brain regions associated with dreaming have been identified (Tononi, 2008). Domhoff (2018) theorized that dreaming is an accidental byproduct of the brain's capacity to engage in fantasy. The third section traced the lineage of depth psychology from C. G. Jung to modern relational psychoanalysts. C. G. Jung's concept of an unconscious/ego divide was supplanted by a relational psychoanalytic "view of mental life as nonlinear, self-organizing repatterning of self-state configurations that produce shifting representations of 'me'" (Bromberg, 2006, p. 3; Jung, 1916/1960, p. 65, [*CW* 8, para. 152]). Finally, the fourth section discussed dreaming from the perspective of depth psychology. In depth psychology, dreams are considered evidence of the non-unified structure of consciousness and the existence of the unconscious (Jung, 1916/1960, p. 65, [*CW* 8, para. 152]). For relational psychoanalysts, dreams are a means of contact with dissociated self-states (Bromberg, 2006).

Chapter III
Findings and Clinical Applications

> You, the reader, must allow me to occupy you, your thoughts, your mind, since I have no voice with which to speak *other than yours*. If you are to read this book, you must allow yourself to think my thoughts while *I allow myself to become your thoughts* and in that moment neither of us will be able to lay claim to the thought as our own exclusive creation. . . . A third subject is created in the experience of reading that is not reducible to either writer or reader.
>
> Ogden, 1994, p. 1

Introduction

If you are reading this thesis, you are conscious. You have some sense that you are a "you," a subject—a something that is experiencing something. You have a sense of self and you have awareness that you have this sense of self or, alternatively, you experience oneness and you are aware of this experience. You experience the boundaries of embodiment, or perhaps you feel continuous with everything, boundless. At either end of the spectrum, you are aware of existing in time and space. You even have awareness that you have awareness that you have this awareness of existence. What can be said with certainty is that something is happening, and you sense, experience, feel, and think all kinds of different things.

And yet, no one knows what exactly is going on. A lot of different people have a lot of different ideas, but no one knows for sure. Are we in a computer simulation? Some prominent philosophers and physicists consider this a distinct possibility, or even the most likely scenario (Bostrom, 2003; Gates, 2010; Moskowitz, 2016). Are you dreaming right now? According to philosophy professor and metaphysicist Jan Westerhoff (2011), this is not an unlikely conclusion: He calculated that because you experience "1.6 hours

of dream consciousness for every 16 hours of waking consciousness, this means that your chance of dreaming at any given moment is 1 in 10" (p. 5). Of course, there is also the possibility that all of this is a continuous dream. Are you the only consciousness in existence, actually producing all the things you think of as reality? Did you write this thesis? This concept of solipsism has haunted humanity for thousands of years and it may be impossible to disprove (Chalmers, 1996; McComiskey, 1997).

This chapter tip-toes around tangled questions about the nature of reality, focusing instead on the nature of consciousness and its relationship to dreaming. This exploration concludes that the sense of self consists of multiple distinct agents, not just a single entity. The perception of a single, cohesive self is an illusion. This chapter then explores the phenomenon of dreaming in the context of the multiplicity of consciousness. The ideas presented here will be conjectures; there are no firm conclusions available in this realm of thought. These conjectures are supported by clinical studies in cognitive neuroscience and psychological experimentation as described in Chapter II, and introspective analysis, including the author's own experience. Yet the ideas presented are still unproven models of the nature of consciousness. In this section, the thinking of cognitive neuroscientists and depth psychologists mingles and produces a possible conceptualization of consciousness that could account for some of the most perplexing neuropsychological phenomena: alien hand syndrome, dissociative identity disorder, and dreaming. The ideas presented may feel unconventional or difficult to believe, but I hope, dear reader, that you can entertain these notions as possibilities. When no one can disprove the idea that all of existence is a simulation, or a dream, or that a single consciousness is creating all of reality, why would it be impossible to entertain the notion that there are multiple, perhaps many, consciousnesses produced by a single brain?

Cognitive Neuroscience and Depth Psychology in Communication

Chapter II presented two different models of consciousness based on research in the fields of cognitive neuroscience and depth psychology. In the model suggested by Gazzaniga (2018) consciousness is not produced by a single specialized neuronal network; it is not unified, but rather is the result of many brain modules, each with the capacity to produce consciousness. Whenever the activity of a particular module has sufficient salience, it produces a conscious experience. The activity of each module is stitched together across time to produce an illusion of a seamless, unified conscious experience. Consciousness is not a unified system where information is fed to a single self or consciousness. Rather, the illusion of singularity is produced by many independent modules producing consciousness in their own right and then linking together across time. To use a metaphor, consciousness functions like a flip book: each page is akin to a single module and the image on the page is like a conscious experience. It is only when the pages are flipped that there appears to be a unified, changing image—the illusion of a singular consciousness.

Gazzaniga's conceptualization of consciousness is similar to the concept of self-states in psychodynamic theory (Bromberg, 1996; Kohut, 1977; Schore, 2003). Bromberg (1996) asserted that conscious experience emerges from "relatively unlinked self-states, each coherent in its own right, and that the experience of being a unitary self is an acquired, developmentally adaptive illusion" (p. 512). Relational psychoanalysts describe the mind as being composed of many independently conscious selves. These self-states switch into control of the body when triggered by environmental cues, replacing one another across time in the same way that Gazzaniga described modules bursting forth and then being "replaced by others in a constant dynamic motion" (2008, p. 405). In general,

it is beneficial for these different selves to mostly share access to memories, experiences, and thoughts and to engage in an illusion of unitary selfhood (Bromberg, 2011). However, the boundaries between these different selves are always defined by dissociation: a restriction of free access to the totality of information available in the brain. In lives characterized by trauma, this dissociation between self-states is even more pronounced, used as a survival strategy to wall-off aspects of experience that are overwhelming and also to allow for the existence of hypervigilant self-states, always on guard for a repetition of the original trauma.

The two theories of extended consciousness described above have much in common. Cognitive neuroscientists and relational psychoanalysts would likely agree that there is no such thing as a central, unified self: this is an illusion. Instead, extended consciousness is comprised of many independent but interconnected modules or self-states. Interestingly, both cognitive neuroscientist Pinker (1997) and relational analyst Bromberg (2006) used the same metaphor of light on a stage to describe the process of modules or self-states rising to control the body: There are many figures waiting on the dark stage, and the spotlight highlights different actors in turn. Likewise, both disciplines recognize that the "vast majority of mental processes that control and contribute to our conscious experience happen outside of conscious awareness" (Gazzaniga et al., 2019, p. 610). To rephrase this idea in depth psychology terms: the unconscious is the primary driver of human behavior and experience ("Depth Psychology", 2019).

The issue between the modular consciousness theory in cognitive neuroscience and the concept of self-states in relational psychoanalysis is a disagreement over whether these subdivisions of self exist as independent entities with agency to influence the brain at all times. Gazzaniga (2018) conceptualized the many modules of the brain as each

possessing "the capacity to make us conscious of the results of their processing" (p. 404). These conscious experiences get "seamlessly linked by time" to produce an illusion of a unitary self, but at any given time, there is only a single conscious experience (p. 405). In contrast, relational psychoanalysts and other depth theorists conceptualize self-states to coexist as multiple conscious entities within the same brain (Bromberg, 2006; Jung, 1948/1975b, p. 79 [*CW* 8, para. 202]; Lampl-de Groot, 1981; Stern, 2011). Even when a given self-state does not actively have control of motor function, and thus the ability to communicate verbally, it still exists as an independent entity. Whichever self-state has motor control at a given time is the only entity that can interact with the external world. However, the other self-sates can influence this primary consciousness internally through thoughts, feelings, or dreams (Hillman, 1989, 1979; Jung, 1961/1963, 1954/1975, 1935/1976; Lampl-de Groot, 1981).

Clinical Evidence of Multiple Self-States

Chapter II presented a variety of examples of complex unconscious processing from cognitive neuroscience studies. There are people who can navigate hallways when they cannot consciously perceive visual information, people who can recognize related images on the right and left despite having no conscious awareness of one half of space, and each night we unconsciously produce complex symbolic dream landscapes with which we interact (de Gelder et al., 2008; Gazzaniga et al., 2019; Tononi, 2008). This thesis asserts that these examples of unconscious processing are complex enough to suggest that there are, in fact, multiple consciousnesses at play in producing them. Consider the following case studied by Gazzaniga (1967): A female spilt-brain patient was shown a nude photo during an experiment. The photo was flashed to her left hemisphere and later to her right. When flashed to her left hemisphere (the hemisphere

with modules for language production), she laughed and said that the photo was a nude. When flashed to her right hemisphere (the hemisphere lacking advanced language abilities), she giggled and smiled slyly. However, when asked why she was laughing, she said, "I don't know. . . nothing . . . oh—that funny machine" (Gazzaniga, 1967, p. 29). As the right hemisphere lacks language production abilities and motor control of the production of speech, she could not verbalize an accurate reason for her giggling. Her verbal left hemisphere, unaware of the photo the right hemisphere had seen, confabulated a reason for her laughter.

But what was going on in her right hemisphere? The modules of the right hemisphere were able to recognize the photo as a nude and have an emotional response informed by societal norms. Is it possible to have such a complex response without awareness? This thesis posits that this and the many other examples of surprising responses in split-brain patients indicate that the disconnected hemispheres contain independent self-states or modules that are simultaneously conscious. Split-brain patients experience surgical dissociation of brain modules that is akin to the dissociation between self-states theorized by relational psychoanalysis. Whereas dissociation between self-states is likely related to activity of different neuronal networks that can regain communication, surgical separation of connections results in dissociation with no path back to communication within the brain. Surgical separation of the hemispheres makes the underlying phenomenon of multiple simultaneously conscious self-states more obvious to outside observation.

The phenomenon of dissociative identity disorder adds credence to the idea that modules or self-states are conscious even when they lack direct physical control of the body. Dissociative identity disorder is defined as "a dissociative disorder in which a

person exhibits in turn different personalities; when exhibiting one personality, he may have no knowledge of the others and no memory for his experiences under a different personality" ("Multiple personality", 1998, p. 284). There is "compelling clinical data showing that different alters can be concurrently conscious and see themselves as distinct identities" (Kastrup, Crabtree, & Kelly, 2018). Modern neuroimaging studies comparing patients with dissociative identity disorder to actors imitating the condition have shown that dissociation has "an identifiable neural activity fingerprint" (Kastrup et al., 2018, para. 3). Specifically, brain imaging has shown that the "Apparently Normal Part"—the alter personality without explicit knowledge of past traumas—exhibits greater activity in the thalamus than the "Emotional Part"—alters with knowledge of past traumas that are activated by triggers and generally do not participate in everyday life (Schlumpf et al., 2014, "Introduction," para. 3). This thesis postulates that dissociative identity disorder is a more obvious example of the dissociation and multiplicity of self-states that always exists in human beings.

Possible Neurological Mechanisms for Multiple Self-States

No single brain region has been identified as producing consciousness (Gazzaniga, 2018; Gazzaniga et al., 2019). In fact, the persistence of consciousness in patients with widespread brain damage is evidence for the decentralized, modular nature of consciousness (Gazzaniga, 2018). If each brain does contain multiple selves or self-states, each conscious in its own right, how is communication and an illusion of unity between these self-states facilitated or inhibited, as in dissociation? This thesis hypothesizes that the thalamus is a candidate for the mediation of this process of communication. The thalamus is identified as involved in consciousness and sleep; thalamo-cortico-thalamic circuits create a loop of processing believed to be important in

the production of self-awareness (Gazzaniga et al., 2019; Tononi, 2008). Neuroscientists believe that these circuits may be how the brain receives data on its own activity (Gazzaniga et al., 2019). Perhaps these looped circuits actually facilitate or inhibit communication between delinked selves or self-states. Lack of activity or communication between networks could be the source of dissociation, as suggested by the decreased thalamic activity in alters with knowledge of past trauma in dissociative identity disorder (Schlumpf et al., 2014).

This thesis posits that each self-state is comprised of a complex network of neurons across many different brain regions. These networks could be connected to one another via the thalamus, which relays sensory information from the outside world to the cortex. Thalamo-cortico-thalamic circuits could link together each self-state network such that sensory information is relayed from the peripheral nervous system through the thalamus and on to a cortical network of self-states. These cortical networks of self-states then relay information back to the thalamus, where the processing in a given self-state network can either be relayed to other self-states or not. If these complex networks of looped communication are inhibited, dissociation—a loss of information sharing between different self-states—occurs.

Imagine each self-state neuronal network to be a spiderweb and information shared between self-states to be a spider. Some of the webs interconnect with other webs via lines of silk, but others are more disconnected or dissociated. There are physical constraints to the way that the spider can move; if there is no silk connecting certain webs, the spider cannot move between them. In this way, depending on the existence and activity of connections between different self-state neuronal networks, information is either shared or restricted. If the thalamus does play a regulatory role in connecting self-

states, the lines of silk connecting the different webs would run through this particular region.

How do these different self-states affect behavior? This thesis posits that different self-states are triggered to gain motor control of the body by different environmental stimuli. The only way that humans exhibit behavior or affect the external world is through the manipulation of muscles. Thus, for different self-states to affect behavior, they must somehow gain or lose control of motor function. Notably, neuroscientist Paul Cisek's (2007) affordance competition hypothesis argues that we develop multiple movement plans in parallel. Gazzaniga et al. (2019) cited an experiment that explained Cisek's hypothesis:

> Cisek developed his model based on evidence obtained in single-cell recordings from the premotor cortex of monkeys. In each trial of his study, the animal was presented with two targets, either of which it could reach with its right arm. After a delay period, a cue indicated the target location for the current trial. During this delay period, neural signatures for both movements could be observed in the activity of premotor neurons, even though the animal had yet to receive a cue for the required action. These signatures can be viewed as potential action plans. With the onset of the cue, the decision scales were tipped. Activity associated with movement to that target became stronger, and activity associated with the other movement became suppressed. Thus, following the cue, the initial dual representation consolidated into a single movement. (pp. 347–348)

Perhaps these multiple parallel plans for movement are an indication of multiple self-states, each with a different idea of what behaviors should be exhibited next. As long as there is a relatively high level of communication between the self-states, there is a sense of continuity and a consensus that it was *me* who carried out the movement that actually occurred. However, for people with dissociative identity disorder, the dissociation between self-states can be so intense that behaviors executed by one self-state may feel entirely foreign to other self-states if they are co-conscious or are made aware of the behavior by an outside observer (Dell & O'Neil, 2011).

Likewise, brain damage to the supplementary motor area—a region involved in internally guided movement—can cause alien hand syndrome, "a condition in which one limb produces a seemingly meaningful action but the person denies responsibility for the action" (Gazzaniga et al., 2019, p. 349). Neuroscience researchers Michael Schaefer, Hans-Jochen Heinze, and Imke Galazky (2010) described complex behaviors of the alien limb, such as unbuttoning clothing and aggression toward the affected individual, and wrote that the alien limb is often perceived by affected individuals as having its own personality. Brain imaging studies of people with alien hand syndrome indicated that apparently involuntary movements and voluntary movements of the alien hand are correlated with similar activity in the primary motor cortex, premotor cortex, and precuneus (Schaefer, Heinze, & Galazky, 2010). However, the two types of movement showed different activity in the inferior frontal gyrus, a region thought to be involved in inhibitory control over apparently involuntary motor responses (Schaefer et al., 2010). This thesis proposes that the phenomenon of alien hand syndrome supports the idea that humans are composed of multiple self-states that oscillate in control of motor function. Within this framework, alien hand syndrome would result from the dissociation of a particular self-state from the other self-states due to damage in communicating networks. This isolated self-state retains connection to certain motor pathways, however, and thus can exhibit behavior through the alien limb. As it is cut-off from other self-states in a physical sense due to brain damage, this self-state is experienced as a "not-me" state, and its behavior dominates rather than being one of many possible movement plans which are integrated and shared between the multiplicity of self-states present.

Dreaming as Evidence of Multiple Self-States

Chapter II covered the distinct ways that dreaming is viewed from the perspectives of cognitive neuroscience and depth psychology: depending on who you ask, dreaming is either a random byproduct of neural activity or the holy grail of access to unconscious material (Domhoff, 2018; Jung 1916/1960, p. 65, [*CW* 8, para. 152]). Each night people wander through worlds, interact with figures they take to be sentient, and act as the protagonists or viewers of complex plots. Tononi (2008) summarized this phenomenon as follows:

> Perhaps the most remarkable property of dreams is how similar they can be to waking consciousness, to the point that the dreamer may be uncertain whether he is awake or asleep. This means that the sleeping brain, disconnected from the real world, is capable of generating an imagined world, a virtual reality, which is fairly similar to the real one and is indeed experienced as real. (p.98)

This thesis posits that the content of dreams is too complex and rife with symbolism to be a random byproduct of other mental functions. As with other complex tasks, like telling a story or creating art, it is difficult to imagine that consciousness plays no role in producing the dream landscape. It is just that the consciousness of the dreamer or the entity one relates to as *me* in the dream is not creating the virtual reality—other consciousnesses or self-states are producing the dream experience.

In this section, using data gleaned from analysis of a personal dream, I argue that dreaming is evidence for the theory of many simultaneously conscious self-states. In the excerpt from my personal dream journal that follows, I refer to my deceased friend by the pseudonym Josselin:

> I dreamed of feeling lonely at a small party hosted by Josselin. The party-goers gathered around a kitchen table and I walked towards Josselin. I reached out to her platinum hair and when I touched a strand, I had the sudden, shocking image pop into my mind of her head caved in, her hair matted with blood. Suddenly everyone in the room stopped talking and faced me with solemn eyes. Josselin explained to me that I was in a dream and thus creating everything around me.

> She proceeded to explain that when I awoke, I would be creating that reality as well, that no consciousness existed aside from my own. She emphasized that I would try to convince myself that this was not the case when I awoke, that this dream would feel distant and surreal, but that I would know it was true because of how convinced I had been of the reality of our encounter before her revelation. Everything suddenly went black and I experienced a horrifying and profound sense of aloneness in this void for what felt like an eternity.
>
> I awoke, panicked, with my husband lying next to me. I woke him up to tell him about my dream and to grasp for something to refute the horrible possibility of what Josselin had told me. (Author's personal dream journal, August 10, 2016)

The Josselin of my waking life died in a car crash about a year before this lucid dream occurred. Josselin, with her blonde hair, lithe body, unwavering cheerfulness, and seemingly blessed life prior to her death provoked in me some combination of envy, resentment, and love. She seemed to succeed effortlessly and with charm at everything she attempted. She was a devout Christian with a view that life is full of god's grace, a distinct counterpoint to my atheism and cynicism. Given our philosophical differences and my hidden jealousy, her sudden death at the age of 21 caused me not only grief but also guilt. Her violent death also struck me as a symbolic representation of the folly of optimism and the illusion of safety.

To put this dream in the terms of relational psychoanalysis, the self-state I identified with as "the dreamer" or "me" within the dream had symbolic contact with "not-me" self-states. What Josselin was insisting upon was simultaneously true and untrue: she was a part of me, a product of the same brain, but also, she represented dissociated self-states. As described by Bromberg (2006), this dream allowed for "the potential linking of self-states that are hypnoidally disconnected" and permitted "the voices of other self-states to be heard and to find access to the dynamic structure that the patient defines as 'me'" (p. 39). Although Josselin insisted that I was producing her, the self-state of the dreamer had no sense of control over this process. In retrospect, the dreamer self-state was not creating Josselin or any other aspect of the dream landscape.

Dissociated self-states—residents of the same physical brain but possessing their own separate autonomy, experiences, and memories—were creating the landscape. The figure of Josselin was used in the dream precisely because the living Josselin was the last person I would have expected to give me this kind of information or to have entertained the notion of solipsism as a possibility. Her particularly cheerful character, her religious faith, and her tragic death made her a symbol of opposites: she is synonymous in my mind with connection, hope, isolation, and death. She embodied these conflicting traits in my personal symbology, and thus she was the perfect figure to suggest the underlying symbolic paradox of the dream.

In this way, my dream was actually a symbolic communication of the existence of multiple self-states and a modular composition of extended consciousness. The self-state of the dreamer was teased with the horrible idea that it existed in isolation. The dream exemplified the philosophical concept of metaphysical solipsism: a position that "I am the whole of reality" (King, 2002, p. 131). Metaphysical solipsism is an exaggeration of the idea of a single unified self: one consciousness in control of everything. Solipsism is to the universe what a single, unified consciousness is to the human mind. Josselin, a symbol of opposites and paradoxes, the last person who would have endorsed solipsism, was suggesting that solipsism was reality. Thus, she in fact represented the opposite of solipsism: the illusion of unitary selfhood and the multiplicity of consciousness. In the dream, I experienced Josselin's revelation as uncanny: I did not feel that I was creating the reality around me, but it was impossible to deny her assertion—I had been convinced that the dream was real. This aspect of the dream is reminiscent of dissociation: In the dream Josselin was suggesting that I had walled myself off from truths about myself. I was dissociated from certain pieces of self-knowledge and now these dissociated pieces

of information were being fed back to me by Josselin. From Bromberg's (2006) perspective, this is indeed what dreams do: Dreams allow dissociated self-states to communicate information to other self-states in a symbolic landscape. Paradoxically, this dream of profound isolation, upon deeper reflection, contains within it an understanding that I am not even alone within my own mind, that I am, in fact, a collection of many self-states, some more integrated into an illusion of unity than others.

Although the dream initially spurred me to existential dread and fear of isolation, further analysis revealed the comfort inherent in the dream. My dream was contact with parts of me that exist at the edges of the illusion of unity. My dream demonstrated that consciousness is a tiny aspect of the functioning of my brain and that my consciousness is certainly not alone, but rather one of a large number of independently conscious self-states.

Clinical Applications

A therapist is not in the room with a single, unified individual, but with a person who contains many parts. Regardless of the precise mechanism, the research of both cognitive neuroscience and depth psychology indicate that there is not a cohesive, singular self. The self is perhaps like a flip-book, modules turning on and producing consciousness sequentially. It is perhaps the interpreter module—or ego—guiding behavior with many other modules/complexes/entities bubbling up and influencing thoughts. Perhaps the human mind is comprised of many simultaneously conscious self-states, separated by varying levels of dissociation. Regardless, the mind is complex: it contains many parts. Therapists work not only with what is presented, but with all that is underneath. They may be working with or speaking to parts of the individual which have no voice, no way to express themselves outside of the realm of images and dreams. The

client may choose to share these experiences or not. But even if these dissociated parts are silent, they may still connect to the experience of therapy.

In the framework of dissociated self-states, a function of therapy may be that information which cannot be communicated internally (the self-sates are inhibited from sharing information with one another within the brain) can perhaps be communicated externally. Even if the neural network of a particular self-state is relatively isolated or dissociated from other self-states, it likely still has access to external sensory information. Thus, speaking out loud, writing, or drawing could give a dissociated self-state access to information which it cannot access in the realm of thought. Likewise, if a therapeutic intervention triggers a dissociated self-state to gain motor control, this self-state can share its knowledge externally so that the other self-states can have access to this isolated knowledge. The client is not just talking to the therapist in a session of therapy. The client is also creating a new pathway for information transfer between self-states. It is as if each self-state neuronal network is a highway and information sharing is like traffic. Some of these highways connect to one another and traffic is free to travel between the different road systems. Some of the highways are isolated, with no connections to other roads. Sharing information externally—through symbolic expression like language, art, or movement—is akin to the traffic on an isolated highway being picked up by an airplane and flown to a new highway.

Finally, although some neuroscience models suggest that dreams are a random byproduct of the capacity to imagine, there are alternative explanations and the body of evidence within depth psychology suggests that they are in fact vital and rich psychological experiences that deserve attention. If the unitary self is an illusion and the human mind is in fact composed of many independently conscious modules or self-states,

dreams could represent a platform for communication between these different entities. Thus, working with dreams is a potential method for communicating more directly with aspects of the self which are otherwise inaccessible to the therapist.

Chapter IV
Summary and Conclusions

Summary

This thesis synthesizes research on models of extended consciousness and dreaming from the fields of cognitive neuroscience and depth psychology in an attempt to encourage communication between these two fields of study, propose an understanding of the multiplicity of self that combines these two perspectives, use depth psychology findings to inform further research on dreaming in the field of cognitive neuroscience, and to encourage the use of dreamwork in clinical practice by proposing a theoretical mechanism for the utility of dreaming in the context of the multiplicity of self. Chapter II presented theories on extended consciousness from the work of cognitive neuroscientists, focusing primarily on the most recent work of Michael Gazzaniga (Gazzaniga, 2018; Gazzaniga et al., 2019). This portion of the literature review presented Gazzaniga's theory that consciousness is modular and not unified: modules that are each independently capable of producing consciousness turn on sequentially in time and are stitched together by the brain's interpreter module to produce the illusion of a cohesive sense of self, much as a flip book produces the illusion of movement from static images (Gazzaniga, 2018). Chapter II then explored cognitive neuroscience perspectives on dreaming, revealing that the phenomenon of dreaming continues to be poorly understood and underutilized in this framework (Max, 2010). Research in this field has explained observable aspects of sleep and dreaming (the correlation of rapid eye movement and dreaming) as well as brain regions activated or deactivated during dreaming but has not

led to a cohesive theory of dreams as a psychologically or evolutionarily useful phenomenon (Tononi, 2008). The dominant theory of dreaming in cognitive neuroscience is that it is an accidental byproduct of other useful brain functions (Domhoff, 2018). This researcher was unable to find cognitive neuroscience literature linking the phenomenon of dreaming to the phenomenon of extended consciousness.

Chapter II subsequently presented models of the sense of self from depth psychology. Chapter II broadly outlined the Jungian concepts of the unconscious, the ego, and the transcendent function (Jung 1916/1960 p. 69, [*CW* 8, para. 167]; 1948/1975, pp. 104–105 [*CW* 8, para. 270]). Jung promoted the idea of parts of the mind that are not in awareness, but nonetheless influence or even control the individual's behavior. Jung presented the ego as the part of the mind that believes itself to be the totality of the self, what a person is generally referencing when using the term "I" (1954/1975, p. 142 [*CW* 8, para. 382]). Chapter II then reviewed the work of modern scholars, focusing on the concept of self-states from relational psychoanalytic theory. In this field, the sense of self is understood as composed of many parts: there is no single cohesive self, rather multiple self-sates are activated in different contexts and are separated by varying levels of dissociation (Bromberg, 2006, 2011; Stern, 2011). Chapter II then explored dreaming from the perspective of these theorists, revealing that depth psychologists consider dreams to be meaningful interactions of different parts of the mind and a platform for communication (Aizenstat, 2009; Bromberg 2006; Hillman, 1989; Jung 1961/1963).

Chapter III explored the similarities and differences between the lenses of depth psychology and cognitive neuroscience on the subject of the sense of self. This section noted the parallels between Gazzaniga's concept of a modular consciousness and relational psychoanalytic theory's concept of self-states (Bromberg, 2006; Gazzaniga,

2018). Utilizing additional findings from cognitive neuroscience and depth psychology, this thesis made an argument for the superiority of self-state theory in explaining phenomena including dissociative identity disorder and alien hand syndrome. Based on these studies, this thesis presented possible neurological mechanisms for self-state theory. Chapter III also presented data from this researcher's experience of an unusual lucid dream about solipsism. This researcher analyzed the dream in the context of the various theories presented in Chapter II and argued for the dream's content as evidence of self-state theory.

Conclusions

Depth psychology and cognitive neuroscience models of the sense of self are unified in viewing the singularity of self as an illusion (Bromberg, 2006; Gazzaniga, 2018). Both depth psychology and cognitive neuroscience propose that the self is divided into multiple modules or self-states (Bromberg, 2006; Gazzaniga, 2018). These theories diverge in their understanding of dreaming and its relation to this sense of self: depth psychology exalts dream material and cognitive neuroscience discounts it (Bromberg, 2006; Tononi, 2008). Evidence from depth psychology as well as the dream described in Chapter III suggest the need for further exploration in the field of cognitive neuroscience into the relationship between a modular theory of consciousness and the phenomenon of dreaming.

Clinical Implications

Theories from depth psychology and from cognitive neuroscience can both be used with clinical populations to help individuals better understand their own minds. The different frameworks and terminologies may appeal more or less to different individuals, and if a clinician is familiar with both they will be better prepared to assist clients of

either preference. The idea of self-states or of a modular consciousness is useful in helping clients understand their experience of simultaneously holding multiple opposing views, emotions, or behaviors. Understanding multiplicity as an innate and normal part of being human is useful to the psychological task of holding the tension of the opposites (Bromberg, 2006). Dreamwork is increasingly marginalized by clinicians in therapeutic practice, despite clients sharing dream material frequently (Leonard & Dawson, 2018). Depth psychologist Douglas Thomas (2009) conducted a review of research on the efficacy of dreamwork and found "substantial evidence for the value of working with clients' dreams in therapy" including for engaging resistant clients, facilitating the development of the therapeutic alliance, and for providing existential meaning for clients at the end of life (p. 5). In the context of the multiplicity of self as described in cognitive neuroscience and depth psychology, dreams may act as communication between delinked self-states or modules (Gazzaniga, 2018; Bromberg, 2006). Clinical dreamwork could enhance the natural function of dreams as a mechanism for integrating information between dissociated self-states (Bromberg, 2006). Thus, emerging theories of extended consciousness provide a theoretical backing for the utility of dreaming in clinical practice.

Recommendations for Further Research

There are other possible theories that explain the data presented by Michael Gazzaniga (2018) from his research on split-brain patients. Specifically, rather than brain modules each independently producing consciousness that is then stitched together, perhaps each module has its own conscious experience. This model would explain not only the split-brain experiments and brain lesion deficits discussed by Gazzaniga (2018), but also suggests a mechanism for phenomena including dissociative identity disorder,

dreaming, and alien hand syndrome. Likewise, relational psychoanalytic theorists would benefit from neuroscientific exploration of the theory of multiple self-states (Bromberg, 2006). Further exploration of the neurological mechanisms of dissociation and the process of self-states gaining and losing motor control would help to either support or refute self-state theory.

In the cognitive neuroscience discipline, further exploration of dreaming is needed as it remains poorly understood despite being a universal human experience (Max, 2010). Specifically, the phenomenon of lucid dreaming may be a pathway to communication with inaccessible self-states or modules. Researchers can induce lucid dreaming in subjects and such subjects can use eye movements to communicate with researchers while they are sleeping (Baird, Mota-Rolim, & Dresler, 2019). These techniques could be expanded to see if external communication with dream figures is possible and if it could reveal unknown aspects of the structure of consciousness. Future research could also include the development of other means to attempt communication with dissociated self-states or isolated modules. Gazzaniga and Miller (2008) described the right hemisphere as "impoverished" from their research on split-brain patients (p. 268). However, it is possible that communication which tailors to the right hemisphere's abilities has not yet been attempted. The right hemisphere lacks much language ability but can read whole words to a limited extent and is skilled in constructing visual representations (Gazzaniga et al., 2019). Creative means of communicating with the right hemisphere in split-brain patients could provide a wealth of information about how this more mysterious half of the brain experiences the world. This, in turn, could provide clinically useful information about how dissociated self-states perceive and experience life.

References

Aizenstat, S. (2009). *Dream tending: Awakening to the healing power of dreams*. New Orleans, LA: Spring Journal.

Archarya, A. B., & Wroten, M. (2019). Broca aphasia. In *StatPearls.* Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK436010/

Baird, B., Mota-Rolim, S. A., & Dresler, M. (2019). The cognitive neuroscience of lucid dreaming. *Neuroscience & Biobehavioral Reviews, 100*, 305–323. https://dx.doi.org/10.1016/j.neubiorev.2019.03.008

Beahrs, J. O. (1982). *Unity and multiplicity: Multilevel consciousness of self in hypnosis, psychiatric disorder and mental health*. New York, NY: Brunner/Mazel.

Bostrom, N. (2003). Are we living in a computer simulation? *The Philosophical Quarterly, 53*(211), 243–255. https://dx.doi.org/10.1111/1467-9213.00309

Bromberg, P. (1996). Standing in the spaces: The multiplicity of self and the psychoanalytic relationship. *Contemporary Psychoanalysis, 32*(4), 509–535. https://dx.doi.org/10.1080/00107530.1996.10746334

Bromberg, P. (1998). *Standing in the spaces: Essays on clinical process, trauma, and dissociation*. London, United Kingdom: Psychology Press.

Bromberg, P. (2006). *Awakening the dreamer*. Mahwah, NJ: The Analytic Press.

Bromberg, P. (2011). Multiple self-states, the relational mind, and dissociation: A psychoanalytic perspective. In P. F. Dell & J. A. O'Neil (Eds.), *Dissociation and the dissociative disorders* (pp. 637–652). New York, NY: Routledge.

Chalmers, D. J. (1996). *The conscious mind: In search of a fundamental theory*. New York, NY: Oxford University Press.

Cisek, P. (2007). Cortical mechanisms of action selection: The affordance competition hypothesis. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences, 362*(1485), 1585–1599. https://dx.doi.org/10.1098/rstb.2007.2054

Consciousness. (1998). In S. Sutherland (Ed.), *The Macmillan dictionary of psychology* (2nd ed., p. 95). Basingstoke, United Kingdom: The Macmillan Press.

Damasio, A. R., & Meyer, K. (2008). Consciousness: An overview of the phenomenon and of its possible neural basis. In S. Laureys & G. Tononi (Eds.), *The neurology of consciousness* (pp. 3–14). London, United Kingdom: Elsevier.

de Gelder, B., Tamietto, M., van Boxtel, G., Goebel, R., Sahraie, A., van den Stock, J., . . . Pegna, A. (2008). Intact navigation skills after bilateral loss of striate cortex. *Current Biology, 18*(24), R1128–R1129. https://dx.doi.org/10.1016/j.cub.2008.11.002

Depth psychology. (2019). In *The Archive for Research in Archetypal Symbolism.* Retrieved from https://aras.org/concordance/content/depth-psychology-term

Dell, P. F., & O'Neil, J. A. (2011). Preface. In P. F. Dell & J. A. O'Neil (Eds.), *Dissociation and the dissociative disorders* (pp. xix–xxi). New York, NY: Routledge.

Domhoff, G. W. (2018). *The emergence of dreaming: Mind-wandering, embodied simulation, and the default network*. New York, NY: Oxford University Press.

Gazzaniga, M. (1967). The split brain in man. *Scientific American*, *217*(2), 24–29. Retrieved from http://s3.amazonaws.com/Edcanvas/9007/local/split%20brain%20in%20man.pdf

Gazzaniga, M. (2018). *The consciousness instinct: Unraveling the mystery of how the brain makes the mind.* New York, NY: Farrar, Straus and Giroux.

Gazzaniga, M., Ivry, R., & Mangun, G. (2019). *Cognitive neuroscience: The biology of the mind*. New York, NY: W.W. Norton & Company.

Gazzaniga, M., & Miller, M. (2008). The left hemisphere does not miss the right hemisphere. In S. Laureys & G. Tononi (Eds.), *The neurology of consciousness* (pp. 261–270). London, United Kingdom: Elsevier.

Gates, J. (2010). Symbols of power: Adinkras and the nature of reality. *Physics World, 23*(6), 34–39.

Gehring, W. J. & Knight, R. T. (2000). Prefrontal-cingulate interactions in action monitoring. *Nature Neuroscience, 3*(5), 516–520. http://dx.doi.org/10.1038/74899

Hall, J. (1984). The use of dreams and dream interpretation in analysis. In M. Stein (Ed.), *Jungian analysis*. Boulder, CO: Shambala.

Hillman, J. (1989). *A blue fire* (T. Moore, Ed.). New York, NY: Harper.

Hillman, J. (1979). *The dream and the underworld*. New York, NY: Harper.

Jung, C. G. (1960). The transcendent function (R. F. C. Hull, Trans.). In H. Read et al. (Eds.), *The collected works of C. G. Jung* (Vol. 8, pp. 67–91). Princeton, NJ: Princeton University Press. (Original work published 1916)

Jung, C. G. (1963). *Memories, dreams, reflections.* (A. Jaffe, Ed.) (R. Winston & C. Winston, Trans.) (Rev. ed.) New York, NY: Vintage Books. (Original work published 1961)

Jung, C. G. (1975). On the nature of the psyche (R. F. C. Hull, Trans.). In H. Read et al. (Eds.), *The collected works of C. G. Jung* (Vol. 8, 3rd ed., pp. 125–175). Princeton, NJ: Princeton University Press. (Original work published 1954)

Jung, C. G. (1975a). Instinct and the unconscious (R. F. C. Hull, Trans.). In H. Read et al. (Eds.), *The collected works of C. G. Jung* (Vol. 8, 3rd ed., pp. 102–108). Princeton, NJ: Princeton University Press. (Original work published 1948)

Jung, C. G. (1975b). A review of complex theory (R. F. C. Hull, Trans.). In H. Read et al. (Eds), *The collected works of C. G. Jung* (Vol. 8, 3rd ed, pp.76–85). Princeton, NJ: Princeton University Press. (Original work published 1948)

Jung, C. G. (1976). The Tavistock lectures: On the theory and practice of analytical psychology (R. F. C. Hull, Trans.). In H. Read et al. (Eds.), *The collected works of C. G. Jung* (Vol. 18). Retrieved from http://www.proquest.com (Original work published 1935)

Kastrup, B. Crabtree, A., & Kelly, E. F. (2018, June 18). Could multiple personality disorder explain life, the universe, and everything? [Blog post]. Retrieved from https://blogs.scientificamerican.com/observations/could-multiple-personality-disorder-explain-life-the-universe-and-everything/

King, D. (2002). New perspectives on metaphysical solipsism. *Philosophy Today, 42*(2), 131–142.

Kohut, H. (1977). *The restoration of the self*. Chicago, IL: University of Chicago Press.

Lampl-de Groot, J. (1981). Notes on "multiple personality". *The Psychoanalytic Quarterly, 50*(4), 614–624.

Libet, B. (1996). Neural processes in the production of conscious experience. In M. Velmans (Ed.), *The science of consciousness* (pp. 96–117). London, United Kingdom: Routledge.

Leonard, L., & Dawson, D. (2018). The marginalisation of dream in clinical psychology practice. *Sleep Medicine Reviews, 42*, 10–18. https://dx.doi.org/10.1016/j.smrv.2018.04.002

Max, D. T. (2010, May). The secrets of sleep. *National Geographic, 217*(5). Retrieved from httpy://nationalgeographic.com

McComiskey, B. (1997). Gorgias, "On Non-Existence": Sextus Empiricus, "Against the Logicians" 1.65–87, Translated from the Greek text in Hermann Diels's "Die Fragmente der Vorsokratiker". *Philosophy & Rhetoric, 30*(1), 45–49. Retrieved from http://www.jstor.org/stable/40237935

Mitchell, S. A. (199l). Contemporary perspectives on self: Toward an integration. *Psychoanalytic Dialogues, 1*(2), 121–147.

Moskowitz, C. (2016, April). Are we living in a computer simulation? *Scientific American.* Retrieved from http://scientificamerican.com

Multiple personality. (1998). In S. Sutherland, *The Macmillan dictionary of psychology* (2nd ed., p. 284). Basingstoke, United Kingdom: The Macmillan Press.

Ogden, T. (1994). *Subjects of analysis*. Lanham, MD: Rowman & Littlefield.

Pacifica Graduate Institute. (2017). *Counseling psychology thesis handbook for 2017 matriculates.* Carpinteria, CA: Author.

Pinker, S. (1997). *How the mind works*. New York, NY: Norton.

Ringstrom, P. (2014). *Everything you've wanted to know about relational psychoanalysis but were too confused to ask*. The Institute of Contemporary Psychoanalysis Los Angeles. Retrieved from http://icpla.edu/wp-content/uploads/2014/09/Ringstrom-P-Everything-youve-wanted-to-know-about-relational-psychoanalysis-but-were-too-confused-to-ask.pdf

Samuels, A., Shorter, B., & Plaut, F. (1986). *A critical dictionary of Jungian analysis*. New York, NY: Routledge.

Schaefer, M., Heinze, H.J., & Galazky, I. (2010). Alien hand syndrome: Neural correlates of movements without conscious will. *PLoS One, 5*(12), 1–5. https://dx.doi.org/10.1371/journal.pone.0015010

Schlumpf, Y. R., Reinders, A., Nijenhuis, E., Luechinger, R., van Osch, M., & Jancke, L. (2014). Dissociative part-dependent resting-state activity in dissociative identity disorder: A controlled fMRI perfusion study. *PLoS One, 9*(6). https://dx doi.org/10.1371/journal.pone.0098795

Schore, A. (2003). *Affect dysregulation and disorders of the self*. New York, NY: Norton.

Soon, C. S., Brass, M., Heinze, H. J., & Haynes, J. D. (2008). Unconscious determinants of free decisions in the human brain. *Nature Neuroscience, 11*(5), 543–545.

Stern, D. (2011). Dissociation and unformulated experience: A psychoanalytic model of mind. In P. F. Dell & J. A. O'Neil (Eds.), *Dissociation and the dissociative disorders* (pp. 653–666). New York, NY: Routledge.

Taylor, J. B. (2008, February). *My stroke of insight* [Video file]. Retrieved from https://www.ted.com/talks/jill_bolte_taylor_s_powerful_stroke_of_insight?language=en

Thomas, D. (2009). Dreams and evidence based practice: The empirical case for restoring dream work to best therapeutic practice.. Retrieved from http://drdouglasthomas.com/DT_images/WRITING_Dreams&EBP.pdf

Tononi, G. (2008). Sleep and dreaming. In S. Laureys & G. Tononi (Eds.), *The neurology of consciousness* (pp. 89–107). London, United Kingdom: Elsevier.

Vogel, M. (1987). Modern poetry in the classroom: A geography of the self: Pablo Neruda's "We Are Many". *English Journal 76*(5), 97–100.

Westerhoff, J. (2011). *Reality: A very short introduction*. Oxford, United Kingdom: Oxford University Press.