Dreaming phenomena constitute a landscape fraught with difficulties for any scientific account motivated to understand it. G. William Domhoff ably traverses this complex landscape by providing an authoritative review of diverse types of findings and builds a forceful defense of the neurocognitive theory, which is an ambitiously comprehensive, multifaceted theory of dreaming. The book sets the domain of discourse clearly in the beginning by identifying the context, definitions, and empirical phenomena of interest. The theory is built on three levels, namely the neural substrate that gives rise to dreaming, the cognitive processes involved in dreaming, and the reported phenomena of dreaming provided by participants in laboratory as well as nonlaboratory studies. To these levels, he adds a developmental dimension by stating that the neural and cognitive bases of dreaming develop gradually. Domhoff argues that the neurocognitive theory is a synthesis built by integrating findings coming from diverse fields. To manage this complexity, Domhoff applies a "divide and conquer" approach in explaining dreaming: "In order to develop a complete theory of dreaming, it is ... essential to distinguish five separate issues from each other: neural substrates, cognitive processes, the psychological meaning contained in dream content, evolutionarily adaptive functions, and historically invented cultural uses. It is then possible to explore how these different issues are intertwined" (p. 4).

To delineate the phenomena of interest, Domhoff defines dreaming “as a unique form of spontaneous, internally generated thought[... in which dreamers experience themselves as being in hypothetical scenarios” (p. 8). This definition is a stepping stone from which Domhoff takes the reader on a journey through the empirical literature on dreaming.

In chapter 2, Domhoff provides a comprehensive review of studies on the neural substrates of dreaming informed heavily by recent theories of
brain networks. He identifies the frontoparietal control network, the dorsal attention network, the salience/ventral network, and the default network as major association networks of the brain. Domhoff focuses on the default network as “the primary basis for dreaming,” which is involved in imagination, memory, and mental imagery and characterized as internally integrated, self-regulated, and self-contained (p. 13). Domhoff cites findings that establish that the default network is somewhat let loose to run free when the individual is not executing a demanding external task. He also identifies the neural network that subserves dreaming, which consists of two subsystems of the default network located in the dorsal medial prefrontal cortex and the medial temporal cortex. The neurocognitive theory as described by Domhoff has an intuitive appeal in explaining the cyclical nature of the relationship between waking and dreaming phenomena.

Armed with the cognitive neuroscientific findings, Domhoff continues in chapters 3 through 5 to cover the content of dreams in order to deliver a more complete theory of dreaming. In chapter 3, he provides a detailed discussion of how quantitative content analyses, specifically the Hall/Van de Castle (HVdC) coding system, can be used to identify and explain what people mostly dream of and to what extent these contents change among individuals, cultures, or time. A highly commendable feature of this book is the conscientious scrutiny of methodological and/or statistical issues that may threaten the reliability of inferences in dream studies. In most cases, Domhoff is successful in acknowledging these issues as well as identifying the approaches that work effectively. These studies show that dream content changes relatively little across age, country, or culture, except for the frequency and nature of aggressive actions in people's dreams, which are also connected to small gender differences.

Throughout the book, Domhoff utilizes as many different types of data as possible to build a comprehensive theory. In chapter 4, he reviews content studies of dream series as recorded in individuals' journals and concludes that dream content shows consistency across the lifespan, albeit with individual differences. One conclusion from these studies appears to be rather novel and potentially fruitful concerning cross-cultural psychology; a very common theme in cross-cultural approaches is that most psychological phenomena show significant variation across cultures. Based on observed cross-cultural similarities in dream reports, Domhoff proposes that “dreams are first of all characterized by pan-human dimensions on the one side and by large individual differences on the other” (p. 137).

In chapter 5, Domhoff covers issues of symbolism in dreams and points to findings from empirical studies of dream reports, which show that symbolic elements in dreams are rather infrequent, contrary to what many would expect. He suggests that cognitive insufficiencies during dreaming can be used to explain this finding. These insufficiencies are caused by the relative deactivation of major association networks during dreaming, save for the default network, which is smaller and more limited compared to others. Since symbolism and metaphor are complex functions, the default network may not be sufficient by itself to support these cognitive feats. In chapters 6 and 7, Domhoff makes good on his addition of the developmental dimension to the neurocognitive theory. He cites many developmental studies of maturation of the default network, which show that early on, it is rather immature and begins to develop to adultlike levels between ages nine to thirteen as connections grow within the network itself and with the frontoparietal control network. Domhoff relates these findings to findings on the development of waking cognitive functions and suggests that it should be no surprise that these developments happen in parallel to give rise to fully mature dreaming, which he characterizes as “a gradual cognitive achievement” (p. 163).
In chapter 8, Domhoff covers the occurrence of emotions in dreams, which he characterizes as “the most difficult and contentious issue in the study of dream content” (p. 207). He suggests that the lower-than-expected frequency of emotions in dreams is due to cognitive insufficiencies caused by the deactivation of four of the association networks during dreaming. Based on his comprehensive review of the scientific literature on dreaming, Domhoff is confident that the neurocognitive theory is the truest account of dreaming, and in chapters 9 through 11, he criticizes the rival theories. He suggests that there is a lack of evidence for the Freudian theory, other than case studies discussed by psychoanalysts. Unsurprisingly, Domhoff points to the inferential inadequacies of these case studies to conclude that “there are essentially no studies supporting Freudian dream theory at the neurocognitive, developmental, or content levels” (p. 249).

Domhoff also criticizes the activation-synthesis theory, which states that dreaming is nothing other than the cortical structures of the brain trying to make sense of random and chaotic firings from the brainstem during the REM (rapid eye movement) stage of sleep. Domhoff cites studies refuting the theory’s neurophysiological foundations. The activation-synthesis theory focuses largely on REM sleep, in which the brainstem bombards the cortex with firings, yet these studies show that these firings are not specific to REM sleep. In addition, as REM sleep occurs in human neonates, the activation-synthesis theory allows for the possibility of dreaming experiences, albeit linguistically indescribable, even in the neonate. This runs directly counter to the developmental thesis of the neurocognitive theory.

Domhoff begins his criticisms of adaptation theories of dreaming by stating point-blank that dreams have no adaptive functions. He supports this statement by reminding the reader of four different empirical findings described earlier in the book: (1) recall of dreams during sleep onset and at night is too infrequent for dream to contain any information useful for waking life; (2) dreaming is “likely absent[!]” in the preschool years and lacks complexity until ages nine to eleven; (3) people who lose dreaming can nevertheless function cognitively; and (4) dream content is consistent over long periods of time, which runs counter to the idea that dreams help people deal with new problems as they arise. According to Domhoff, these findings provide a strong basis for rejecting any adaptive theories, which claim that dreams help people solve specific problems, regulate emotions, and master waking situations. He proposes that dreaming is better characterized as a type of unintended byproduct of one or more adaptations; it is there because it does not hinder reproductive success.

In many instances, Domhoff rejects other theories because of the absence of evidence for these theories or possible alternative interpretations of the findings. This book is a staunch defense of the neurocognitive theory of dreaming, and equally, it is a strong rejection of all other theories. Of course, proponents of rival theories, especially adaptive and activation-synthesis theories, will interpret at least some of the findings in different ways. They might raise issues such as the unresolved cases of underdetermination in the context of updated versions of activation-synthesis and adaptive theories. Some might also cite the statistical notion that the absence of evidence for a theory is not necessarily evidence against it and argue that further evidence may turn out to support at least certain aspects of these alternative theories. Nonetheless, Domhoff is highly confident that the neurocognitive theory will be further confirmed by novel data from new studies that will use new technologies. He concludes the book by stating that “the fate of the neurocognitive theory of dreaming, as well as the fate of the other theories ... could be decided within a decade” (p. 299). Regardless of whether one agrees with this statement, Domhoff’s book is an invaluable resource
that will elevate the scientific work on dreaming
as well as cognitive science in general.

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