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Expanding the Scope of "Supernatural" Dreaming in the Light of the Cognitive and Evolutionary Study of Religion and Cultural Transmission

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Abstract: A conundrum in the cognitive, evolutionary, and anthropological study of religion is how to propose descriptions and explanatory models of the structure and functions of supernatural dreaming and its relationship to action imagery, the use of experience, and, importantly, cultural transmission (factors) associated with these representations. Research has long emphasized the important function and significance of dreams and dreaming in beliefs and practices related to religious phenomena. The literature of anthropology and religious studies shows that dreams, dream experiences, and narratives are often associated with religious ideas and practices, both in traditional societies and in the world religions. Indeed, at the very beginning of the anthropological study of human beings, scholars proposed that dreaming is a primary source of religious beliefs and practices. Another facet of this is the recurrent manifestations of divinities, spirits, ancestors, and demons—in short, imagery of various supernatural agents—together with the occasional ritualization of dreams in the waking state. However, we know less about the associated phenomenon of dreams about ritual imagery. The aim of this paper is to elucidate and map dream imagery about rituals, drawing on simulation theories from dream research and prominent models of ritual behavior in the cognitive and evolutionary science of religion (CESR). This theoretical and methodological endeavor is illustrated by examples from dream narratives collected in Nepal before and after the COVID-19 pandemic.

Keywords: dreaming; cognitive and evolutionary study of religion; ritual imagery

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1. Introduction

Dreaming is a universal experiential modality and theme in human cultures. The phenomenon of dreaming tends to be ascribed special status in the many cultural settings, traditions, and practices of the world religions (Bulkeley 2007, 2008; Jedrej and Shaw 1992; Lohmann 2003). Religious dreams are commonly reported to contain imagery about various social or non-social entities—supernatural/human agents—but less often descriptions of ritual interaction. The significance of dreaming is culturally varied. The difference in the significance of dreams is shown in models that contrast monophasic with polyphasic cultural features (Laughlin 2011). In monophasic cultures, there is a sparser distribution of representations that promote special evaluation of dreams or the benefits of attending to them, along with an emphasis on a strict division between imagination and reality (Laughlin et al. 1990; Laughlin 2011). Monophasic dream beliefs may be much more predominant in the modern world and in so-called "WEIRD" societies (Henrich et al. 2010). The opposite is observed in polyphasic cultures, which have predominated in most human societies throughout history. These polyphasic environments are characterized by a tendency to

ascribe epistemic authority to dreams as a kind of communicative signalling and to make ontological assumptions about dream contents, such as that they are not products of the imagination but function as evidence about reality, and to attribute eminent value to dreams (e.g., Bourguignon and Evascu 1977), which may be equivalent to practices concerned with trance-, ordeal-, and drug/entheogen-induced states (Locke and Kelly 1985). In a related way, the previously mentioned monophasic/polyphasic distinction resembles descriptions of dreaming developed in early anthropological theory, which sees it as a primary, experiential source of religious beliefs (e.g., Tylor 1871); however, some scholars caution against exaggerating these distinctions (e.g., Campany 2020).

In a renowned cross-cultural survey of ethnographic literature, Roy D'Andrade demonstrated the (statistical) predominance of cultural traits relating dreams to religious systems (D'Andrade 1961), as well as pervasive dream imagery that concerns contacting or attempting to exercise influence over supernatural entities and powers. In D'Andrade's investigation, anxiety, social loneliness, isolation, and the need for self-reliance had correlative links with dream imagery about supernatural entities and powers (D'Andrade 1961, pp. 320, 328). Other research has reported that nightmares are frequent in the context of initiations and conversion ordeals (Bulkeley 2007). These conditions suggest that dreams can function as anchors for belief by providing direct sense-based "evidence" of supernatural entities and spirit realms (Bulkeley 2008). Indeed, such assumptions are associated with emotionally intense and convincing dream experiences, a sense of the "realness" of dream imagery, and, frequently, forced and obtrusive encounters with supernatural entities, as evidenced by nightmares. Hence, dream apparitions and "big dreams"—encounters with culturally significant supernatural/human agents (SAs) and so-called "visitation dreams" (encounters with the dead, ancestors, relatives, or loved ones; see Campany (2020) on the "visitation paradigm") can merge an intense sense of reality with a non-frightening or terrifying emotional experience. Supernatural dreams also tend to be awarded sacred and cultural value, as shown in the ethnographic literature (Jedrej and Shaw 1992; Littlewood 2004; Peluso 2004; Renne 2004). Dreams are also used in various spiritual cultivation traditions and religious disciplines (Jensen 2023).

Not surprisingly, the significance and functions of such dreams, as well as their tendency to have affordances for institutional use, are found in all the religious traditions (Bulkeley 2007, 2008, 2009; Doniger and Bulkeley 1993) and in various recent religious or fundamentalist movements, such as among Taliban jihadists (Edgar 2004), Jewish nationalists (Knafo and Glick 2000), Trinidadian Baptists (Littlewood 2004), and Nigerian church cults (Renne 2004). In a more general sense, anthropological theorizing has pointed to various ways in which cultures tend to accentuate diverse dream conceptions concerned with topics related to "soul travel", visitation, discernment, semiotic messages, generative precognition, and "nonsense"/bizarreness (Lohmann 2007, pp. 41–44). In addition, the importance of the pragmatic and communicative context of the dream and the dreamer has been emphasized (Tedlock 1987). These public dream representations are often organized according to classifications about how the dreams are perceived, used, and linked to pragmatic and social concerns (Kilborne 1987, p. 174). Dreams can also be effective vehicles for the cultural transmission and dissemination of religious ideas (Knafo and Glick 2000).

The uses of dreams again illustrate the values and truth claims attached to supernatural agent dream imagery and have been established in the ethnographic literature (e.g., Jedrej and Shaw 1992; Peluso 2004; Renne 2004). In particular, dreams tend to be related to precognition or prognostication performed by oracles (e.g., Bulkeley 2008; cf. Patton 2004) or in oneiromancy or dream divination (Nordin 2023; Tedlock 2006).

Various dream-related practices performed in the waking state, such as ritualized dream incubation (Morinis 1982; Patton 2004), divination, prediction of the future, and

dream interpretation, have existed in polyphasic cultures in numerous religious traditions and traditional societies (e.g., Bourguignon 1972; Bulkeley 2008; Hughes 2000; Jedrej and Shaw 1992; Laughlin 2011; Lincoln 1935; Tedlock 1987). Ethnographic reports from numerous cultures in which ancestor worship is a common practice also note that dead ancestors appear in frightening and memorable dreams to reprimand the dreamer for failing to perform commemorative rituals (e.g., Boyer 2001; Jedrej and Shaw 1992; Trompf 1990).

While much of the previously mentioned research emphasizes the occurrence and function of supernatural agent imagery in religious dreaming, there is little knowledge about the various ways that ritual performance is represented in dreams. This article adopts the assumption that dreaming is a process that "simulates" innumerable kinds of events and behaviors. An example of this is a person's dream imagery of social interactions and engagement in ritual behaviors (which may or may not be realized in waking life). Dreaming can thus be seen as a remarkable case where ritual action types and ritualized behaviors are simulated in specific events. Rather than metacognitive reflections—where people brood over or converse about (the symbolic meaning or message of) rituals—this is a kind of modelling that focuses directly on the cognition and simulation of ritual interactions during sleep and dream states.

Further, starting points for the analytical strategy adopted here are the assumptions that the processes of dreaming are shaped and constrained by evolved and adapted simulation abilities, that dreaming about ritual interaction is a common and relatively unknown terrain in the research on religious dreaming, and finally, that these conditions are generally likely to constitute transmission factors for some cultural distribution of social information in the waking state. It is also assumed that we should adopt empirically supported, strong (explanatory) theories and research to map the lacunae in our knowledge about dreamed ritual imagery. Influential and strong approaches in dream research and in cognitive and evolutionary theories of both religion and cultural transmission suggest definite explanatory descriptions of what to expect regarding the functions and features of dreamed ritual imagery. But is "ritual" not one of those contested and vague terms in academic discourse? Anthropologically, "ritual" does not denote one single type of phenomenon, and scholars therefore suggest that the concept of "rituals" comprises a polythetic category based on family resemblances (e.g., Needham 1975). Consequently, attempting to model a single concept and (explanatory) theory of "ritual" would seem to be a fruitless endeavor. However, it is plausible to note that there are obvious behavioral features of the various types of interactions recognized as "rituals" (Rappaport 1979). The disparate but recurrent features of "ritual" will here be methodologically used in accordance with the proposed evolutionary cognitive functions they serve (Boyer and Liénard 2020).

Accordingly, one objective of this article is to suggest a methodology and theory that can guide an analysis of ritual imagery in dreams. A second objective is to apply the exploration of dreamed ritual interactions to the assumption that "rituals" refer to diverse constellations of (a) normative and usually scripted interaction; (b) signals of social relationship, cohesion, and affiliation; (c) reckoning in terms of magical thinking; and (d) ritualized performance (Boyer and Liénard 2020). A third objective is to sketch an alignment between dream simulation theories and the approach to ritual phenomena adopted here. Finally, these goals are related to and illustrated by dream interviews collected during research and fieldwork in Nepal. Some caveats are necessary. The sketched alignment and the purported methodology may need further improvement, but hopefully, they suggest potentially fruitful directions for research. It is, furthermore, not the aim of this article to provide a comprehensive statistical account of all the data and the entire method since such an admittedly relevant undertaking must be the focus of other publications.

2. Data and Materials

This article draws on data collected during fieldwork in Nepal and, in particular, two studies on dreaming. Neither of these studies aimed to map dream content with ritual imagery. Instead, they had other aims and served as secondary data sets for the present research. This means that studies more directly targeting ritual imagery in dreams may produce other results. On the other hand, both data sets employed here used questionnaires and semi-structured interviews enquiring into religiosity and the ritual use of dream content.

The aim, methods, and setting of the second study—"the pandemic group" (54 participants)—were concerned with the impact of the COVID-19 pandemic on strange dreams, nightmares, and religious dreaming. This study was conducted during 2022. Some dream excerpts and narratives used below come from interviews with the pandemic sample. The pandemic group consisted of 50 participants, 60 percent of whom were male, and the mean age was 55 years (age range 26–76).

However, the main part of the analysis of ritual imagery in this article (see Section 9) was based on the first study, conducted in 2016—"the prepandemic group" (60 participants). This research was primarily interested in mapping the occurrence of counterintuitive content in dream reports and religious dream imagery. All data were collected in the central and western parts of Nepal, in semi-urban and rural areas, but also around sacred sites. Sixty participants were interviewed (using a semi-structured questionnaire), of whom 65 percent were male, and the mean age was 61 years (range: 17–92 years). The majority of the interviews and data collection were carried out by a field assistant and translator working with the Nepali- and Hindi-speaking informants. The projects used the Qualtrix system for data collection, and the analysis was mainly performed in SPSS (29.0.2.0.(20)). In the pre-pandemic sample, one major aim was to use Barrett's (2008) coding model for counterintuitiveness in cultural representations and test it on allegedly religious dreams. For extensive details of the setting, conditions, coding procedure, statistics, design and limitations of the research, and its application to religious dreaming, see Nordin and Bjälkebring (2019, 2021), Nordin (2020, 2023).

This research will provide narrative examples of specific elements of religious dreaming and dream imagery of alleged ritual actions and artefacts.

3. Exemplars of Ritual Dream Imagery

This section illustrates how ritual imagery occurs in religious and supernatural dreaming, with reference to selected excerpts from (1) the research literature and (2) my own research on religious and pandemic dreaming with Nepalese and mainly Hindu informants. The use of dream narratives from the literature and my own research alludes to the arguably widespread occurrence of ritual dream imagery.

3.1. Dream Excerpts from Research Literature

> This dream was reported by the anthropologists Thomas and Jeffrey in early 1902-05 in connection with the succession to the rulership of Agukwu-Nri in Igboland (Ray 1992, p. 61). One candidate reports a dream related to the agonies of facial scarification: "One night Enwalana [. . .], the last Ezenri, appeared to him and said that he was the chosen man: thereupon he proceeded to **offer sacrifices**".
>
> (Ray 1992, p. 61)

In a dream collected from an Asabano woman in Papua New Guinea, the anthropologist Lohmann (2000) reports: "(. . .) sometimes at night I would wake up and feel afraid (. . .). I have seen spirits of the dead in dreams. Last night, I was **praying**. I closed my eyes and **prayed** because Walen [my husband] is sick, and I saw Sgane [an old woman who

recently died] come in, all wrapped in a sheet with her face exposed, and she went to play with Walen (. . .)".

Ritualistic dream imagery related to witchcraft and healing is found in dream accounts from the Peruvian Arawak of Amazonia (Santos-Granero 2004, pp. 274–75): "In their dreams, they are visited by any number of demonic teachers. . .who are under the command of Korioshpiri, the 'father' or 'ruler' of all demons. These demonic teachers, which include birds (cuckoos, nocturnal swallows), insects (grasshoppers, crickets), and the souls of other living and dead human sorcerers, appear to the sleeping child in human guise (. . .). The visiting demons **place animal or fish bones, palm-leaf slivers or other small objects in the child's palm, and then knock them off** so that they will be buried in the ground. Once buried, these objects cause somebody to fall ill".

3.2. Ritual Dream Imagery Collected in Nepal

The following section provides a brief account of how imagery about dreamed ritual interaction is manifested, employing data from the research among Hindus in Nepal. This research consists of two different surveys (for all information about the circumstances, design, setting, and limitations of this research, see Nordin (2020, 2023), Nordin and Bjälkebring (2019, 2021).

Below are excerpts from several different interviews (edited versions). The bolded words in the quotes are taken as anecdotal examples of different ritual elements that occur in dream narratives.

> "Before, about one year ago, we were on a ***tirtha yatra*** (pilgrimage) to Muktinath. We reached Kagbeni and stayed there. That night in my dream—my *sasura* (husband's father) *pitr* (ancestor) came and covered me with a blanket and closed the windows. He sprinkled water on us (wife and husband) and told us to do his ***shraddha*** (ancestral rite) with full commitment and following all the procedures. So, he will get *mukti* (liberation), and happiness will come to their family."

> "I was bathing in a river (Gandaki) and doing ***puja*** (offering, prayers) after it. After finishing the ***puja*** I distributed the ***prasad*** (eatable blessings) and cooked lunch for them. All the people were in the queue waiting for the food. I distributed lunch to all the people. They all thanked me and went away (. . .). I was just relaxing after distributing the lunch, and at the same time I heard a voice from somewhere: 'now it's your turn to take food'. I opened my eyes (in the dream) and there was a plate covered with a delicious meal. I ate it and washed my hands. At the same time I saw *Bhagwan* (a deity as "Lord") in the water, which was coming out of the water."

> "I was somewhere in an unknown place. (I was) so frightened, some unknown creatures were surrounding me. They were so big that I was like an ant in front of an elephant. At the same time a big snake—*Naga* (supernatural serpent)—appeared, whispering. It was bigger than (the) creatures. It threw some white liquid onto my body. After that I fell down, (and) when I woke up I was at (a) *Shiva mandir* (temple). When (I) opened my eyes I **had direct eye contact** with *Shivaji*, who put a **holy thread** (Mala) on me and told me to go home. I was awake at that time and fell from the bed."

> "(I) saw/got ***Darshan*** (a gaze of blessing from a supernatural agent) of *Budhanilakantha Bhagwan* who stood up from the water (and) came to her—**vomited on her hands three times**. She opened (a) big mouth in her dream (and) *Bhagwan* disappeared for a while, but she felt *Bhagwan* has entered her body when she closed her eyes. When she opened the (eyes) *Bhagwan* again lay down in the water."

> "In the dream: we were around 40 people on a ***tirtha yatra*** (pilgrimage) to some unknown places. (During) the daytime it rained heavily; we all ran to (a) *Dharmashala* (accommodation for pilgrims), but the door was closed, we were sitting outside on the floor. The rain stopped. About two more doors of Mandirs opened (and an) invisible voice called from inside the Mandir. I went (and) saw *Bhagwans* (. . .) family sleeping inside. No one was there to talk with me. Again, I heard a voice: 'take ***prasad*** from the container and **distribute it'.**"

> "I was (in) the ***Mandir*** which was in front of my home, conducting ***puja***, and at the same time God (. . .) told me to light the ***Agarbatti*** (burning of incense and wicks) every morning in front of the photo. I slept the whole night and when I got up I could not **open my eyes properly (and) my body parts were not moving properly (and) I was shivering**. I told the dream to my wife (and) she was scared and lit the ***agarbatti*** in front of the small photo of *Shivaji* which I had at home, and after that I was fine as before."

> (. . .) *Bhagwan Pashupatinath* came in my dream and said that my life living as a normal person should be ended here. He pulled me (and) took me inside *Pasupathi Mandir*. *Bhagwan* asked the main *pujari* (priest) **to sprinkle some (*jaal*) holy water into my body** and made me ***Pavitra*** (sacred purity).(...) **I was like a dead man seeing and listening (to) all the things without moving or talking**. Then *Bhagwan* took me to *Narka* (hell) and threw me into the cage where the demons and other wild animals were eating other people too. They ate my whole body. *Bhagwan Pashupatinath* called other *Bhagwans* and held a *dharmic* (sacred law) seminar, all the *Bhagwans* were sitting in a circle (. . .) (with) something like a box covered with *pabitra* (sacred purity), red and yellow coloured cloth was in the middle of (the) *Bhagwans*. *Pashupatinath* told (the) other *Bhagwans* that I had finished his *apabitra* (impure) *atma* (soul) and sent him to *Narka* and now I am making him alive again (by) giving him *pabitra atma* and sending him to the earth, giving him some power which *Bhagwans* have so that he takes care of the (other) people, and *Hindu dharma* too, and also inspire people to follow the right path, following *Bhagwans*. Every *Bhagwan* agreed and **threw flowers** and ***pabitra jaal*** towards me (.) The red and yellow cloth came out automatically and I was there (in) a holy *dharmik* (robe). All the *Bhagwans* **blessed** me together. I stood up and admired their **blessing and bowed down my head** towards (the) *Bhagwans* (. . .).

The excerpts above were all compiled as illustrative examples of how dream experiences and narratives can contain imagery of ritual interactions that are of various sorts and come from different research and cultural settings.

4. Some Key Topics in Dream Research and Simulation Theories of Dreaming

Some cutting-edge perspectives on dreaming suggest that dreams function as simulations of aspects of waking (social) life, drawing on a range of negative and positive emotions, as well as diverse circumstances, entities, and motivations (e.g., Blagrove et al. 2019a) in order to rehearse hypothetical and predicted outcomes. Research has shown that dream processes involve a variety of puzzling phenomena and modes of cognition that facilitate prospective comprehension and the modelling of counterfactuals (McNamara et al. 2002) in terms of future or past states of affairs. These processual states appear to be part of REM dreaming, which, among other things, consists of prospective coding (Llewellyn 2016) as well as the encoding of episodic memory information (Llewellyn 2013). Relatedly, dream processes are implicated in the initiation and embellishment of aspirations,

values/desires, and daydream content, which may be crucial for episodic prospection (Szpunar 2010; McNamara and Bulkeley 2015; Wamsley 2022) of probable states of affairs and outcomes. Technical differences aside (Foulkes 1985; Domhoff 2007; Hobson 2009; Hobson and Friston 2012), an established stance in dream research is that both waking consciousness and dreaming function as a sort of "realistic simulation" and/or "world simulation" (Foulkes 1985; cf. Llinás and Paré 1991). One implication of the simulation accounts is that similar types of neuro-cognitive processing govern both dreaming and the waking state (Tart 1987; cf. Revonsuo 2006). Phenomenologically, dream simulations function as a kind of "immersive spatiotemporal hallucinations" (Windt 2010), which is also related to the generation of a self-model of the dreamer during dreaming (Windt 2015).

There are undoubtedly many theories and traditions that explore the functions and content of dreaming. Three major accounts of dream simulation that are predominant (following the suggestions in Revonsuo et al. 2016) will be discussed below. Two of these have metatheoretical support from evolutionary considerations and purported adaptive functions, as seen in Threat Simulation Theory (TST), as well as in Social Simulation Theory (SST), while the versions of the Continuity Hypothesis (CH) are seemingly non-functional in an evolutionary sense. Although the precise contents and assumptions of the continuity hypothesis are debated, there are currently two versions, the Incorporation Continuity Hypothesis (ICH), in which dreams incorporate and reflect waking events, experiences, and activities (Schredl and Hofmann 2003), and the Cognitive Continuity Hypothesis (CCH), in which dreams modulate and articulate individual concerns and preoccupations that reflect waking life (Domhoff 2017). Intuitively, ICH would be appealing if religious dreams were supposed to generate imagery of rituals; hence, the content of dreams reflects or is directly influenced by (cultural and social) information from the waking state (e.g., Schredl and Hofmann 2003). Accordingly, Muslims would dream about the pilgrimage of Hajj more than atheists or Protestants, while tribes in the circumpolar north, whose livelihoods are highly dependent on sea life, would have a higher proportion of landscape and animal imagery in their dreams than dreamers in urban areas. Although CH, as it is currently framed, suggests that dreams simulate whatever reflects personal concerns coming from the waking consciousness, it cannot explain why some elements occur in the dream state and are imported for simulation rather than others (Revonsuo et al. 2016).

The other account of dream simulation proposes a more comprehensive and parsimonious model in which active selection biases serve to guide what specific and affective information is manifested in dreams. The prevalence of vigilance to upcoming dangers and threats in dreams is elaborated in Threat Simulation Theory (TST) (Revonsuo 2000; Valli and Revonsuo 2009). This theory suggests that dream cognition manifested during REM sleep and sometimes in NREM sleep is an ability—evolved in response to adaptive fitness challenges—to simulate threatening events in order to practice threat avoidance skills and threat acuity and enhance vigilance and perception of potential threats in waking life (Revonsuo 2000; Valli and Revonsuo 2009). In brief, TST suggests that the adapted function operates by running through the cognitive, affective, and perceptual systems involved in threat detection and avoidance, as well as the motor brain mechanisms, to enhance prompts and apt reactions in relevant waking situations. While TST may offer a gloomy account of the functions of many types of dreaming, a rich body of research on nightmares shows that various topics about threats to survival, relating to aggression, predation, and accidents, are pervasive and provide evidence for the TST stance. Themes about the dreamer being chased, threatened, or attacked by monstrous and predatory creatures, malicious foes, wild animals, or strangers are typically very frequent in dreams, and research suggests that various threats are predominantly manifested in reported dreams (60–75%) (Hall and Van de Castle 1966; Domhoff 1996; empirical details and statistics in Valli and Revonsuo 2009).

Accordingly, when respondents in questionnaire surveys are asked to choose from a set of exemplary dream topics which ones they recall having dreamed about, the scenario of being "attacked"—usually by (male) strangers or wild animals—is the most common and characteristically remembered dream theme across cultures.

TST associates dreamed threat simulation with various emotions such as fear, panic, and horror. There is an apparent difference between REM and NREM sleep states in terms of dream content and experience. In REM sleep, negative emotions, nightmarish threat scenarios, and bizarre imagery peak, while in NREM states, the reverse tendency is observed (Hall and Van de Castle 1966; Revonsuo 2000; Domhoff 2003). Research shows that aggression content is lower in NREM and waking reports than in REM sleep. This can be compared with the dream content relating to friendliness that characterizes NREM states (McNamara et al. 2010). The connection between apprehensive/non-apprehensive dream content and REM/NREM states suggests that the religious dream imagery of ritualization is heavily affected. Obviously, many forms of aggressive, demonic, predatory, and supernatural imagery occur in REM states, while non-apprehensive, friendly, and loving imagery typifies NREM states (Bulkeley 2007; McNamara and Bulkeley 2015).

From the perspective of the cognitive and evolutionary science of religion, TST obviously bears a resemblance to other proposed explanatory models, such as a hypersensitive agency detection device (HADD) (Barrett 2004), as well as a dedicated threat-detection psychology more generally (e.g., Boyer and Bergstrom 2011). This would include proclivities to assess and detect fitness challenges related to social offence and intrusion, threats to offspring, predation, and contagion. Subsequently, these sorts of adaptations would have evolved not only in response to the straightforward fitness challenges seen in natural selection but also in response to other pressures related to social as well as sexual selection. Thus, it is reasonable to expect dreaming to have adaptive functions that have also evolved as dynamic extensions of the mapping and simulation of social complexities and interactions (e.g., McNamara 2004; Humphrey 2000; Nielsen and Germain 2000; Brereton 2000).

Accordingly, in Social Simulation Theory (SST) (Tuominen et al. 2019b; Revonsuo et al. 2016), dream content is modelled as simulations of recurrent and major trials in waking social life related to intricacies and bonds, related actors and characteristics, and interactions. Evidence of social simulation is demonstrated in the research literature, with studies finding that at least one social feature occurred in more than 83.5 percent of dream reports (Tuominen et al. 2019a), and, complementarily, that barely 6.5 percent of dream reports are related to non-social simulation (Domhoff and Schneider 2018). Research also suggests that social bonding dreams are promoted by REM sleep (McNamara 1996) and that social actors occur more frequently in dreams than in reports from the waking state (McNamara et al. 2005). Relatedly, social simulation in dreams is evident in research about Theory of Mind (ToM) cognition in dreams related to social perception and mind reading of others (e.g., Kahn and Hobson 2005; McNamara et al. 2007). The gist of SST is the suggestion that specific evolved functions direct the simulation of social perceptions and episodes, with affectively positive and/or neutral dreams complementing the themes that are described for the threat simulation (above) and are manifested in nightmares. Social simulations and threat simulations can co-occur in actual dreams, but according to the theory, each is dedicated to simulation within its specific domain and may function in complementary and parallel ways (Revonsuo et al. 2016, p. 14).

5. Diminished Agency and "Decentring" Schema in Dream Imagery

A notable feature of imagery in dreams is the propensity to reorganize the dreamer's locus of agency in relation to the dream. This is frequently manifested in the imagery of nightmares, which display a much greater reduction in the dreamer's imagery of agency

than ordinary dreams (McNamara et al. 2018). Dreams during REM sleep often contain action-loaded imagery of a dreaming self as an agent, but at the same time, REM nightmares are particularly associated with the dreamer having diminished agency. This tendency has been linked to expanded ascription of agency and causal functions to other specific dream entities—and more specifically, to "superhuman/supernatural" agents and entities (McNamara 2016; McNamara et al. 2018; McNamara and Bulkeley 2015). Consequently, for dreamers who dreamed about SA in nightmares, 90 percent of the dream imagery was coupled with the dreamer having diminished agency, which was related to topics of victimization, threats of physical aggression, and malicious intentions (from SA) toward the dreamer. Other themes of dream imagery associated with diminished agency are being eaten, being preyed upon, being unable to move, being mute, being stuck, or drowning. Such an amalgamation of imagery seems to be a predictor of engaging in dream divination according to recent studies (Nordin 2023). The issue of dream or nightmare-linked imagery concerned with agency restriction can be compared to the general topic of "decentring" schemas, which are found in a variety of purportedly religious conceptualizations related to ritualized and meditative practices, mystical experiences, and spirit possession (McNamara et al. 2015; McNamara 2009). A schema that is decentring involves a significant loss or diminishing of the dreamer's sense of control, selfhood, and agency, as well as experiences of anxiety, disorientation, and fear (see discussion in McNamara et al. 2015).

The consistent occurrence of dream imagery about SAs in nightmares, in the context of diminished dreamer agency (McNamara et al. 2018; McNamara and Bulkeley 2015), has been explained as the attribution of agent causality to ego-external entities in order to correct for cognitive prediction errors (McNamara and Bulkeley 2015). Accordingly, the occurrence of external agents in dream simulation is currently described in line with an overall neuro-cognitive "pruning" of redundancy in predictive schema failure (e.g., Hobson and Friston 2012; Bucci and Grasso 2017). Specifically, in REM dreaming, the self-model is downregulated or absent in relation to actions and intentions, which generates gaps in the dreamer's predictive model.

Recent studies on the experience of control, religious beliefs, and ritualized behavior suggest a link between a sense of absent (internal and external) control and an attribution of supernatural agency, which can afford an experience of compensatory control (Kay et al. 2010; Hoogeveen et al. 2018). In Compensatory Control Theory (CCT), certain religious concepts can be employed in circumstances of anxiety, confusion, uncertainty, and randomness (cf. Boyer 2001, pp. 203–28) to strengthen the acuity of (compensatory) control over the situation. It is the ability of religious beliefs to provide compensatory control that is crucial, not that they are comforting in general (Hoogeveen et al. 2018). Similarly, control in situations of perceived uncertainty motivates action. According to research by Legare and Souza (2014), perceptions of uncertainty and lack of control increase belief in the effectiveness of ritual actions (compare below on "ritualized behaviour" and cf. Lang et al. 2020). However, rituals have no actual effects in terms of their purported physical causation and instrumental results (Humphrey and Laidlaw 1994; Legare and Herrmann 2013). Perhaps rituals function as a means of asserting a mirage of augmented control by performing authorized and stipulated actions that basically imitate actual causal efficacy (Legare and Souza 2014).

CCT may hint at and inform reasoning about the neuro-cognitive underpinnings of how dreamed ritual imagery operates. Diminished control and agency, as well as a sense of fear, terror, and threat, would enhance the simulation and rehearsal of prototypical social actions, such as those (rituals) that mimic causal control and efficacy. This appears to be particularly the case in ritualized behaviors that imitate and employ cognitive proclivities for threat-detection, precaution, and safety appraisals. Notably, the peculiar

pattern of diminished agency and activation of fear (of threats) during REM-sleep dreams stressed here also bears a resemblance to models of ritual behavior that focus directly on the alteration of agency in many "rituals" (McNamara et al. 2018, p. 437; Nordin 2011a, pp. 233–35). Indubitably, "ritual" interaction appears to be directly related to threat and precautionary systems of cognition. Consequently, different types of ritual in the dream imagery (according to the model presented in this article) are likely to be manifestations or functions of threat simulation (such as hazard, predation, contagion) or social simulation. Dreamed ritual interaction sequences thus display degrees of agent/agency along a continuum, and their frequency, actual configuration, and distribution require more detailed empirical exploration.

6. The Varieties of "Ritual"

The phenomenon of ritual has been observed and is claimed to exist in all historical eras and cultures, while its exact scope and the coherence of its nature are debated by scholars of religious and ritual studies, even if such disputes are less common among "ritual practitioners" themselves. There is also a vast corpus of literature about "ritual", fields of study, types of approaches, functions, and the like (for some overviews, see Bell 1992, 1997; Grimes 1996, 2006, 2013; Kreinath et al. 2004; Lawson and McCauley 1990; Staal 1979; Whitehouse 2022; Xygalatas 2022). This article follows a methodological assumption that is common among scholars in the cognitive and evolutionary science of religious and cultural phenomena who are concerned with what anthropologist Roy Rappaport (1979) describes as obvious characteristics of "rituals".

The category of "ritual", in both scholarly and lay parlance, denotes different exemplars (Boyer and Liénard 2020), and "ritual" is seemingly another instance of a polythetic category (Needham 1975; Sperber 2017). In this sense of family resemblance, "ritual", like "religion", is therefore best understood as fragmented into numerous different phenomena and traits (cf. Barrett 2007, 2017; Taves 2011). Given the plausibility of this assumption, "ritual" refers to such diverse types of behaviors and characteristics that no single theory can account for them all with plausible explanatory value. On the other hand, a possible and indeed productive strategy is to adopt different explanatory models and forms of analysis for all those various traits and clusters of social interaction that are collectively labelled as "ritual". The term "ritual" accordingly refers to various collections of traits that (1) have separate co-occurrence in cultural distribution and (2) co-occur to varying degrees. In a recently developed model and typology (Boyer and Liénard 2020), ritual subvariants involve diverse constellations of (a) normative and usually scripted interaction; (b) signals of affiliation, cohesion, and social relationship; (c) magical thinking and reckoning; and (d) performance based on ritualized behavior. These different ritual elements can be analyzed and explained in terms of their alleged adaptive and cognitive functions (Boyer and Liénard 2020).

7. A Matter of Scope: What Kinds of Dream Imagery of Ritual Elements Are Conceivable?

One aim of the present discussion is to model the conceivable layout of dream imagery about ritual by employing and modifying the model of the predominant "ritual" elements and their purported cognitive mechanisms and social effects discussed above. A first step in this endeavor is to recognize that any relevant sense of "ritual"—as previously shown—relates to either (a) the "ritual" use of dreams or dream content or (b) dream imagery that refers to ritual action types and/or ritual objects or states. There is also (c) an intersection between (a) and (b) that relates to dream imagery about ritual and ritual engagement with the dream imagery about ritual. There is also the issue that links (b) with

the initiation of the transmission and cultural dissemination of ritual activities or other religious beliefs in the waking state. In the present analysis, the primary concern is with (b)—what types of dreaming about rituals can be found that correspond to the model of ritual proposed in the present context. Relatedly, how can the explanatory models of types of rituals be reconciled with the two major approaches to dream simulation previously mentioned? The propensities of ritual conduct and beliefs, as well as their evolutionary and cognitive backgrounds, further point to the propensities and probabilities of these notions being recreated and positioned as attractors amid the massive diversity of variants in the processes of cultural transmission (Claidière and Sperber 2007; Scott-Phillips et al. 2018).

It has been generally observed that dreams and sleep can stimulate a sense of "creativity", innovation, and novelty (e.g., Walker 2017). It is therefore reasonable to suggest that imagery of ritual forms in dreams is relevant to the transmission and communication of cultural traits in the waking state and can lead to novelty and inventiveness in religious contexts, as well as in non-religious contexts and social networks devoted to dream sharing, such as oneirocommunities (e.g., Bilu 2015).

In general, REM dreaming facilitates problem solving in the waking state and invigorates creativity, as seen in popular culture and the creation of music, literature, and other forms of artistic expression (Walker 2017). Additionally, dreaming itself and the communication of dream content foster the experience of subjective insight (Blagrove et al. 2019a, 2019b; Edwards et al. 2015). The notion of insight is understood here as the unexpected and sudden comprehension of a previously unfathomable concept or puzzle through the recognition and integration of new associations between knowledge domains (Zander et al. 2016). Could it be that dream divination, or the attempt to tap into additional meanings, diagnoses, prognoses, or recommendations for actions, is more prevalent in contexts of a depleted sense of insight from remarkable dreams or nightmares? Future research into these complex topics is of interest.

8. A Specified Model of the Features Occurring in Dreamt Ritual Imagery

8.1. Ritual as Normative and Scripted Types of Interaction

These behavioral communications are likely to be accompanied by an intuitive sense that when a scripted rule is not properly performed or is disrupted, then the specific ritual behavior will not be perceived as an example of that given category of action. When interactions follow a script and specific behavioral orders and rules (Schank and Abelson 1977) and are categorized, they are usually described with specific names or labels and have normative force in so far as participants have a sense of particular action properties that constitute the interaction type and other actors tend to recognize the actions in a similar way. Related to this, anthropological studies show gradations of voluntariness or compulsoriness in the adherence to ritual procedures (Gellner 1992). Interactions such as these scripted and labelled action types often express some normative stance in that people more or less explicitly assume that others adhere to the specific rules (e.g., Bicchieri 2005). Research suggests that pressure from an evolved and dedicated norm psychology developed during early infancy (Rakoczy and Schmidt 2013) and tailored to the intricacies of social interaction and coordination (Bicchieri 2005) underpins the cultural transmission (Göckeritz et al. 2014) of "rituals" in enforced consistency with the script-based interactions. Indeed, ritual in this sense is a "basic social act", as suggested by Rappaport (1999), and this relates to the second type of ritual.

8.2. Rituals as Signals of Social Relationship, Affiliation, and Cohesion

Interactions that are scripted and labelled are often highly communicative, and thus social, with the evident potential to serve social functions such as signalling commitment,

identity, cohesion, and affiliation (Watson-Jones and Legare 2016; cf. Atran 2002, 2011). Communicative signals in rituals can have deferential functions (e.g., Bloch 2004) and manifest as stipulation, imitation, or commentary on social rank, order, and/or relationships in human interaction (Humphrey and Laidlaw 1994). Epistemic and emotional effects have been observed where signalling promotes interpretations that tend to conform to "common knowledge" and a shared socio-cognitive framework (Chwe 2001) that is based on a similar understanding of events among the participants of the ritual interaction and the generating of strong shared sentiments and sense of group cohesion, as well as altruistic loyalty to in-group affiliates of a group of people (e.g., Whitehouse and Lanman 2014; Reddish et al. 2016).

Given the adaptations that humans have made to live in social groups (e.g., Legare and Wen 2014), it makes sense that named and scripted interactions have consequences for the signalling of social unity and connectedness in the form of affection, which controls "in-group" versus "outgroup" or "us/them" dynamics (Hornsey 2008), as well as for the establishment and maintenance of cooperative groups and alliances (Yamagishi and Mifune 2009). From this perspective, evolved psychological traits adapted to managing coalitional interactions and challenges are prone to be dedicated to the numerous complex tasks involved in handling both internal and between-group dynamics (Pietraszewski 2016; Boyer et al. 2015). Thus, the ability to signal and communicate social commitment through scripted and normative behaviors in public is an essential coalitional device for in-group affiliation. In this perspective, costly social displays and signalling in ritual performance (e.g., Sosis 2006), such as undergoing ordeals during strenuous pilgrimage journeys (Nordin 2011b), communicate information about commitment to imagined others or to others within a group or are symbolic gestures to competing alliances. It is likely that modes of coalitional psychology are further ingredients of attraction and stability for these forms of "ritual" interaction in the broader process of cultural transmission (Boyer and Liénard 2020).

8.3. Ritual-Based Magical Thinking and Viewing

Many types of "rituals" that are script-based and named interactions are characterized by performances, emotions, reasoning and objects based on notions of "magical" effects, connections, or influences, including modalities such as consuming, seeing, touching, or being in contact with objects and substances that are believed to provide blessings, protection, or cures, or with items used as instruments for enabling rituals in the future (Nordin 2009; Siegal et al. 2001). In the classical historical accounts, anthropologists have proposed numerous associations of causality in magic based on proximity, similarity, contiguity, or contagion (Tylor 1871; Frazer [1922] 1963; Mauss 1972; Nemoroff and Rozin 2000; Siegal et al. 2001; Sørensen 2007). Magical connections and interactions involve ideas of causal and physical efficacy, even though the manifest and specific structures of the mechanisms are usually obscure to those practicing magic. At the same time, idiosyncratic individuals and purported ritual "experts" may entertain intricate theories about the causal efficacy of the practice; however, these are a kind of justification, and are not crucial to the belief in magical influences in the first place (Boyer and Liénard 2020, p. 3). That is to say, the cultural ubiquity of magical thinking and beliefs seems to be based more on the sense of naturalness that comes from absorbing intuitive sensitivities to contagion, sickness, pathogens, and disease transmission (Nemoroff and Rozin 2000; Siegal et al. 2001). Expectations of these kinds are based on intuitions about invisible or hidden vectors that can spread between people. Such vectors are equally dangerous or infectious regardless of the dose or level of exposure.

Magical causality is a crucial element in the "form theory" and typology of ritual efficacy and action cognition developed by Lawson and McCauley (1990) and McCauley

and Lawson (2002). Accordingly, causation of a magical (and superhuman) kind is implicit in the way that people's understanding of actions impacts their understanding of ritual performance, their notions about its efficacy, and how they consider it to operate (Lawson and McCauley 1990; McCauley and Lawson 2002; cf. Malley 2019; Malley and Barrett 2003). In McCauley and Lawson's Ritual Form Theory (2002), ritual practitioners presuppose that (supernatural) agents are causally necessary for (religious) rituals to work, and that some divine agent functions as either an actor or a patient in sequences of ritual actions. According to this theory, people believe that the ritual efficacy is due to magical causation involving supernatural/human agency, which is activated in different ways. Such SAs are acting, for example, through the executive functions of the priestly role in special agent rituals (as seen in many types of social initiations such as marriages or death rites) that cannot be repeated. In the case of special patient rituals that can be repeated, the action is instead performed to the SA (e.g., cleaning, honoring, preparing, thanking). Lastly, as seen in special instrument rituals, which are repeatable, the ritual practitioner may receive various blessings and boons through the assorted magical influences of an SA or an SA object (for more details, see McCauley and Lawson 2002; Malley 2019). The ritual form theory may imply detailed suggestions about why SA dreams are accorded specific religious value. This is because it assumes a principle of "supernatural immediacy", which suggests a condition of structurally basic and central rituals in any religious and cultural system (Lawson and McCauley 1990, p. 126). Accordingly, the basic rituals make subsequent ones possible (McCauley and Lawson 2002, p. 33).

8.4. Rituals as a Particular Type of Ritualized Performance

One set of characteristics that appear to be prototypical of "rituals", if not exclusive or universal to them, are the characteristics of ritualized behavior. These features have been extensively discussed in recent research about ritual and ritualization (Boyer and Liénard 2006; Dulaney and Fiske 1994; Fiske and Haslam 1997; Liénard and Boyer 2006; Sørensen and Nielbo 2019; Whitehouse 2022; Xygalatas 2022). The characteristics of ritualized behavior include compulsion (the need to habitually perform a behavior without a distinct notion of why); scripted conduct (a strong inclination to enact the performance in a stereotyped manner and order and without having explicit reasons for the details); goal demotion (where parts or sequences of the enactment are not cognized as causally leading to the overarching goal of the performance); and repetition (an intense motivation to repeat sequences of actions, again usually without a clear idea of why). Boyer and Liénard (2006) and Liénard and Boyer (2006) argue that the features of ritualization are a manifestation of behavioral by-products of cognitive systems devoted to "hazard precaution". This is held to be an adaptation that evolved to detect and respond to various threats that are hard to monitor and are related to contagion and contamination, social misdemeanors, intrusion by outsiders, and harm to offspring (Boyer and Liénard 2020). The excessive number of these indistinct fitness threats makes it difficult to wholly perceive and act against them. It has been suggested that this initiates a system for threat detection with its accompanying ritualized behaviors. When a threat detection system is activated but disrupted, it can lead to specific syndromes, for instance post-traumatic stress disorder (PTSD), phobias and, typically, obsessive-compulsive disorder (OCD), with symptoms associated with compulsive, repetitive, scripted, and ritualized behavior types (Dulaney and Fiske 1994; Fiske and Haslam 1997), and, finally, biased, intrusive thoughts and ruminations about impending dangers—for example, a sense of impending doom and supernatural justice. In such circumstances, an inability to foster one's perception of safety through precautionary ritual performance (over) activates OCD rituals and related pathological repetitions (Szechtman and Woody 2004). The OCD enactment of rituals has also been described in terms

of harm prevention and its overactivation (Del Giudice 2018). Thus, ritualized behavior emerges from a "hazard precaution" and "action parsing" system (Boyer and Liénard 2006; Liénard and Boyer 2006), which is tuned toward splitting the range of behaviors into parts and segments. Activation of the hazard precaution system prompts relevant behavioral sequences with matching evolved precautionary action routines. Concurrently, the system divides the actions into a sequence of smaller parts, focusing on the quality of the behavior at a subordinate level (thus causing the fixation with adhering to definite behavioral sequences and avoiding "incorrect" movements). In the absence of a manifest and salient "stop" signal, uncertainty prompts repetition of the behavioral sequence, and this propensity may ultimately overload the working memory and lead to a temporary respite from anxiety. In a cross-cultural perspective, obsessive-compulsive themes are common, and the evolved cognitive tendencies that support precautionary enactment are likely to be powerful factors in the cultural attraction and transmission of the religious ritual behavior.

The manifestation of action characteristics such as compulsion, repetition, and invariance is probably a reason why ritual actions have been seen as similar to entering a tunnel through which one can only pass in one direction (Bloch 1974).

Associated types of imagery about restrained behavior that take place during REM-sleep dreams tend to involve agency loss or self-demotion in the dreamer (McNamara 2016; McNamara and Bulkeley 2015). Experience of agency loss is common in nightmares, sleep paralysis, and "mystical" dreams, as the research literature shows for many cultures (De Sá and Mota-Rolim 2016; Hinton et al. 2005; Sharpless and Doghramji 2015). Furthermore, there is a decisive correlation between the imagery of reduced agency and a dreamer's self-model throughout the dreaming states of REM sleep and intensified attribution of the causal function to other dream entities and agents, specifically SAs (McNamara and Bulkeley 2015; McNamara et al. 2018). Consistent with predictive coding models, cognitive processing in the brain operates by "pruning" prediction errors and redundancy by imagining other acting agents and characters (McNamara and Bulkeley 2015). In conditions such as sleep paralysis, which usually takes place while waking up or falling asleep (Mahowald et al. 2011), immobility is also commonly accompanied by hypnagogic hallucinations, delusions, and intense anxiety (Dahlitz and Parkes 1993), which often include a sense of intrusion and threatening apparitions (Cheyne et al. 1999). Not surprisingly, in many folk traditions and cultures, these intrusions are viewed as supernatural attacks (Hinton et al. 2005; De Sá and Mota-Rolim 2016). This phenomenon may also be evident in dreams of alien abduction. These conditions in sleep paralysis may be similar to some properties of nightmares and supernatural imagery, even though the latter evidently includes flight/fight modalities and diminished agency. In any case, in such dreams, paralysis may be associated with the prompting of an adapted threat psychology specifically tied to the automatic and involuntary response of tonic immobility that is manifested in conditions of serious threat where flight or fight is impossible or is too costly, such as among victims of predation and rape, as discussed in Buss (2021) and Marx et al. (2008). Moreover, vigilance and risk assessment activate not only fight or flight but often also a complex array of responses based on appeasement, avoidance, aggressive defence, attentive immobility, tonic immobility, and withdrawal (Cantor 2009). In this context, Cantor suggests that in encounters with dominant social others, a primary defence is likely to be appeasement, which involves conciliation, pacification, and submission. Nevertheless, depending on the social rank and involvement of supernatural agents (demons, ghosts, souls, spirits, demigods, and low- or high-status deities) that appear in the dreams about ritual interaction, the behavior should be associated with appeasement, avoidance, aggressive defence, withdrawal, attentive immobility, or tonic immobility in social and/or threat simulation. Strategies of appease-

ment in ritualized imagery may, for example, be significant in social simulation involving deities with high status, but perhaps not in dreams about supernatural animals, demons, and ghosts. Attentive immobility and tonic immobility, avoidance, aggressive defence, or withdrawal are likely to predominate in typically nightmarish imagery with threatening entities and monsters.

9. Dream Simulation in the Variation of Imagined Ritual Modalities

If dreams simulate ritual imagery, it follows that they are likely to be generated by SST and/ or TST simulation and exhibit features of ritual modalities. As the theoretically driven analysis of ritual variants implies, the functions of these characteristics are generated by adapted cognition and correspondingly evolved precautionary systems dedicated to handling diverse fitness challenges related to survival threats and social life, as proposed by TST and SST. One proposal is, therefore, that dreaming that produces imagery about normative and scripted interaction, signals of social relationship, and affiliation and cohesion predominantly arises from social simulation dedicated to topics related to in-group inclusion, social perception, and interaction (Tuominen et al. 2019a; 2019b). Dream content with imagery about magical thinking and forms of ritualized performance would be produced by structures devoted to the simulation of threats, mainly in relation to the threats to offspring, social offence, intrusion, predation, and contagion (Boyer and Liénard 2020; Revonsuo et al. 2016). In actual dream imagery, however, threat and social simulations are intermingled or occur together in rapid succession (cf. Revonsuo et al. 2016), and such dynamic modalities are also to be expected in the occurrence of ritual variants. This situation can be indirectly recognized, for example, in dream reports that contain imagery of scripted, normative interaction, references to labelled and named actions (e.g., darshan or puja), or allusions to sacred objects, blessings or purification (manifesting magical thinking), and/or imagery of action segments and features (ritualized behavior). The occurrence of these ritual modalities in dreams can thus be implied, nested, or manifested, which may also point to the metaphorical appearance of dream imagery (Antrobus 1977; Blagrove et al. 2019a; Lakoff 1993). For example, dreamed ritual imagery also appears to have indexical properties in the semiotic sense, such as smoke being a sign of fire (cf. Campany 2020). The cognition of indexical processing (Frøkjær Sørensen 2021) also implies that humans construct associations based on associative and cultural learning as well as on intuitive causal reasoning. Dream imagery about ritual artefacts may thus be indexical in relation to a named and scripted interaction. Furthermore, dream imagery about a specific ritualized behavior can have indexical properties of magical thinking.

10. Systematizing the Coding and Exemplification of Dreamed Ritual Imagery

Previous discussions have considered the approaches to simulation in dreams and the various modes of "ritual" by stressing an amalgamated model. It has also been shown—although the research has mainly stressed topics concerned with the appearance of different supernatural entities—that interaction with others is involved in religious dream imagery. This is consistent with the predictions of SST, as well as with the exceedingly social information of dreams, the interactive and highly communicative quality of religious phenomena, as well as the predominance of allegedly religious features and supernatural information in dreaming.

What features of ritual are conceivable, and what is the distribution and prevalence of these interactions in dream imagery? If dream imagery includes ritual objects and actions, the latter must be modalities of normative and scripted interaction, signals of affiliation, cohesion and social relationship, instances of magical thinking, or forms of ritualized

performance. Dream imagery about rituals should also result from social simulation and threats in the dream process, in alignment with specific psychological and evolved cognitions as well as with the emotional underpinnings of rituals. Prima facie, social simulation should be manifest in dreamed ritual imagery based on normative and scripted interaction, signals of social relationship, affiliation, and cohesion, while threat simulation would underpin imagery based on magical causation and reckoning. It would seem that dream imagery of ritualized behavior involves both social and threat simulation since there is a memory association between scripted and social signalling and ritualized behavior. However, there is also a link between threat simulation and ritualized behavior, in that the former underpins certain types of the latter. In addition, threat simulation is crucially involved in nightmares and related dreamed ritualized behavior, or a spectrum of responses related to withdrawal, tonic immobility, appeasement, aggressive defence, avoidance, etc. Furthermore, behaviors and traits associated with rituals may, but do not have to, activate any of the cognitive systems related to signalling (normative and scripted interaction), cooperative coordination (signals of social relationship, affiliation, and cohesion), magical beliefs (magical thinking), or ritualized actions (ritualized performance), and these are all manifested in more or less overlapping ways (Boyer and Liénard 2020). Accordingly, dream reports are often about specific types of social interaction, some of which are normative and most of which contain imagery of supernatural agents. The nested dream information contains, to varying degrees, the machinery of signalling, coordination and social affiliation, magical thinking, and ritual performance in the activated dream simulation process.

The last sections of the article take the investigation further by providing brief and tentative descriptions and demonstrations of imagery of ritual interaction in dreaming, using a limited set of data from research among Hindus in Nepal. For a more detailed description, see Section 2.

According to this dream research, imagery about rituals (as modelled in this article) was either implicit or manifest/explicit, and the frequency and occurrence of the modalities are described below. Information about ritual imagery occurs in 90 percent of the dream narratives (55 out of 61 informants) and points to implicit or directly manifested elements in the domains of normative and scripted interaction, signals of social relationship, affiliation and cohesion, magical thinking, or forms of ritualized performance. In 29.5 percent of the dream reports, SA(s) instructed the dreamer to perform some kind of ritual.

10.1. The Coding of Scripted, Normative Interaction in Dream Imagery

The analysis traced the manifestation of explicitly labelled interaction sequences expressed in or implied in the dream narratives (in the present Hindu-Nepalese case, tirtha yatra, aarthi, puja, bali (animal sacrifice)). Indicators of scripted, normative interaction traits were present in 73.2 percent of the dream reports and described one type of action (bali, puja, darshan, tirtha yatra, cremation, prayer, gestures—subordination and greeting) or a combination of ritualized actions (e.g., procedures such as snan or darshan). The exchange of gazes of blessing with deities—darshan—was the most common type of the labelled action category (in total 23%).

10.2. Coding Signals of Social Relationship, Affiliation, and Cohesion in Dream Imagery

In order to identify signals of social relationship, affiliation, and cohesion traits, attention was given to accounts of dreamed social interactions that indicate relationships with or within a social group, the social order, and/or a family. Unless otherwise indicated in the dream, participation in various normative and scripted interactions was coded as implying social relationship, affiliation, and cohesion. In particular, this included dreamed participation in initiation rituals (e.g., receiving a "sacred thread"), weddings, cremations,

and ancestral cult activities. With regard to dream imagery indicating social relationships, affiliation, and cohesion, this could be identified in 78.8 percent of the reports. The most common type, which appeared in 68.9 percent of the narratives, involved imagery of scripted, normative interaction (see the above section), including social signals and interactions between SAs and humans. In this way, the appearance of imagery of SAs accounted for most of the dreamed interactions with social agents, or 75.4 percent of the cases, which points to the regularity of social dream simulation related to imagined episodes of coalition and cooperation.

10.3. Coding Magical Thinking in Dream Narratives

This procedure was designed to identify dream reports that contained allusions to substances and objects serving a magical interaction function or having magical effects. The purported magical causation and thinking properties were coded in the dream narratives with reference either to direct interaction with an SA or indirect interaction through a priest (e.g., special agent rituals, such as various initiations seen in weddings or thread ceremonies), to imagery of special patient rituals (e.g., thanking, cleaning, honoring, preparing—labelled as puja or shraddha, etc.), to imagery of special instrument rituals—blessings by sight (darshan), proximity to or physical contact with sacred artefact such as temples (mandir) or statues (murti), or to immersion in and ingestion of various substances (food prasad or water jaal). All of these items are magical objects with special causal "essences" or properties. These were alluded to or explicitly named (e.g., prasad, sacred food, or saligram, sacred fossils). According to these dream narratives, there were direct or indirect indications of objects of a magical kind and types of ritual forms associated with the functions of supernatural agent causation. In 78.7 percent of the dream reports, these pointed to images of various forms of ritual objects, substances, and/or instruments. The most common form of magical thinking in reported dream imagery was temples (as objects for "auspicious gaze exchange", see below) in 29.5 percent of cases, followed by (religious) statues, combinations of temples and statues, and other combinations of sacred and auspicious objects.

Once the dream analysis had linked magical items to cognitive models of forms of ritual performance in the dream reports, the results suggested that special agent rituals appeared in 5 instances and special patient rituals in 21 instances, while special instrument rituals occurred in 12 cases. A combination of both special patient and instrument rituals was seen in 12 cases, and a combination of special agent and patient rituals was seen in 2 cases. Given these descriptions, the most frequent type of dream imagery was special patient ritual, involving various forms of honoring, thanking, and preparing for SAs (33 cases, or 54.1%), followed by special instrument ritual imagery, typically blessings from supernatural agents (24 cases, or 39.4%). When coding specifically for blessed objects (cf. Nordin 2009), these were present in 30 reports (49.2%). In 45 interviews (41 percent), the narratives referred to blessings such as asirbad and darshan.

As previously noted, the category of "auspicious gaze exchange", or darshan, refers to the culturally common notion of blessings that are received and transmitted through gazing and the gaze (Eck 1985; Gell 1998). In the present case, darshan occurred indirectly, with reference to accounts such as "I saw Bhagawan". Darshan implies that a devotee or "worshipper" receives a blessing from the supernatural agent in a passive way. Dreams are said to be "given to" the dreamer, and thus, they have an external source—an SA or some demonic power—rather than stemming from inside the person (Young 1999, p. 29). Since SAs are seen as the immediately acting parties in dreams, and the dream can be held to be a ritual episode, this may suggest a particular ritual cognition (cf. immediacy, structural depth, in McCauley and Lawson 2002), which may explain the allure of SA dreams and

their potential ritual and religious use. However, more thorough research is needed to properly explore these suggestions.

10.4. Coding of Ritualized Performance in Dreams

Items of the ritualized behavior type concern implicit or explicit information in the dream reports about (a) seemingly goal-demoted, repetitive, redundant, scripted, and rigid successions of actions, and (b) the dream ego having difficulty acting and speaking (e.g., paralysis), being chased, having to escape, or being acted upon (e.g., being eaten). Admittedly, the dream characteristics of (b) are not among the classical traits of ritualized performance. However, they relate to associated threat detection modalities such as strategies of appeasement involving high-status deities. Attentive immobility, avoidance, aggressive defence, withdrawal, and tonic immobility are likely to predominate in prototypical nightmarish imagery with threatening entities and monsters (supernatural animals, demons, and ghosts).

In the present study, the dreamer was the main agent in 12 (19.7%) of 60 instances. In 17 narratives (27.9%), one or more SAs in the dream imagery appeared as the primary actor. In 25 cases (41%), both the dreamers and the SAs were actors. These rough analyses suggest that, in the narratives, social dream simulation involved the dreamer and/or other supernatural agents.

It is worth noting that items related to ritualized behavior were present in 23 percent of the dream reports but were much more common (67.2%) when they were implied by specific named interactions that designate and consist of ritualized performance. Thus, these cases consisted of indexical connections to labelled ritual types occurring in the dream narratives. As with all these limited and somewhat anecdotal examples, the way in which ritualized behavior is implicated and referred to in dream imagery needs more thorough cross-cultural research and theorization, for example, in relation to daytime experiential and sociocultural input, as well as to social and threat-related simulation. For example, is dreaming more likely to simulate implied rather than manifest imagery of ritual behavior in a more general and cross-cultural sense? And why or why not? And are there important connections to nightmares and related simulations of threats? Relatedly, dreamed ritual performance seems to be related to the imagery of the omitted self and agency in the narratives. The occurrence of nightmares in the narratives from this data was a predictor of the presence of omitted self-agency models. This latter imagery predicted engagement in divinatory practices in waking conditions (Nordin 2023).

11. Discussion

Imagery in dreams has usually been regarded in anthropology and religious studies as sensorial experiences during sleep in which different types of supernatural agents are manifested. By analyzing another crucial side of "religion"—the phenomena of rituals, and particularly the understudied domain of dreaming about ritual actions—this article aims to contribute to research in the cognitive and evolutionary science of religion, as well as the anthropology of religion. It is anticipated that this task will contribute to the scientific comprehension of the modes, processes, and pervasiveness of dream imagery about ritual interactions. The article points to ways of studying religious dreaming (about ritual interaction) that surpasses a concern for supernatural entities—a topic that is common in the research on, and theoretical understanding of, religious phenomena in dreams.

It was also assumed that a fruitful way to conceptualize "rituals" is the one outlined by Boyer and Liénard (among others), which draws upon a strong naturalistic research program. The gist of this approach has been adopted in the present article (1) as a well-informed analysis for extending a coding model for describing religious dreaming and,

secondly, (2) as a theory that integrates cutting-edge dream research and theories of simulation with evolutionary and cognitive theories of rituals. Consequently, it is also assumed that the approach to ritual presented here is well suited for use and examination in the present article because it is based on broadly accepted and well-informed explanatory theories of "ritual phenomena".

What is the rationale for adopting a cognitive and evolutionary stance toward dream imagery of ritual interaction? This article has presented a theoretically informed model and methodology that proposes that dream imagery about rituals should be recognized as generated (a) dream simulation concerning social life and threats that are directly practiced in specific (b) imagery of various ritual forms, which are also buttressed by evolved cognitive systems dedicated to computing a wide range of fitness challenges. While contention (a) provides explanations of the types of dream simulations, (b) suggests both an explanation of ritual modes (that can occur in the processes of dream simulation) and suggestions for a theory-driven method for analyzing items that hypothetically can be coded and categorized as "ritual" in dream narratives. The final part of the article has furnished an empirical and ethnographic demonstration meant to be applied to actual dream reports.

This article indirectly concerns the question of whether (religious) dreaming containing ritual events always references SAs. Dreams with ritual features often contain imagery of SAs. When this imagery is part of dreams of ritual, the ritual action features may be direct or indirect. In line with the ritual stance adopted here, there is a probable, though not necessary, association between SAs and normative and usually scripted interaction; signals of cohesion, affiliation, social relationship, and magical thinking; and ritualized performance. An exception, however, is magical cognition, as discussed in some theories, where ritual actors (in theory) assume that (supernatural) agents are the main cause of the efficacy of religious rituals (McCauley and Lawson 2002). However, modes of ritual interaction also appear in social situations unrelated to concepts of supernatural agents. It should also be noted that, as a purely empirical review of the current ethnographic data suggests, references to SA imagery were very common in the dream reports, as shown by the different ritual forms in the present data.

In summary, the present article uses a theoretically supported analysis that also takes further steps toward establishing an empirical coding system and method for the analysis of dreaming about ritual imagery. What is the lesson of this form of undertaking? The coding procedure presented here proposes that religious dreams are structured by the simulation of ritual interaction types. Furthermore, these types relate to deeper predispositions for simulation that may be continuous with religious conduct in waking life. The refinement and applicability of the proposed coding scheme allow for exploration into the social, cultural, and religious significance of distinct forms of ritual interaction manifested in dream experiences. Even though the preliminary statistics introduced here are highly limited and the coding procedure must be subjected to further improvement, the analysis also hints at some tendencies in the distribution and structure of dream imagery. It is assumed here that this information will be of further value in testing hypotheses about ritual theories and religious dreaming and in carrying out a more fine-grained and detailed exploration of social dream transmission and the intersection between dream imagery and the culture in which it is situated.

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