

# UC Riverside

## UC Riverside Electronic Theses and Dissertations

### Title

Integration or Social Control? The Evolution of Religious-Rituals

### Permalink

<https://escholarship.org/uc/item/1rz3c94n>

### Author

Aldecoa, John Manuel

### Publication Date

2016

Peer reviewed|Thesis/dissertation

UNIVERSITY OF CALIFORNIA  
RIVERSIDE

Integration or Social Control?  
The Evolution of Religious-Rituals

A Thesis submitted in partial satisfaction  
of the requirements for the degree of

Master of Arts

in

Sociology

by

John Manuel Aldecoa

June 2016

Thesis Committee:

Dr. Alexandra Maryanski, Chairperson

Dr. Jonathan H. Turner

Dr. Jan E. Stets

Dr. Christopher Chase-Dunn

Copyright by  
John Manuel Aldecoa  
2016

The Thesis of John Manuel Aldecoa is approved:

---

---

---

Committee Chairperson

University of California, Riverside

## ABSTRACT OF THE THESIS

### Integration or Social Control? The Evolution of Religious-Rituals

by

John Manuel Aldecoa

Master of Arts  
Graduate Program in Sociology  
University of California, Riverside, June 2016  
Dr. Alexandra Maryanski, Chairperson

Scholars generally agree that religion is a social construct, but polarize along the line of what consequences religious-rituals actually have in society. Durkheimian and neo-Darwinian scholars argue that the religious-ritual evolved to integrate societal members and promote prosocial behavior. Critical theorists contend religious-rituals may not operate so much to create shared beliefs but instead to legitimate a structure of dominance within society. I argue that a nexus between these theories can be found with an examination of the underlying neurology of religious-rituals. The mirror neuronal system (MNS) is the foundation for the humanistic ‘desire’ for mimesis. Religious-rituals stimulate the MNS to promote empathy, trust, and integration. As societies grew, increasing social distance and differentiation (i.e., stratification) weakened empathetic bonding between religious specialists and the religious group. Reduced empathy lead to increased selfishness and other antisocial behaviors that benefited the social elite. I conclude with a discussion of the primary link between the integration and social control hypotheses: mimesis, synchrony, and emotionality.

**Keywords:** religion, ritual, evolution, mirror neurons, emotions

## Table of Contents

Introduction -----	1
Durkheim on Ritual -----	1
Critical Approach to Ritual -----	3
Mimesis in Ritual -----	4
Mirror Neurons and Social Bonding -----	6
“Musilanguage,” Dance and the MNS -----	8
<i>The Synergistic Effect of Music</i> -----	9
Emotions and Memory in Ritual -----	12
<i>Episodic and Semantic Memory</i> -----	13
<i>Integration and Cooperation</i> -----	14
Religious Specialists and Institutionalization -----	18
Altered State of Consciousness and Hypnotic Susceptibility -----	20
<i>Prefrontal Cortex Deregulation in Induced ASC</i> -----	21
Integration or Social Control? -----	23
Conclusion -----	25
References -----	27

## **Introduction**

Durkheim (1912/2008) defined religion as “a unified system of beliefs and practices relative to sacred things, that is to say, things set apart and forbidden – beliefs and practices which unite into one single moral community called a Church, all those who adhere to them.” Durkheim argues that the moral community emerges from religious-ritual. Exactly how religious-rituals operate and what consequences they have in society remain debated topics, however. Religious-rituals have been hypothesized as having two different effects: integration or social control. Scholars of the integration hypothesis typically follow a Durkheimian or neo-Darwinian (Wilson 2002) framework and suggest that religion evolved as an adaptation to selection pressures that promoted integration and cooperation among group members. Those arguing from the social control perspective tend to follow a critical framework indicating how ideology within ritual is used to legitimate social structures that benefit the social elite. Unfortunately, the inability of these two camps to find a middle ground has been detrimental to any comprehensive understanding of religious evolution. I present such a solution here.

I argue that a look at the underlying neurology shows that religious-rituals have both effects. Also, I argue that both effects are natural byproducts of human social interaction. What makes religion unique is not religious practice, but emotion arousal. Emotions have the power to produce strong affective commitments (i.e., loyalty) to religious groups and leaders. Intense emotional arousal during religious-rituals possesses a synergistic effect that ‘fuses’ individuals to a religious group.

## **Durkheim on Ritual**

Bellah (2005) emphasizes the importance of ritual practices in Durkheim’s construal of religion and how Durkheim viewed these practices as giving rise to religious beliefs. In

*Elementary Forms of Religious Life*, Durkheim (1912/2008) illustrates the power of ritual practices to unify individuals:

“Once the individuals are gathered together a sort of electricity is generated from their closeness and quickly launches them into an extraordinary height of exaltation... Probably because a collective emotion cannot be expressed collectively without some order that permits harmony and unison of movement, gestures and cries tend to fall into rhythm and regularity, and from there into songs and dances” (Bellah 2005: 183-184).

An “electricity,” or heightened emotional state, arises as individuals engage in harmonious singing and dancing. Durkheim goes on to state that religious beliefs (*collective representations*) emerge when individuals’ respective states of “consciousnesses are acting and reacting on each other.” What Durkheim describes here is intersubjectivity (Zlatev 2008), the liminal or subliminal process of communication between two or more actors. The discovery of mirror neurons in macaque monkeys (di Pellegrino et al 1992) evidenced a neurological foundation for intersubjectivity through miming, or mimicry. Through mimicry, actors synchronize both body and mind, creating a synergy that strengthens social bonds and group identities.

Our hominin ancestors were not highly social beings, but selection worked over millions of years to enhance social capacities to form stronger ties with others and thus increase their chances of survival in dangerous environments (Turner and Maryanski 2008; Turner 2010; Turner 1996). These early biological, physical, and neurological adaptations paved the way for the emergence of more complex cultural adaptations, such as religion.

For Durkheim, the primary “function” of religion is group cohesion. Religion not only defined right and wrong behaviors, but also their consequences. Through a shared representation of the sacred (Richerson and Boyd 2001; Durkheim 1912/2008; Boehm 2012; Fehr and Fischbacher 2004), religious group members learned how to behave toward other group members. These shared moral understandings harmonized moral and prosocial behaviors, enhanced empathetic bonding, and promoted egalitarian social structures.



Religious-rituals also operate to ‘connect’ the natural with the supernatural. Religious specialists (i.e., shamans, medicine men, witch doctors) emerged for this reason. Recognizing the specialist’s unique healing powers, magical abilities, knowledge, and/or ability to transcend to spiritual realms, religious groups appointed specialists to lead rituals. Electing leaders is typically a ‘natural’ group behavior as groups seek to maximize goal attainment (Berger et al. 1974). The emergences of religious specialists, however, dawned a new age of institutionalized religion. I argue that this emergent (status and power) inequality increased social distance between religious specialist and religious group, reducing synchrony and empathy. Social distance paved the way for selfish behavior, intragroup conflict, and factionalism.

### **Critical Approach to Ritual**

Many scholars recognize that religion creates a system of shared values, beliefs, and morals that legitimate the social structure (Bellah 1964; Müller 1988; Lerro 2000). While Durkhiemians argue religion promoted egalitarian social relations among hunter-gatherers, critical theorists argue that shared beliefs operate not only to privilege and empower a select few but to promote the legitimation of an unequal social structure. This argument follows the Marxian perspective that religion is the “opium of the people.” Ideologies largely derive from those in power and so integration is nothing more than the stabilization of one group’s dominance over another (Bell 2009). The Durkheimian notion of beliefs and practices are then seen as hegemonic ideology. Those in power want to stay in power and so dominant actors disseminate cultural ideologies that legitimate their high power and social status. While powerful actors do act selfishly to maintain their power status (Case and Maner 2015), I argue this is a consequence of social differentiation and increased ‘social distance.’

This paper presents religion as a series of evolving phenomena. That is, religion is seen as continuously adapting and accumulating culture where new adaptations are contingent and

build upon earlier adaptations. I take into account emergent properties that bring about new stages in evolution (i.e., language), though cautiously refrain from any linear or causal models of religious evolution. Instead, I highlight the basic elements of religious-rituals that make religion religious. I begin where early hominids separate from apes – mimetic culture (Donald 1991). Mimetic properties are evident in early religious-rituals (McClenon 1997) and are thus the foundation for all later religious adaptations. In the following section I explore the importance of the mimetic aspect in religious-rituals.

### **Mimesis in Ritual**

Many animals mimic; primates imitate. But only humans have the cognitive capacity for mimesis. Mimesis is “the ability to produce conscious, self-initiated, representational acts that are intentional but not linguistic” (Donald 1991: 168). Whereas mimicry and imitation are the bases of cultural inheritance and social learning, mimesis incorporates the two while adding a representational component. That is, early hominids developed the capacity for symbolic representation through bodily gestures. This prelinguistic form of communication facilitated more dynamic social interaction. In this section, I differentiate mimicry from mimesis and illustrate the mimetic properties of religious-rituals.

Aside from social learning, mimicry among many primates also facilitates social bonding (Stel and Vonk 2010; Iacoboni 2009). Orangutans at play, for example, adopt other’s emotional states by mimicking the other’s facial expressions (Ross, Menzler, and Zimmermann 2008).<sup>1</sup> Voluntary or involuntary mimicry allows one to ‘take on’ another’s emotional state. This emotional contagion facilitates social bonding by building empathic ties between conspecifics.

---

<sup>1</sup> Similarly, bottlenose dolphins (Reisse and McCowan 1993) and songbirds (Kelley et al. 2008) have been shown to mimic the vocal signals of others, implying that the act of mimicry also plays a role in social learning processes.

The development of mimetic ability advanced early mimicry in a number of ways. For example, hominids were capable of associating emotional states to a specific cause. Mimesis also allowed for cultural adaptation as opposed to biological adaptation (this is known as the “ratchet effect;” Tomasello 1999). Donald (1991) also acknowledges that mimesis produces conformity and cooperation through play, eventually developing into collective rituals of mimetic chanting, drumming, and dance.

Durkheim proposed that these collective ritual practices arouse an ‘electricity’ that enhances social bonding. There are a number of elements that produce this phenomenon that will be enumerated throughout this paper, but important to highlight here is the oxytonergic response to empathy. Oxytocin levels rise when people empathize with others (Barraza and Zak 2009). Empathy derives from bodily mimesis in a process called synchrony. Synchrony is the unification of two or more actors in both body and mind. When two or more actors synchronize, an empathetic bond develops producing positive affect.

In the context of religious-rituals, actors synchronize by enacting behaviors appropriate for the ritual. In order to be religious, one must act religious and religious acts are learned through mimicry, imitation, and mimesis. People also judge their behaviors through the perceptions of others (Burke and Stets 2009). When everyone is behaving in accordance with ritual practices, everyone receives positive feedback. Positive feedback elicits a dopaminergic response (oxytocin release) that produces positive emotions (Uvnäs-Moberg 1998). This collective emotionality is the ‘electricity’ that unifies the social group. Commonly labeled the ‘love hormone,’ oxytocin secreted from the posterior pituitary gland enhances social bonding by increasing trust (Kosfeld et al. 2005; Domes et al. 2007) and group commitment (Campbell 2010). Out of collective rituals develops shared meanings or representations of objects and behaviors.

Humans possess an innate ‘desire’ for mimesis (Girard 1976). The discovery of mirror neurons in macaque monkeys (di Pellegrino et al 1992) and the subsequent surge of research, (Rizzolatti et al. 1996; Gallese 1999) provides a neural substrate for mimesis in human sociality. Specifically in humans, mirror neurons are special motor neurons within the ventral premotor cortex. Mirror neurons activate not only when one engages in purposeful or goal-oriented action, but also when one *perceives* another engaged in the same behavior. The following section will expand on mirror neuronal system to provide a neurological basis for mimesis in rituals.

### **Mirror Neurons and Social Bonding**

The mirror neuronal system (MNS) plays a special role in interaction processes. Research has shown the MNS to be active in empathetic bonding, shared representations between self and other, and recognition of other’s intentional actions (Decety and Sommerville 2003; Gallese 2001). As stated, visually perceiving the actions of others activates the neural substrate that is typically active when individuals are actually engaged in the same act. Gallese (2001) rightfully cautions, however, that visually *perceiving* such action does not denote *understanding* the action. That is, the act is mere movement until one is able to interpret or code the information as purposeful or goal-oriented. Since understanding develops from shared meanings, the MNS operates to synchronize interacting actors’ behaviors. This synchrony facilitates to development of shared meanings.

The superior temporal sulcus (STS), the groove that divides the superior temporal gyrus and middle temporal gyrus in the brain, has shown to be consistently active when individuals attempt to decipher the intentions of another’s actions (Gallese 2001; Pelphrey et al 2004). Iacoboni et al (2005) found that the inferior frontal gyrus (IFG) and ventral premotor cortex (vPMC) are also active when attempting to understand the intentions of others. The left IFG, also known as Broca’s area, is typically considered the motor center for speech; however, it is also

known to be active when interpreting the actions of others, possibly insinuating a potential common origin between speech and action recognition. This common origin may highlight a link between the ability to interpret others' actions and the ability to represent them through speech (Fadiga and Craighero 2006; Fadiga et al 2009).

Researchers have also identified the superior temporal cortex (STC) and inferior frontal cortex (IFC) as vital in action representation (Molenberghs et al 2010). Importantly, these two regions connect to the limbic system via the insula, highlighting an important linkage between visual and auditory processing (STC) and language comprehension and production (IFG) to the emotion centers of the brain (Carr et al. 2003). Speech and language are relatively recent tools for communication, but our primate ancestors have been communicating their emotional states by signaling for millions of years (i.e., facial gestures) (Arbib 2005). However, signaling only possesses a weak bonding potential. Thus, during the evolution of Broca's area, symbolic representations importantly allowed for understanding of the intentions of other's behaviors. It is not enough for collective bodily mimesis to occur in rituals. Actors must also know why they are behaving in such a way. It is the symbolism of the behavior that gives the ritual meaning.

The MNS works to 'take on' the emotional states of others. Thus, the MNS explains how "consciousnesses are acting and reacting on each other" in religious-rituals (Durkheim 1912: 232). In this regard, religion satisfies the basic human desire for mimesis. People desire to feel good and the process of mimesis and synchrony produces the positive affect that people desire (dopaminergic reward). When synchrony occurs, a synergistic effect produces an emergent group identity. This group identity is defined by its shared representations of sacred objects, beliefs, values, and morals. In the following section I will explore how music in rituals stimulates MNS activity to enhance this mimetic process.

### **“Musilanguage,” Dance and the MNS**

Robert Bellah (2003) citing Steven Brown’s (2000) theory of musilanguage states that, albeit music and language occupy different regions of the brain, both are believed to have developed from a common origin. More eloquently, Mario Baroni (2008) summarizes Brown’s idea:

“According to this hypothesis the points of convergence of the two forms of languages can be seen first in prosodic phrasing (temporally segmented vocalizations), secondly in a limited number of discrete phonetic units (each phrase based on internal microsegmentations) connected by rules of combinatorial syntax, and thirdly in the expressive aim of communicating emotional states” (p 199-200).

Steven Mithen (2005) expands upon this in his discussion of “singing Neanderthals.” He proposes that Neanderthals had developed a degree of musicality in proto-language as a way to express or communicate emotions. Recent evidence supports this common origins hypothesis (Kunert et al 2015; Weiyi and Thompson 2015). Accordingly, a newly acquired lexicon along with advanced vocal control (i.e., the ability to sing) facilitated oral communication among hominids. The ability to shift pitch and tone enhanced communication of emotional states.

Oral communication allowed for mythic culture to emerge (Donald 1991). Thus, cultural traditions could be passed down from generation to generation by mythic storytelling. Through metaphor, symbolism, and imagery, cultures could reproduce allowing *Homo sapiens* to develop complex understandings of the universe. In this phase of human evolution, hunter-gathering tribes developed holistic interpretations of how the world works. Such constructions of natural phenomena, for example, evident in animistic religions, are the basis for the later development of spirits and gods. Though before digressing further, an understanding of the importance of music must be developed.

Music is incorporated into religious-rituals for an important reason: it serves as an integrative force.

People interpret meaning and emotion in music (Molnar-Szakacs and Overy 2006; Rizzolatti and Craighero 2004). The visual and auditory systems work with the MNS to perceive and mimic the emotion in music. The collective listening to music (i.e., ritual drumming) enhances synchrony by orchestrating a rhythmic flow to collective interaction, which is probably why dance evolved simultaneously with music to create rhythm (Brown and Parsons 2008). Rhythm in ritual harmonizes the religious group in a way that stabilizes interaction by creating predictable behaviors. This harmony allows for a synergistic effect to take place.

#### *The Synergistic Effect of Music*

Music is the quintessential element of the ritual experience. Without music, the ritual is likely to lose its integrative effects (Alcorta and Sosis 2005). Drumming, in particular, has been shown to stimulate sensory-motor integration, which has a significant importance for synchrony and group integration (Freeman 1998). The basal ganglia are directly involved in sensory-motor integration (Albin, Young, and Penney 1989). The basal ganglia are the part of the brain that is important for the coordination of bodily movements. The basal ganglia are also the part of the brain that learns ritualized behaviors. Since rhythm and ritual are required for synchrony to occur, music is a necessary feature of religious-rituals. Arguably, without music to stimulate the subcortical areas of the brain (basal ganglia) that integrate sensory and motor systems, religious-rituals would lose their strong synergistic effect.

Music also invokes strong positive emotions within rituals, which then activates the dopaminergic reward system (Alcorta and Sosis 2005). Simply, the dopaminergic reward system is a neurochemical response that makes people feel good in situations that are beneficial (like

eating) or enjoyable (social bonding). When dopamine is released, it alters one's behavior in a way that increases the probability that he or she will continue that behavior in the future. Dopamine release is caused by activation of the hypothalamus in interaction with the nucleus accumbens (NAc) and the ventral tegmental area (VTA). This process is a well-known cause of drug addiction (Menon and Levitin 2005; Cacioppo, Gardner, and Berntson 1999). Similar to drug addiction, the dopamine secreted from the NAc affects individual behavior and motivation by preventing, mediating, or amplifying behaviors as information is sent through the nucleus accumbens to the motor areas of the brain (Salamone et al. 2005). As a result, individuals become more motivated to perform these ritual practices. Motivation is one reason why hallucinogenic and psychotropic substances were used in Native American and Mesoamerican religious-rituals (others being transcendence and achieving an altered state of consciousness) (de Rios et al. 1974; de Rios and Winkelmann 1989; Schultes, Hofmann, and Räscher 2001).

The role of positive emotionality within the field of sociology is well understood as an important force of group solidarity, as exemplified by Turner and Stets (2006):

“First, the gathering of individuals in proximate space; next, the emission of stereotyped greeting rituals that raise the level of transient emotions that, in turn, increase the shared mood and focus of attention; then, the ensuing rhythmic synchronization of talk and bodies that increases collective effervescence, followed by rising levels of positive emotional energy. As positive emotional energy escalates, group solidarity increases, leading to symbolization of this solidarity, and with group symbols, particularized cultural capital consisting of the experiences of members of the group increases” (p 33).

It is easy to see the effect of music here as being the foundational element that leads to synchrony and social bonding in religious-rituals. Music possesses the capacity to arouse a strong positive



emotional response, stimulate a psychophysiological reaction (i.e., body temperature rises, sweating, increased heart rate, rhythmic synchronization) and produce the rhythmical and harmonious behavior (Egermann and McAdams 2013) necessary to produce the synergistic effect. It is easy to see now that music evolved elicit synchrony within the religious group.

As mentioned, synchrony produces empathy. Whereas empathy facilitates identification with others emotional states, it also operates to promote altruistic behavior (De Waal 2008, 2012). Altruism is an emergent property of the synergistic effect (Swann et al. 2009). Individuals develop a strong affective commitment to the religious group to the extent that they will incur personal costs for the betterment of the group. At this stage, the religious group has become the unit of analysis. As individuals unify along a group identity, individualistic differences between group members become peripheral to the core similarities between actors. Group members develop a “oneness” with the group in that they do not identify as a person separate from the group (Swann et al. 2008). This is evident in the evolutionary phenomenon of parochial altruism (Bernhard et al 2006; Choi and Bowles 2007).

The religious group identity is an important property that emerges from a synergy produced during religious-ritual practices, and what sustains the group identity over time is memory. McCauley (2001) contends that religious-rituals evolved mechanisms to “exploit variables that facilitate memory.” Music is one of those variables (Jäncke 2008). Music arouses strong emotions that are important to code and retain episodic memory. Episodic memory is important for remembering object-context associations. The repetitious nature of religious-rituals operates to ingrain memories into semantic knowledge, thus instantiating religious beliefs, practices, and morals as taken-for-granted truths. In the following section, I will detail further the processes and importance of episodic and semantic memory.

## **Emotions and Memory in Ritual**

Music has been shown to activate regions of the brain implicated in short-term and long-term memory processes (Wallin, Merker and Brown 1997; Brown, Martinez, and Parsons 2004; Juslin and Västfjäll 2008; Koelsch 2010; LaBar and Cabeza 2006). Notably, stimulation of the emotion centers of the brain (amygdala and hippocampus) during music perception enhances memory processes. This relationship between emotion and memory is important because the emotion centers produce affective ‘codes’ to visual, somatic, auditory, and olfactory stimuli via the transition cortex to categorize and store information in memory. The more memories are ‘remembered,’ over an extended period of time, the more stable memories become. This stabilization, or consolidation, is the result of a reciprocal feedback loop between the subcortical and cortical regions of the brain via the transition cortex. The subcortical areas (emotions) are important for memory formation, whereas the cortical areas (i.e., the frontal lobe) are necessary for long-term potentiation (Miller et al. 2014; Ramus et al. 2007). The continuous firing of synapses as memories are recalled strengthens synaptic connections, thus stabilizing memories in the brain. As memories stabilize they are abstracted and stored in the differentiated systems of the brain.

There are two types of long-term memory that are important for this discussion: episodic and semantic. Episodic memory, deals with item-context information. This information is important when trying to remember familiar faces or the name to a specific song, for example. Semantic memory processes more general or abstract information such as values, morals, and beliefs. Semantic memory also works at varying levels of categorization allowing people to distinguish between different idiosyncratic features of objects. This can be exemplified in one’s ability to distinguish another as an individual, as a member of specific group, or a social category (i.e., male or female).

### Episodic and Semantic Memory

As mentioned, episodic memory works to recollect specific objects or events. This process primarily takes place within the medial temporal lobe (MTL). The MTL works to contextualize objects by connecting the object to a specific time, place, or spatial setting (Eichenbaum and Ranganath 2007). The amygdala plays an important role in episodic memory retention. When the amygdala is activated, it works to consolidate memory by strengthening synaptic connections in a process known as long-term potentiation (LTP). For example, intense amygdalar activation consequent a fear response increases the likelihood a specific object or event will be remembered (Rogan et al. 1997). This fear response causes neuromodulation where the basolateral amygdala integrates various information-processing regions of the brain to consolidate and regulate memory (McGaugh 2002, 2004; McGaugh et al. 2002).

Semantic memory, on the other hand, stores general or cultural knowledge such as beliefs, values, and morals (Yee et al. 2014). Whereas information gets stored within the hippocampus, upon repeated stimulation this information spreads outside of the hippocampus and becomes consolidated within different cognitive modalities throughout the brain (particularly, the frontal lobe). In doing so it allows information to become abstracted from sensorimotor stimulation. Binder and Desai (2011) propose a multi-modal convergence framework of semantic memory, stating that sensorimotor information *converges* within the inferior parietal lobe and ventral and lateral temporal lobe. This convergence of different modalities (i.e., visual, auditory, tactile, olfactory, and proprioception) then abstracts semantic information at various levels from any association with context-specificity. So knowledge becomes hierarchically categorized and thus generalizable across situations. Once semantic knowledge is imbedded within the different cognitive modalities, the prefrontal cortex works to select information when needed.

Religious-rituals exploit episodic and semantic memory in important ways. In the following section I will illustrate how these two types of long-term memory processes were (and are still) important for maintaining group integration and cooperation.

### *Integration and Cooperation*

Integration and cooperation are often viewed as synonymous and thus require delineation. Integration is simply the combination of multiple parts into a whole. Great apes, and hence, humans' ancestors were naturally individualistic and, over time, natural selection worked to make humans' ancestors more emotional in order to facilitate sociality (Turner and Maryanski 2012). Religion eventually evolved to arouse social emotions as a mechanism to strengthen social bonding through affective commitment. Emotions are thus the glue that keeps groups integrated. Cooperation is the working together toward a common goal. With this definition, cooperation can then be seen as the dynamic component that makes the social group function. Integrated groups are not necessarily cooperative. Though, without cooperation, integrated groups are subject to cheating and freeloading (Sosis and Alcorta 2003) or worse, factionalism. Social groups need both integration and cooperation for social stability. The religious ritual is a mechanism that promotes each.

Whitehouse (2002) contends that religion adopted ways to arouse intense emotions to stimulate memory processes and enhance retention. Increased retention was an evolutionary benefit because it protected religious traditions from decaying over time. Groups develop an identity that, once stabilized in memory, becomes resistant to change. This commitment to a group (religious) identity is the result of the emotional coding of memory during ritual practices. The repetition of religious-rituals creates an affective commitment to traditional beliefs and practices because these beliefs and practices make up the meanings of the group's identity. However, not only positive emotions operate in religious-rituals.

While positive emotions integrate the religious group, negative emotions generate group cooperation. In Whitehouse's (1996) earlier examination of Melanesian initiation cults, he adheres to the extent that traumatic experiences (i.e., beatings, genital mutilation, exposure to extreme temperatures, tattooing, isolation, food and water deprivation, consumption of toxic substances, and death threats [Sosis and Alcorta 2003]) can arouse intense negative emotions that enhance long-term memory. He refers to a "flashbulb" effect illustrating how "dramatic, frightening and surprising experiences seem to be 'printed' on the mind" (Whitehouse 1996). The shared experiences and memories between individuals who have gone through similar experiences engender a "concretion of [group] identity" (Whitehouse 1996; Turner 1969/2008). Here episodic memory is activated to associate specific people to specific events, which creates a foundation of trust and commitment between group members (Whitehouse 1996).

It is hard to fake one's commitment to the group when he or she withstands extensive physical and psychological trauma simply for group inclusion. However, I would stress it is not the negative emotion that build strong bonds, but the subsequent positive emotions that are experienced when such intense initiation rituals are successfully completed. Individuals come to feel a sense of elation, exaltation, or jubilation when they pass intense and emotionally exhaustive rites of passage as exemplified when one graduates from college or becomes a member of a fraternity or sorority. Though positive emotions and empathetic bonds increase altruistic behavior, they do not prevent individuals from defecting from group-oriented behavior. That is, early hunter-gatherers had to devise a system to prevent cheaters and free riders (Boehm 1997). As described in the introduction, there are numerous ways hunting and gathering groups maintained egalitarianism, but religion provided the most effective solution.

Boehm (2012) describes the deterring effect shaming individuals who enact antisocial behaviors. But humans are constrained by their perceptive capabilities, thus shaming is only

effective within a proximal limit. The inability for people to police everyone at all times posed a problem because when people defect it reduces trust between group members. As the adage goes, “fool me once shame on you, fool me twice shame on me.” People do not like to feel cheated. When one feels cheated by another, the cheated person will associate a negative emotional ‘code’ (in episodic memory) to the cheater that, in all future situations, will deter the cheated person from interacting with the cheater (Damasio 1996). Such division between individuals reduces one’s trust and commitment to relationships, creating distance between group members, reducing group integration. Shaming causes cheaters to feel shame or guilty for what they have done. This type of negative emotion may be considered a consequential or retrospective emotion, in that the emotion arouses as the result of committing some immoral or unjust act. Though, there are also other types of negative emotions, what can be called a ‘foreshadowing’ emotion. Such emotions arouse when individuals perceive the consequences of actions that have yet to occur. For example, how knowledge of spiritual or supernatural powers can deter antisocial behaviors (Sharif and Norenzayan 2007; Gervais and Norenzayan 2012). These supernatural powers generate a fear that maintains group cooperation.

Early religious beliefs all have notions of the supernatural. Whether it be dead ancestors, spirits, ghosts, zombies, gods, objects in nature (mountains, rivers, sun, moon, or animals) a cross-cultural commonality is the belief in supernatural agency (Boyer 2001). Religious-ritual practices are seen in early society as a way of communicating with these supernatural forces to ask for help (rain in a drought), protection (when going to war), advice (when unsure), or for conciliation (when angered). Rituals are in this way superstitious. Religious-rituals are practiced to reduce anxieties and show respect to spiritual entities. Whether people see them or not, the supernatural is imbedded within the religious group’s cultural memory. The meanings attributed

to these supernatural beings however are largely culturally-based and are inculcated within the oral transmission of knowledge by religious specialists.

Gervais and Norenzayan (2012) found that if people believe in supernatural forces and believe these supernatural forces will punish them, they are likely to deter from antisocial behavior. This forces individuals into engaging in more cooperative behavior (Johnson 2016). This is because the retributive force of the supernatural is innumerable more intense than any punishment from humans. Using Christianity as an example, God not only punishes an individual for their moral transgressions while they are alive, but also in their afterlife by sending them to Hell. This is simply an argument made by Pascal over three centuries ago, but instead of a metaphysical argument over the existence of God, this reasoning evidences the evolutionary significance of supernatural punishment (Johnson 2016). The human fear response can then be seen as promoting cooperative group behavior. Negative environmental events (i.e., floods, drought, disease, death) can easily be construed as supernatural aggression resulting from immoral behavior. This aversive stimulus has neuromodulatory effects that shape future behaviors (Fanselow and Gale 2003). Religious-rituals (enacted before a meal, when entering a spiritual building, when interacting with others) are then conditioned behaviors that are intended to reduce uncertainty by showing respect, loyalty, and deference to spiritual or supernatural forces.

Thus far I have shown how positive and negative emotional stimulation affects memory processes that work to maintain integrative social ties and cooperation. Both positive and negative emotions play important and distinctive roles in religious-rituals:

- (1) Positive emotions aroused from mimetic displays of music, song, and dance within the religious-ritual work produces a synergy that that unifies a social group. Unification, coupled with memory processes

produces group identification. Group identification then enhances empathetic bonding, trust between group members, and altruistic and prosocial behaviors

- (2) Negative emotions aroused from religious-rituals work to maintain cooperative (prosocial) group behaviors. Positive emotions are not strong enough to deter all antisocial behaviors, but the fear of shaming and supernatural punishment is. The maintenance of social control then operates at the natural and supernatural levels.

Emotions and memory are vital for religion to be effective as an integrative and cooperative force in society. As religion evolved to exploit human emotions that promoted integration and cooperation, religious specialists emerged to facilitate religious knowledge. However, religious beliefs are only effective when they are believed. In the following section I will describe how the institutionalization of religion lead to the differentiation between religious group and religious specialist. Whereas the former maintains many of the qualities described above, the latter introduces a new dynamic of status, influence, and power.

### **Religious Specialists and Institutionalization**

The emergence of religious specialists dawned a new age of institutionalized religion (Wallace 1966; Turner 2003). Typically recognized are the shamans of the Tungus people of Siberia, however religious specialists have been recognized cross-culturally. For example, religious specialists have been associated with many different labels such as medicine men, witch doctors, diviners, sorcerers, and magicians, to name a few (Liberty 1970). The ubiquity of religious specialists alludes to the importance of their role in society. They are believed to possess beneficial traits or characteristics that can enhance religious experience and, thus, are appointed to lead religious practices and rituals (Basilov 1997; Poshinski 1965). After completing an



arduous initiation, rite of passage, or spirit quest the candidate achieves a differentiated status from others in the religious group. Viewed as having spiritual knowledge and abilities that others do not, religious leaders also possess a significant amount of influence in religious groups.

The religious specialist's influence on the group can be characterized by "the belief that certain individuals can influence spiritual entities for the benefit or harm of clients" (Eliade 1972). Influence then derives from the perception that the religious specialist is a spiritual medium with the ability to link the natural to the supernatural (Flannery and Markus 2012; Turner 2003). With this ability, the religious specialist is then considered "extraordinary and treated as endowed with supernatural, superhuman... [and/or] exceptional powers or qualities" (Weber 1948). This places the focus less on the religious specialist and more on the social interaction between the religious specialist and members of the religious group. Individuals come to revere the religious specialist and respect his or her supernatural powers. Developing are loyalties to (religious) organizational leaders.

Important to note is that at this stage in human evolution, hunting-gathering societies have developed sedentary lifestyles. The sedentary lifestyle brought on new social dynamics that allowed for material accumulation and social stratification. While individuals gain power by material accumulation (Lenski 1966), status is attributed to actors with culturally favorable traits or characteristics. In any goal-oriented group activity, group members typically allocate tasks based upon the skills and characteristics of group members (Berger, Wagner, and Zelditch 1974). The shaman is no exception. For example, if an individual is believed to have contacted the spiritual realm, they are believed to have powers others do not. Such encounters may oblige a group to choose this person to lead religious-rituals. As all individuals in a religious-ritual are attempting to communicate with the supernatural, it is only rational to select the individual who has experience in this area to lead the way. When this occurs, the shaman's new role within the

group alters the interaction process. As the shaman comes to gain prestige and social influence, ritual participants increasingly attempt to mimic or imitate their behavior. Here mirror neurons work in a social learning capacity where individuals come to learn symbolic ritual practices (through mimesis) that may bring them closer to the supernatural. However, the shaman's role was not only to direct ritual practices, but also to translate spiritual information to ordinary people. As religion exploits cognitive processes that facilitate memory and information processing (McCauley 2001), it is likely shamans exploited ritual practices to induce an altered state of consciousness as a way to produce a heightened state of sensory awareness (under subcortical [emotional] control) and hyper-suggestibility.

#### **Altered State of Consciousness and Hypnotic Susceptibility**

As discussed, mimesis, synchrony, and emotionality in religious-ritual produces a synergy that unifies individual to a religious (group) identity. Intense emotionality, however, is also important within the context of the altered state of consciousness (ASC). Religious practices have profound psychological and physiological effects on individuals (i.e, opioid activation, MNS activation, increased heart rate, rise in body temperature) that can induce an ASC (de Rios and Winkelman 1989; Winkelman 2004; McClenon 1997). An ASC is, broadly, an 'altered' sense of one's self and/or environment. For this argument I focus solely on trance states that have been associated with other physically exhaustive activities like exercise (Dietrich 2003). With this in mind, I refer to an ASC as a heightened sense of awareness that typically comes about when executive processes (problem solving, working memory, reasoning/rationality) experience cognitive depletion that then impairs normal cognitive functioning (Revonsuo, Kallio, and Sikka 2009; Ludwig 1966; Tellegen and Atkinson 1974; Tart 1976; Dietrich 2003; Baddeley 1995). Typically people experiencing an ASC lose their ability to consciously recognize self as separate

from the environment. This is likely because important neocortical processes (primarily, the prefrontal cortex) become incapacitated during these times of hyper-emotional stimulation.

### *Prefrontal Cortex Deregulation in Induced ASC*

Durkheim (1912/2008) described how individuals experience a *collective effervescence* during collective rituals. In a religious-ritual, this state of hyper-emotionality is the result of an overload of cognitive resources (i.e., adenosine triphosphate [ATP]) travelling from the executive system (PFC) to the emotion centers of the brain. Such cognitive resource transfer over-stimulates the brain's subcortical regions, reducing neocortical functions. But what does this mean?

Dietrich (2003) constructed a hierarchical model of the neural structures of consciousness from the highest (dorsolateral prefrontal cortex [dlPFC]) to the lowest (the brain stem). He argues that the higher order structures integrate the lower level structures. Therefore, deregulation of the dlPFC, which connects to a variety of brain regions, will affect important cognitive functions such as perception, memory, attention, relational learning, basic emotions, and emotional memory (Dietrich 2003). The dlPFC only makes up half of the PFC, however. The ventromedial prefrontal cortex (vmPFC) makes up the other half. This region connects to the emotion centers and is implicated in rational decision-making processes (Damasio 1996). Cognitive depletion within this region will likely result in more impulsive, emotion-driven decision-making. Evidence from exercise induced ASC may provide insight into how PFC deregulation comes about during physically exhaustive behaviors such as those seen in religious-rituals.

People who experience exercise induced ASCs such as a “runner’s high” report a sense of elation or euphoria (Hoffman 1997), “inner harmony,” or even orgasmic sensations (Dietrich and McDaniel 2004). As cognitive resources deplete from the PFC and travel to subcortical regions of the brain, individuals come to experience a heightened sense of positive emotionality. Here the basal ganglia, a subcortical region associated with habitual learning and behavior, play an

important role. An exercise induced ASC like a runner's high, for example, typically only occurs in highly experienced runners (Dietrich and McDaniel 2004) because experienced runners have subconsciously learned the necessary movements and behaviors through ritualized practice. As those behaviors associated with running become habitual or automatic, these processes come to rely less on the PFC and more on the basal ganglia. The same is also true for ritual practices. The more frequently an individual participates in a religious-ritual, the more likely these movements will become enacted at a subconscious level. Individuals would then experience a state of hyper-awareness controlled by the subcortical regions of the brain where serotonergic and opioid release increase basal ganglia activation as well as other subcortical regions, intensifying the feelings of elation or euphoria.

The spiritual healing ability of the shaman may be based within this neurological process. The release of these neurochemicals is considered to be the body's coping mechanism as it helps induce a state of relaxation, as well as reduce stress and pain (Li et al. 2014; Boeker et al. 2008). The highly influential role the shaman plays within religious-rituals is related to processes of spiritual healing because, as mentioned previously, the perception that the shaman has such supernatural abilities increases the likelihood that other's will come to follow (and mimic) their behaviors as well as their beliefs.

Schjoedt et al. (2010) found evidence that showed the vmPFC and dlPFC exhibited a considerable "shut off" in participants who were in the presence of an authority figure they believed possessed healing abilities. They attribute this function as a "handing over" of higher order functions to the authority figure in a similar way a hypnosis patient hands over these functions to a hypnotist. Schjoedt et al (2013) have since expanded upon these findings to further support Dietrich's argument. They believe that the hyperstimulation of certain cognitive faculties during an ASC takes resources from other important areas of the brain, primarily the PFC. This

also corresponds with Tellegen and Atkinson's (1974) "absorption" hypothesis in which they claimed that a heightened sensory state of awareness (i.e., ASC) increases one's hypnotic susceptibility. In absorption, individuals become entranced on a specific object within their environment and lose focus of all else within their perceptual range. Such entrancement is the result of hyperactivity of the mirror neuronal system (Burgmer et al. 2013). During religious-rituals, participants in an absorptive state will become more focused on the shaman, increasing their social learning capacity. The connection between the emotion centers of the brain and the PFC are important here. During PFC shut off, an individual would not be functionally capable of constructing their own interpretations or biases of events or knowledge. That is, they would not have the capacity for critical thought as the majority of cognitive processing would be active at the subcortical level.

Obviously not all ritual participants will experience an ASC because, as discussed earlier, an induced ASC is a learned behavior. However, with this understanding of cultural transmission in can be hypothesized that the greater the degree of subcortical (emotional) processing the greater (measured as emotional intensity) an individual will internalize a system of beliefs and practices. This is likely why religion evolved ways to maximize emotional arousal. Emotions not only enhance the storage of beliefs and practices in long-term memory, but also alter consciousness in a way that allows for their internalization. Finally, we are able to ask: do religious-rituals operate to promote integration or social control?

### **Integration or Social Control?**

In this paper I have discussed the various elements of religious-rituals and ritual practices and how they function in society. I argued that religion evolved to integrate social groups and maintain cooperation in society. Though, critical theorists maintain that religion is coercive and

rituals are mechanisms that benefit the social elite. So how might a critical theory be explained by the argument made within this paper?

McCaffree (2015) similarly argues that mimesis, synchrony, and emotionality are the fundamental elements of integration and group identity formation. Expanding upon this, he states that as societies differentiate through evolution, increasing *social distance* reduces people's ability to synchronize and thus empathize with others (also, Blau 1977), a dynamic that I argue is also true for religious specialists as well. Once the religious specialist's status is elevated within the religious group, they develop new role identities with new meanings and expectations that differentiate them from other members of the group. As religious group members increasingly strive to mimic the religious leader, the opposite is not the case. The overall goal of the group is to achieve transcendence, or the ability to connect the natural with the supernatural. Ordinary group members do not possess this power, but the shaman does. Therefore, in a religious-ritual, there is no reason for the religious specialist to mimic others because such behavior is counterintuitive and is not conducive to the achievement the group's overall goal. This reduction in the shaman's willingness to mimic other members of the group reduces synchrony and weakens empathy. Although it should be noted that empathy is more likely to be weakened from the top-down than from the bottom-up as the religious group still attempts to mimic the religious specialist.

When empathy fades, individuals are more likely to act less morally and more selfishly. This is especially true for high status and high power individuals. When one comes to acquire power and status within a social group he or she becomes reluctant to relinquish it. This kind of behavior is manifest throughout the animal kingdom (Henrich and Gil-White 2001; de Waal 1986; von Rueden, Gurven, and Kaplan 2011; Sapolsky 2005). Religious specialists were originally selected for prosocial purposes, but Case and Maner (2014, 2015) suggest that even

prosocial leaders become antisocial when his or her status and power are threatened. Group leaders will become more self-interested (less prosocial) to maintain their social position, regardless the harm the group may incur. The social influence religious leaders have can easily be exploited to legitimate institutionalized rules or laws that benefit only a select few. As Wilson (1966) argues, “it may be far easier to reinterpret values than to reorganize society.”

Despite this, followers will still attempt to mimic religious leaders and experience PFC shutoff and subcortical processing of information that will lead to the internalization of ritualized beliefs and practices. Corruption then occurs because empathy is unidirectional (occurring only from the bottom-up). People continue to seek spiritual healing (i.e., reduced stress/anxiety) and continue to believe religious leaders despite a potentially corrupt leadership. Thus, the Karl Marx’s “opium of the people” analogy may carry some weight in this discussion. Religion operates just as importantly on a psychological level as it does on a sociological level. Mimesis and synchrony reduces a individual’s fear, anxiety, and stress. A group identity provides meaning to people’s life, defining not only how, but also why one should behave in specific fashion. In this, religion provides for people an identity, a sense of self, and the meanings associated with it.

### **Conclusion**

In this paper I have shown how both the integration and social control hypotheses can be synthesized with an understanding of the underlying neurology. The human mirror neuronal system is the basis of mimesis and synchrony. This produces a positive emotional output that strengthens social bonding. Religious-rituals evolved practices that exploited this ability as a way to unite individuals into a common group identity. However, the emergence of religious leaders likely created an asynchrony reducing group egalitarianism. As populations grew and societies differentiated, increased social distance weakened ties between individuals of different statuses. This likely made it easier to act selfishly or, at least, less prosocially. I have purposefully not

argued against integration or social control because it is likely that both operate in tandem. Large populations necessitated powerful gods to maintain the moral order (Norenzayan 2013; Johnson 2016), but increased social distance also made it easier for high status and high power actors (religious leaders) to act more selfishly. Thus, the nexus between integration and social control lies in the neurological and physiological processes of mimesis, synchrony, and emotionality.



## References

- Albin, Roger L. Anne B. Young, and John B. Penney. 1989. "The Functional Anatomy of Basal Ganglia Disorders." *Perspectives on Disease* 12(10): 366-375.
- Alcorta, Candace S., and Richard Sosis. 2005. "Ritual, Emotion, and Sacred Symbols." *Human Nature* 16(4): 323-359.
- Arbib, Michael A. 2005. "Interweaving Protosign and Protospeech: Further Developments Beyond the Mirror." *Interaction Studies* 6(2): 145-171.
- Baddeley, A.(1995). "Working Memory." Pp 755-764 in *The Cognitive Neurosciences*, edited by M.S. Gazzaniga. Cambridge: MIT Press.
- Baroni, Mario. 2008. Music, Musicality, "Musilanguage". *Musicae Scientiae* 12(1): 197-218.
- Barraza, Jorge A. and Paul J. Zak. 2009. "Empathy Toward Strangers Triggers Oxytocin Release and Subsequent Generosity." *Annals of the New York Academy of Sciences* 1167(1): 182-189.
- Basilov, Vladimir N. 1997. "Chosen by the Spirits." Pp 3-45 in *Shamanic Worlds: Rituals and Lore of Siberia and Central Asia*, edited by M.M. Balzer. London: M.E. Sharpe, Inc.
- Bell, Catherine. 2009. *Ritual Theory, Ritual Practice*. Oxford University Press.
- Bellah, Robert. 1964. "Religious Evolution." *American Sociological Review* 29(3): 358-374.
- Bellah, Robert N. 2003. "The Ritual Roots of Society and Culture." Pp 31-44 in *Handbook of the Sociology of Religion*, edited by M. Dillon: Cambridge University Press.
- Bellah, Robert. 2005. "Durkheim and Ritual." Pp. 183-210 in *Cambridge Companion to Durkheim*, edited by J. C. Alexander and P. Smith: Cambridge University Press.
- Berger, Joseph, David G. Wagner, and Morris Zelditch, Jr. 1974. "Theoretical and Metatheoretical Themes in Expectation States Theory." Pp 148-168 in *Micro Sociological Theory: Perspectives on Sociological Theory*, edited by S.N. Eisenstadt and H.J. Helle. Beverley Hills: SAGE Publications.
- Binder, Jeffrey R. and Rutvik H. Desai. 2011. "The Neurobiology of Semantic Memory." *Trends in Cognitive Sciences* 15(11): 527-536.
- Blau, Peter M. 1977. "Inequality and Heterogeneity." Free Press.
- Boecker, Henning, Till Sprenger, Mary E. Spilker, Gjermund Henriksen, Marcus Koppenhoefer, Klaus J. Wagner, Michael Valet, Achim Berthele, and Thomas R. Tolle. (2008). "The Runner's High: Opioidergic Mechanisms in the Human Brain." *Cerebral Cortex* 18(11):2523-2531.

- Boehm, Christopher. 1997. "Impact of the Human Egalitarian Syndrome on Darwinian Selection Mechanics." *The American Naturalist* 150(1): 100-121.
- Boehm, Christopher. 2012. *Moral Origins: The Evolution of Virtue, Altruism and Shame*. Basic Books.
- Boyer, Pascal. 2001. *Religion Explained: The Evolutionary Origins of Religious Thought*. New York: Basic Books.
- Brown, Steven. 2000. "The 'Musilanguage' Model of Music Evolution." Pp 271-300 in *The Origins of Music*, edited by N. Wallins: MIT Press.
- Brown, Steven, Michael J. Martinez, and Lawrence M. Parsons. 2004. "Passive Music Listening Spontaneously Engages Limbic and Paralimbic Systems." *Neuroreport* 15(13): 2033-2037.
- Brown, Steven, and Lawrence M. Parsons. 2008. "The Neuroscience of Dance." *Scientific American* 299(1): 78-83.
- Burgmer, Markus, Harald Kugel, Bettina Pfleiderer, Adrianna Ewert, Thomas Lenzen, Regina Pioch, Martin Pyka, Jens Sommer, Volker Arolt, Gereon Heuft, and Carsten Konrad. 2013. "The Mirror Neuron System Under Hypnosis: Brain Substrates of Voluntary and Involuntary Motor Activation in Hypnotic Paralysis." *Cortex* 49(2):437-445.
- Burke, Peter J. and Jan E. Stets. 2009. *Identity theory*. Oxford University Press.
- Cacioppo, John T., Wendi L. Gardner, and Gary G. Berntson. 1999. "The Affect System Has Parallel and Integrative Processing Components: Form Follows Function." *Journal of Personality and Social Psychology* 76(5): 839-855.
- Campbell, Anne. 2010. "Oxytocin and Human Social Behavior." *Personality and Social Psychology Review* 20(10): 1-15.
- Carr, Laurie, Marco Iacoboni, Marie-Charlotte Dubeau, John C. Mazziotta, and Gian Luigi Lenzi. 2003. "Neural Mechanisms of Empathy in Humans: A Relay From Neural Systems For Imitation To Limbic Areas." *Proceedings of the National Academy of Sciences*, 100(9): 5497-5502.
- Case, Charlene R. and Jon K. Maner. 2014. "Divide and Conquer: When and Why Leaders Undermine the Cohesive Fabric of their Group." *Journal of Personality and Social Psychology* 107(6): 1-18.
- Case, Charlene R. and [Jon K. Maner](#). 2014. "When and why power corrupts: An evolutionary perspective." In *Evolutionary Analysis in the Social Sciences*, edited by R. Machalek, J. Turner, A. Maryanski: Paradigm Publishers.
- Christiansen, Morten H., and Simon Kirby. 2003. "Language Evolution: Consensus and Controversies." *Trends in Cognitive Sciences* 7(7): 300-307.

- Damasio, Antoino R., B. J. Everitt, and D. Bishop. 1996. "The Somatic Marker Hypothesis and the Possible Functions of the Prefrontal Cortex [and discussion]." *Philosophical Transactions of the Royal Society B: Biological Sciences* 351(1346): 1413-1420.
- De Rios, Marlene D., Norman Alger, N. Ross Crumrine, Peter T. Furst, Robert Weston La Barre, Herbert J. Landar, Joseph K. Long, Tatiana Proskouriakoff, Arthur J. Rubel, Francisco Samaranch, J. Eric S. Thompson, and Roger W. Wescott. 1974. "The Influence of Psychotropic Flora and Fauna on Maya Religion." *Current Anthropology* 15(2): 147-164.
- De Rios, Marlene D., and Michael Winkelman. 1989. "Shamanism and Altered States of Consciousness: An Introduction." *Journal of Psychoactive Drugs* 21(1): 1-7.
- De Waal, Frans. 1986. "The Integration of Dominance and Social Bonding in Primates." *The Quarterly Review of Biology* 61(4): 459-479.
- De Waal, Frans B. 2008. "Putting the Altruism Back into Altruism: The Evolution of Empathy." *Annual Review of Psychology* 59: 279-300.
- De Waal, Frans B. 2012. "A Bottom-up View of Empathy." Pp 121-138 in *The Primate Mind: Built to Connect With Other Minds*, edited by F.B. de Waal and P.F. Ferrari. Cambridge: Harvard University Press.
- Decety, Jean, and Jessica A. Sommerville. 2003. "Shared Representations Between Self and Other: A Social Cognitive Neuroscience View." *Trends in Cognitive Sciences* 7(12): 527-533.
- Di Pellegrino Giuseppe, Luciano Fadiga, Leonardo Fogassi, Vittorio Gallese, Giacomo Rizzolatti. 1992. "Understanding Motor Events: A Neurophysiological Study." *Experiments in Brain Research* 91:176-80.
- Dietrich, Arne. 2003. "Functional Neuroanatomy of Altered States of Consciousness: The Transient Hypofrontality Hypothesis." *Consciousness and Cognition*. 12: 231-256.
- Dietrich, Arne and William F. McDaniel. 2004. "Endocannabinoids and Exercise." *British Journal of Sports Medicine* 38(5): 536-541.
- Domes, Gregor, Markus Heinrichs, Andre Michel, Christoph Berger, and Sabine C. Herpertz. 2007. "Oxytocin Improves 'Mind-Reading' in Humans." *Biological Psychiatry* 61(6): 731-733.
- Durkheim, Émile. 1912[2008]. *The Elementary Forms of Religious Life*. Translation by Carol Cosman. New York: Oxford University Press.
- Eichenbaum, H., A.R. Yonelinas, and C. Ranganath. 2007. "The Medial Temporal Lobe and Recognition Memory." *Annual Review of Neuroscience* 30: 123-152.

- Egermann, Hauke and Stephen McAdams. 2013. "Empathy and Emotional Contagion as a Link Between Recognized and Felt Emotions in Music Listening." *Music Perception: An Interdisciplinary Journal* 31(2): 139-156.
- Eliade, Mircea. 1972. *Shamanism*. Princeton: Princeton University Press.
- Fanselow, Michael S. and Greg D. Gale. 2003. "The Amygdala, Fear, and Memory." *Annals of the New York Academy of Sciences* 985(1): 125-134.
- Fehr, Ernst and Urs Fischbacher. 2004. "Social Norms and Human Cooperation." *Trends in Cognitive Sciences* 8(4): 185-190.
- Flannery, Kent, and Joyce Marcus. *The Creation of Inequality: How Our Prehistoric Ancestors Set the Stage for Monarchy, Slavery, and Empire*. Cambridge: Harvard University Press.
- Freeman III, Walter J. 1998. "A Neurobiological Role of Music in Social Bonding." *The Origins of Music*, edited by N. Wallin, B. Merkur, and S. Brown. Cambridge: MIT Press.
- Gallese, Vittorio. 1999. "From Grasping to Language: Mirror Neurons and the Origin of Social Communication." Pp 165-178 in *Towards a Science of Consciousness*, edited by S. Hameroff, A. Kazniak and D. Chalmers. Cambridge: MIT Press.
- Gallese, Vittorio. 2001. "The 'Shared Manifold' Hypothesis. From Mirror Neurons to Empathy." *Journal of Consciousness Studies* 8(5-7): 33-50.
- Girard, René. 1976. *Deceit, Desire, and the Novel: Self and Other in Literary Structure*. Johns Hopkins University Press.
- Gervais, Will M. and Ara Norenzayan. 2012. "Like a Camera in the Sky? Thinking About God Increases Public Self-Awareness and Socially Desirable Responding." *Journal of Experimental Social Psychology* 48(1):298-302.
- Grinde, Bjørn. 2012. "The Evolutionary Rationale for Consciousness." *Biological Theory* 7(3): 227-236.
- Henrich, Joseph and Fransisco J. Gil-White 2001. "The Evolution of Prestige: Freely Conferred Deference as a Mechanism for Enhancing the Benefits of Cultural Transmission." *Evolution and Human Behavior* 22:165-196.
- Hoffmann, Pavel. 1997. "The Endorphin Hypothesis." Pp 163-177 in *Physical Activity and Mental Health*, edited by W.P. Morgan. Washington: Taylor and Francis.
- Iacoboni, Marco. 2009. "Imitation, Empathy, and Mirror Neurons." *Annual Review of Psychology* 60: 653-670.
- Iacoboni, Marco, Istvan Molnar-Szakacs, Vittorio Gallese, Giovanni Buccino, John C Mazziotta, and Giacomo Rizzolatti. 2005. "Grasping the Intentions of Others With One's Own Mirror Neuron System." *PLoS Biol* 3(3): 529-535.

- Jäncke, Lutz. 2008. Music, "Memory and Emotion." *Journal of Biology* 7(21): 1186-1190.
- Johnson, Dominic. 2016. *God is Watching You: How the Fear of God Makes Us Human*. New York: Oxford University Press.
- Juslin, Patrik N., and Daniel Västfjäll. 2008. "Emotional Responses to Music: The Need to Consider Underlying Mechanisms." *Behavioral and Brain Sciences* 31(05): 559-575.
- Koelsch, Stefan. 2010. "Towards a Neural Basis of Music-Evoked Emotions." *Trends in Cognitive Sciences* 14(3): 131-137.
- Kosfeld, Michael, Markus Heinrichs, Paul J. Zak, Urs Fischbacher, and Ernst Fehr. 2005. "Oxytocin Increases Trust in Humans." *Nature* 435: 673-676.
- Kunert, Richard, Roel M. Willems, Daniel Casasanto, Aniruddh D. Patel, and Peter Hagoort. 2015. "Music and Language Syntax Interact in Broca's Area: An fMRI Study." *PLoS One* 10(11): e0141069.
- LaBar, Kevin S., and Roberto Cabeza. 2006. "Cognitive Neuroscience of Emotional Memory." *Nature Reviews Neuroscience* 7(1): 54-64.
- Lerro, Bruce. 2000. *From Earth Spirits to Sky Gods: The Socioecological Origins of Monotheism, Individualism, and Hyperabstract Reasoning from the Stone Age to the Axial Iron Age*. Lexington Books.
- Li, Hao, Jamie L. Scholl, Wenyu Tu, James E. Hassell, Michael J. Watt, Gina L. Forster, and Kenneth J. Renner. (2014). "Serotonergic Responses to Stress Are Enhanced in the Central Amygdala and Inhibited in the Ventral Hippocampus During Amphetamine Withdrawal." *European Journal of Neuroscience* 40(11):3684-3692.
- Liberty, Margot P. 1970. "Priest and Shaman on the Plains: A False Dichotomy?" *The Plains Anthropologist* 15(48): 73-79.
- Ludwig, Arnold M. "Altered States of Consciousness." *Archives of General Psychology* 15(3): 225-234.
- Ma, Weiyi, and William Forde Thompson. 2015. "Human Emotions Track Changes in the Acoustic Environment." *Proceedings of the National Academy of Sciences* 112(47): 14563-14568.
- McCaffree, Kevin. 2015. *What Morality Means: An Interdisciplinary Synthesis for the Social Sciences*. New York: Palgrave Macmillan.
- McCauley, Robert N. 2001. "Ritual, Memory, and Emotion: Comparing Two Cognitive Hypotheses." Pp 115-140 in *Religion in Mind: Cognitive Perspectives on Religious Belief, Ritual, and Experience*, edited by J. Andresen. Cambridge: Cambridge University Press.

- McClenon, James. 1997. "Shamanic Healing, Human Evolution, and the Origin of Religion." *Journal for the Scientific Study of Religion* 36(3): 345-354.
- McGaugh, James L. 2002. "Memory Consolidation and the Amygdala: A Systems Perspective." *Trends in Neuroscience* 25(9): 456-491.
- McGaugh, James L, Christa K. McIntyre, and Anne E. Power. 2002. "Amygdala Modulation and Memory Consolidation: Interaction with Other Brain Systems." *Neurobiology of Learning and Memory* 78(3): 539-552.
- McGaugh, James L. 2004. "The Amygdala Modulates the Consolidation of Memories of Emotionally Arousing Experiences." *Annual Review of Neuroscience* 27:1-28.
- Menon, V., and D.J. Levitin. 2005. "The Rewards of Music Listening: Response and Physiological Connectivity of the Mesolimbic System." *Neuroimage* 28(1): 175-184.
- Miller, Adam M. P., Lindsey C. Vedder, L. Matthew Law, and David M. Smith. 2014. "Cues, Context, and Long-Term Memory: The Role of the Retrosplenial Cortex in Spatial Cognition." *Frontiers of Human Neuroscience* 8: 1-15.
- Mithen, Steven J. 2005. *The Singing Neanderthals: The Origins of Music, Language, Mind, and Body*. Harvard University Press.
- Molenberghs, Pascal, Christopher Brander, Jason B. Mattingley, and Ross Cunningham. 2010. "The Role of the Superior Temporal Sulcus and the Mirror Neuron System in Imitation." *Human Brain Mapping* 31(9): 1316-1326.
- Molnar-Szakacs, I. and Overy, K. 2006. "Music and Mirror Neurons: From Motion to 'E'motion." *Social cognitive Affect Neuroscience*. 1(3): 235-241.
- Müller, H. P. (1988). "Social Structure and Civil Religion: Legitimation Crisis in a Later Durkheimian Perspective." Pp 129-151 in *Durkheimian Sociology: Cultural Studies*, edited by J.C. Alexander. Cambridge: Cambridge University Press.
- Niemeyer, Richard E. 2013. "What Are the Neurological Foundations of Identities and Identity-Related Processes?" Pp 149-165 in *Handbook of Neurosociology*, edited by D.D. Franks and J.H. Turner. Netherlands: Springer.
- Neu, J. (1975). "Lévi-Strauss on shamanism." *Man*, 285-292.
- Norenzayan et al. 2014. "The Cultural Evolution of Prosocial Religions." *Behavioral and Brain Sciences*.
- Norenzayan, Ara. 2013. *Big Gods: How Religion Transformed Cooperation and Conflict*. Princeton: Princeton University Press.

- Pelphrey, Kevin A., James P. Morris, and Gregory McCarthy. 2004. "Grasping the Intentions of Others: The Perceived Intentionality of an Action Influences Activity in the Superior Temporal Sulcus During Social Perception." *Journal of Cognitive Neuroscience* 16(10): 1706-1716.
- Posinsky, S. H. 1965. "Yurok shamanism." *Psychiatric Quarterly* 39(1): 227-243.
- Ramus, Seth J., Jena B. Davis, Rachel J. Donahue, Claire B. Discenza, and Alyssa A. Waite. 2007. "Interactions Between the Orbitofrontal Cortex and the Hippocampal Memory System During the Storage of Long-Term Memory." *Annals of the New York Academy of Sciences* 1121(1): 216-231.
- Revonsuo, Antti, Sakari Kallio, and Pilleriin Sikka. 2009. "What is an Altered State of Consciousness?" *Philosophical Psychology*. 22(2): 187-204.
- Richerson, Peter J., and Robert Boyd. 2001. "The Evolution of Subjective Commitment to Groups: A Tribal Instincts Hypothesis." *Evolution and the Capacity for Commitment* 3: 186-220.
- Rizzolatti, Giacomo, Luciano Fadiga,, Vittorio Gallese, and Leonardo Fogassi. 1996. "Premotor Cortex and the Recognition of Motor Actions." *Cognitive Brain Research* 3(2): 131-141.
- Rizzolatti, Giacomo, and Liala Craighero. 2004. "The Mirror-Neuron System." *Annual Review of Neuroscience* 27: 169-192.
- Rogan, Michael T., Ursula V. Stäubli, and Joseph E. LeDoux. 1997. "Fear Conditioning Induces Associative Long-Term Potentiation in the Amygdala." *Nature* 390(6660): 604-607.
- Ross, Marina Davila, Susanne Menzler, Elke Zimmermann. 2008. "Rapid Facial Mimicry in Orangutan Play." *Biology Letters* 4(1): 27-30.
- Salamone, J.D., M. Correa, S.M. Mingote, and S.M. Weber. 2005. "Beyond the Reward Hypothesis: Alternative Functions of Nucleus Accumbens Dopamine." *Current Opinion in Pharmacology* 5(1): 34-41.
- Sapolsky, Robert M. 2005. "The Influence of Social Hierarchy on Primate Health." *Science*, 308(5722): 648-652.
- Schjoedt, Uffe, Hans Stødkilde-Jørgensen, Armin W. Geertz, Torben E. Lund, and Andreas Roepstorff. 2010. "The power of charisma—perceived charisma inhibits the frontal executive network of believers in intercessory prayer." *Social Cognitive and Affective Neuroscience*, nsq023.
- Schjoedt, Uffe, Jesper Sørensen, Kristoffer Laigaard Nielbo, Dimitris Xygalatas, Panagiotis Mitkidis, and Joseph Bulbulia. 2013. "Cognitive Resource Depletion in Religious Interactions." *Religion, Brain and Behavior*. 3(1): 39-86.

- Schultes, R. E., A. Hofmann, and C. Rätsch. 1992. *Plants of the Gods: Their Sacred, Healing, and Hallucinogenic Powers*. Rochester: Healing Arts Press.
- Sherif, Azim F. and Ara Norenzayan. 2007. "God is Watching You: Priming God Concepts Increases Prosocial Behavior in an Anonymous Economic Game." *Psychological Science* 18(9): 803-809.
- Sosis, Richard. and Candace Alcorta. 2003. "Signaling, Solidarity, and the Sacred: The Evolution of Religious Behavior." *Evolutionary Anthropology*. 12: 264-274.
- Stel, Mariëlle and Roos Vonk. 2010. "Mimicry in Social Interaction: Benefits for Mimickers, Mimickees, and their Interaction." *British Journal of Psychology* 101: 311-323.
- Tart, Charles T. 1976. "The Basic Nature of Altered States of Consciousness: A Systems Approach." *Journal of Transpersonal Psychology* 8(1): 45-64.
- Tellegen, Auke. and Gilbert Atkinson. 1974. "Openness to Absorbing and Self-Altering Experiences ("Absorption"), A Trait Related to Hypnotic Susceptibility." *Journal of Abnormal Psychology*. 83(3): 268-277.
- Turner, Jonathan. 1996. "The Evolution of Emotions in Humans: A Darwinian-Durkheimian Analysis." *Journal for the Theory of Social Behavior* 26(1): 1-33.
- Turner, Jonathan H. 2003. *Human Institutions: A Theory of Societal Evolution*. Oxford: Rowman and Littlefield Publishers.
- Turner, Jonathan. 2010. "Natural Selection and the Evolution of Morality in Human Societies." Pp 125-145 in *Handbook of the Sociology of Morality*, edited by S. Hitlin and S. Vaisey: Springer.
- Turner, Jonathan H. and Jan E. Stets. 2006. "Sociological Theories of Human Emotions." *Annual Review of Sociology* 32:25-52.
- Turner, Jonathan and Alexandra Maryanski. 2008. *On the Origin of Societies by Natural Selection*. Paradigm Publishing.
- Turner, Jonathan H. and Alexandra Maryanski. 2013. "The Evolution of the Neurological Basis of Human Sociality." Pp 289-309 in *Handbook of Neurosociology*, edited by D.D. Franks and J.H. Turner. Netherlands: Springer.
- Turner, Victor. 1965[2008]. *The Ritual Process: Structure and Anti-Structure*. Transaction Publishers.
- Uvnäs-Moberg, Kerstin. 1998. "Oxytocin May Mediate the Benefits of Positive Social Interaction and Emotions." *Psychoneuroendocrinology* 23(8): 819-835.



- Von Rueden, Christopher, Michael Gurven, and Hillard Kaplan. 2011. "Why Do Men Seek Status? Fitness Payoffs to Dominance and Prestige." *Proceedings of the Royal Society of London B: Biological Sciences* 278: 2223-2232.
- Wallace, Anthony F.C. 1966. *Religion: An Anthropological View*. New York: Random House Inc.
- Wallin, Nils Lennart, Björn Merker, and Steven Brown. 2001. *The Origins of Music*. MIT Press.
- Whitehouse, Harvey. 1996. Rites of Terror: Emotion, Metaphor and Memory in Melanesian Initiation Cults. *Journal of the Royal Anthropological Institute* 2(4): 703-715.
- Whitehouse, Harvey. 2002. "Modes of Religiosity: Toward a Cognitive Explanation of the Sociopolitical Dynamics of Religion." *Method and Theory in the Study of Religion* 14:293-315.
- Winkelman, M. 2004. "Shamanism as the Original Neurotheology." *Zygon* 39(1):193-217.
- Wilson, David Sloan. 2002. *Darwin's Cathedral: Evolution, Religion, and the Nature of Society*. Chicago: University of Chicago Press.
- Weber, M. 1948. *Economy and Society*. University of California Press.
- Yee, Eiling, Evangelia G. Chrisikou, and Sharon L. Thompson-Schill. 2014. "The Cognitive Neuroscience of Semantic Memory." Pp 1-16 in *Oxford Handbook of Cognitive Neuroscience*, edited by K. Ochsner and S. Kosslyn: Oxford University Press.
- Zatorre, Robert J., Joyce L. Chen, and Virginia B. Penhune. 2007. "When the Brain Plays Music: Auditory-Motor Interactions in Music Perception and Production." *Nature Reviews Neuroscience* 8(7): 547-558.
- Zlatev, J. 2008. "The Co-evolution of Intersubjectivity and Bodily Mimesis." Pp 215-244 in *The Shared Mind: Perspectives on Intersubjectivity*, edited by J. Zlatev, T.P. Racine, C. Sinha, and E. Itkonen. John Benjamins Publishing Company.