SYNCHRONOUS RITUALS AND SOCIAL BONDING: REVITALIZING CONCEPTIONS OF INDIVIDUAL PERSONHOOD IN THE EVOLUTION OF RELIGION

by Léon Turner

Abstract. The evolutionary cognitive science of religion rarely strays far from strong individualistic principles despite a deep interest in the adaptive social bonding functions of religion. This raises serious problems for recent Christian theology, which favors concrete relational conceptions of individual personhood. Here, I argue that the wider evolutionary study of religion can mitigate this individualism by embracing recent research suggesting that religion's social bonding functions might be explained as much through energetic, endorphin stimulating, synchronous rituals as through cognitive mechanisms that increase prosocial behavior. The brain opioid theory of social attachment provides a helpful framework for understanding the evolutionary significance of such rituals. A close examination of research into the social effects of synchronous activity, I argue, reveals the need for a theoretically pluralistic explanation of how religion facilitates sociality, the major components of which are readily interpreted in terms that recognize the inherent relationality of individual personhood.

Keywords: CSR; embodiment; endorphins; individualism; religion; ritual; social bonding; synchrony; theological anthropology

Individualistic Tendencies in the Evolutionary Study of Religion

The cognitive science of religion (CSR) and its close cousin the evolutionary CSR (ECSR) are currently dominated by a small but growing number of central themes that unite the early cognitive by-product accounts of the origins of religion with a concern for religion's evolutionarily adaptive social functions, particularly the role it plays in bonding groups of people together. But despite ECSR's admirable openness to theoretical pluralism, the underlying individualism of its earliest days, which still characterizes

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some elements of more recent theorizing, retains its potential to make many Christian theologians, as well as many humanistic social scientists, quite uncomfortable.

Christian theological anthropology, especially, has formed a strong consensus around inherently relational concepts of personhood, and is broadly united in its condemnation of mechanistic individualistic concepts of the individual. In such circles, the notion that any area of human activity can be described in terms of the actions of self-contained autonomous entities is anathema. As Joel Green writes, "biblical faith challenges those, past and present, who insist that the human person can ever be understood 'one person at a time'" (Green 2002, 22). Contemporary Christian theologians are mostly united in the belief that individual personhood can only adequately be conceptualized in concrete terms, as constituted in crucial ways by persons' relations with each other and their contingent historical environments. Theological expressions of the importance of relationality to the concept of the individual are not difficult to find. This is what the Anglican theologian Vernon White is keen to express, for example, when he cites the political philosopher John Gray with approval for his recognition that "human individuals are not natural data … but artefacts of social life, cultural and historical achievements … exfoliations of the common life. Without common forms of life, there are no individuals" (Gray 2013, 136–37). Shults, in describing the impact of the relational turn in secular and religious thought writes, "Instead of autonomous subjects that stand over against the natural world and other subjects, today human self-consciousness is understood as always and already embedded in relations between self, other, and world" (Shults 2003, 31). For Anderson, "Self-existence is a struggle between the reality of individuality and the reality of community. Because humanity is originally and essentially co-humanity, the fundamental affirmation of human existence is surely one of relatedness. 'It is not good that the man should be alone' (Gen 2:18)" (1982, 168). McFadyen too is in full agreement when he writes, "it is impossible to think of individuality as isolated, for the existence of one and other is inextricably linked … Individuals are not linked through an abstract metaphysical principle but through concrete relations" (74). All these theologians clearly agree that individual persons simply cannot be understood in isolation from their relations. It is not that the idea of the individual is just impoverished when conceived in isolation from relations; it is rather that such a concept of the individual is utterly incoherent.

This is not the picture of the individual that has typically been painted by ECSR, although, because concepts of personhood are not exactly its primary concern, it is perhaps better to speak of the "impression" of personhood that emerges from its theorizing about religion rather than any particular concept that it is dogmatically attached to. Evolutionary theory, of course, is individualistic at its core because fitness benefits accrue at the

level of the individual rather than the group, even if those individual benefits also ultimately benefit the group. It is therefore perfectly understandable that the network of cognitive explanations of religious phenomena that constitutes ECSR should have been mainly interested in the evolution and functioning of the internal mechanics of individual minds. This may be especially true of its explanations of the ultimate origins of beliefs in supernatural entities (Boyer 2001; Atran 2002; Atran and Henrich 2010; Norenzayan et al. 2016), but it is also discernible in explanations of the pervasive and enduring attractiveness of religious beliefs (Atran 2002; Barrett 2010; Norenzayan 2013), and many of the means by which it achieves its adaptive social functions (Johnson and Bering 2006; Gervais et al. 2011; Norenzayan 2013; Norenzayan et al. 2016). Here, religious beliefs and behaviors are often explained, finally, in terms of universal predispositions and the interactions between evolved cognitive tools and features of human physical and social environments, whether those are features of the landscape or the perceived actions of other people (see Turner 2020). Unfortunately, in contrast to the theological claims about personhood described above, when framed in this way human beings often come to look a lot like extremely complex, autonomous "machine-like entities" (Laidlaw 2007), or robots. What is assumed to be of most interest about human beings, as far as explaining religious phenomena is concerned, is the functioning of their own independent cognitive tool kits, whether those toolkits are involved in the production of novel supernatural agent concepts, or the decoding or interpretation of particular rituals. Since religious phenomena are produced, transformed, and reproduced when those toolkits come into contact with various features of the physical world and the toolkits of other individual people, explaining the evolution of religion involves, at some level, explaining the evolution of the toolkits and how they are adapted to particular human environments. It is not immediately clear what a relational conception of the person might add to these sorts of explanations, and so it very rarely becomes a subject of debate.

Even more recent research concerned explicitly with the organization and maintenance of religious communities' social structures seems to encourage an impression of autonomous self-contained individuals, including accounts of the ways religions enhance group solidarity and prosocial behavior via certain rituals, which act as costly, hard-to-fake signals of cooperative intent (see Bulbulia and Sosis 2011), credibility enhancing displays (Henrich 2009; Atran and Henrich 2010; Norenzayan 2013), or through fear of supernatural punishment (see Bering and Johnson 2006; Norenzayan 2013; Norenzayan et al. 2016). These theories are often much less concerned with the specific operations of cognitive toolkits or other specialised cognitive structures. In the case of Sosis' commitment signalling hypothesis, for example, the actual cognitive mechanics of how individuals interpret rituals, according some more credibility than others,

is consciously left very much in the background. But the production and performance of religion is still in a sense automatic, and individual human beings are still functionally indistinguishable from automatons—they are interchangeable nodes in a network of functionally identical and conceptually independent entities. The study and explanation of religion's social cognitive dimensions involves, first and foremost (and sometimes exclusively) understanding how these independent entities react to each other and to different sorts of information in various social situations (see Turner 2020). It does not, in other words, necessitate a relational conception of individuals any more than the original by-product theories of religion's origins.

To be clear, I am not suggesting that a fundamental disagreement divides theologians from evolutionary theorists about whether individuals, in and through their relationships, have effects on each other's lives in profound ways (everyone agrees they do). Nor am I suggesting that ECSR pays insufficient attention to the social context of religion. Again, it is perfectly clear that recent research has focused to a much greater extent on particular, historically contingent social context than earlier theories of the cognitive origins of religion. Nor am I assessing the relative merits of different notions of innateness, maturational naturalness, the plausibility of theories of individual and group selection, or the fundamentally social character of both religious belief and behavior. Rather, I am attempting to highlight a basic difference between the ways theologians (and many like-minded humanistic social scientists) and evolutionary cognitive scientists of religion tend to conceptualize individual human beings and the nature of their relations with other people and the world. For the former, individuals are literally constituted in part by their concrete relations with others, which is only to say that individuals cannot be conceived in isolation from those relations; whereas the latter, though they spend little time reflecting on how best to conceptualize individuality, explain the functions of religion in such a way as to perpetuate the idea that individuals can be seen as autonomous, self-contained agents. For them, relationships are just things people do. Relating to others and the world just provides raw stimuli for the internal cognitive machinery, in terms of the action of which, the evolutionary history of religion can be explained. Individuals merely "initiate acts and are acted upon. They are never able to enter one another or to participate in the being of one another. They attract, repel, collide, and cooperate" (Proudfoot 1976, 25).

Of course, the majority of ECSR theorists are likely to bristle at the accusation that they consciously reduce the individual to its cognitive dimensions, and thereby equate human beings with autonomous robots. They would be quite right to do so. ECSR is obviously not ideologically committed to abstract individualism, and is theoretically perfectly open to conceptualizing persons in more social and relational terms. I certainly do

not mean to suggest that anyone in the field has ever actively opposed the relational approach to personhood that has achieved such broad theological consensus. It just is not a direction that research has often taken. It might thus be thought of as more of a current blind spot for ECSR than a point of principle. But as far as the position taken by McFadyen, Shults, White, Kelsey et al., is concerned, an absence of theoretical conflict with ECSR offers little comfort. The same might be said of most of the social sciences—they can accommodate relational accounts of personhood, but often proceed as if an exclusively individualistic framework is all that is really necessary to explain human behavior, including religion. This is a view of the world that a great many theologians have been fighting to overcome, since the individualistic approach perpetuated by most of the human and social sciences is frequently seen as being enormously damaging to society and to our self-understanding (see, e.g., McFadyen 1990; White 1996; Kelsey 2009)

So, might it be possible not just to find theoretical room for a relational conception of the individual in ECSR, but to identify one or more ways in which such a relational conception slots easily and constructively into the evolutionary study of religion in practice? I believe so. I will focus on one specific example of how this might be achieved, suggesting that a particularly promising body of research into religious ritual simultaneously expands the range of available evolutionary theories of religion and demonstrates the importance of embodied relational processes in social bonding. This research concerns the way that synchronized energetic activities, including singing, dancing, chanting, and rhythmic music production appear greatly to facilitate group bonding processes. Although many accounts of this phenomenon exist, perhaps the most convincing and empirically well-supported account is grounded in what has become known as the brain opioid theory of social attachment (BOTSA). BOTSA forms the basis of a novel and parsimonious evolutionary account of religious rituals' social bonding functions, which emphasizes the bodily, affective processes involved in sociality, alongside the cognitive mechanisms typically studied by ECSR. Below, we will explore the possibility that many such processes can be unpacked in terms that actively encourage a conceptualization of the individual as constituted, in part, by and through their relations with others. There may be many other areas of the evolutionary study of religion that might lead to similar conclusions upon deeper analysis, but my intention here is only to demonstrate, through a single case study, that the concept of relational personhood can both fit comfortably and serve a useful purpose within ECSR.

BOTSA, Endorphins, and Social Bonding

ECSR has successfully blended together many different theories of human social evolution to answer questions about religion's role in promoting social cohesion and coordinating group behaviors in line with the consensus opinion that religion should be considered "a force of integration, a unifying bond contributing to social stability and control" (Saliba 1995, 119). But it has achieved this without, I have suggested, fully escaping the individualistic bias of its early years. Countering this inherent individualism means identifying processes and mechanisms underlying religion's capacity to facilitate group bonding that might be explicable in less starkly individualistic terms. The aim here is not to displace cognitive theories altogether, but rather to encourage the evolutionary study of religion to expand its range still further. One particularly promising line of enquiry has explored the role of psychopharmacological mechanisms in social bonding. Although most of this research has focused on oxytocin or the aminergic system (see, e.g., McNamara 2006; Previc 2006; Xygalatas 2008; Sasaki et al. 2011), it is another psychopharmacological system, the endogenous opioid system (EOS) that arguably holds the greatest promise for explaining the ubiquity of certain sorts of religious ritual, and their roles in social bonding.

Robin Dunbar (2013, 2017) argues that certain kinds of religious ritual appear to exploit the endorphin system very efficiently. His arguments are rooted in the well-established principle that physical interactions typical of social grooming behavior in primates stimulate the production of endorphins via highly specialized afferent c-tactile, or CT, neurons (Olausson et al. 2010), and have profound effects upon the social bondedness of groomer and groomed. For Dunbar and Shultz (2010, 782), grooming creates a "psychopharmacological environment of trust" where alliances can be formed easily, and cooperative behavior is encouraged (also see Panksepp et al. 1978). From this perspective, "Bondedness is not just a cognitive process, even though cognition may be a necessary component; rather, bonded relationships appear to involve two parallel and quite distinct mechanisms—a cognitive mechanism … and an emotionally based form of attachment (often involving a psychopharmacological mechanism)" (Dunbar and Shultz 2010, 782). This is the theoretical basis of what has become known as the BOTSA. Evidence for the significance of this dual-process mechanism in both human and nonhuman primate sociality is rapidly accumulating (see Keverne, Martensz, and Tuite 1989; Dunbar 2012, 2018).

Actual physical grooming, of course, is not a universal feature of religious rituals, and so cannot be the basis of an evolutionary explanation for their ubiquity. Rather, the significance of this research for religion's evolution lies in the fact that a host of human behaviors,

including singing, dancing, chanting, and the production of rhythmic music, which do play important roles in religious rituals, appear to act as behavioral proxies for physical grooming, with similar remarkable effects. Dunbar suggests these behaviors evolved as a result of the pressing need for ancestral humans to overcome time-budgeting constraints brought about by living in ever larger groups. Grooming is essential for group stability, he assumes, but when groups reach a certain size there are simply not enough hours in the day for everyone to groom everyone else and still have time to perform other essential activities. So, if groups are to continue to expand and yet remain coherent, he reasons, maximizing the efficiency of social bonding behavior becomes essential (Dunbar 2003). Consequently, we see the evolution of behavioral developments that are much more time efficient than the physical interactions that reinforce bonding in dyadic relationships, because they enable the bonding of large numbers of people at the same time (also see Merker 2000; Lehmann, Korstjens, and Dunbar 2007; Dezecache & Dunbar, 2012; Cohen, Mundry, and Kirschner 2014; Dunbar 1991, 2012, 2014; Pearce, Launay, and Dunbar 2015).

A Bottom-Up Approach to Bonding

Although the production of endorphins is a consequence of all energetic activities, many religious rituals may be especially effective stimulants specifically because they are performed in group settings and are highly synchronized. Endorphin production is known to be significantly enhanced when energetic activities are performed synchronously in groups (see Cohen et al. 2010; Dunbar 2014; Tarr, Launay, and Dunbar 2014; Pearce, Launay, and Dunbar 2015; Dunbar et al. 2016; Tarr, Launay, and Dunbar 2016; Weinstein et al. 2016), and social bonds are more effectively established and reinforced than when the same activity is performed by individuals in isolation. It is a phenomenon that has been repeatedly observed in studies of rhythmic music production (Cohen, Mundry, and Kirschner 2014); choral singing (Pearce, Launay, and Dunbar 2015; Weinstein et al. 2016); dancing (Tarr et al. 2015; Tarr, Launay, and Dunbar 2016); and even such simple things as synchronized finger-tapping (Hove and Risen 2009). Weinstein et al. (2016) report that, "even after only a single session of singing, a large group of unfamiliar individuals can become bonded to the same level as those who are familiar to each other within that group" (156). The findings of Tarr, Launay, and Dunbar (2016), using a "silent disco" paradigm, ultimately led them to conclude that its social bonding function may offer an evolutionary explanation of the origins of dance (10). The bonding effects of synchronized action may even extend beyond those actually taking part in an activity and establish

feelings of bondedness among observers (Reddish, Bulbulia, and Fischer 2014).

Although these studies collectively provide a striking and intuitively plausible explanation of how religious rituals (Maurice Bloch 1989 called them the "rhythmic drivers" of ritual) can underpin human sociality, ritual and social bonding have been directly linked to endorphins relatively infrequently. Frecska and Kulscar (1989), for example, describe what they call "the opioid way of social bonding," arguing that ritual performance has a significant effect upon group identity by virtue of its capacity to stimulate endorphin production. Winkelman (2002a, 2020b, 2020c) and Rossano (2006) have all drawn a link between ecstatic states, induced by rhythmic dancing and chanting, and the reinforcement of social bonds among hunter-gatherers. None of these studies, however, draw upon what is now quite an extensive experimental literature linking synchrony, endorphin production and sociality. Endorphins feature only as a footnote in an otherwise impressively comprehensive recent multiauthored review of the psychology of ritual (Hobson et al. 2017). Others have touched briefly upon the subject, but rarely explicitly in the context of synchrony and social bonding (see Marshall 2002; Sosis and Alcorta 2003; Xygalatas 2008). Actually, theories of the psychopharmacological basis of religion's social functions have tended to focus largely on the role of the aminergic, particularly dopaminergic, system, which is universally considered an important moderator of prosocial and antisocial behavior (see, e.g., Alcorta and Sosis 2005; Previc 2006; McNamara 2006; Xygalatas 2008; Sasaki et al. 2011).

Focusing on the direct causal relationship between religious ritual, endorphin production and social bonding distinguishes a BOTSA-centered account of ritual from the rest of ECSR in two significant ways. First, it emphasizes the primary role of embodied processes in group bonding, not just the cognitive effects of those processes. Second, it describes a distinct mode of bonding to that more usually described by ECSR, which tends to concentrate on why "some religious beliefs and practices, under specific sociohistorical contexts, foster prosocial behaviors" (Norenzayan, Henrich, and Slingerland 2013, 365). Dunbar's focus is rather upon how synchronous rituals, by virtue of their ability to stimulate the endorphin system, effect *feelings* of bondedness (i.e., emotional attachment to the group). Crucially, he argues that this "opioid mode of bonding" is primary—it is the most basic and, from an evolutionary perspective, the most important type of bonding. Primate groups that practice endorphin-stimulating behaviors are presumed to prosper because the group is tightly emotionally bonded and sticks together through thick and thin. The emotional trust established between individuals by grooming (and proxies for grooming) provides solid foundations for future relationships, which enable the sort of coordinated action that give groups significant survival and

competitive advantages. Dunbar (2008) therefore suggests that BOTSA supports what might be described as a bottom-up approach to social bonding as opposed to the top-down approaches that characterize ECSR. These top-down approaches describe secondary culturally scaffolded bonding processes that exploit evolved cognitive structures and processes, including, for example, fear of punishment by a divine agency for failing to act prosocially, or the interpretation of particular rituals as providing a credible demonstration of commitment to the group. In all these cases, the establishment of trust is seen as the fundamental basis of group solidarity. But for Dunbar, this can be established directly by the exogenous stimulation of the endorphin system, rather than developing as a result of the complex cognitive accounting processes of the sort that underlie ECSR's concern with mechanisms that reinforce cooperative behavior.

An even closer examination of the social behavioral triggers for the production of endorphins, I will argue below, has the potential to transform the impression of the individual that emerges from the evolutionary study of religion. This is because at least some accounts of the effects of synchrony upon social bonding—those which attempt to explain the embodied synchronization *process* itself, instead of focusing on the cognitive effects of synchronization—can be readily interpreted in terms that strongly support a relational conception of personhood. First, however, it will be helpful to clarify precisely how Dunbar's approach to synchrony and social bonding diverges from other accounts of synchrony in recent ECSR.

Synchrony and the ECSR

Although the wider evolutionary study of religion has so far mostly ignored research into endorphins and social bonding specifically, synchronized singing, dancing, chanting, and music production in the context of religious rituals has received considerably more attention (see Hove and Risen 2009; Mogan, Fischer, and Bulbulia 2017). However, there is still a degree of uncertainty about precisely how these phenomena ought to be incorporated into extant models of religious evolution. Until now, research in this area has only really been deemed significant for religion inasmuch as it offers further potential support for a broadly cognitive account of religion's prosocial functions (see Norenzayan et al. 2016).

The search for a direct link between synchrony and prosocial behavior, which is grounded in cognitive mechanisms, and which might deepen our knowledge of ritual's role in the evolution of religion, has not met with unqualified success. This should not be surprising given that the link between synchrony and prosocial behavior has always been more precarious than that between synchrony and social bondedness. Studies by Lang et al. (2017) and Wiltermuth and Heath (2009) did find a strong relationship

between prosocial attitudes and synchronous behavior, but other experimental results have been much more ambiguous. In a study of synchronized dancing, Tarr et al. (2015) found that synchrony increased prosocial tendencies of individuals toward other members of the group participating in the study, but not toward equally familiar absent acquaintances. In a subsequent study, Tarr, Launay, and Dunbar (2016) similarly found no evidence that synchrony led to increased cooperative performance in economic games. An experiment by Reddish et al. (2014) found mixed support for the notion that synchrony bolstered prosocial behavior among large groups depending on how prosociality was measured. Significantly, Reddish et al. found that bonding, "measured by self-reported closeness to co-performers" was unrelated to one measure of prosocial behavior—willingness to help (19), even though synchrony did lead to the enhanced bonding of the in-group of performers. Mogan, Fischer, and Bulbulia's (2017) meta-analysis of synchrony studies did find strong support for the principle that synchrony encouraged prosocial behaviors, but so many different measures of prosociality are condensed into a single term in this study that it cannot wholly resolve uncertainty around specific issues in this area.

The cognitive phenomenon that is perhaps most often supposed to connect synchrony to prosocial behavior is the dissipation of a concrete sense of self-autonomy, and a sense of blending with one or more others surrounding oneself, which often attends rhythmically synchronized action. A diverse cluster of theories attempt to explain this phenomenon (see Rossano 2006; Hove and Risen 2009; Swann et al. 2012; Fischer et al. 2013; Reddish et al. 2013; Paez et al. 2015; Tarr et al. 2015; Reddish et al. 2014; Tarr, Launay, and Dunbar 2016). "Entitativity," a term used to describe an individual's sense of "being on the same team" as the others of the group (Lakens 2010; Tarr, Launay, and Dunbar 2016), is also sometimes invoked to link synchronous action to social bondedness. Unfortunately, even those who have found a positive correlation between the performance of synchronous actions, self-other merging and prosocial behavior have struggled to explain it. Bloom (2012) states "Laboratory studies find this synchrony has prosocial effects … The reason why this works is unclear; one possibility is that it is due to a glitch in the system. If I dance with others, and they move with me, their bodies moving as I intend my own body to move, it confuses me into expanding the boundaries of my self to include them" (186). An experiment run by Fischer et al. (2013) is one of only a few to have actually examined synchrony, self-other merging, entitativity, and social bonding all in the context of religious rituals. They concluded that collective rituals that combine synchronous body movements and sacred values have especially powerful effects upon prosociality attitudes and behaviors (121), seemingly suggesting a direct causal relationship between synchronous movement, the "intensification"

of sacred values, and the "amplification" of prosocial behavior (116). It is possible, Fischer et al. propose, that collective action leading to the intensification of sacred values may constitute a reliable source of evidence of the intention to cooperate further in the future: "If we have acted for each other in a ritual, why not in a market?" (122). Though they admit their explanation of this phenomenon is speculative, they propose that increased entitativity arising from synchronous action may result in the elision of self and group perceptions, and a corresponding willingness to act for the benefit of the group as if it were oneself. Such a link between synchrony and entitativity has been made before (e.g., Lakens 2010), and a similar function of ritual was suggested by Marshall (2002, 362), based on the work of Festinger et al. (1952) and Zimbardo (1970), as well as his own reading of Durkheim. More recently, Paez et al. (2015) reported the existence of a positive correlation between synchronous action and what they also call "identity fusion," a result they claim broadly corroborates the Durkheimian notion of collective effervescence. Graham and Haidt (2010) suggest something similar through their notion of an "off switch" for self-representations in the brain—the idea being that closely synchronized action somehow short-circuits those processes involved with distinguishing self from other. Norenzayan et al. (2016), who advocate a particularly comprehensive and inclusive approach to the evolution of religion, also acknowledge the potential significance of this research, even if they have no ready means to explain how synchronized rituals might bolster prosocial behavior. They note only that such studies might mean rituals enhance individuals' sense of "being on the same team" (13), and therefore their willingness to trust one another.

All of these explanations, we should note, are effectively silent on the question of whether religion's social bonding functions can be understood entirely in terms of cognitive structures and processes. Nevertheless, because the phenomenon they are trying to explain—an increased willingness to engage in prosocial behavior—is understood as a sort of social accounting ledger recording who is due (or who deserves) favorable treatment, and because the interesting implications of synchrony are considered almost exclusively in terms of internal cognitive processes, these explanations do not challenge mechanistic, individualistic conceptions of human minds and human persons. But once again, it is worth repeating, this is not to say that such an individualistic view is actively endorsed by any particular ECSR approach.

Confusion over precisely how self-other merging and entitativity might be related to prosocial behavior in the light of ambiguous experimental data and theoretical complexities suggests that any putative connection between them might be (at the very least) both less simple and less direct than is commonly supposed. Tarr, Launay, and Dunbar (2014) agree, arguing that self-other merging cannot possibly constitute a complete

explanation of how synchrony bonds groups together. Most studies of self-other merging, they suggest, have focused on dyadic synchrony or synchrony in small groups (e.g., Reddish et al. 2014), and there is no good reason to believe this effect would scale up to account for sociality in large groups. What is more, Tarr et al. argue, when large numbers of people are involved self-other merging is an even less plausible explanation of the effects of synchrony (3), a finding supported by Mogan, Fischer, and Bulbulia (2017). Like Mogan, Fischer, and Bulbulia (2017) and Novembre, Mitsopoulos, and Keller (2019), Tarr, Launay, and Dunbar (2014) propose that other mechanisms need to be considered in accounting for large-scale group bonding. For Tarr et al., the most obvious candidate is the EOS. They assume that endorphins provide a much more plausible explanation since they can be activated in very large numbers of people simultaneously.

This brings us back to BOTSA, and to a fuller explanation of how exactly it might help steer a course away from abstract individualism in the study of religion. BOTSA, it is clear, represents a novel, physiologically grounded means of understanding the relationship between synchrony and social bonding. From this perspective, the lack of definitive support for the notion that prosocial behavior and sense of bondedness with a group are reinforced directly by the experience of self-other merging is unproblematic. A BOTSA-centered account of synchronous action is happy to acknowledge that it may involve both the transformation of self-experience and the reinforcement of social bonds, but it does not imply that the former causes the latter, or that entitativity or self-other merging in turn facilitate social bonding by encouraging prosocial behavior. As Dunbar notes, cooperation in economic games may be, but does not have to be, an outcome of bondedness to the group. It may be an indirect consequence of an endorphin mechanism designed to ensure community cohesion that need not, of itself, form a part of what it is to be social (see also Houser and Kurzban 2002; Burton-Chellew et al. 2016; Burton-Chellew et al. 2017; Lang et al. 2017). As far as BOTSA is concerned, social bonding is a primary and direct result of endorphin stimulation. Self-other merging may be at once both cause and effect of synchronizing one's actions with another—part of a dynamic feedback loop whereby the blurring of self and other facilitates synchrony, which causes further blurring, and so on (Tarr, Launay, and Dunbar 2016). This may occur because of shared neural pathways for action and perception, a point we will explore further below. Consequently, we might see a BOTSA-centered approach as describing a distinct, but perfectly compatible account of the relationship between synchrony and social bonding to those described in terms of cognitive mechanisms. They simply apply at different levels. This is perhaps not as controversial a claim as it used to be. In their meta-study of synchrony studies, Mogan, Fischer, and Bulbulia conclude that a variety of

neurobiological mechanisms should be considered "important horizons of further meta-analyses, once more primary studies are available" (2017, 14).

To recap briefly, BOTSA suggests that the endorphin system's role in social bonding is chiefly to facilitate sufficient commitment for an individual to remain in the group despite the ancillary costs associated with the stresses of group-living. This system has ancient evolutionary roots, preceding the development of supplementary, culturally scaffolded social bonding processes that depend upon more recent evolved cognitive mechanisms. In challenging the notions, first, that synchronous activity facilitates social bonding solely by fostering prosocial behavior, and second, that the mechanisms connecting synchronized action to social bonding are purely cognitive, a BOTSA-centered account of religious rituals is based on the claim that social bonding is a direct pharmacologically led, affective response to particular sorts of synchronized actions. But what, exactly, are the implications of this for our chief concerns in this article—namely, explaining how a more relational conception of the individual can both fit comfortably and serve a constructive purpose within ECSR?

The key lies in the way that a BOTSA-centered account of synchrony and social bonding places itself squarely in the orbit of a number of theories that have attempted to explain similar phenomena in the context of neuropsychological and phenomenological studies of attachment. These theories encourage us to take a broader view of individuals and their behaviors than is usually the case within ECSR. Of particular relevance are a group of studies that take synchronous action to be a special case of behavioral matching—an individual's tendency to mimic the movements, posture or even speech of those with whom they interact. BOTSA's role in leading the evolutionary study of religion away from abstract individualism, then, is not primarily through its explanation of social bonding as a psychopharmacological effect. That is, after all, an intrapersonal mechanical process that is difficult to unpack in relational terms. Rather, it is BOTSA's demand that we attend to the actual embodied performance of those particular actions that elicit the desired pharmacological response, and the subsequent framing of that response in specifically affective terms, which are of most value here.

Synchrony and Relationality

For Novembre, Mitsopoulos, and Keller (2019), there is more than sufficient evidence to conclude that engaging in synchronized rhythmic activity has a multitude of positive social effects, including increased "affiliation, trust, cooperation, closeness to others, perceived cohesion, and empathy" (8). The account of social bonding described by Dunbar leaves plenty of room for a range of different mechanisms to explain how religious rituals might produce these various effects. Our chief concern here, however, is

the principle that we cannot understand the way synchrony effects social bonding purely in abstract cognitive terms, but only in terms of physically embodied practices. Synchrony has an irreducibly bodily dimension as well as a cognitive dimension, and, in its capacity to mediate social bonding via the stimulation of the endorphin system, it has irreducibly bodily effects.

Explanations both of how people actually manage to keep time with one another in the performance of synchronized activities, and of the various effects of those activities, can be readily constructed in terms of embodied interpersonal processes that may help ensconce a more relational conception of the individual in the evolutionary study of religion. For this purpose, research drawn from the (still emerging) field of embodied cognition is especially enlightening. From the embodied perspective, neither synchronous movement, nor its correlates or products, including self-other merging, entitativity and the formation of emotional bonds via the stimulation of the endorphin system can be adequately understood entirely in terms of the internal processes of an isolated individual, but must rather be cast in terms of the concrete interactions of persons with each other and with their environments. Accordingly, from this view, we cannot adequately understand either the performance or the effects of certain religious rituals purely in terms of internal processes. In what remains of this article, I will briefly outline some recent research focusing on the role of bodily processes in interpersonal interaction and some of its implications for the conceptions of individual personhood that underlie evolutionary accounts of religion.

Many recent discussions of intentional synchronized movements draw upon studies of mimicry and mental simulation, which have identified very close relationships between particular brain areas involved in physical activities and perception (e.g., Hove and Risen 2009; Behrends, Müller, and Dziobek 2012; Cacioppo et al. 2014; Tarr, Launay, and Dunbar 2014; Novembre, Mitsopoulos, and Keller 2019). Such studies suggest that the neural processes of performing an action and perceiving an action are very similar. Collectively, they might be described as constituting a motor-resonance account of action and perception (e.g., Iacoboni et al. 1999; Buccino et al. 2001; Gallese, Keysers, and Rizzolatti 2004; Bosbach et al. 2005). This work is strongly supported by other work on mirror neuron systems in humans and nonhuman primates (see Gallese, Keysers, and Rizzolatti 2004; Rizzolatti and Craighero 2004). A number of studies have demonstrated that both observing and undertaking physical actions can activate the same sites in an individual's premotor and superior parietal cortex (e.g., Buccino et al. 2001; Fadiga et al. 1995). Even imagining physical actions appears to be sufficient to activate those areas of the brain associated with the corresponding actions, evoking the same neurological processes in the brain and body that are involved in their

actual performance. As Hove and Risen put it, perception of another's action automatically and directly maps onto the observer's action system, "creating a neural coupling between the agent and observer" (2009, 50). From this perspective, the very act of mimicry is interpersonal, and cannot be understood purely in terms of internal, isolated computational processes.

Tarr, Launay, and Dunbar (2014), Cross, Turgeon, and Atherton (2019), and Novembre, Mitsopoulos, and Keller (2019) all note that intentional synchrony of the sort observable in dance and music production involves much more than just mimicry. It includes the need to anticipate others' behavior in the interests of precise coordination, and is likely to have a greater impact than mimicry upon social bonding. It relies on precisely the same action perception linkages, but also appears to involve the capacity to take another's perspective. This draws the study of a closely related, embodied interpersonal phenomenon into the study of synchrony: empathy.

Empathy might loosely be defined as "the human capacity to respond to—and share—experiences of others" (Novembre, Mitsopoulos, and Keller 2019, 2), and appears to have a lot in common neurologically with mimicry, particularly as regards its dependence upon the mirror neuron system (Gallesse 2008, 2009). Far from being an exclusively cognitive phenomenon, empathy is now frequently supposed to have a pronounced "kinaesthetic dimension," which refers to "a person's own corporal feeling as a response to the body movements or posture of someone else" (Behrends, Müller, and Dziobek 2012, 108). Vittoria Gallesse, a pioneer of the embodied approach to empathy, suggests that the mirror neuron system generates instances of "embodied simulation," which reduces the gap between self and other, and creates what he calls a "we-centric" space (2009, 520). Empathy involves the evocation within an observer of internal representations of body states associated with the actions, emotions, and sensations of another. As Behrends, Müller, and Dziobek (2012) write, "the kinaesthetic dimension of empathy allows us to feel the physical state of another person with our own body" (108).

Evan Thompson (2005) describes several different models of empathy, but all of them are undergirded by the idea of empathy as the involuntary coupling or pairing of one living body with another in perception and action (2005, 6). Central to this idea is the principle that human beings empathically bond with other beings because they are perceived to be similar to themselves. Thompson writes: "This similarity operates not so much at the level of visual appearance, which forms part of the *body image* as an intentional object present to consciousness, but at the level of gesture, posture, and movement, that is, at the level of the unconscious *body schema*. Thus, empathy is not simply the comprehension of another person's particular experiences" (2005, 6), but rather a participation in those

experiences. Consequently, he explains, when we witness another being like ourselves behaving in particular ways, those sensorimotor representations associated with those sorts of behavior are activated in the perceiving individual, generating autonomic and somatic responses in the process. This is also sometimes known as "ideomotor action" (cf. Gibbs 2005, 35).

As far as synchrony is concerned, the ability to take another's perspective likely plays a crucial role in allowing the individual to predict the movements of others, further reinforcing the notion that the capacity to synchronize one's actions with members of a group might helpfully be understood as a fundamentally embodied, interpersonal, rather than exclusively internal computational, activity (see Novembre, Mitsopoulos, and Keller 2019). A number of theorists have noted that synchronized action appears to increase empathy among the members of a group (Chartrand and Bargh 1999; Rossano 2006; Hove 2008; Behrends, Müller, and Dziobek 2012; Paez et al. 2015). Novembre, Mitsopoulos, and Keller (2019) even found that a natural predisposition toward enhanced empathic perspective taking facilitated coordinated action, leading them to suggest the existence of a bidirectional relationship between synchrony and empathy.

Research into mimicry and empathy has also been used to explain what evolutionary theorists have usually taken to be the other most significant cognitive aspects of synchrony—the experiences of self-other merging, and entitativity. Hove and Risen (2009), for example, suggest that, as with mimicry, "synchrony may promote self-other overlap in neural representation, with corresponding effects on affiliation. In addition, because synchronous behavior is often associated with close, communal relationships … synchronous behavior may be interpreted as evidence of a close relationship, which in turn, could promote more closeness" (950). Hove and Risen (and Hove 2008) draw on the same embodied accounts of action-perception linkages in mimicry to explain this phenomenon (also see Capoccio and Capoccio 2012). Similarly, Tarr, Launay, and Dunbar (2014) in explaining how synchrony might lead to the confusion of self with other, note that mimicry is supposed to establish an interpersonal rapport that further encourages mimicry, thereby causing what they describe as "a positive feedback loop in which people can become increasingly socially close to one another through making similar movements, and more inclined to continue making similar movements once social closeness is established" (2). Not all accounts of this phenomenon appeal to studies of mimicry or the motor-resonance theory of action-perception (e.g., Graham and Haidt 2010; Bloom 2012; Capoccio and Capoccio 2012; Swann et al. 2012; Fischer et al. 2013), but where the focus is upon explaining how synchrony establishes initial bonds between individuals and enhances feelings of personal closeness, it is now a more common theme (see Hove and Risen 2009; Novembre, Mitsopoulos, and Keller 2019).

Embodied accounts of the physical achievement of synchrony and its remarkable perceptual effects—entitativity and self-other merging—seem to offer moderate support for the idea that neither synchronous activity, nor the individuals that perform them, can be adequately conceptualized purely in terms of internal processes. But there is still more that might be said about the relationship between synchrony and social bonding from this perspective. For Dunbar, the emotional basis of sociality established by the EOS should be viewed as an indeterminate "raw feels" sense of the emotional warmth of relationships that prompts immediate, unhesitating, "thought-less" action on behalf of another and constitutes the first vital step in the establishment of primate groups. Here, again, an extensive literature on embodied and enacted emotion provides an embodied explanation of how the emotional states of individuals are perceived by others and how they are communicated among the members of a social group. What is more, it does so in more relational terms than an adherence to strict cognitivist principles would permit.

The discussion of empathy makes up a considerable part of embodied accounts of emotion perception, where studies of mirror neurons and the natural, automatic mimicry of the perceived emotional states of others are contrasted with traditional "Theory of Mind" accounts (see Niedenthal 2007). From this perspective, the perception of emotional states, which might be seen as a special case of empathic perspective taking is enabled via a process of neural coupling, whereby an individual understands the emotions of another through the direct experience of those emotions themselves (see Gallesse et al. 2004). The existence of such dedicated mirror neurons has been debated, but there is still strong evidence supporting the embodied imitation of emotional states (Niedenthal 2007; Niedenthal et al. 2009). Inasmuch as this body of research draws upon the same basic ideas as research into empathy more broadly, it can be said to have similar implications for conceptions of individual persons—it challenges the notion that individuals can be seen as the sum total of their individual powers and dispositions in isolation from those others with whom emotional episodes are enacted (see Pfeifer and Dapretto 2009).

Other research into embodied emotion adds yet another dimension to the notion that recent theories of the perception of emotion should have significant implications for the conceptualization of individuality. This has focused upon the situatedness of emotion, emphasizing the role of environmental factors in a dynamic relationship between emotional experience and expression, and their specifically social contexts (see Griffiths and Scarantino 2009). In this case, emotional states and expressions are treated as a form of transactional behavior, or a complex behavioral strategy that is never static, but rather develops constantly through interrelation with others. Using the term "social cognition" as a general term to describe understanding others' emotions, intentions and actions, De Jaegher and

Di Paolo (2007) propose that sense-making in a social context can, at times, be seen as a genuinely interpersonal embodied process. They explain how conversations are constrained and modulated by such things as pauses and vocal intonations, which carry implications for patterns of coordinated behavior, and thereby for sense-making, and the regulation of affect. In a subsequent article, De Jaegher argues, "sense-making plays out and happens through the embodiment and situatedness of the cognitive agent: her ways of moving and perceiving, her affect and emotions, and the context in which she finds herself, all determine the significance she gives to the world, and this significance in turn influences how she moves, perceives, emotes, and is situated" (2013, 1). De Jaegher and Di Paolo ultimately conclude that there is frequently something going on above and beyond what each individual brings to the interaction, which cannot be explained purely in terms of the information processing of individuals, and is best understood in terms of coordinated embodied action. For this reason, as De Jaegher et al. propose, at least some embodied processes themselves must be considered constituents of the participants' social cognitive processes.

Understanding the effects of synchronized action through research on mimicry, empathy, entitativity, self-other merging and emotion in terms of embodied processes in the manner outlined here enables us to think about the bonding role of religious ritual in terms that transcend abstract individualism. Although some embodied cognition theorists merely document the fact that bodily processes are involved in social interaction in some sense (such as in nonverbal communication, see, e.g., Caetano et al. 2007), others suggest there is some sort of dependence relationship between bodily processes and social cognition, whereby bodily states exert a causal influence upon the processing of socially relevant information. But for some embodied cognition theorists—those of the opinion that the cognitive system and cognitive processes extend beyond the brain into the environment—embodied interpersonal interactions sometimes deserve to be considered constituents of cognition itself. This is certainly the case for Thompson and De Jaegher, for example. From this perspective, the capacity to synchronize oneself with others is a fundamentally embodied and relational activity. It is impossible to describe individuals as the sum total of their own powers and dispositions because at least some of their elements depend for their own explication upon particular encounters with other individuals. They are no longer completely self-contained, nor entirely autonomous. In short, they might be said to be constituted in part by their relations with others. And inasmuch as these ideas may help explain the social functions of synchronized behaviors in the context of specifically religious ritual, they might also help deflect accusations of inherent abstract individualism from evolutionary studies of religion and social bonding.

Conceptual Reconciliation

By understanding religious rituals as particularly clear, real-life examples of synchronized behavioral performances, a BOTSA-centered approach to religion and social bonding significantly broadens the theoretical range of the evolutionary study of religion. In emphasizing the role played by the endorphin system in religious rituals that incorporate synchronized rhythmic behaviors, BOTSA exposes a psychopharmacological mechanism that helps explain religion's capacity to bond large numbers of people together simultaneously. In so doing, it demonstrates the theoretical and practical benefits of looking beyond purely cognitive mechanisms to explain the well-known effects that synchrony has upon bonding processes. A closer analysis of synchronous action itself suggests that both the actual process of people synchronizing their movements with each other, and certain cognitive and emotional effects of that synchrony, can all be understood in terms of fundamentally embodied processes, which simultaneously encourage a conceptualization of the individual as constituted, in part, by and through their physically embodied relations with others. This is because at least some aspects of individual cognition and behavior cannot themselves be understood purely in terms of the internal computational processes of entirely autonomous entities.

Finally, then, we return to address the issue with which we started—the possibility of bridging the gap between the ways that most contemporary theologians tend to think about individual persons and the strongly individualistic conceptions of individual persons that tend to underlie the evolutionary study of religion. By bridging this gap, the vast explanatory resources of the evolutionary study of religion can be made more accessible to theologians, who otherwise would struggle to reconcile two largely incompatible ways of thinking about individual human beings. So, has this been achieved by the discussion above? Needless to say, the arguments above are focused exclusively on what Kelsey (2009) calls, the "proximate" social, cultural and physical contexts (338) of human relationality, as opposed to the "ultimate" context, constituted by humanity's relationship with God. The latter is clearly not a topic that can be helpfully elucidated through a study of ritual's role in social bonding.

I hope to have shown that the broader evolutionary study of religion of which ECSR is an invaluable part is not irredeemably individualistic. And in showing this, I hope not to have stretched the embodied interpretation of the effects of synchrony too far. What we can say without ruffling too many feathers is that this research, and the moderate claims it supports about social cognition (in De Jaegher's sense), suggests one possible way of understanding the claim that individual human beings are literally constituted by their relations with other human beings. Clearly, they do not do enough to support the much stronger thesis that all aspects of all cognitive

processes are constituted by interpersonal processes, but they do seem to diverge quite sharply from the traditional cognitivism that typically underpins ECSR. Even if we accept only minimalistic claims about the ways in which social cognition is constituted by interpersonal interactions entailed by Thompson's and Gallesse's accounts of empathy, and admit that these are the only social processes that can be conceptualized in relational terms, this would still do considerable damage to the idea that cognition is a purely internal individualistic affair, and so to nonrelational conceptions of individual personhood. It might not contribute anything to theologians' ethical discourses of relationality, and it certainly would not inform specifically theological discourses of why it is so important that we understand individuals in relational terms. It does not represent in any way, therefore, a scientific legitimation of theological concepts of personhood per se. What it does do, critically, is offer support for a particular understanding of the cognitive system and social cognitive processes, which in turn offers strong support for the particular understanding of individuality that underpins the only concept of the individual that many theologians are prepared to entertain. If this is the case, then we can be confident that the gap has indeed been bridged successfully, and the door to constructive future engagement between theological anthropologists and evolutionary theorists of religion, upon this topic at least, may have been opened a little wider.

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