MUSIC, DANCE, SYNCHRONY, AND CONFORMITY: DEALING WITH NON-COOPERATION IN EARLY HOMININ CULTURE

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Abstract. Using Robin Dunbar’s theories about hominin social bonding and the evolution of music, dance and religion, this article argues that a proto-ritualistic collective song and dance performance established conditions that were ideal for the evolution of fundamental elements of human cognition, such as shared intentionality, joint attention, and the ability to form a mental template. Furthermore, it is argued that this dance routine would have been an effective breeding ground for the development of a psychological regulatory system that could powerfully enforce cooperation by collectively targeting individuals who do not or cannot conform to the melody or the beat – i.e. misfits who do not achieve synchrony with the other members of the dance group. Thus a hominin society consisting of highly cooperative individuals possessing the cognitive skills of shared intentionality, joint attention, and the ability to form mental templates – i.e. a society with all the necessary skills for the development of a mimetic form of communication, followed much later by spoken language – comes into being.

Keywords: bonding, music, dance, synchrony, shared intentionality, nonconformist, collective violence, evolution of cognition

INTRODUCTION

From an evolutionary perspective, music and dance may appear to be two of the most pointless activities that humans commonly engage in. However, recent research suggests that music and dance might have played a crucial role in human evolution. Using Robin Dunbar’s theories, it will be argued here that a proto-ritualistic collective song and dance played such a role, and that a regulatory system that could enforce cooperation would have evolved as a logical consequence of this dance, thereby facilitating the establishment of the initial stages of hominin cooperative culture.

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ROBIN DUNBAR’S BONDING THEORIES

Primate societies are characterised by an intense level of social bonding among members, which appears to be unique to primates. To an important extent, this bonding is done by grooming each other, an activity that can occupy up to 20 percent of the day. Grooming releases endorphins, producing a mild opiate high that might be ‘instrumental in creating a sense of trust and commitment between the two animals concerned, thereby providing the psychological substrate for alliances’ (Dunbar, 2009, 223–4).

Recent research has shown that primate brain evolution has apparently been driven specifically by the demands of sociality. There is a correlation between social group size and brain size, particularly neocortex size, although it is really the complexity of social relationships in larger groups that is the key issue here. This correlation has been used by Aiello and Dunbar (1993) to estimate social group size for hominin populations, with neocortex ratios estimated from cranial volumes. They demonstrated that group size, amongst Australopithecus, stays well within the range of the living apes (50-60), but starts to rise slowly with *Homo erectus* (ca. 60–80) and then rises steeply with the appearance of archaic humans (*Homo heidelbergensis* and allies) around 0.5 mya, culminating in the 150 characteristic of modern humans (Dunbar, 2009, 224).

And, since grooming time increases more or less linearly with group size, they could determine the minimum required grooming time for the various hominin populations from the respective cranial volumes. Thus, *Homo erectus* required a minimum of 25 percent of the day, after which the graph rises steeply, culminating in an estimated 45 percent for modern humans. However, modern humans spend about 20 percent of their time in social interaction – the same as the maximum time devoted to social grooming by nonhuman primates (Dunbar, 2009, 225, 227).

Dunbar (1993, 1996) argues that language enables modern humans to use this ‘grooming’ time more efficiently so that we can bond with a much larger group of people. However, by using language for bonding, we lose the crucially important psychopharmacological benefits of grooming, which means that something else was needed to ‘bridge the bonding gap.’ Laughter and music (song and dance), which are both extremely good at triggering the release of endorphins, could plausibly have done this, according to Dunbar, and he proposes that they emerged relatively early – long before the evolution of language – as mechanisms for bonding social groups. Thus laughter, if it came first, might have evolved into a recognizably modern form with the earliest *erectus* populations (ca. 2mya). Alternatively, music might have evolved first
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(ca. 2mya), out of the natural chorusing exchanges as found in species such as the gelada, as a form of grooming at a distance (Dunbar 2009, 225–8).

After the appearance of archaic humans (Homo heidelbergensis and allies), groups size, in terms of the above, increased rapidly over a very short period of time (from about 100 to 150 in 300,000 years), which would probably have been associated with considerable social and demographic strain. Dunbar argues that the need for a new, more powerful mechanism for enforcing group cohesion was met by religion, the rituals of which are particularly effective at triggering the release of endorphins (Dunbar, 2009, 228–9). He proposes that religion might have developed out of collective music and dance – the starting point being the powerful bonding effect of the endorphin surges produced by prolonged song and dance. This surge can result in an ecstatic trance state (as experienced in the Bushman trance dance) that leads to religious notions of out-of-body experiences and the like. Thus, initially, a purely chemical effect would have helped to bond large dispersed hunter-gatherer groups, while the intellectual dimension of religion would only have evolved much later, once modern humans had acquired language and fifth-order intentionality, around 200,000 years ago. This means that religion, in such an initial stage, might predate the appearance of Homo sapiens (Dunbar, 2004, 193–7).

Collective Song and Dance

All of this provides strong support for David Lewis-Williams’s hypothesis that shamanism, with the central role that it affords to trance states, is the original form of religion among prehistoric humans (Lewis-Williams, 2002a, 2002b; Dunbar, 2009, 195–6). However, what I want to focus on here is Dunbar’s proposal of what may have preceded it: a proto-religious trance dance – or, at least, a collective song and dance routine that, even if it did not, in its earliest stages, induce an actual trance state, was nevertheless sufficiently effective at generating endorphin release to facilitate social bonding on the required scale.

This routine could have evolved out of gelada style chorusing, as Dunbar suggests. Dunbar et al have demonstrated experimentally that playing music together releases endorphins, just as rowing together does. This indicates that the element of synchrony is of vital importance in generating endorphin release (Dunbar et al., 2012). Early hominins could have discovered this effect accidentally, and, after numerous experiences thereof, chorusing would have become progressively synchronic due to the immediate positive reinforcement of endorphin release associated with such synchrony.

The exact repetition of simple rhythmic and melodic motifs, which make synchrony easier to achieve, would eventually emerge as a dominant feature of
the chorusing. Likewise, rhythmically repetitive dance motions would facilitate the achievement of synchrony because they are predictable by the other members of the group (Freeman, 2000, 9).

What is particularly interesting about this proto-religious song and dance scenario is the possibility that it might have provided an ideal platform for the evolution of shared intentionality, which, as Tomasello et al. (2005) argue, is the crucial difference between human cognition and that of other animals, and which is fundamental to the evolution of human culture. This dance is a collective activity that does not (initially) depend on a communal goal – each participant conforms to the common beat and melody because of the immediate psycho-pharmacological rewards, and is therefore acting selfishly. Nevertheless, this situation would very effectively facilitate a gradual transition from Machiavellian social behaviour, as found in the other apes, to shared intentionality and cooperative behaviour (compare Knight, 2007). The more an individual acts in uniformity with the group, the greater the immediate rewards of endorphin-release. This dance would therefore condition hominins to act in unison, i.e. synchronically, and thereby encourage the evolution of the ability to read intentions, which, according to Tomasello et al. (2005, 24), is the ‘key cognitive substrate required for skilful collaboration.’ In order to dance, clap hands, and chant in unison, members of the group have to acquire a basic level of this ability.

Such synchronic singing and dancing might therefore have been an ideal platform for the evolution or further development of cooperative action (Roederer, 1984; McNeill, 1995; Freeman, 2000; Merker, 2000; Hove & Risen, 2009; Miles, Nind, & Macrae, 2009; Wiltermuth & Heath, 2009; Kirschner & Tomasello, 2010; Dunbar et al. 2012; Cirelli, Einarson, & Trainor, 2014). It is perhaps the simplest form of cooperative action, consisting of the straightforward synchronic repetition of a simple rhythmic dance movement and melodic motif. Furthermore, and importantly, it has no practical goal or application that needs to be communicated to all members of the group, so that it can emerge well before language or even more primitive forms of communication, such as the gesture and mime proposed by Merlin Donald (1991, 162–200; see also Tomasello, 2008, 202–204, 218–25; Sterelny, 2012). Significantly, Paul Reddish, Ronald Fischer, and Joseph Bulbulia (2013) have demonstrated experimentally that synchrony (in music and dance) combined with shared intentionality leads to greater cooperation.

Furthermore, even though the need to achieve synchrony might initially have been driven by the selfish desire for a chemical reward, the associated bonding effect, together with the need to entrain your movements and sounds to those of the rest of the group in order to get this reward, would have encouraged not only a growing awareness of a shared intention, but also a concomitant
sense of togetherness (compare McNeill, 1995; Freeman, 2000, 7–9). Thus cooperative action could have evolved without the (initial) aid of reciprocal altruism, in a scenario that offered an immediate reward (in more or less equal measure) to every participant in this group behaviour, so that there were no considerable costs involved for the individual that had to be weighed up against possible future benefits (compare Mithen, 2005, 214). Reciprocal altruism, as first proposed by Robert Trivers (1971), might then have evolved gradually from such selfish or solipsistic beginnings (compare Freeman, 2000).

Because this coordinated action has no practical application, it would provide a safe breeding ground for the evolution of shared intentionality and cooperative action (compare Cross 2001, 6). By means of a slow process of trial and error, in which there are no serious costs involved – as there would be in the case of, for example, a collective hunt – the ability to read intentions and the ability to coordinate collective action could establish themselves.

**MUSIC, DANCE, MIME, AND TOOL MANUFACTURE**

A variety of animals use tools, from birds to primates. But, due to the more sophisticated nature of their tools, hominins, possibly from *Homo erectus* onward, must have developed the ability to form a mental template that could initiate and guide the manufacture of the desired tool. The successful and sustained production of such tools would also have depended on active teaching and practice, which, again, required a mental template.¹ This ability could then be used to develop a mime language (Donald, 1991, 179–80; Sterelny, 2012, 2146). A fundamental feature of language and mimetic communication, the ability to refer to something that is not present in time or space, requires such a mental image or concept of that thing. And, in the case of mime, it requires a fairly detailed mental image of the referent in order to mimick it effectively, as well as to comprehend the significance of someone else’s mime representation.

It is possible that this ability to form a mental template evolved, in part, through collective music and dance – driven by the need to replicate or remember a previous dance action or melodic motif that was effective in inducing an endorphin surge. Once again, the immediate rewards of this endorphin rush would ensure that, through persistent trial and error, this ability is gradually developed. This is perhaps one of the simplest forms of mental template – evolving from the duplication of a simple dance movement, rhythmic motif or melodic motif that can be copied directly in present time and space. And since the dance consists of an effectively endless repetition of such motifs it is very well suited to instil this mental ability. This might lead to the ability to duplicate such motifs from memory, i.e. from a mental template thereof, and
this could be followed by the ability to duplicate or imitate a phenomenon from outside of the dance – such as the characteristic movement of a particular person or animal.

A further and crucially important step, the mental ability to move beyond mere mimicry – to produce an iconic gesture or mimetic representation, an action that communicates some information beyond itself – requires joint attention or common conceptual ground, along with shared intentionality (Tomasello, 2008, 72–82). Collective music and dance would also be an effective breeding ground for the development of this mental skill. By entraining their movements and musical acts to those of each other, dancers might arguably develop joint attention, i.e. the ability to achieve a common point of attentional focus (see Large & Jones, 1999). This cognitive skill, as Michael Tomasello argues (2008, 72–82), is fundamental to the working of gestural and mimetic communication as well as language proper.

Thus collective song and dance might arguably have produced one of the earliest forms of mimetic cultural behaviour, since dancers effectively mimic each other’s movements to achieve synchrony. And dances in which characteristic animal movements are mimicked, as found in the great religious festivals of archaic societies such as those of aboriginal Australia, might possibly have their origin in such a scenario in which mimetic communication gradually emerges from pure music and dance (compare Donald, 1991, 169–70; Dunbar, 2004, 193–7). Mimetic communication sets the stage for the evolution of spoken language, which could probably not have developed without piggy-backing on such a well-established system (Donald, 1991, 197–200; Tomasello, 2008, 218–225; Sterelny, 2012).

THE ADAPTIVE VALUE OF CONFORMITY

Without mental conformity, instilled through synchrony, shared intentionality might perhaps never have been achieved – which means that human cooperative culture would not have been achieved. The nonconformist or misfit, the individual who could not or would not conform to the beat, who could not sing and dance in time, would therefore have been incapable of taking part in cooperative actions – including those of language or even simple mimetic communication. Such individuals, or, more specifically, the nonconformity that they represented, would therefore have posed a fundamental threat to the establishment and maintainence of human cooperative culture. Consequently, they would have been punished and made to conform, or ostracised (compare Freeman, 2000, 10).
Selective pressures would have ensured that they were punished severely (Trivers, 1971; Axelrod & Hamilton, 1981; Gintis, 2000; Boyd, Gintis, Bowles, & Richerson, 2003; Fehr & Fischbacher, 2003; Knight, 2007; Gintis, Henrich, Bowles, Boyd, & Fehr, 2008). Modern human social behaviour suggests that this was done collectively – that the entire community or social group unanimously turned on the nonconformist and punished her or him. Modern humans gang up, instinctively perhaps, against any individual who cannot or will not fit in. They ridicule, humiliate, abuse, and ostracise these misfits, whose only offense is often that they do not conform. Whether this behaviour has a relatively lighthearted tone, in the form of ridicule, or is deadly serious, in the form of physical violence, a common denominator is its collective nature (Heinemann, 1972; Leymann, 1990; Westhues, 1998). And it is this that makes it so devastating to the victim, and therefore such a powerful means of enforcing conformity. Virtually no individual is capable of successfully opposing such collective violence, whether physical or emotional. Mob violence and other forms of collective aggression that target individuals may have a number of different and complex causes in modern human cultures. Nevertheless, it is possible that such behaviour is, to a considerable degree, driven by such an instinctive urge to gang up against the misfit or the outsider in order to safeguard cooperative culture against the threat of nonconformity.

The collective violence with which the nonconformist or misfit is targeted would thus be a highly effective means of enforcing conformity, which few would willingly dare to defy, thereby helping – along with song and dance – to produce ‘a mind predisposed to acquiesce in the collective view’ that Dunbar attributes to the workings of religion (Dunbar, 2004, 184). His argument about this function of religion, in dealing with the disruptive influence of individualists, non-cooperators and free riders, is persuasive. Nevertheless, the above indicates that the same regulating function could have been achieved without the aid of language or religion by early hominin groups who had neither, but who needed to enforce cooperation in order to survive.

It is possible, then, that early hominin cooperative cultures were characterised by a marked intolerance of nonconformity. This would have been powerfully adaptive, especially during the initial stages of establishing a cooperative culture. The publicly executed punishment of the nonconformist, through various forms of collective violence, abuse, or sanction, might therefore have been a fundamental part of human social behaviour since hominin cooperative culture first established itself. A conformist mentality is thus instilled in children from infancy, thereby producing a society of highly cooperative adults who are capable of sustaining a culture based on cooperation. Such a high level of cooperation would have been a prerequisite for the evolution of language (compare Ulbaek, 1998; Power, 1998; Knight, 2007).
THE ADAPTIVE VALUE OF NONCONFORMITY

If the above was such a powerful adaptive strategy at a critical stage in hominin evolution, then why do we (generally) disapprove so strongly of such acts of collective violence against misfits and outsiders? Possibly, among other things, because it produces a mind that is too predisposed to conformity – a narrow-mindedness, a mental inflexibility that runs the risk of rendering a society incapable of coping with the daunting challenges that humans have had to face during their evolutionary history.³ To survive and thrive, humans needed to foster a cognitive flexibility that could meet these challenges (Mithen, 1996, 2006). This would have meant, among other things, developing a culture that could tolerate and accommodate, to a significant degree, individual differences of behaviour, personality, and opinion.⁴ And here, again, music might have played a decisive role. Because of its non-efficaciousness and its multiple potential meanings, music, according to Ian Cross, would have facilitated the development of the cognitive flexibility that sets us apart as a species, and that made us far more versatile in dealing with the problems of survival than our predecessors (Cross, 1999, 2001).

Hence, to some extent, the ambivalence that human society still feels towards the nonconformist. The creative genius is praised and admired for his or her individuality, uniqueness, and nonconformism, as is the rebel or nonconformist in fiction, and, generally, it has long been fashionable for people to present themselves or think of themselves as heroic nonconformists who stand out from the crowd.⁵ But still there is a powerful drive to conformity, even in the most liberal of communities. Merlin Donald attributes this to the legacy of mimetic culture:

Mimetic vestiges persist in human affairs . . . The vestiges of mimesis are especially evident in our irrepressible tendency toward conformity. A unique feature of human social life is an incessant pressure to conform to group norms, and to be accepted by one’s peer group . . . The pressure to conform to those unwritten, unspoken cultural norms is virtually irresistible, whether it takes the form of imposed totalitarianism or the superficially voluntary conformity manifest in great public spectacles and demonstrations. Moreover, the threat of social ostracism is so profound that it can drive individuals to suicide. Mimesis is the driving force here; the pressure to conform reflects a profound instinct in humans to imitate the group, to absorb and internalize its cognitive models of reality (Donald, 1998, 64).
Interestingly, Donald’s view that mimetic behaviour is the cause of the pressure to conform shares a certain amount of common ground with René Girard’s celebrated view (Girard, 1977) of the scapegoat mechanism (exemplified by mob violence that targets misfits and outsiders) as being rooted in what he describes as mimetic behaviour (which, however, differs from Donald’s conception thereof in terms of origin and basic function).

Nevertheless, as argued above, mimesis (i.e. mimetic communication) could be the product of, rather than the driving force behind, the need to imitate the group (in the collective dance), and the pressure to conform would have been caused by the fact that hominin cooperative culture depended on such conformity in the most fundamental way.

Notes

¹ Late Acheulian hand-axes, made by Homo erectus, are arguably sophisticated enough to have required these skills (Donald, 1991, 179; Sterelny, 2012, 2146).

² Mobbing is a phenomenon that humans share with a number of other social species, ranging from primates and other mammals to birds. While it is primarily aimed at predators, in which context it has a clear adaptive value, conspecifics are also occasionally targeted. Kenneth Westhues argues that mobbing, or ganging up, amongst humans is a coming to the surface of such an animal instinct (Westhues, 2007). If this is indeed the case, early hominins would have found a new adaptive use for this instinct, thereby reinforcing it as well as giving it a specific social/cultural role, as argued above.

³ While the evolution of human cognition might, to some extent, have been a response to extreme climate variation (see, for example, Richerson, Boyd, & Bettinger, 2005), Merlin Donald argues convincingly that it was primarily driven by competition with rival hominids for roughly the same, huge ecological niche (Donald, 1991, 208–10). This would explain why only one subspecies of the entire hominid line has survived (Donald, 1991, 209).

⁴ Chris Knight, with respect to the strong reciprocity or ‘rule of law’ that he, following Gintis (2000), proposes as the basis of human cooperative culture and a prerequisite for the evolution of language, states that ‘like other primates, humans are by nature Machiavellian – that is, they cooperate or cheat according to perceived need’ (Knight, 2007, 12-13). However, Homo sapiens’s tolerance of nonconformity, powerfully adaptive as it might have been, would inevitably have opened the door to individualistic behaviour that can be described as Machiavellian, so that this type of behaviour in modern humans could have re-emerged in a very different adaptive context from those of the other apes, and should not be taken as indicative of characteristic behaviour in earlier hominin societies.

⁵ The cult of the rebel, nonconformist, or outsider that is a prominent feature of modern Western culture is to a considerable extent the product of 19th Century Romanticism (Hampson, 1968, 201–203; Honour, 1968, 69–87; 1981, 217–244, 245–275). Nevertheless, this development is arguably, amongst other things, an elaboration of the above adaptive strategy, promoted by specific historical and cultural conditions that have allowed it to thrive to an extraordinary degree. The cultural support that is given to the individual who goes his or her own way might still have an adaptive value due to the competitive advantage, in terms of creative thinking, that it might give over human societies that do not encourage such cultural behaviour.
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