

Art in Early Human Evolution: Socially Driven Art Forms versus Material Art

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Abstract

Art is a human communicative system that relies on referential cognition of thoughts, emotions, and experiences through symbolic meanings, which explains why only humans have art and why it is ubiquitously present throughout human societies. Archaeological evidence for early material art signals presence of symbolic and abstract cognition. In early human life in Africa the symbolism afforded by group dance formation would have been more advantageous for survival than individual artistic expression, but it would not leave archaeological physical traces. Slipping into synchronized movements is a natural form of expressing interpersonal unity and symbolically signaling the members' affiliation to the group. In sharp contrast, production of material art encourages individual virtuosity in talent, something only a select few would possess, and in this regard it is not as inclusive as group dance. It is proposed here that the early *Homo sapiens* relied on symbolic expressions of intermember unity through group dance.

Keywords: group dance, culture, *Homo sapiens*, symbolic thought, abstract cognition

BACKGROUND

One of the unique features of the human brain is that it supports symbolic and abstract cognition whereby ideas, concepts, objects, sounds, and behavior refer to coded systems whose meanings are understood by the members of the society in which the symbolic codes arose (Deacon 1998). Language communication is one example of this type of cognition (Deacon 2011), but so is art. Hand gestures, body postures, and facial expressions are all similarly communicative systems humans have developed thanks to the cognitive ability to efficiently and flexibly interpret cultural codes and abstract concepts. For many decades, discussions in archeology, psychology, neurology, and neuroscience emphasized visual material art as the best example of symbolic and abstract cognition. Other forms such as dance, music, or theater have been largely left out. The focus here is on the art form that could have first been practiced in humans' evolutionary

past to fulfill social needs, around the time of the first anatomically modern *Homo sapiens*, about 200,000 years ago in Africa, namely, group dance. Choreographed or spontaneous group dance (not necessarily accompanied by music) can serve a socially unifying symbolic purpose and at the same time not leave behind physical traces. This type of expression is in contradistinction to material art in which individual virtuosity is the primary mode of execution. Not all art forms need have emerged simultaneously in that early period of human existence. Material art is not the only cultural form that should be considered to signal presence of symbolic, referential thought nor must it be viewed as the optimal representation of such capacity.

Some nonhuman primates possess limited symbolic capacity (Smith and Delgado 2013) but the extent and use of it never approaches that exhibited by humans. To practice art, a certain threshold of symbolic cognition capacity

has to be crossed. With humans, even young babies are equipped to understand others through reference to abstract notions (Frith and Frith 2012; Suddendorf 2013). Art is a human communicative system that relies on referential cognition of thoughts, emotions, and experiences through symbolic meanings, which explains why only humans have art and why it is practiced nearly ubiquitously throughout human societies. Some might suggest that a definition of art is needed in order to explore its early beginnings or to understand its current nature, but the view adopted here is that an exhaustive definition is unnecessary, considering that members in a given society know how to distinguish between those items and practices that represent art and those that do not (Davidson 1997). Philosophers themselves have argued that “this thought that art can’t be defined, may be better grounded than one might suspect at first glance. Several philosophers have argued in defence of the claim that certain concepts—concepts we all use and feel familiar with—just can’t be defined” (Goldie and Schellekens 2009, 39). Indeed, art now has grown to express multiple and varied forms ranging from paintings, drawings, sculptures, engravings, ornaments, and jewelry to dance, music, theater, film, storytelling, poetry, novels, and many more. The list is long, and is growing.

In delving into early art it is useful to comment on its biological and evolutionary roots. The biological curiosity about art is twofold, namely, that only humans create it (but there are discussions regarding the one exception of the bowerbird [Endler 2012]), and, on the surface, it appears to have no survival or utilitarian adaptive purpose. Artists frequently spend an enormous amount of time on a given piece without any apparent economic or survival benefit. Many forms of art require the artist to work alone and only share with others when the work is complete. But art does have a biological survival value for humans in the sense that it can communicate ideas, experiences, thoughts, emotions, and wishes in effective nonlinguistic

ways. Indeed, art has not only been practiced by humans for tens of thousands of years by now, but it has also developed and grown to include what seems to be an infinite variety of forms, types, mediums, and combinations of those, a fact that attests to its beneficial adaptive value.

The evolutionary puzzle is that material art (the only kind that leaves archaeological traces) was not fully developed and practiced when anatomically modern *Homo sapiens* first emerged in Africa some 200,000 years ago, a date gathered from archeological evidence (McDougall, Brown, and Fleagle, 2005) and genetic analysis (Elhaik et al. 2014). Archaeological evidence for the presence of early human activities gives evidence for what must have been abstract thought at least 100,000 years prior to the emergence of *Homo sapiens*. Nonetheless, substantive and consistent material art items have not been uncovered (McBrearty and Brooks 2000; Wadley 2013; Würz, 2013).

Between the time when *Homo sapiens* emerged in Africa and the time when material art became regularly practiced, a sizeable stretch of time intervened, spanning roughly 160,000 years. Despite a remarkable paucity of material art, there could still have been expressions of art. Group dance is one such possibility that is discussed here, but there could have been other collectively driven forms also. Abundant and consistent material art made its appearance only around 45,000–35,000 years ago, and was initially geographically restricted to Europe, in a period known as the Upper Paleolithic (Powell, Shennan, and Thomas 2009; Zaidel 2013). This art production was completely different from the occasional, sporadic, and meager art-related material objects produced until then (McBrearty 2012). In the Upper Paleolithic, material art includes statuettes, engravings, drawings on ivory, stone, shells, and additional materials (Lewis-Williams 2002; Mellars 2011). Once started, artistic expression has gone unabated to this day, growing and developing in myriad of ways.

Early Art Expression, Social Groups, and Symbolic Capacity

Social group existence appears to have been a preferred mode of survival that characterized the life of early *Homo sapiens* (Tomasello, Kruger, and Ratner 1993; Tomasello 1999; Dunbar and Shultz 2007a; MacLean 2016). The social feature of human groups appears to imply that these groupings provided adaptive advantageous conditions for survival (Dunbar 1998; Melis and Semmann 2010; Carroll 2015; Tooby and Cosmides 2016). Climate, environment, food sources, and other currently less understood factors could all have contributed to this cooperative scenario. Our nonhuman primate ancestors have exhibited a trend toward adaptation to social living for many millions of years (Changizi, Zhang, and Shimojo 2006; Platt, Seyfarth, and Cheney 2016). (A full discussion and review of human group-selection evolution is discussed in Carroll 2015). Important to the idea of adaptive evolutionary forces behind art practice is that in tracing the trajectory of hominins from the time of the split from the chimp lineage around 4 to 7 million years ago (Patterson et al. 2006) through several *Homo* lineages, the gradual trend toward social living developed (Dunbar 1998; Dunbar and Schultz 2007b; Culotta 2010).

There is an interaction between the early purpose of art expression and the evolutionary trajectory toward group living, namely, that art practice facilitated social unity because of its symbolic communicative value: bonding among members to promote survival would have been paramount because unlike nonhuman primates, human societies include kin and nonkin (Hill, Barton, and Hurtado 2009; Hill et al. 2011; Hill et al. 2014). Sharing food and various resources, cooperating in hunts or fishing, fending off preying animals, promoting prosocial behavior, and competing with enemy groups would all provide advantageous survival strategies. Modern-day hunter-gatherer units, who often serve as models for early human

existence, include related and unrelated members who share and cooperate (Hill, Barton, and Hurtado 2009). What needs to be explored further is the possibility that early on, around the time when anatomically modern *Homo sapiens* emerged, art production was initially driven by survival needs of the group as a whole, namely, cohesiveness, unity, and bonding, in other words, that the early art practice was functional and also symbolic of cultural concepts. Material art depends on individual artists' virtuosity, something that did not satisfy those needs at that early period (for reasons discussed in a section below). Similarly, and not unlike group dance, musical vocalization and verbal story sharing are art forms that do not leave physical traces, but they could have all been practiced for their socially unifying value, and at the same time represented coded systems that referred to symbolic meaning understood by members of the group (Hagen and Bryant 2003).

Archaeological finds suggest that advanced cognitive traits were in place by the time the early modern humans evolved, albeit expressed in stone tool technology, living spaces arrangements, and increase in the size of group bands (McBrearty and Brooks 2000; McBrearty, 2007; Wurz 2013; Douze and Wurz 2015). The key to the initiation of art production and incorporation into cultural practice is now widely thought to lie in human cooperative social group living (Bowles and Gintis 2011; Powers and Lehmann 2016). Communication among members would be critical for learning and transmission of knowledge, whether or not expressed through language or art. Both are social communicative systems.

Material traces of the Middle Stone Age time in Africa, covering the period of 280,000–50,000 years ago, reveal advanced technology for producing stone tools (Ambrose and Lorenz 1990; McBrearty 2012; Wadley 2013; Wurz 2013). If early on humans already had a brain that supported the functional operations of symbolic and abstract cognition, we cannot rule out the possibility that multiple forms of

material art that did not survive the ravages of time were in fact produced. Preservation of material is always a factor to consider when there is absence of evidence (Guthrie 2006). Such art forms could have consisted of body paintings or body coverings coupled with plant and animal parts (e.g., feathers), which were initially motivated for practical survival purposes, possibly camouflage, and subsequently practiced symbolically as an art form (Zaidel 2005). The same can be argued for musical vocalization, that it first served a practical clever purpose of animal mimicry to entrap prey or to avoid predation, but it later developed as musical art forms. Humans have a propensity to mentally rehearse and rehash concerns, a propensity that could be transferred to explicit expressions through art (dancing, storytelling, combined acting-singing). Viewed in this way, art practice may have seen its early beginnings as an extension of functional (practical) survival strategies that, once successful, became worthy of symbolic expressions.

The most impressive advances of the Middle Stone Age in Africa are exemplified in the industries practiced in southern Africa, which include the findings from Blombos Cave, Still Bay, and Howiesons Poort traditions. These industries are regarded as major innovations in technology, cultural practices, and implementation of subsistence strategies (Henshilwood 2011; Jacobs et al. 2008). In Blombos Cave alone, significant findings, dating to 77,000–100,000 years ago, suggest a shift in culture and cognition: different shades of ochre have been unearthed there; cross-hatched geometrical configuration was found on ochre pieces; bifacial chipped stone points made from quartzite and other stone material were ferried from a substantial distance into the cave; abalone shells, which had to be skillfully freed from nonshallow ocean levels, were used as containers for ochre; and purposefully pierced beads made of shells suggest they were strung together and possibly used as body ornaments (Henshilwood 2007; McBrearty and Stringer 2007; Henshilwood

and Lombard 2013; Vanhaeren et al. 2013). All of these skills exercised by the dwellers of the cave reflect advanced cognition. The beads are interpreted to signal early examples of material art with the symbolic purpose of social identification through body ornaments (Zilhao 2007). The small quantity of physical artifacts does not rule out the parallel practice of other art forms mentioned above.

Nonmaterial Art: Collectively Driven Group Dance

Against this background, social group dance display is inherently a group activity, whether in today's ballet or in African group dances. When everyone participates collectively it relays the social symbolic message that the members are one; they are together regardless of their genetic affiliation (kin versus nonkin). The physical effort put into collective group dance is intentional, meaningful, and thus communicative.

People break into group dance spontaneously. Large group dancing is commonly seen worldwide in wedding celebrations, inaugurations, graduations, religious ceremonies, holiday festivals, mate selection displays, sporting events, victories, and many more. This phenomenon has a powerful adaptive function for affiliation, social identification, and bonding (Merker, Morley, and Zuidema 2015). Collective group formation dances with symbolic meaning are currently practiced throughout the world. Examples include the circle dance (Watts 2006), and in Papua New Guinea the group reenactment of peace between warring tribes (Salak 2004). In Africa alone, currently there is the stamping dance (Nguni), the jumping dance (Maasai), the shaking dance (Xhosa), and the Mohebolo striding dance (Sotho), to name but a few such dances (Ajayi 1998; Welsh 2010). There is a symbolic purpose behind all of these dances.

Slipping into collective formations while swaying, holding, shuffling, and clapping in unison is a natural act that seems rooted in biological needs of primates for social comfort,

closeness, and touch. Synchronizing rhythmically to a beat as in entrainment has deep biological roots, it is easily achieved by current modern humans, and recently has been found to be displayed to some extent in fireflies, in certain pet birds, sea lions, elephants, horses, and other animals (Rouse et al. 2016; Wilson and Cook 2016). Dancing is a natural human expression (Sheets-Johnstone 2005)—very young children spontaneously break into rhythmical body dance motion in response to music without prior instructions. There is no reason to assume that rhythmic motoric synchrony was not present at the dawn of early anatomically modern humans and grew to obtain meaningful symbolic purpose.

Human infants as young as six months respond to auditory rhythms, as shown through brain EEG measurements (Cirelli et al. 2016). From the time they are born, infants respond positively to rhythmical rocking movements whether or not they are accompanied by musical sounds, suggesting that repetitive movement is naturally calming for humans from birth. Babies aged 12 months have been found to synchronize their movements with others in social settings (Tunçgenç, Cohen, and Fawcett 2015), confirming that early social skills such as matching motoric movements to those of others develop early. Indeed, studies have shown that adults easily synchronize their walking tempo regardless of the presence of musical sounds (Schmidt and O'Brien 1997). Matching one's movements with the other has been linked to trust, rapport, and similarity, all of which are prosocial traits (Wiltermuth and Heath 2009). Turning this trait into an art form with abstract and coded symbolic meaning is an easily achieved act that even the early humans from the Middle Stone Age period in Africa could have practiced.

Individual Artists Produce Material Art

There is a major difference between collective group dancing and material art production, and

the key lies in the mode of execution. Unison dancing masks individual variability in skill and talent in the sense that dance formations reflect the average ability of the contributing members—it enables the drawing of the viewer's perceptual attention to the whole configuration inherent in the formation, not to the details, that is, not to the individual dancers. By contrast, material art emphasizes individual talent, skill, and cognition, since it focuses attention on single items and in this way spotlights the mind in the brain of a specific artist. Indeed, individual artists typically work alone on their art, sometimes investing enormous effort and time on a single material item.

To use a modern example, consider the “Dance of the Little Swans” in act 2 of Tchaikovsky's ballet *Swan Lake*. Our attention as the audience is drawn to the whole gestalt of the performance, not to the ballerinas' individual leg movements—we are meant to view the effect of the motion created when they move in unison in order to understand the symbolic message of the dance. This is when the whole scene takes precedence over its individual parts. Compare this to the mode of execution of material art as exemplified in paintings, sculptures, engravings, and ornamental jewelry, all of which are produced largely by single artists working alone. The planning of the final product, the skill, talent, and brain cognition of the individual artist are selectively and singularly exhibited in the art object. Multiple hands working on a single object are vulnerable to interference in accomplishing the final product (“too many cooks spoil the broth”), since each individual's planned manual movements can be antagonistic to the other's output. In this regard, art and language are similar: several voices speaking at the same time produce garbled, unintelligible messages. Communication, regardless of the mode used to express it, depends on clarity. The “greater good” lies in group displays of cohesiveness. Masking the individual in favor of the whole may have been a necessary step in the long, steady progression toward expanded

cultural practices materializing many tens of thousands of years later in the Upper Paleolithic in Europe.

Individual talent is exemplified in the rapid multiplication of material art items approximately 160,000 years after the emergence of *Homo sapiens*: statuettes, carvings, etchings, and cave walls reflect the individual talent idea but do not necessarily herald a novel emergence of symbolic capability. That capability can be argued to have been already functional in Africa. Early humans migrated from Africa to populate the rest of the world (Tattersall 2009). Organized social existence is thought to have progressed into a successful survival strategy brought by the humans who migrated from Africa into Europe (Sterelny 2011; Boyd and Silk 2014). Increased practice of material art became a useful form of expression when the dynamics of social structure were favorable, possibly as a result of increase in the size of groups (Culotta 2010), community cultural innovations, varied and readily available food sources, monitoring of animal and fish migration, and inherited social genetic qualities facilitating prosocial behavior with pooled resources and cooperation (Gintis 2011).

We can only speculate on the early cultural conditions in Europe around 45,000–35,000 years ago. They must have been such that recognition of individual artists gained importance, particularly in emphasizing the benefits of having artistically talented members. The group as a whole recognizing and accepting single artists' talent and skill is a prosocial direction toward which human cultures strived. However, in the early days in Africa, synchronized group movements in dance formations could well have had a significant adaptive value.

It is reasonable to assume that the practice of material art was added to the cultural repertoire when survival and adaptation to the ecological niche were favorable to individual expressions and the time needed to produce them (carvings, engravings, sculpting, paintings)—precisely what occurred in the Upper Paleolithic. Relatively safe conditions with regular assorted food abundance could have provided the necessary foundation (Bar-Yosef 1998).

Echoes from humans' early art traditions are evident in current times. Recent modern history is replete with constraints and impositions on individual artistic expression in favor of art that fosters social cohesiveness. Consider the dismissive category “degenerate art” that the Nazi regime applied to art not falling into step with its authoritarian ideology (Peters 2014), or the emphasis on “socialist realism” in authoritarian communist regimes (Cushing and Tompkins 2007). Many other political systems have imposed censorship on paintings, literature, theater, and dance that did not (or currently do not) conform to idealized norms of the dominant religion, culture, and government (Golomstock 2012). In historical terms, the notion of individual artistic freedom is relatively new; all one has to do is review the art history of both Western and non-Western societies to realize that cultural norms have been and are a dominant force in the content and form of art expression. This trend has deep roots in humans' evolutionary past, probably because it has a strong adaptive value for survival dependent on a social mode of existence. Art, rather than being an act of free and spontaneous expression in the early days of the *Homo sapiens* may have been particularly subjected to rules that emphasized cohesiveness.

WORKS CITED

- Ajayi, O. S. 1998. *Yoruba Dance: The Semiotics of Movement and Body Attitude in a Nigerian Culture*. Trenton, NJ: Africa World Press.
- Ambrose, S. H., and Lorenz, K. G. 1990. “Social and Ecological Models for the Middle Stone Age in Southern Africa.” In *The Emergence of Modern Humans*, edited by P. Mellars, 3–33. Edinburgh: Edinburgh University Press.

- Bar-Yosef, O. 1998. "On the Nature of Transitions: The Middle to Upper Paleolithic and the Neolithic Revolution." *Cambridge Archaeological Journal* 8 (2): 141–63.
- Bowles, S., and Gintis, H. 2011. *A Cooperative Species: Human Reciprocity and Its Evolution*. Princeton, NJ: Princeton University Press.
- Boyd, R. T., and J. B. Silk. 2014. *How Humans Evolved*. 7th ed. New York: Norton.
- Carroll, J. 2015. "Evolutionary Social Theory: The Current State of Knowledge." *Style* 49 (4): 512–41.
- Changizi, M. A., Q. Zhang, and S. Shimojo. 2006. "Bare Skin, Blood and the Evolution of Primate Colour Vision." *Biology Letters* 2 (2): 217–21. doi:10.1098/rsbl.2006.0440.
- Cirelli, L. K., C. Spinelli, S. Nozaradan, and L. J. Trainor. 2016. "Measuring Neural Entrainment to Beat and Meter in Infants: Effects of Music Background." *Frontiers in Neuroscience* 10. doi:10.3389/fnins.2016.00229.
- Culotta, E. 2010. "Did Modern Humans Get Smart or Just Get Together?" *Science* 328 (5975): 164.
- Cushing, L., and Tompkins, A. 2007. *Chinese Posters: Art from the Great Proletarian Cultural Revolution*. San Francisco: Chronicle Books.
- Davidson, I. 1997. "The Power of Pictures." In *Beyond Art: Pleistocene Image and Symbol*, edited by M. Conkey, O. Soffer, D. Stratmann, and N. G. Joblonski, 128–58. San Francisco: California Academy of Sciences.
- Deacon, T. W. 1998. *The Symbolic Species: The Co-Evolution of Language and the Brain*. New York: Norton.
- _____. 2011. "The Symbol Concept." In *Oxford Handbook of Language Evolution*, edited by M. Tallerman and K. Gibson, 393–405. Oxford: Oxford University Press.
- Douze, K., and Wurz, S. 2015. "Techno-Cultural Characterization of the MIS5 (c.105–90 Ka) Lithic Industries at Blombos Cave, Southern Cape, South Africa." *PLOS ONE* 10(11):e0142151. doi:10.1371/journal.pone.0142151.
- Dunbar, R. I. M. 1998. "The Social Brain Hypothesis." *Evolutionary Anthropology* 5 (5): 178–90.
- Dunbar, R. I. M., and Schultz, S. 2007a. "Understanding Primate Brain Evolution." *Philosophical Transactions of the Royal Society B: Biological Sciences* 362 (1480): 649–58.
- _____. 2007b. "Evolution in the Social Brain." *Science* 317 (5843): 1344–47.
- Elhaik, E., T. V. Tatarinova, A. A. Klyosov, and D. Graur. 2014. "The 'Extremely Ancient' Chromosome That Isn't: A Forensic Bioinformatic Investigation of Albert Perry's X-Degenerate Portion of the Y Chromosome." *European Journal of Human Genetics* 22 (9): 1111–16.
- Endler, J. A. 2012. "Bowerbirds, Art and Aesthetics: Are Bowerbirds Artists and Do They Have an Aesthetic Sense?" *Communicative and Integrative Biology* 5 (3): 281–83.
- Frith, C. D., and U. Frith. 2012. "Mechanisms of Social Cognition." *Annual Review of Psychology* 63:287–313.
- Gintis, H. 2011. "Gene-Culture Coevolution and the Nature of Human Sociality." *Philosophical Transactions of the Royal Society B: Biological Sciences* 366 (1566): 878–88.
- Goldie, P., and Schellekens, E. 2009. *Who's Afraid of Conceptual Art?* London: Routledge.
- Golomstock, I. 2012. *Totalitarian Art*. New York: Overlook.
- Guthrie, R. D. 2006. *The Nature of Paleolithic Art*. Chicago: University of Chicago Press.
- Hagen, E. H., and Bryant, G. C. 2003. "Music and Dance as a Coalition Signaling System." *Human Nature* 14 (1): 21–51.
- Henshilwood, C. S. 2007. "Fully Symbolic Sapiens Behaviour: Innovation in the Middle Stone Age at Blombos Cave, South Africa." In *Rethinking the Human Revolution: New Behavioural and Biological Perspectives on the Origins and Dispersal of Modern Humans*, edited by C. Stringer and P. Mellars, 123–32. Cambridge: Cambridge University Press.
- _____. 2011. "The Still Bay and Howiesons Poort, 77–59 ka: Perspective-Taking and the Evolution of the Modern Human Mind during the African Middle Stone Age." *Current Anthropology* 52 (3): 361–400.
- Henshilwood, C., and Lombard, M. 2013. "Becoming Human: Archaeology of the Sub-Saharan Middle Stone Age." In *The Cambridge World Prehistory*, Vol. 1, edited by C. Renfrew and P. Bahn, 106–30. Cambridge: Cambridge University Press.
- Hill, K. R., M. Barton, and M. Hurtado. 2009. "The Emergence of Human Uniqueness: Characters Underlying Behavioral Modernity." *Evolutionary Anthropology* 18 (5): 187–200.
- Hill, K. R., R. S. Walker, M. Božičević, J. Eder, T. Headland, B. Hewlett, A. Magdalena Hurtado, F. Marlowe, P. Wiessner, and B. Wood. 2011. "Co-Residence Patterns in Hunter-Gatherer Societies Show Unique Human Social Structure." *Science* 331 (6022): 1286–89. doi:10.1126/science.1199071.
- Hill, K. R., B. M. Wood, J. Baggio, A. M. Hurtado, and R. T. Boyd. 2014. "Hunter-Gatherer Inter-Band Interaction Rates: Implications for Cumulative Culture." *PLOS ONE* 9:e102806. doi:10.1371/journal.pone.0102806.

- Jacobs, Z., R. G. Roberts, R. F. Galbraith, H. J. Deacon, R. Grün, A. Mackay, P. Mitchell, R. Vogelsang, and L. Wadley. 2008. "Ages for the Middle Stone Age of Southern Africa: Implications for Human Behavior and Dispersal." *Science* 322 (5902): 733–35. doi:10.1126/science.1162219.
- Lewis-Williams, D. 2002. *The Mind in the Cave: Consciousness and the Origins of Art*. London: Thames and Hudson.
- MacLean, E. L. 2016. "Unraveling the Evolution of Uniquely Human Cognition." *Proceedings of the National Academy of Sciences USA* 113 (23): 6348–54.
- McBrearty, S. 2007. "Down with the Revolution." In *Rethinking the Human Revolution*, edited by P. Mellars, K. Boyle, O. Bar-Yosef, and C. Stringer, 133–52. Cambridge: McDonald Institute for Archaeological Research.
- . 2012. "Palaeoanthropology: Sharpening the Mind." *Nature* 491 (7425): 531–32.
- McBrearty, S., and Brooks, A. S. 2000. "The Revolution that Wasn't: A New Interpretation of the Origin of Modern Human Behavior." *Journal of Human Evolution* 39 (5): 453–63.
- McBrearty, S., and C. Stringer. 2007. "The Coast in Colour." *Nature* 449 (7164): 793–94.
- McDougall, I., F. H. Brown, and J. G. Fleagle. 2005. "Stratigraphic Placement and Age of Modern Humans from Kibish, Ethiopia." *Nature* 433 (7027): 733–36.
- Melis, A. P., and Semmann, D. 2010. "How Is Human Cooperation Different?" *Philosophical Transactions of the Royal Society B: Biological Sciences* 365 (1553): 2663–74. doi:10.1098/rstb.2010.0157.
- Mellars, P. 2011. "Paleoanthropology: The Earliest Modern Humans in Europe." *Nature* 479 (7374): 483–85.
- Merker, B., L. Morley, and W. Zuidema. 2015. "Five Fundamental Constraints on Theories of the Origins of Music." *Philosophical Transactions of the Royal Society B: Biological Sciences* 370 (1664): 20140095.
- Patterson, N., D. J. Richter, S. Gnerre, E. S. Lander, and D. Reich. 2006. "Genetic Evidence for Complex Speciation of Humans and Chimpanzees." *Nature* 441 (7097): 1103–8.
- Peters, O. 2014. *Degenerative Art: The Attack on Modern Art in Nazi Germany*. Berlin: Prestel.
- Platt, M. L., R. M. Seyfarth, and D. L. Cheney. 2016. "Adaptations for Social Cognition in the Primate Brain." *Philosophical Transactions of the Royal Society B: Biological Sciences* 371 (1687): 20150096. doi:10.1098/rstb.2015.0096.
- Powell, A., S. Shennan, and M. G. Thomas. 2009. "Late Pleistocene Demography and the Appearance of Modern Human Behavior." *Science* 324 (5932): 1298–1301.
- Powers, S. T., and L. Lehmann. 2016. "When Is Bigger Better? The Effects of Group Size on the Evolution of Helping Behaviours." *Biological Reviews of the Cambridge Philosophical Society* (March). doi:10.1111/brv.12260.
- Rouse, A. A., P. F. Cook, E. W. Large, and C. Reichmuth. 2016. "Beat Keeping in a Sea Lion as Coupled Oscillation: Implications for Comparative Understanding of Human Rhythm." *Frontiers in Neuroscience* 10 (June). doi:10.3389/fnins.2016.00257.
- Salak, K. 2004. *Four Corners: A Journey into the Heart of Papua New Guinea*. Washington, DC: National Geographic.
- Schmidt, R. C., and B. O'Brien. 1997. "Evaluating the Dynamics of Unintended Interpersonal Coordination." *Ecological Psychology* 9 (3): 189–206. doi:10.1207/s15326969eco0903_2.
- Sheets-Johnstone, M. 2005. "'Man Has Always Danced': Forays into the Origins of an Art Largely Forgotten by Philosophers." *Contemporary Aesthetics* 3. <http://www.contempaesthetics.org/newvolume/pages/article.php?articleID=273>.
- Smith, L. W. and R. A. Delgado. 2013. "Considering the Role of Social Dynamics and Positional Behavior in Gestural Communication Research." *American Journal of Primatology* 75 (9): 891–903.
- Sterelny, K. 2011. "From Hominins to Humans: How Sapiens Became Behaviourally Modern." *Philosophical Transactions of the Royal Society B: Biological Sciences* 366 (1566): 809–22.
- Suddendorf, T. 2013. *The Gap: The Science of What Separates Us from Other Animals*. New York: Basic Books.
- Tattersall, I., 2009. "Human Origins: Out of Africa." *Proceedings of the National Academy of Science USA* 106 (38): 16018–21.
- Tomasello, M. 1999. *The Cultural Origins of Human Cognition*. Cambridge, MA: Harvard University Press.
- Tomasello, M., A. C. Kruger, and H. H. Ratner. 1993. "Cultural Learning." *Behavioral Brain Science* 16 (3): 495–511.
- Tooby, J., and L. Cosmides. 2016. "Human Cooperation Shows the Distinctive Signatures of Adaptations to Small-Scale Social Life." *Behavioral Brain Science* 39:e54. doi:10.1017/S0140525X15000266.
- Tunçgenç, B., E. Cohen, and C. Fawcett. 2015. "Rock with Me: The Role of Movement Synchrony in Infants' Social and Nonsocial Choices." *Child Development* 86 (3): 976–84.
- Vanhaeren, M., F. d'Errico, K. L. van Niekerk, C. S. Henshilwood, and R. M. Erasmus. 2013. "Thinking Strings: Additional Evidence for Personal Ornament Use in the Middle Stone Age at Blombos Cave, South Africa." *Journal of Human Evolution* 64 (6): 500–517.

- Wadley, L. 2013. "Recognizing Complex Cognition through Innovative Technology in Stone Age and Paleolithic Sites." *Cambridge Archaeological Journal* 23 (2): 163–83.
- Watts, J. 2006. *Circle Dancing: Celebrating the Sacred in Dance*. Glastonbury, UK: Green Magic.
- Welsh, K. 2010. *African Dance*. New York: Chelsea House.
- Wilson, M., and P. F. Cook. 2016. "Rhythmic Entrainment: Why Humans Want to, Fireflies Can't Help It, Pet Birds Try, and Sea Lions Have to Be Bribed." *Psychonomic Bulletin and Review* 1–13. doi:10.3758/s13423-016-1013-x.
- Wiltermuth, S. S., and C. Heath. 2009. "Synchrony and Cooperation." *Psychological Science* 20 (1): 1–5.
- Wurz, S. 2013. "Technological Trends in the Middle Stone Age of South Africa between MIS 7 and MIS 3." *Current Anthropology* 54 (S8): S305–S319.
- Zaidel, D. W. 2005. *Neuropsychology of Art: Neurological, Cognitive, and Evolutionary Perspectives*. Hove, UK: Psychology Press.
- _____. 2013. "Cognition and Art: The Current Interdisciplinary Approach." *Wiley Interdisciplinary Reviews: Cognitive Science* 4 (4): 431–39.
- Zilhao, J. 2007. "The Emergence of Ornaments and Art: An Archaeological Perspective on the Origins of 'Behavioral Modernity.'" *Journal of Archaeological Research* 15 (1): 1–54.