Art in the Making: The evolutionary origins of visual art as a communication signal

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1. ART UNFOLDING: STUDYING THE ORIGINS OF VISUAL ART

All art is then utilitarian: the sceptre, symbol of royal power, the bishop's crook, the love song, the patriotic anthem, the statue in which the power of the gods is cast in material form, the fresco that reminds churchgoers of the horrors of Hell, all undeniably meet a practical necessity. The gratuitousness of art does not lie in its motivation but in the flowering of the language of forms.

ANDRÉ LEROI-GOURHAN, 1964

Ever since the earliest discoveries of artworks from a remote Ice Age came to light in Europe in the late 1800s, the corpus of early 'prehistoric art' has grown remarkably. Specially, over the past couple of decades finds have become more frequent, more remarkable, and more ancient. For example, in 1994 the discovery of Chauvet Cave, in France, containing the most impressive and oldest of figurative paintings (c. 32,000 years old) completely shook our previous ideas of the recent age and gradual development of art in the Upper Palaeolithic. Similarly, in Germany, examples of ivory figurines depicting animals and humans now go back some 40,000 years. By the beginning of this century, finds from the South African site of Blombos Cave yielded the "oldest dated art" (Lewis-Williams 2002:98), constituted by geometric engravings on a piece of red ochre, making us reconsider not only the time depth of visual art, but also the location of its earliest emergence. Since then, the finds of personal ornaments as old as 100,000 years in the north and south of Africa, and in the Middle East, have again made us rethink the kinds of artefacts that should be included in the category of visual art, as I review in chapter 2. In contrast to these rapid and somewhat unexpected breakthroughs in the archaeological record, the models that explain the origins of art have remained fundamentally the same since the first part of the 20th century.[1] The emphasis is still being put on the content of the artworks (e.g. symbolism, information, ritual, etc.), while pleasure, emotion, expression, and religion are still being invoked as the primeval causes for visual art-making, just as they were over a century ago (see: Hirn 1900). As a result, there is now a certain discrepancy between the dynamism of the record of early visual art and the static character of the models that explain it. The time is right for revisiting these different views in light of the recent evidence from the record, and for exploring novel perspectives that can take research on the origins of visual art forward.

1 Throughout this volume, 'model' is understood as the specific – real or assumed – testable application of a theory or hypothesis (Read et al. 1978:310).

This introductory chapter gives an overview of the situation sketched above and suggests a research approach that may make it easier for the models to cope with the rapid changes in the material record. The first section briefly outlines what the term Pleistocene art entails, and explains why this will be preferred over 'prehistoric art' throughout this book. The following section gives an impression of the diversity of study perspectives to the origins of visual art, with a focus on currently influential archaeological and evolutionary models. These two sorts of models (archaeological and evolutionary) have been chosen over the array of approaches to visual art origins (e.g. art historical, psychological, philosophical) because both can more readily make use of and be tested against the empirical data provided by the archaeological record. I also suggest a possible synthesizing approach based on understanding visual art in the broader framework of human communication. In the final section, I explore topical research views on the evolution human behaviour which talk about a 'human niche' built upon the coevolution of cognition, communication, cooperation and culture with human social interactions. I suggest that this 'new thinking', [2] which emphasizes feedback processes between these '4 Cs' and the biosocial environment of humans throughout evolution, should also be incorporated into an explanatory model of the origins of visual art.

1.1 Pleistocene visual art: An outline of definitions

Scholars interested in the study of visual manifestations from the distant human past have often questioned whether these should indeed be classified as art. Many researchers are, perhaps rightfully, suspicious of the term *art* – particularly with a capital A – because it is loaded with connotations of non-functionality and self-purpose that cannot automatically be assumed for prehistory (Berghaus 2004:5; Davidson 2012; Dissanayake 1992:41; Nowell 2006:244; Soffer & Conkey 1997). Over the past decades, some specialists have suggested that, when referring to prehistoric artistic manifestations, one should talk of 'art' – in quotation marks (Conkey 1987), or even replace the term altogether for supposedly less problematic ones, such as 'systems of representation' (Davis 1984), 'graphic manifestations' (Arratia 1987), 'visual cultures' (Soffer & Conkey 1997), 'material forms of representation' (White

2 A recent special issue of the *Philosophical Transactions of the Royal Society B* (2012, vol.367, no. 1599) has called attention to the 'new thinking' in research on the evolution of human cognition and behaviour. A field that over the past 25 years has been dominated by evolutionary psychology, with its concept of an innate and relatively fixed human mind compartmentalized in modules shaped to solve Stone Age problems. This 'new thinking', in contrast, "(i) takes a longer historical perspective, and therefore a more comparative approach, (ii) highlights the importance of co-evolution and cultural evolution in generating gradual, incremental change and (iii) suggests that humans are endowed with uniquely powerful, domain-general cognitive-developmental mechanisms, rather than with cognitive modules" (Heyes 2012:2095).

1992, 1997), 'depictions' (Ingold 2000), or 'markings' (Davidson 2012). These alternative terms, however, have not managed to replace 'art' in the literature rather, they have become its synonyms. Instead of getting rid of the word *art*, most anthropologists, archaeologists, art historians and other scholars concerned with ancient and contemporary 'traditional' arts have recently insisted on adopting a broad art concept that allow for the inclusion of all visual art practices across time and space (Morphy 1999:443; van Damme 2008:27). In this perspective, art "may then be deployed as an umbrella term to refer to the human tendency to create, use, and respond to arresting visual images" (van Damme & Zijlmans 2012:218). This inclusive designation becomes stronger when we recognize, as the celebrated art historian Ernst Gombrich did at the very beginning of his *Story of Art*, that art is a man-made construct (1995[1950]:15):

> There really is no such thing as Art. There are only artists. Once these were men who took coloured earth and roughed out the forms of a bison on the wall of a cave; today some buy their paints, and design posters for hoardings: they did and do many other things. There is no harm in calling all these activities art as long as we keep in mind that such a word may mean very different things in different times and places, and as long as we realize that Art with a capital A has no existence.

Certainly, art is a socially constituted and socially defined practice (Wartofsky 1980:239). Consequently, 'being art' is not an intrinsic property of objects or actions, but a cultural categorization (Levinson 2002:377), and the art concept is historically determined and dynamic. So, for now, we will continue to use the term *art*, partly because it is familiar, and partly because, in the words of archaeologist David Lewis-Williams, "art is a handy monosyllable" and provided we are aware of its problems and limitations, "we can use it with caution" (2002:41).

In either a narrow or a broad sense, the term 'art' is frequently meant to refer to a number of manifestations included in the so-called plastic or visual arts (e.g. painting, sculpture, ornamentation, architecture), and the performing arts (e.g. dance, music, theatre, storytelling, poetry). In this work, however, I focus exclusively on the earliest evidence for the production of visual art, for which I offer two reasons. The first is preservation. Whereas, for instance, the performing arts leave only indirect traces in the archaeological record, the production of visual artworks more frequently endures the passing of time, rendering them accessible for direct research. The second and more important reason is that, as I discuss with more detail in Chapter 4.3, recent evidence indicates that the various 'arts' did not evolve in unison, and might be phylogenetically and cognitively distinct. The variety of behaviours we usually identify as 'the arts' seem to each have followed a unique development, with

visual art flourishing only over the past 130,000 years (see: Chapter 2).[3] The clearest example of the heterogeneity of the arts is provided by evidence that the processes involved in music-making and visual art production make use of quite different neurological mechanisms and brain structures (Brown *et al*. 2006; Fitch 2005b; Zaidel 2010; Zeki 1999). This strongly suggests that the various 'arts' truly are dissimilar faculties and so, for the purposes of clarifying their particular evolutionary history and functions, they should be studied separately (Lewis-Williams 2002:67).

The visual artworks treated in this book are colloquially referred to as 'prehistoric art'. But the term 'prehistoric' can be problematic. Strictly speaking, *prehistory* refers to a time before written accounts (history), which varies in different regions (e.g. 5,000 BC in the Middle East, 200 BC for Central Europe). Moreover, the term is applied in diverse contexts to denote different ideas. Particularly in parts of the world where writing arrived late or was never used at all, 'prehistory' may allude to very different time periods or circumstances (White 2003:9). In the Americas for instance it is commonly used to refer to the archaeological phases before the systematic practice of agriculture around 2,500 BC (Cassiano 1992:105), while in Australia, prehistory in the strict traditional sense continued up to the arrival of European settlers only some 300 hundred years ago (Layton 1992:257). Thus 'prehistoric art' can hardly be defined explicitly and may easily lend itself to confusion. Locally, archaeologists prefer specific terminologies such as Palaeolithic (Eurasia), Stone Age (Africa), Paleoindian (North America), etc. to indicate particular time periods in regional prehistory. These local terms, however, are not suitable to talk about the earliest art at a panhuman scale.

In contrast to the term 'prehistoric art', 'Pleistocene art' has global applicability (Nowell 2006). Pleistocene is the name given to the previous geological era, which started some 2.5 million years ago and concluded 12,000 years ago with the end of the last Ice Age, which marks the beginning of our current geological epoch, the Holocene. And it is to the Pleistocene period that the earliest evidence for the emergence of visual art belongs. Pleistocene visual art is used in this book to refer to all of the evidence of artistic activities present globally in the archaeological record up to 10,000 years before our current era. As explained by April Nowell, this category typically contains (2006:239):

> A large and varied corpus of paintings and engravings on the walls, ceilings and floors of caves and rock shelters throughout the regions of Australasia, Africa and Europe that predate the Holocene. It also includes items of personal adornment such as beads, pendants, bracelets and rings as well as engraved and incised bone, antler and

3 In this book, I understand behaviour as a recurrent action pattern within a cohesive population with a shared evolutionary history (i.e. species). In this sense, visual art-making qualifies as a current human behaviour.

stone. Ivory and, more rarely, clay sculptures of animals and human figures form part of this corpus as well.

The earliest occurrences of each of these forms and their implications for reconstructing the development of visual art will be examined in the following chapter.

1.2 Research approaches to the origins of art

The study of Pleistocene visual art and the related issue of its origins came of age during the 20th century. The history of the discovery, recognition, and scholarly reception of Pleistocene art has been traced in detail by various authors, and therefore will not be recounted in this review. The narratives of this history usually take us from the early finds of Palaeolithic 'portable' art pieces, to the discovery of the painted cave of Altamira in Spain and its initial dismissal by the academic community, up to its final recognition in 1902 as a true 'masterwork' of prehistory, leading to a re-evaluation of the cave paintings as humankind's 'first art' (Bahn & Vertut 1997; Cartailhac & Breuil 1903; Conkey 1987; Grand 1967; Lewis-Williams 2002; Pfeiffer 1982).

What will be reviewed in this section is the context and contents of the hypotheses that have attempted to answer the question of why humans began and kept on producing artworks, i.e. the origins of (visual) art. As mentioned in the introduction to this chapter, I will focus particularly in archaeological and evolutionary models because they make themselves available for testing against the material archaeological and palaeoanthropological records. The guiding questions of this research, then, can be formulated in the following manner:

- What are the models and hypotheses that have been used to explain the origins of art (from an archaeological/ evolutionary perspective)?
- Are these models consistent with the evidence from archaeology and evolutionary science?

In order to answer these questions, I first do a selection of representative models on the basis of their relevance and impact in the field, and then I set out to test the pronouncements made by these models against available empirical data from archaeology and various evolutionary disciplines.

In brief, the research problem can be summarized as follows: A) There are various models that aim at explaining the emergence of visual art in the Pleistocene (i.e. 'the origins of visual art'); B) There is a growing corpus of archaeological evidence for Pleistocene visual art; C) There are various hypotheses about human evolution that account for the development of patterns of modern human behaviour in phylogeny and ontogeny. The aim of this investigation is to assess whether A is consistent with the information provided by B and C.

Perspectives from archaeology

In the pioneering period of the early decades of the 1900s, scholars started to systematically record and describe hundreds of examples of 'portable' and cave art found all over Europe, known to have originated in a remote Ice Age. In the first instance, these artworks were thought to have been produced 'for their own sake'. Most writers assumed that the prehistoric artists were driven by an 'artistic impulse' to embellish their environment and to depict elements from their surroundings that were important to them; hence the recurrence of 'primeval' naturalistic themes (Breuil & Windels 1952). Inspired by a growing ethnographic record, however, some scholars related prehistoric art to 'primitive' ceremonies, rituals and religious practices like 'picture magic', which referred to the use of representation to gain power over the depicted things and beings (Bégouen 1929). Hunting and fertility magic then became the 'standard' explanation for the beginning and continuation of visual art in prehistory, and remained popular well into the second half of the century (Grand 1967:22).

By the 1950s, a large corpus of Palaeolithic portable art and cave paintings had accumulated, and archaeology had adopted an array of interpretive perspectives that encouraged scholars to start offering explanations in terms of the 'meaning' of prehistoric artefacts. One of these perspectives became known as the 'structuralist' approach. Highly influenced by the linguistic theories of Ferdinand de Saussure and the work of French anthropologist Claude Lévi-Strauss, the structuralist school proposed that most human institutions (e.g. kinship, religion, exchange, art) may be conceived of, described, and analysed as if they were 'languages' in order to uncover the hidden universal rules that structure them. This approach also highlighted the role of beliefs and symbols as fundamental aspects of human mental and social organisation (Renfrew & Bahn 1996:426). The mid-century interpretive turn that approaches such as structuralism triggered in anthropology and art studies was captured by anthropologist Morton Levine (1957:143):

> Students of primitive art have come to believe that this realm of expressive behavior provides another avenue to the values of the culture or the cultural ways of apprehending reality. This relatively new emphasis in the anthropological study of art has opened our eyes to yet another fascinating possibility, namely, the use of prehistoric art as documents from which we may someday be able to derive a plausible idea of the ideological culture of peoples dead and gone.

Seen in this light, scholars began to perceive Palaeolithic visual art as a coded system whose interpretation could give us a glimpse into the social life and ideology of prehistoric peoples. In addition, it was in the realms of social and belief systems that they searched for an explanation of the origins of artistic practices. French prehistorian André Leroi-Gourhan is best known among rock

art researchers for his structuralist analysis and interpretation of Palaeolithic motifs in terms of 'mythograms' and allusions to the male/female duality of nature and society (Bahn & Vertut 1997:191; Lewis-Williams 2002:63).[4] However he also outlined an important hypothesis regarding the origins of visual representation, namely that visual art evolved as a human medium of expression. He argued that visual art, like writing, involved "the capacity to express thought in material symbols" ([1964]1993:187). Thus, Leroi-Gourhan called Palaeolithic art a 'language of forms', that is, an early type of graphism not very different from script: "in its origins figurative art was directly linked with language and was much closer to writing (in the broadest sense) than to what we understand by a work of art. It was symbolic transposition, not copying of reality" ([1964]1993:190). An important implication of his reasoning was that visual art could be seen as evidence for language, which in turn could be interpreted as evidence for the mental abilities to abstract and symbolize ([1964]1993:365). The link that Leroi-Gourhan established between speech, visual art and symbolism is still one of the guiding principles in Pleistocene art research to date (Nowell 2010:441).

From this point onward, scholars explicitly or implicitly acknowledged that Pleistocene visual art contained information, that some of its manifestations – e.g. cave paintings – had sense and structure, and that the motifs and compositions most likely expressed specific 'messages'. As a result, an array of research approaches developed in the archaeology of art. Several focused on trying to 'decode' the depicted symbols and figure out what they might have stood for (e.g. totems, maps, constellations, time-keeping notations, hunting tallies, shamanic visions, etc.).[5] Some attempted to 'measure' the complexity and flow of the information contained in the art in order to outline potential clusters or networks of communication according to the frequency and location of certain motifs (e.g. information theory; landscape archaeology).[6] Finally, others looked into inferring possible social contexts rather than the contents of the images. Often drawing on the ethnographical record, researchers working in

4 "Statistical analysis of several thousands of cave paintings or art objects reveals the existence of a central theme: man/woman and (or) horse/bison, expressed in a manner that met the prescribed conditions for rendering what was probably the content of a myth" (Leroi-Gourhan [1964]1993:371).

5 For example, Alexander Marschack has interpreted geometric marks in Palaeolithic art as a system of notation to keep track of a lunar calendar (1991), whereas David Lewis-Williams has interpreted them in terms of 'entopic' signs, or visual hallucinations that a person may experiment during altered states of consciousness (2002:126).

6 This became a strong framework, for example, in rock art studies (e.g. Schaafsma 1980), where quantifying the information contained in art motifs became a research aim: "information in its fundamental sense, is what people seek and exchange to reduce uncertainty about physical and social reality. Meaning is the interpretation of the information a message contains. A message is simply the means by which information is obtained. With these definitions in mind we envisage information, and developed by communication theorists, to be the aspect of messages that increases or reduces uncertainty. Information is measurable, and rock-art – apart from whatever meaning it was assigned in prehistoric socio-cultural systems – is subject to this measure" (Hartley & Vawser 1998:195).

this last framework suggested potential settings in which art could have been produced and used (e.g. ritual, pedagogical, narrative), and noted that visual art generally mediates social interactions and can be used to transmit and reinforce norms, bonds, and identities.[7] But whereas these diverse approaches have contributed much towards the potential interpretation and understanding of the social roles of Pleistocene art, few have examined the problem of why and how visual art-making should have developed as a standard human practice in the first place (Conkey 1987:422; Soffer & Conkey 1997).

In fact, after having been a 'hot' topic during the first half of the 20th century, archaeologists almost gave up on the matter of the origins of art during the second half. It is only recently that the issue of the emergence of visual art has become topical again, however not in its own right but to the extent that, as 'evidence of symbolic capacities', it can be used to submit and test ideas about human cognitive and behavioural evolution. Over the past two decades, for instance, there have been relevant archaeological works dealing with the origins of image-making (i.e. figurative art) in the European Palaeolithic (e.g. Guthrie 2005; Lewis-Williams 2002:99), and the origins of 'symbolism' as a cognitive capacity, which is supposed to be the source of visual art (e.g. D'Errico et al. 2003; Mithen 1996b; Power 1999; Zilhão 2007, 2011). However, some of the currently most influential models for the origins of art, as such, have been developed outside archaeology, by evolutionary scholars (e.g. Miller 2000a; Dissanayake 1992).

As mentioned, the conception of visual art as an indicator of the ability to use symbols can be traced back to the work of Leroi-Gourhan, for whom even the simplest art "implies a conventionality inconceivable without concepts already highly organized by language" ([1964]1993:191). Therefore, scholars interested in the evolution of human cognition have turned their attention to Pleistocene visual artworks "as products of the human capacity for symboling and in their possible relation to the origins of language" (Marschack 1976:278). Because of this association, it is frequently assumed that the presence of visual art in the archaeological record "demonstrates the use of modern language" (D'Errico *et al*. 2003:31) and that, in turn, modern language testifies to 'behavioural modernity', i.e. a set of common behaviours that generally characterize humans today.

Although researchers disagree as to which faculties and activities should be considered exclusive to modern humans, most agree that modern behaviour "has symboling at its core" (Nowell 2010:447), and often this is implicitly meant as the ability to communicate through vocal or visual conventional signs.

7 For example, the explosion of art in the European Palaeolithic has been explained from this perspective not as a consequence of the emergence of modern cognition but as a social mechanism to cope with changes in the environment (Jochim 1983), establish alliance networks (Gilman 1984), communicate identity (White 1982), or maintain information flow among groups (Conkey 1978, 1984).

Explicitly, symbolic behaviour is generally understood in archaeology as "the ability to represent objects, people, and abstract concepts with arbitrary symbols, vocal or visual, and to reify such symbols in cultural practice" (McBrearty & Brooks 2000:492).[8] The main current questions about the origins of 'modern' cognition have changed as a result of the recent decoupling of human anatomical and behavioural 'modernity', as April Nowell explains (2010:438):

> Two decades ago it was widely accepted that 'modern' behavior and modern anatomy evolved in tandem in Europe approximately 40,000 years ago at the start of the Upper Paleolithic. It was argued that the emergence of [anatomically modern humans] (*Homo sapiens sapiens*) coincided with an explosion of modern behaviors (e.g., language, cave art, specialized tools, complex social organization, extensive trade networks, etc.). However, the intensification of paleoanthropological research outside of Europe began to paint a different picture of our origins. As mounting evidence (an important point of contact between genetics and fossils) pointed to an African origin for modern humans at 130,000 years before present (BP) there appeared to be a 'lag' between the emergence of modern anatomy and the emergence of modern behavior. Recent studies suggest modern anatomy evolved even earlier by at least 160,000–195,000 BP.

So, the backdrop for the discussion on the development of human biological and cognitive changes and their implications has deepened in time and moved from Europe to Africa, and other important questions have arisen, particularly, whether the appearance of modern behaviour "is sudden (revolutionary and continuously built upon) or gradual (appearing and disappearing at different times and places – more mosaic in character and only gradually becoming more generalized"; and the extent to which it is "the result of new cognitive abilities or cultural, historical, social, and demographic factors". (Nowell 2010:438-9). Another point of contention among scholars has been "whether particular

8 Whether the objects discussed in this book should be considered symbolic or not is an on-going debate in archaeology, palaeoanthropology and related disciplines. Although the commonly used concept of the symbol –as a sign that arbitrarily stands for something else– is namely rooted in linguistics and semiotics, archaeologists (and often anthropologists) typically understand symbols differently, as meaningful artefacts that evoke ideas and command interpretation (Gärdenfors 2011:383). This has generated a great amount of confusion in discussions within and across fields (Corbey & Roebroeks 2007). To be clear, in this research, I do not adhere to the classic Peircean semiotic model of 'icon, index and symbol'. Instead, I take on Vygotsky's view –closer to the Saussurian model (Daniels 2012:68)– where it is understood that all human-made (artificial) signs involve assigning meaning to an object or behaviour (Holland & Valsiner 1988:249) and are in principle conventional, thus symbolic. These include, for example, language, counting systems, writing, algebra, and visual art. More specifically, I adopt Mario Bunge's definition of symbol: "An artificial sign, or symbol, may be characterized as a sign produced or used to either designate a concept, such as that of language, or denote an extraconceptual item, such as an individual material thing or another sign". Symbols "can be read only with the help of (explicit or tacit) semiotic conventions". In other words, "symbols are material artefacts together with (explicit or tacit) designation rules" (2003:58-59).

aspects of cognition are uniquely derived for *H. sapiens*, or shared derived traits present in other, extinct hominins as well" (Langbroek 2012:7).[9] Visual art remains at the centre of these debates, as a tell-tale sign of modern human activity.

It is true that although cognitive abilities do not fossilize, by analysing the archaeological signature of some behaviours archaeologists are able to infer the kinds of mental and technical abilities involved in them (Davidson 2010:215). Take for example the implications of the colonization of the Australian continent. The evidence now indicates that by 50,000 years ago, modern humans had settled in Australia and New Guinea. It is also known that even during glacial periods when sea levels were lower than today, these territories were separated from mainland Asia by ocean stretches of at least 80 km. Thus, we may conclude that the early colonisers arrived to these territories by boat (Erlandson 2010:199). And from this conclusion, we can infer that they possessed all the necessary abilities (cognitive and technological) for maritime navigation, like planning, 'reading' environmental signs, teamwork, woodworking, etc. (Davidson & Noble 1992). However, these inferences can only be made after the fact. So, we cannot reverse the argument and assume that people lacked those abilities before the colonisation of Australia, or that they sailed to Australia *because* they acquired such abilities.[10] A similar confusion of correlation and causation occurs in some cognitive hypotheses for the origins of art, when it is assumed for example that before the earliest evidence of figurative art, people lacked the capacity for 'image-making' (e.g. Mithen 1996b). To avoid such mistaken conclusions, Olga Soffer and Margaret Conkey have pointed out that we must take into account the fundamental difference between the 'capacity for' and the actual 'performance of' a behaviour (1997:6). This means that even when some behaviour is potentially accessible, it only becomes manifest in a relevant context (i.e. when it is needed or relevant), and it is only by working out those contexts that we will understand why and how

9 Since the year 2000, a new taxonomic classification for humans has been in use. Accordingly, the term 'hominid' that had been employed up to that point is no longer applicable. This means that the human line "can no longer be described as containing 'hominids', for the family Hominidae has become more inclusive, and now refers to the common ancestor of the living African apes (i.e. Homo, Pan, and Gorilla) and all of its descendants. The appropriate vernacular term for a member of the human clade is now 'hominin', for this is the way to refer to members of the tribe Hominini, and its 2 component subtribes, the Australopithecina and the Hominina. Thus, 'hominid evolution' becomes 'hominin evolution'" (Wood & Richmond 2000:20).

10 Richard Klein has challenged the early dates of the colonization of Australia arguing precisely that it could not have taken place before 50,000 years ago (Klein and Edgar 2002:247) because prior to that date, "people possessed limited ability to innovate" (Klein & Edgar 2002:269). Only afterwards, when some neural change had taken place, did people become behaviourally modern and this allowed them to spread out of Africa (Klein & Edgar 2002:273). For their part, Frederick Coolidge and Thomas Wynn, who place 'mental modernity' even later at 32,000 BP, maintain that the colonization of Australia is not evidence of advanced cognition, since it could have been unplanned or just happened by accident! (2009:230).

the behaviour becomes patent.[11] Furthermore, some of the cognitive models might rightly point to a correlation between art-making and some mental capacity, but this does not answer any evolutionary questions about either one of them. As stated by Antonio Gilman (1984:119):

> Even if, for the sake of argument, one were to allow that *Homo sapiens sapiens* was biologically more capable of cognitive representations such as language than his immediate predecessors, however, one would still not be able to use his increased abilities as a sufficient explanation for the new elements in his cultural repertoire. To say, for example, that Cro-Magnons were capable of painting caves (and that Neanderthals were not) does not explain why they painted them. Conversely, if painting caves is part of a more effective adaptive system, the one need not appeal to the capability of painting them in order to explain why the painting took place.

It is therefore reasonable to argue that the evolution of human cognition and the origins of visual art should be treated as two separate archaeological problems, clearly "we do not need to invoke new capacities or creativities to explain [art], and conversely, in itself it cannot be used as evidence for the emergence of new capacities or creativities" (Davis 1986:201). Thus, it would be better to seek alternative explanations for the emergence of art-making beyond cognition. In any case, it is evident that we need to look for a framework able to explain changes "with reference to social, cultural, historical, and demographic factors instead of (or in addition to) cognitive ones arguing this is most parsimonious with archaeological, paleoneurological, and life history data" (Nowell 2010:445). So even though scholars do not yet agree on exactly where we should be searching, many now realize that looking into the evolution of social organisation might move research in the right direction.

Perspectives from evolutionary disciplines

The study of visual art from an evolutionary point of view has a rather long tradition going back to Darwin's *The Descent of Man*, where he discussed the evolution of the 'mental powers' and the aesthetic preferences of humans, in general and in regards to art ([1879]2004:114). Since then, several scholars have attempted to account for the place of art in human biology, and vice versa, (Hirn 1900) and to explain art-making "as a biological, or behavioural, phenomenon" (Morris 1962:141).

Anthropological data from across the globe show that some sort of visual art is present in every known human culture (Anderson 1992). Its wide-ranging presence led scholars to classify visual art as a 'universal' human behaviour that involves a propensity to make and/or mark objects with certain visual patterns

11 For example, despite understanding the technologies and potential 'advantages' of food storage, Australian hunter-gatherers rarely engaged in this practice, since their economic system of generalized food-sharing made it redundant (Testart 1982:524).

(Davidson 2012; Dissanayake 2010). Two main lines of thinking have prevailed within this view: the first suggests that visual art may indeed have been selected, although not because it had a value in itself, but by being coupled to other actually adaptive traits, or 'piggybacking', for instance on general intelligence, or as a side-effect of visual and perceptual biases (De Smedt & De Cruz 2010; Verpooten & Nelissen 2010), and was retained only because it was pleasurable, in Steven Pinker infamous words, as "cheesecake for the mind" (1997:524). The second view maintains that art most likely has had a genuine 'adaptive value' throughout human evolution, meaning that it was shaped by natural selection because it contributed towards the survival and reproduction (i.e. fitness) of the individuals that displayed it, so that it may be thought of, and studied, as a veritable human adaptation (Dissanayake 1982:146).[12]

I will focus primarily on this second line of research, since it is the one that has generated more narratives about the origins of art. To explore the issue of art as an adaptive trait, scholars have often followed the methods of ethology (the biological study of behaviour), which analyses action patterns, or behaviours, as if they were 'organs' – "as attributes with special functions to which they were intricately adapted" (Tinbergen 1963:413) and, like physiology, aims to infer adaptive value by examining the trait's function (Lorenz 1981). Along these lines, the guiding research question in the evolutionary study of art has often been: what did art evolve for? The answers have been varied,[13] but three themes seem to be recurrent: 1) Sexual selection; this relates to the idea that art, "like the peacock's tail" can indicate the genetic quality of the individual that displays it (Dutton 2009; Miller 2000a; Thornhill 2003; Zahavi & Zahavi 1997). 2) Social cohesion; where art is thought to bring individuals together by reinforcing in-group norms, badges, and bonds (Boyd 2005; Coe 2003; Cooke 1999; Dissanayake 1992). 3) The enhancement of cognitive abilities; implying that through art, people can express, discuss, exchange and expand concepts and ideas, and 'tune in' their perceptual senses (Ludmany 1999; Mithen 1996a; Smith 2005; Tooby & Cosmides 2001; Zeki 1999). These three themes will be explored thoroughly in separate chapters through the work of their most representative authors (see Fig. 1). In this manner, chapter 3 will consider Geoffrey Miller's argument that art is fundamentally a sexually selected trait. Chapter 4 will discuss Ellen Dissanayake's view of art as an adaptive behaviour

12 In biology, "a trait that exists because natural selection has favored it is called an adaptation ... Each adaptation was selected for some effect or effects that influenced the fitness of its bearer" (Sterelny & Griffths 1999:217).

13 In a recent review, Ellen Dissanayake identified at least nine of these proposals (2007), each suggesting that art evolved for some specific purpose: pattern recognition (Zeki 1999); mental problem-solving (Ramachandran & Hirstein 1999); adaptive decision-making (Thornhill 1998); increasing mating opportunities (Miller 2000a); supporting religious behaviour (Irons 2001); providing fictional scenarios for action-planning (Tooby & Cosmides 2001); social manipulation (Aiken 1998); social cohesion (Coe 2003; Dissanakaye 1992); and cognitive enhancement (Mithen 2001).

selected to reinforce social cohesion in ritual ceremony. Then, chapter 5 will examine the work of Steven Mithen and his view of art as a medium for exchanging ideas and its origin in 'cognitive fluidity'. Each of these prolific scholars are regularly cited in the literature on art's origins, and their work continues to be a starting point for studies on the emergence of art, including the present one.

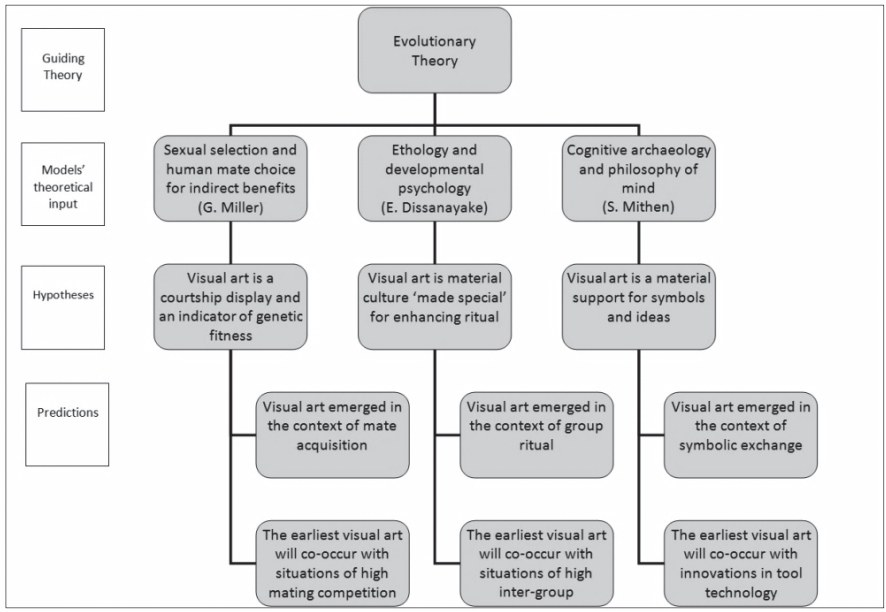

Figure 1. *Theoretical structure of the origins-of-art models examined in chapters 3, 4 & 5, respectively.*

The origins-of art-models by Miller, Dissanayake and Mithen will be the subject of a theoretical analysis that includes, in each case, an exploration of the model's background, an examination of its main arguments, a critical review, and the formulation of some predictions (derived from the model) to be tested against the data from the archaeological record of visual art, presented in chapter 2. This analysis will, evidently, be carried out from my own personal reading of the models and the assessment will be done according to my own position which, regarding issues of ontology and epistemology, is compatible with scientific realism, as outlined by philosopher of science Mario Bunge (2003, 2010; Cordero 2012; Mahner & Bunge 1997), whose definitions and terminology will be used and often cited throughout this study. The guideline of this position is that "science provides the best possible factual knowledge", and therefore "it requires every proposition, be it hypothesis or datum, to be ultimately justifiable either theoretically or empirically" (Mahner & Bunge 1997:134-5). That is, it requires that our (scientific) pronouncements (i.e. hypotheses) about how the world works be formulated in terms of (real) material entities or processes in

those entities, and be testable, which means that ideally they "can be checked for truth by contrasting [them] with data or with the bulk of accepted knowledge" (Mahner & Bunge 1997:78). These are the principles that will guide my theoretical analysis of the evolution-based models that I will review in chapters 3, 4, and 5. As mentioned at the beginning of this section, the model assessment implies checking for consistency between some predictions derived from the models and data from archaeological and evolutionary sources.

Finally, this approach advises that the researcher "should not just criticize the prevailing view, but try to propose alternatives." (Mahner & Bunge 1997:v). In line with this, after identifying some potential problems of those models, I will suggest that an alternative scenario based on the role of visual art as a communication signal expressed in material culture, in the manner suggested by anthropologists Martin Wobst (1977) and Polly Wiesner (1983, 1984). In chapter 6, I sketch a tentative model that accounts for the emergence of visual art in these terms, and indicate that this is coherent with both the archaeological record and current ideas on the evolution of human behaviour.

A multidisciplinary perspective from communication

Archaeological and evolutionary explanations of the origins of visual art cannot be completely independent of each other. On the contrary, they should be complementary, although they rarely are. Evolutionary scholars often reproach archaeologists for relying too much on a record that is fragmentary and limited (Miller 2000a:22) and for lacking a theoretical framework able to situate the archaeological data from specific times and places in the broader scope of human evolution (Dissanayake 2010). Equally, archaeologists have complained that models of behavioural evolution grounded in other disciplines often either ignore archaeological information or treat it superficially (Gamble *et al*. 2011:115; Ingold 2007; Roebroeks & Verpoorte 2009). Finally, both fields may at times make use of different definitions of art and evolution. Therefore, it would be fruitful to apply a framework that could bridge over multiple disciplines, including archaeology, palaeoanthropology, biology, and cognitive science.

In recent decades Pleistocene visual art has increasingly drawn the attention of scientists as a rich material that can give access to all sorts of relevant information about the people that created it. Nevertheless, the importance of explaining the emergence and development of the art itself frequently fades to the background of grander schemes that attempt to account for the evolution of language, cognition, mate choice, ritual, etc. As discussed above, in current archaeological debates, the issue of the origins of visual art is often brought up only to support or test scenarios of human cognitive and behavioural evolution. But works on the origins of visual art as a research subject in itself have not been prominent in the archaeological literature of the past two decades. Paradoxically, it is in the last twenty years that the most significant evidence in this respect, since the discovery of Palaeolithic cave art, has been unearthed. As

I review in the following chapter, recent finds and their dates, particularly from Africa, have extended the corpus and antiquity of Pleistocene visual art beyond any previous expectations. Therefore it is now a good moment to reflect on the existing origins-of-art hypotheses and to explore frameworks able to incorporate the latest archaeological data.

A research framework will often correspond with the definition of the subject and the questions that guide the research. For instance, as we have seen, scholars that understand visual art as a symbol system have often opted for a semiotic approach, whereas those that define it as an evolved behaviour, have followed the ethological view. So, in large part, the way visual art is defined will influence how it will be approached.[14] As a category, visual art is constituted by a group of artefacts that we call visual artworks. These can be described as any object or pattern made, modified, or displayed to engage the attention and influence the behaviour of a perceiver through visual cues – like colour, shape, texture, brightness, etc.[15] Examples of Pleistocene artworks include personal ornaments, engravings, paintings, and sculptures (Nowell 2006:239), but the diversity of media and forms surely was greater than what has been preserved and identified archaeologically. These artefacts and the processes involved in their production are then the constituents of visual art.[16] Hence, without them, there is no visual art.[17] One strategy towards defining visual art, is precisely to look for the 'common denominator' that unifies all of these objects (e.g. Dissanayake 1992:41). But whereas many researchers search for this common feature in the artworks' contents or function, I suggest to focus first in their form, that is in their material aspects, and only secondarily in their content.

It is the case that art studies in archaeology often address the meanings of artworks and the relations between them, but not the artwrorks as archaeological materials in themselves (Boivin 2009:271; Conkey 2006:357). For this reason, few archaeological models have accounted for the development and change of visual art forms, e.g. questions such as why art media seem to diversify over time, or why personal ornaments predominate in the earliest stages. As archaeologist Randall White has pointed out, material culture is a

14 In strict sense, a definition should say what something is, not what it looks like, or what it does (Mahner & Bunge 1997:100).

15 Elaborated after van Damme (2008:30). Kathryn Coe gives a comparable description of visual art, as a manner to attract attention towards something. For her, it is "the modification of an object or body through color, line, pattern, and form that is done solely to attract attention to that object or body" (2003:76).

16 Just like numbers are not 'the product' of numeral systems, but their components.

17 This marks a fundamental difference with models that suggest that the emergence of visual art is correlated with the origin of the capacity to 'store' symbols in material culture (e.g. Donald 1991; Mithen 2000a; Renfrew & Scarre 1998). Instead, it is suggested here that the symbols manifested in material culture cannot exist a priori, independently of the media, which embodies them (Ingold 1998; Malafouris 2004). Therefore, what becomes relevant is not the ability to 'express' symbols in objects, but to understand, produce and use objects as symbols.

theme that has frequently been missing from the literature on the origins of art. As a consequence, Pleistocene art studies "usually end up speculating about the process by which 'art' (almost always conceived as graphic depiction) was 'discovered', rather than illuminating the broader social, technological, and ideational contexts and processes that made complex representational systems possible, desirable, and useful" (1992:538). Indeed, by focusing on form instead of content we may be able to discern some of those contexts and processes White mentions, which have made visual art viable.

Understanding visual artworks as material culture, however, does not mean to reduce them to mere "objects to be analysed" nor to reduce "the *visual* to the *visible*" (Ingold & Lucas 2007:290-1).[18] Rather, it means to take a broad view of material culture as including not only end-products but all the steps in the processes of manufacture, use and discard, as well as the social and technical contexts that bring material culture into being (Chilton 1999:1; Gibson 2012; Ingold 2000:299; Ter Keurs 2006:6). While keeping in mind that the world of material culture is made up of subjects, agents, materials, practices, relationships, interactions, objects, and functions, among other elements, it should be acknowledged that it is the material aspect of artefacts what is central to their scientific study, particularly when archaeological remains are concerned. So it is "the materiality of physical objects that should be used as the starting point" (Ter Keurs 2006:57). Along these lines, archaeologists Olga Soffer and Margaret Conkey have rightly proposed to study Pleistocene art "as we would any category of archaeological artifacts. This involves a dual look that includes a study of the artifacts themselves as well as the context in which they were made and used" (1997:7). Following their suggestion, Pleistocene visual art refers here both to the artefacts known as artworks as well as to the practices and activities involved in art-making. Finally, by conceiving of visual art as material culture we may further understand its role and impact in human cognition and behaviour, since objects actually influence and even change their makers/users and their environments as they are produced and used (Malafouris 2008a). Neuroscientific and developmental psychology studies, for instance, are throwing light on the ways that brain, behaviour, and artefacts interact and change each other, creating a continuous feedback loop throughout an individual's lifetime (Clark 2004; Latour 2007; Malafouris 2008a).[19] In addition to

18 There has been a tendency in archaeology to 'go beyond' the material and aim at the cognitive and the symbolic aspects of artefacts. Consequently, the objects themselves are sometimes relegated to the background as merely vehicles for ideas and meanings (Ingold 2007). Nowhere is this tendency stronger than in prehistoric art studies, where it would seem that the materials always have to "mean/symbolize something" in order to be at all relevant. At the other end of the spectrum are approaches that focus only on the description of artworks as material, arranging them in archaeological categories (types, styles, phases, etc.) but do not offer anything in terms of use or context. In actuality, the cognitive, the symbolic, and the behavioural cannot be separated from the practical, the material, and the historical (Davis 1989; Ingold 2007; Ingold & Lucas 2007).

19 For instance, our brain capacity allows us to learn new skills, even as adults, (e.g. a second language, a craft, a musical instrument). The learning process, in turn, changes not only our

conceiving of visual art as material culture, I argue that visual art is a very particular kind of material culture which emerged in the context of human communication.

The subject of communication is anything but novel in visual art studies, 'art as communication' has been a recurrent theme in anthropology, archaeology, psychology and art history since the 19th century (Conkey 2006:362; Hirn 1900; Lewis-Williams 2002:67). There are, however, a great many research approaches to communication. The one that has predominated in the social disciplines is the 'informational' model, where communication is seen as "a process of sending and receiving messages or transferring information from one mind to another" (Craig 1999:125). Within this perspective, archaeology has traditionally adopted the semiotic tradition, where communication is understood in terms of the functioning and relations of sign systems, and the "problems of (re)presentation and transmission of meaning" (Craig 1999:136). For example, Leroi-Gourhan, and several scholars after him, defined visual art as a semiotic system (like a language) composed of conventional signs that can encode and transmit messages. As discussed above, the emphasis of semiotic views has been on decoding, measuring, or interpreting the information contained in visual art, again the main focus being on the art's content.

In evolutionary models, like those I will discuss in chapters 3 and 4, art is identified as a behaviour, or action pattern, that consists of making visually arresting objects or designs which give information about an individual's state, affiliation, or ideas. Therefore, these have often adopted a psychological view of communication, where it is understood as "a process in which the behavior of humans of other complex organisms expresses psychological mechanisms, states, and traits and, through interaction with the similar expressions of other individuals, produces a range of cognitive, emotional, and behavioral effects", that is, as "the process by which individuals interact and influence each other" (Craig 1999:143). Frequently, psychological/behavioural models define visual art as a 'vehicle' or medium of information or expression and work on analysing the motives and effects of art-making. Here I focus in mainly on the several *effects* that the perception of art can have.

The common element to both views is the idea that visual art is able to 'transmit', 'encode', 'store' or 'evoke' information, in other words, that visual art can serve for communication (Alland 1977:61). However, 'messaging' or 'communicating' through art has recurrently been presented either as self-evident (Lewis-Williams 2002:67), or as a function or even a secondary effect of art media, "a consequence of the nature of the marks as symbolic signs" (Davidson 2012:3). But why and how visual art communicates is something to be explained. In contrast to the approaches described above, I will argue that communication is not something that visual art *does*, but rather, that viusal art-

behaviour but also our neural anatomy (e.g. grey matter volume, hippocampus size), which again releases new learning potential (Mithen & Parsons 2008).

making *is* a communicative operation in itself. So, studying communication interactions should be central to explaining visual art.

Furthermore, the traditional semiotic and psychological perspectives are based on a view of communication as 'transmission of information', but such a view may fall short because its description of communication is incomplete (Croft 2000:87). A more comprehensive description of communication includes the act of signalling (emitting information), signal reception (receiving information), and the signal's effect (response) (Scott-Phillips 2008:388). Furthermore, the purpose of communication is not exchanging information for its own sake, but with the purpose of coordinating behaviour between the signalling agents (i.e. guide decision-making regarding how to behave in a situation). That is, communication is a process that ultimately influences and guides the behaviour of the organisms involved in the communicative interaction (Maturana 1980). Therefore, it may be fruitful to switch the focus from the unidirectional action of information transmission to the signal-response dynamic between agents. To be sure, communicating is never a passive operation, as Martin Mahner and Mario Bunge make clear (1997:65):

> To understand communication we must realize that exchanging 'information' is not like trading goods, but is interacting with another animal (directly or via artifacts) in such a way that each party elicits certain learning processes in each other's brain. In other words, successful communication consists in the *construction or (re)creation* of similar processes in the brains of the animals involved in the interaction.

Another reason that an information-centred view of communication proves insufficient is that information is only a unit of analysis or description but not a real entity (Bunge 2010:67; Mahner & Bunge 1997:339), i.e. it does not exist a priori or independently of a signal (or sign), but only comes into being as the content of a signal. In this sense, information may be said to be an emergent feature of the communication process (Scott-Phillips 2008:392).[20] The structure of communication systems is constituted not by signs and information nor 'information and brains' (Pinker 2010:8995) but by interacting agents and signals, i.e. by organisms in an environment who exchange signals of one or more kinds – visual, acoustic, chemical, etc. (Bunge 1998:346, 2003:67). So, only

20 Here a further distinction should be made, between sign and signal. A sign is a real material artefact (human-made, conventional, and artificial) which takes on a signalling function; whereas signals are not concrete objects (things) but processes that occur in concrete objects – an individual, an artefact, or a system (Bunge 1998:346). In other words, signals "are the stuff of purposive communication", and signs "are the raw material of signals" (Gambetta 2009:170). Hence, signs – and the information they convey only emerge through the process of signalling itself (Bunge 1997:419; Noble & Davidson 1996:115; Scott-Phillips 2008:392).

by looking at signals and signalling agents (real ontological entities) will we understand how information is produced and what for.[21]

Communication is a widespread process in the biological world (Endler 1993). All animal species have evolved ways of communicating with conspecifics, from the chemical pheromone signals produced by ants, to the complex songs of whales, to human speech. So, a comparative approach might be able to throw some light on the evolution of biological communication systems in general, and of primate and human communication in particular.

So far, I have argued that visual art-making is a communicative operation, but more than that, I argue that visual art *is* a communication signal. Signals are typified as any stimulus (act or structure) that conveys information to organisms and affects their behaviour. Accordingly, I will define visual art is a signalling system displayed in material culture or, as anthropologist Martin Wobst once put it, signalling in artefact mode (1977:326). In chapter 6, I will discuss the evolution of communication signals, and show that visual art complies with the same characteristics, and thus should be redefined as a signal.

Summarizing, I have proposed that visual artworks are not only 'carriers of information', but also human-made artefacts, and as such they should be approached for their study as any other instance of human material culture, or technology. This means explaining how people conceive or perceive artworks, as well as how they make them, what their production entails, what roles they play in their social contexts, and what effects they have on human behaviour. Also I have championed visual art as an instance of communication, where the latter is understood as the operation of signalling and response with the purpose of coordinating behaviour between organisms. Finally, I have suggested that evolutionary perspectives of visual art – be it in archaeology, psychology, or biology – should focus not only on the contents or effects of visual art, but also on the forms of visual art, how these developed, and the role they have played in human communication. As I have discussed, throughout the research history of Pleistocene art and its origins, most scholars have focused on recovering or interpreting the messages coded in artworks (content) but, as explained above, signs and information do not constitute the core structure of a communication system, so these elements can hardly explain how such a system emerges and develops. By shifting the focus towards interacting humans in a social environment and the relevant signals that guide their behaviour (form) we can aim to understand and explain how the communication system that we identify as visual art might have originated, and by looking at research on the evolution of (biological) communication we may obtain clues as to the mechanisms and potential selection pressures that may have shaped visual art behaviour.

21 A further problem of informationist views is that the term 'information' itself has at least half a dozen different meanings in the scientific literature: as meaning, signal, message, quantity of order, knowledge, and communication (Mahner & Bunge 1997:280), often rendering it ambiguous.

Whereas communication offers a promising approach for understanding the emergence of visual art in particular, we also need a more general framework that will help us explain the evolution of modern human behaviour, cognition, and culture. In the following section, I suggest that cooperation may serve that purpose.

1.3 Cooperation as an explanatory framework of human evolution

To address the problem of the origins of visual art implies asking when and why humans started systematically engaging in visual art-making. The first issue (when) is addressed by archaeology and the material record, the second (why), by evolutionary studies of human cognition and behaviour. Therefore, a working model of the origins of visual art should integrate data from both. An evolutionary model of visual art should further aim to account for the emergence and retention of visual art practices in human phylogeny. Evolution is understood here as a general process that involves *qualitative* change that "consists in the emergence of things of a new kind" (Mahner & Bunge 1997:311). Evolution, then, may occur in all sorts of systems: biological, cultural, semiotic, cosmic, etc. so far as they present transformations that give rise to new ontological levels or kinds. An evolutionary approach would then be concerned with describing the processes of stasis and change in an evolving system of any sort (Eldredge 1989). In this case, an evolutionary model of the origins of visual art as communication should deal both with the emergence of visual art as a new kind of signalling system, and the emergence of novel forms of visual art, as well as with the processes that potentially influenced these developments. The latter requires a general explanatory framework of human evolution.

Studies on the evolution of human cognition and behaviour seem to be now at a turn. Because Darwin's theory of evolution is based on the principles of the struggle for existence and the differential survival of fitter individuals, competition and self-interest have been continuously championed as key evolutionary forces, and the main motivations for people's actions (Dawkings 1989:18). Even in cooperation studies the "emphasis on individual advantage" has been a guiding principle of research (Axelrod & Hamilton 1981:1396). At the moment, however, there is a growing awareness that "individual-based 'selfish-gene' perspectives are insufficient to effectively model human evolution" (Fuentes 2004:711), and that cooperation may offer a better framework for understanding many aspects of human cognition and behaviour.

Whereas all primates are intensely competitive, "in addition to competing with others (and coordinating with others generally, like all social animals), humans evolved skills and motivations for collaborating with one another in activities involving shared goals and joint intentions/attention" (Tomasello et al. 2005:687). Indeed, humans are the most cooperative primate, living in social

groups structured by unique forms of social cooperation (Moll & Tomasello 2007). For instance, by distributing communal tasks among the members of the community (i.e. social division of labour), humans achieve high subsistence productivity. Specific units take on most foraging activities and the returns are shared with the entire group. The manufacture of tools and implements is also a social enterprise, from sharing the knowledge about the manufacturing process to putting them into practice. Even bringing up children is taken on communally; in this strategy, called 'alloparenting', group members other than the parents are actively involved in the care and provisioning of the human infant (Burkart et al. 2009; Hawkes et al. 2000; Hrdy 2009). At the individual level, cooperation is also embedded in human psychology. Prosocial behaviour and cooperative action appear spontaneously in humans from an early age: young children are keen on offering help and requesting it, and enthusiastically take on cooperative activities (Moll & Tomasello 2007). These types of behaviours involve what has been called shared intentionality, which is the ability to envision and work together towards common goals and ideas. It then seems that "human beings have evolved some specialized social-cognitive skills (beyond those of primates in general) for living and exchanging knowledge in cultural groups: communicating with others, learning from others, and 'reading the mind' of others in especially complex ways" (Hermann et al. 2007:1365). In fact, according to cognitive psychologist Michael Tomasello and his coworkers, it is this "special kind of shared motivation in truly collaborative activities in the form of a shared goal" that differentiates "human collaboration and intentional communication from the social interactions of other primate species" (Tomasello et al. 2005:680). That is, the ways human cooperate, and the socio-cognitive skills involved, is what qualitatively distinguishes human and ape cognition, and is both the source and the fuel of human culture (Tomasello & Hermann 2010).[22]

Since humans are so highly cooperative, it is reasonable to suggest that many of the unique characteristics of human behaviour may be explained by the effects of cooperative behaviour and shared intentionality. Human cooperation strategies can then potentially account for much of human communication, cognition and culture (Moll & Tomasello 2007:646; Tomasello 2008:217). In fact, cooperation underlies much of human communication, to such an extent that

22 Michael Tomasello and colleagues have dubbed this perspective the 'cultural intelligence hypothesis' (Hermann et al. 20007; Tomasello & Hermann 2010), or 'Vygotskian intelligence hypothesis' (Moll & Tomasello 2007), because it proposes that "what most clearly distinguishes human cognition from that of other primates ... is their adaptations for functioning in cultural groups" (Tomasello & Hermann 2010:7), as suggested by Vygotsky. This hypothesis prioritizes human interaction (particularly cooperation) as the main driver in the evolution of human cognition, comunication and culture (Moll & Tomasello 2007:639). Primatologists Carel van Schaik and Judith Brukart, however, have suggested that this hypothesis may be expanded to encompass social animals, and minimally primate cognition as well. In this broader perspective, the hypothesis states that, not only humans, but all "species with frequent opportunities for social learning should more readily respond to selection for a greater number of learned skills" (2011:1008).

the latter may be understood as a cooperative behaviour itself (Tomasello 2008; Tomasello & Hermann 2010). If, as suggested above, visual art is an instance of human communication, then the pressures of cooperative behaviour must have shaped it, too. On this basis, in chapter 6 I will argue that the study of human cooperation can throw light on the early emergence and use of visual art.

Many of the defining behavioural traits of our species mentioned above in turn, coevolved with the hunting and gathering way of life (Kaplan et al. 2007:64). It seems that, social foraging and the social division of labour not only rendered greater returns for Pleistocene humans but also promoted collective work, group food sharing and communal child-rearing, which offered increased opportunities for social learning, communication and, ultimately, complex cognition (van Schaik & Burkart 2011). Currently, cooperative interactions are then being reassessed as crucial for understanding human evolution, especially as key selective pressures in the evolution of communication (Buckley & Steele 2002; Croft 2000; Fitch 2010; Gärdenfors 2004; Godfrey-Smith 2013; Tomasello 2008), and cognition (Dunbar 1998; Fuentes 2004; Pinker 2010; Whiten & Erdal 2012).

The emerging view is one of a human niche shaped by the coevolution of cooperation, cognition, communication, and culture (Burkart et al. 2009; Shea 2011; Sterelny 2011; Tomasello et al. 2012; Withen & Erdal 2012), something that had been suggested since Darwin's time. For example in his writings on human evolution, philosopher Friedrich Engels ([1876]2012) emphasized "the special feature of the human niche being productive labor and cooperation, which channelled the evolution of hand and brain" (Levins & Lewontin 1985:253).[23] Following Engels, the pioneering developmental psychologist Lev

23 Engels's model of cooperative labour as key to hominin evolution, elaborated in his 1876 essay "The part played by labour in the transition from ape to man" ([1876]2012), has proven quite insightful for its time (Trigger 1967). It anticipated the central tenets of leading hypotheses in current evolutionary anthropology, like the correlation between sociality, cognition, and language – as suggested by the 'social brain hypothesis' (Aiello & Dunbar 1993), and the 'cultural intelligence hypothesis' (Hermann et al. 2007) – and the coevolution of diet, brain and life history – as proposed by the 'expensive tissue hypothesis' (Aiello & Wheeler 1995), and the 'embodied capital hypothesis' (Kaplan et al. 2003). On the former, Engels states: "The development of labour necessarily helped to bring the members of society closer together by increasing cases of mutual support and joint activity, and by making clear the advantage of this joint activity to each individual. In short, men in the making arrived at the point where they had something to say to each other [...] The reaction on labour and speech of the development of the brain and its attendant senses, of the increasing clarity of consciousness, power of abstraction and of conclusion, gave both labour and speech an ever-renewed impulse to further development" ([1876]2012:175-6). On the latter, he says: "A meat diet contained in an almost ready state the most essential ingredients required by the organism for its metabolism. By shortening the time required for digestion, it also shortened the other vegetative bodily processes [...] The meat diet, however, had its greatest effect on the brain, which now received a far richer flow of the materials necessary for its nourishment and development, and which, therefore, could develop more rapidly and perfectly from generation to generation" ([1876]2012:178). Unfortunately, Engels has suffered from 'guilt by association' and his thoughts on human evolution have often been overlooked. However, in view of its explanatory and predictive

Vygotsky (1971, [1930]1978, 1986) proposed that human cognition was the result of the history of human interactions, which are fundamentally cooperative (c.f. Moll & Tomasello 2007). More recently, prehistorian and palaeoanthropologist Glynn Isaac suggested that the characteristic traits of hominins evolved in an "adaptive complex" based on reciprocity (that included food-sharing, the division of labour, and a home base), and he advanced that "we ought to think of an inseparable set of distinctive behaviors which reinforced each other and which were jointly intensified through the action of natural selection without any one factor being an isolated prime mover" (1978:320). This is precisely what topical scenarios of a coevolved human niche emphasize, that there is no 'smoking gun' in the evolution of the human modern mind, behaviour and culture, but that the various elements that constitute them evolved together influencing and shaping each other along the way, so that 'what makes us human' is seen not a single special feature, but a "a whole cluster of systems of interacting abilities" (Bunge 2010:197).

Besides recognizing the impact of social interaction and of (material) culture in human evolution, this 'new thinking' likewise acknowledges that, as Vygotsky suggested, human cognition and behaviour are the result of our specific phylogenetic and ontogenetic histories. The implication being that, these are not atemporal, fixed traits but have been and are in continuous flux. Such perspective has the potential of offering a fruitful framework for advancing research in human evolution, as recently noted by psychologist Louise Barrett and colleagues (2012:2108-9):

> The inclusion of sociocultural and historical processes into our consideration of cognitive evolution is made more productive, we would argue, if we adopt a theoretical framework that recognizes the 'mutuality' of organism and environment: the idea that they are interdependent, forming mutually reinforcing feedback loops, so that each can only be fully understood in terms of the other.
>
> One way forward, then, is to take a step back, and return to those thinkers who emphasized the mutuality of organism and environment in just this way; people such as John Dewey, George Herbert Mead, Jakob von Uexküll, Lev Vygotsky and James Gibson.

In sum, what all these views have in common is that they emphasize the processes and properties of individual development and interaction with the social and natural environments (e.g. epigenesis, self-regulation, feedback, plasticity, emergence of behaviour in ontogeny, etc.), which have often been overlooked by evolutionary frameworks (Jablonka & Lamb 2005:303) since the time of Darwin, as lamented by Engels ([1876]2012:180):

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power (Woolfson 1982), Engels's labour model deserves to be acknowledged and reconsidered as an important contribution to human evolutionary theory.

> In nature nothing takes place in isolation. Everything affects and is affected by every other thing and it is mostly because this manifold motion and interaction is forgotten that our natural scientists are prevented from gaining a clear insight into the simplest things.

The present book also seeks to situate the study of the origins of visual art within this framework of a cultural historical cognition, and a human niche shaped by cooperative interactions.