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

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ART IN THE MAKING

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Cover design: Coördesign, Leiden
Cover illustration: Tom Gauld

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The Evolutionary Origins of Visual Art as a Communication Signal

Proefschrift

ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van Rector Magnificus prof. mr. C.J.J.M. Stolker
volgens besluit van het College voor Promoties
te verdedigen op 10 september 2014
klokke 13:45

door

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geboren te Mexico Stad
in 1977

PROMOTIECOMMISSIE

Promotoren
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Printing of this book was financially supported by the Leiden University Centre for the Arts in Society (LUCAS).

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PREFACE

Art never ceases to inform, never ceases to please, never ceases to stimulate, never loses something of a magical efficacy.

YRJÖ HIRN, 1900

Visual art is all around us. Not only in museums, galleries, and books, but also in our homes, in our places of work and of worship, in urban landscapes and virtual spaces, and even on our clothes and on our bodies. Most people probably take it for granted that visual art has been around since the dawn of our species, but has it? The material remains left by the earliest of humans indicate that most likely this is not the case. Visual art, then, must have a traceable 'origin' and history of development. How to reconstruct the beginnings and unfolding of visual art over the course of human evolution is a topic that has concerned scholars of various disciplines for many decades. It is also the central theme of this book.

In the research presented in the pages that follow, I look at different ways in which art scholars, archaeologists, and researchers of human evolution have approached the problem of explaining the origins of visual art, ever since Charles Darwin first pondered about the role of nature/biology in the foundation of the human "sense of beauty" and the universal "passion for ornament" observed across all cultures and historical periods ([1879]2004:640). I compare these views with the evidence of early visual art forms in the archaeology of the Pleistocene period, and show that there is a clear gap between current hypotheses on the emergence of visual art and the material record.

This gap, I suggest, may be bridged by understanding visual art in the general framework of the study of biological communication and by conceiving of visual art as a material signal that displays identity, as has often been suggested by archaeologists and anthropologists in the past (e.g. Coe 2003; Conkey 1978; Kuhn & Stiner 2007a; Wiessner 1983; White 1992; Wobst 1977). Furthermore, by looking at other changes in the archaeological record, related for example to social organisation, demography, and resource acquisition strategies, it should be possible to suggest a scenario that explains why possibly Pleistocene humans would have required and effectively adopted visual art as a signal. The proposal presented in the last chapter of this book, in this manner, emphasizes the social role of visual art in the context of human cooperative behaviour as key to its development.

As an archaeologist by training, I rely on the available material evidence to interpret the events of the past. Thus, I choose to follow a bottom-up analytical method that starts from the material artwork itself, examines it and its context, and formulates a testable explanation. This approach to explaining the production of visual art, originally suggested by Vygotsky (1971:24), is not

satisfied with enquiring about the aesthetic emotions and motives of either the artist or the audience. Instead, it sees the art researcher rather like a judge in a criminal court, who must follow the material evidence and compare the various statements against the data to come up with a coherent explanation of the available facts. Along these lines, my argument is that if we are to achieve a relatively reliable account of the evolution of visual art, research should focus not only on the content and interpretation of Pleistocene artworks, but also on the forms and media that make them up and how these changed and diversified over time.

This book consists of six chapters, the first of which offers a general overview of the research history and main issues and challenges of studying the origins of visual art. It explores the differences between the terms and definitions of prehistoric art and Pleistocene art, which will be preferred here. It also describes different perspectives to the origins of visual art, with a special emphasis on archaeological and evolutionary views. It also gives a synopsis of the way the evolution of human cognition and behaviour are perceived in this research.

Chapter 2 presents a survey of the earliest traces of visual art forms in the Pleistocene, while it also deals with the problems of defining and identifying visual art, particularly from the remote past. It zooms in on two particular periods where novel forms of visual art seem to have developed: the mid-African Middle Stone Age and the European Early Upper Palaeolithic. The aim is to identify certain emerging patterns in the archaeological record of early visual art.

In chapters 3, 4 and 5, respectively, one particular origins of art model is discussed in depth. These proposals, correspondingly by Geoffrey Miller, Ellen Dissanayake and Steven Mithen, are representative of three ways of conceiving of visual art in an evolutionary perspective. These approaches have been most influential over the past two decades but have not yet been reassessed in view of recent archaeological finds that have significantly pushed back the dates of visual art's beginnings. In each case I present the model's key concepts, carry out a critical review in light of our present knowledge of human biocultural evolution, and check for consistency with the current archaeological evidence. I find that even though these three proposals make an accurate description of certain effects and developments of early visual art forms, overall there is a mismatch between the hypotheses and archaeological data.

Subsequently, in chapter 6 I sketch an alternative scenario based on the premise that visual art is a social communication strategy that uses material culture as a medium to signal identity to coordinate action between individuals and groups. This perspective, I suggest, is more compatible with current archaeological information about the development of visual art in the Pleistocene, and is also capable of integrating several aspects of the previous three models, in particular regarding the proposed social functions of visual art.

Ultimately, the aim of this book is to restate a link between the formulation of hypotheses on the origins of visual art and the evidence from the archaeological record, which is often taken too lightly even though it is our most reliable source for inferring the evolution of human behaviour. To be sure, the debate around the evolution of visual art would benefit greatly from the production of testable scenarios that could be potentially falsified and corrected as new data comes to light. In this sense, my purpose is not to do away with existing origins-of-art models, but to identify which of their aspects do in fact describe and explain what we see as the development of visual art in the early history of our species. Moreover, I suggest that these models may become complementary when seen in the greater scope of human communication. Therefore, a communication framework offers, on the one hand, a way to generate alternative models, and to rethink and synthesize existing proposals in a new light, on the other.

This research, in sum, is a contribution to the on-going interdisciplinary debate about the origins of visual art. But more than that, it also is an invitation to reflect on the ways in which current scholarship perceives and explains the evolution of human cognition and behaviour, and to reconcile these with the material record of fossils and artefacts that constitute the pages of our species' early history.

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.

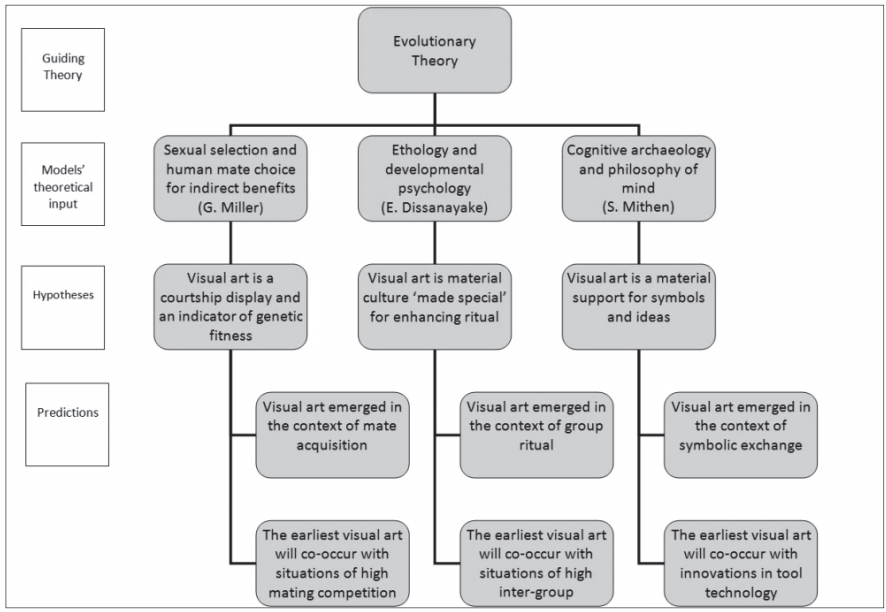

Figure 1. *Theoretical structure of the origins-of-art models examined in chapters 3, 4 & 5, respectively.*

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.

2. FROM THE CRADLE TO THE CAVE: A SURVEY OF PLEISTOCENE VISUAL ART

Art-historicity and its prehistoricity are interpenetrating and variable phenomena, historical in themselves. They are never wholly present in but never wholly absent from an actual individual artwork. Thus it might be a mistake – and a major source of the apparent insolubility of the question of art's origins – to look for a beginning in actual individual artworks, chronologically prehistoric or otherwise. A 'Figure 1' which could actually be dug up and exhibited will never be found.

WHITNEY DAVIS, 1993

The way scholars envision the art from early prehistory has been profoundly transformed over the past few decades. Once a term reserved exclusively for the enticing images of Europe's Palaeolithic cave paintings, prehistoric art now includes engraved patterns before regarded as simple 'doodles', and items such as beads and pendants, previously relegated to the category of trinkets for 'mere' decoration (Moro & González 2010:238). More importantly, recent finds have now demonstrated without a doubt that visual art did not emerge in a single sudden event, and that its different forms did not appear simultaneously. Rather, as I will review in the present chapter, visual art has developed over a long time, and has generated a great formal diversity – some of which has unquestionably been lost through the ages. There is a growing corpus of archaeological remains that constitute what is here referred to as 'the Pleistocene record of visual art', which includes objects such as beads, pendants, incised and engraved designs on various media, figurines, sculptures, reliefs, carvings, and painted motifs (usually on rock). Those art forms that are now irretrievable must have included more ephemeral sorts (body painting, designs on sand or earth) as well as applications on perishable materials (wood, hides, bark, feathers, fur, textiles, basketry, hair, and the human body).[24]

I must point out that the following survey is based on an extensive review of secondary literature. I personally have not carried out an analysis of the sites and materials that will be discussed so, I rely on the work, interpretations and opinions of the cited scholars. For this reason, the survey is constrained to instances which, to my present knowledge, have been preserved, identified, recovered, made public, and accepted by (the majority of) the archaeological community as of Pleistocene age. Chronologically, the survey spans the latter part of the Pleistocene era from 130,000 to 25,000 years before present (BP),

24 For instance, sand painting is still a well-known practice among Australian aboriginals, and the 19th century explorer James Bonwick reported that Tasmanians frequently created drawings "on a tree" (1870:47). Similar practices must have existed worldwide.

and leads from the cradle of our species, the African continent, to the painted caves of Ice Age Europe.

As discussed before, a general description of visual artworks comprises objects or patterns made, modified, and displayed to engage attention through the manipulation of visual qualities like colour, shape, texture, brightness, etc. The following survey offers a general overview of the earliest examples of such objects from the Pleistocene, which may be compressed in five categories: 1) ochre use – presumably for body painting and other applications, 2) personal ornaments, 3) incised objects, 4) carved figures, and 5) painting. The classification somewhat reflects the chronological sequence in which the various art forms appear in the record, and to some extent correlates with an increase in technical and organisational complexity.

The forms of Pleistocene visual art that will be reviewed are in themselves quite diverse, span large regions and time periods, and are found in various types of settings – isolated finds, habitation sites, ritual spaces, etc. Due to this diversity, 'one-size-fits-all' explanations of Pleistocene art have become suspect, particularly those which aim at a universal interpretation of content, motivation, 'meaning', or unilinear stylistic development (Nowell 2006:244). As I discussed in the previous chapter, a more productive approach might be to study Pleistocene visual art not only as a semiotic system, but first and foremost, as a class of human material culture (Ingold 1993:344). This is not to say that the semiotic aspect of visual art is irrelevant, but it is clear that at the moment our finest attempts to 'recover' its past meaning constitute educated guesses, at best, and more often than not, mere speculations. In contrast, by situating the emergence and development of artworks in the broader spectrum of the Pleistocene archaeological record, we may be able to formulate inferences about the circumstances under which this art was created and/or used, even if we remain unable to access its original meaning or intention.

The aim of the present chapter is, then, not to give a detailed review of the whole of the archaeological record of visual art in the Pleistocene, nor to reassess the evidence, or discuss interpretations of meaning or content.[25] Rather, the purpose is to identify probable chronological and cultural patterns of occurrence and change in the visual art forms that, seen in the light of the archaeological record, might point towards the circumstances in which visual art behaviour flourished as a human practice. With this objective in mind, I will focus particularly on two moments that are often referred to as 'bursts' of high human creativity, during which novel technologies and behaviours arose, including various forms of visual arts (McBrearty & Brooks 2000). The first is situated in the mid part of the African Middle Stone Age (MSA) between 130 and 70,000 years before present, and the second, in the European Early Upper

25 For thorough reviews of the Pleistocene record of visual art, see: Bahn & Vertut (1997); Cook (2013); D'Errico et al. (2003); D'Errico & Henshilwood (2011); McBrearty & Brooks (2000); Rau et al. (2009); White (2003); Zilhão (2007).

Palaeolithic (EUP) between 45 and 25,000 years before present. Note that the attention lies on the archaeological record of our species, *Homo sapiens*,[26] which as far as we can say with any certainty has been the only systematic producer of visual artworks.[27] In the following chapters, this survey will also provide the yardstick with which to assess origins-of-art models, and will be used to test specific predictions from those models.

2.1 Archaeological periods in focus: The MSA and EUP

One of the goals of this survey, as mentioned above, is to provide a general overview of the circumstances in which visual art first emerged and of its major developments during the Late Pleistocene period, so that it can be contrasted against existing hypotheses about the origins of art. Therefore, it concentrates on the two periods that, according to current data, encompass the earliest occurrences of visual art: the African Middle Stone Age (MSA), which spans from 280 to 30,000 years before present (BP), and the European Upper Palaeolithic (UP), which roughly dates from 45 to 12,000 BP.[28] Within these extensive periods, I will further zoom in on two moments which, according to archaeologists, involved a number of behavioural innovations in diet, technology, social organisation, and culture, including the appearance of new art forms: the MSA between 130-70,000 BP, and the European Early Upper Palaeolithic (EUP) between 45-25,000 BP.

During the periods of our interest, several hominin species still inhabited the Old World. The exact number of hominin species that have existed since the split between *Homo* and *Pan* (chimpanzees and bonobos) is still unknown, but estimates range between 8 and 27 (Bokma et al. 2012). It is also unclear how many of them co-existed at any one time,[29] but multiple lineages must have lived side by side perhaps for long periods (Endicott et al. 2010; Tattersall 2009). The complex picture of the evolutionary relations between these hominin sorts

26 Following the phylogenetic species concept, a species is understood as a lineage of organisms, distinguished from other lineages by its evolutionary trajectory, bound in time by its origin in a speciation event and its eventual disappearance by further speciation or extinction (Sterelny & Griffiths 1999:193). Seen in this light, Neanderthals, other extinct hominins – like the recently discovered Denisovans –, and *Homo sapiens* are considered separate species (Stringer 2012:36). This means that whether these other human groups were absorbed by modern African populations or died out, they constitute separate lineages by virtue of their own particular evolutionary path, which diverged from ours for at least 400,000 years, since the split from a last common ancestor (Hublin 2013). Therefore, 'our species' means here all individuals classified as *H. sapiens*, from the 200,000 year-old Omo fossils to contemporary populations (aka modern humans).

27 Alternatively, it is the only hominin whose visual artworks have left a distinguishable trace in the archaeological record.

28 Henceforth, BP: years Before Present.

29 Evolutionary biologist Folmer Bokma and colleagues report: "Allometric analyses of mammal families of similar size and weight as humans also suggested a low number of hominin species simultaneously in existence. Similar to these studies, we calculated that it is highly unlikely that there ever simultaneously existed more than 5 hominin species" (2012:2973).

is frequently being revised according to new fossil and genetic data (Carrión et al. 2011; Johanson & Wong 2009:253).[30] At the moment, we know of at least four extinct hominins that at some point co-existed with modern humans during the Late Pleistocene: *H. helmei/heildelbergensis* in Africa, Neanderthals in Europe and the Middle East, Denisovans in Asia, and *H. floresiensis* in Indonesia (Endicott 2010; Reich et al. 2010; Stringer 2012).[31]

Regarding the emergence of our own species, *Homo sapiens*, the earliest fossil specimens that may be classified as such are the remains found at the site of Omo Kibish, in the Omo River Valley in Ethiopia, dated to around 195,000 years ago. These are followed by the cranial remains of the Herto Bouri site, also in Ethiopia, which have been assigned an age of 150,000 years (Trinkaus 2005:209; White et al. 2003). These fossils, alongside genetic evidence which indicates that all living human populations share a common African female ancestor (Olson 2002; Stringer 2011), indicate that our species likely emerged in that continent some 200,000 years ago.

The coexistence of various human sorts is potentially problematic for Pleistocene archaeology, as it is sometimes difficult to attribute material remains to a particular hominin population. However, as I discuss elsewhere in this chapter, so far the evidence suggests that only *Homo sapiens* recurrently and consistently engaged in visual art-making. It is for this reason that every description, table or list of traits that aims at showing the differences between the archaeological signatures of extinct hominins and modern humans features visual art as a key – if not *the* key – element that distinguishes 'us' in the archaeological record (Wadley 2001:203).[32]

30 See: Bonde (2012); Stringer (2002, 2011); Trinkaus (2005); Reynolds & Gallagher (2012), and papers within.

31 Just over the past decade, researchers have discovered the last two hominin sorts. In 2004, scientists exploring the Liang Bua Cave on the island of Flores, in the Indonesian archipelago, discovered the bones of a tiny human of about a metre tall. Officially called *Homo floresiensis*, and popularly known as 'The Hobbit', this species lived as recently as 18,000 years ago and is thought to be a direct descendant of an archaic population of Asian *H. erectus* (Brown et al. 2004). In 2010, another hominin came to light, as a research team extracted DNA from a finger bone and a tooth of 40,000 years of age found at the site of Denisova Cave, in the Russian Altai Mountains. When the genetic sequencing was completed, to the everyone's surprise, it did not correspond with either the *sapiens* or Neanderthal genomes, but represented a new as yet unknown hominin type (Krause et al. 2010). The now called 'Denisovan' hominins are thought to have been a local group derived from an Asian *H. heidelbergensis* population. Whereas *H. floresiensis* seems to be a unique island species remotely related to modern humans, we share a more recent common ancestor with Neanderthals and Deninovans – *H. heidelbergensis* – from which the African and Eurasian lineages split some half a million years ago (Endicott 2010:93). To make matters more intricate, it now seems that some amount of interbreeding might have taken place between *Homo sapiens* and extinct hominin groups, as traces of their 'archaic' DNA is found in the genetic composition of living humans. Sub-Saharan African populations show genetic markers of 'archaic' African humans. Eurasian and American groups have been found to possess some Neanderthal genetic remnants, and traces of Denisovan genes are present among Australasian peoples (Stringer 2012).

32 See, for example: Bar-Yosef (2002:367); Gilman (1984:116); Henshilwood & Marean (2003:628); McBrearty & Brooks (2000:492); Mellars (1996:397); Roebroeks (2008:919).

The African Middle Stone Age (MSA)

The African Middle Stone Age, or MSA for short, is an extremely important archaeological period since it comprises the emergence of our species, *Homo sapiens*, and its expansion out of Africa (Trinkhaus 2005). Although imprecisely defined, the MSA denotes a set of African archaeological industries south of the Sahara that belong to the long period between 280 and 30,000 years BP (Clark 1988; Jacobs et al. 2008). The lithic industries of the MSA represent a transition from the Earlier Stone Age and its 'Acheulean' type tools like handaxes and cleavers produced from large flakes or cores, towards more sophisticated production techniques involving prepared cores, the use of flakes and blades as tool blanks, and retouching as a method for shaping or sharpening tools (Barham & Mitchell 2008:17). These new variety of stonetool technologies indicate general changes in hominin cognition and behaviour related, for example, to innovations in diet, resource acquisition, and social organisation.

Although, as mentioned, several hominin species coexisted in Africa during the MSA, a few well-studied sites seem to reveal the 'archaeological signal' of modern humans (*H. sapiens*), meaning that the activities that can be inferred from them resemble the sorts of practices observed among historical hunter-gatherer groups, such as the San Bushmen of the Kalahari Desert (Deacon 1992). Several of these sites are found near the coast of South Africa (Howiesons Poort, Diepkloof, Klasies River Mouth, Border Cave, Sibudu, and Blombos Cave), and some include very early traces of artistic behaviour (see section 2.3), which indicates that humans, modern in both anatomy and behaviour, were present in those locations (Henshilwood & Dubreuil 2011). These sites, whose dates span from before 100,000 and up to 60,000 years BP, include several novelties regarding lithic technology, the use of space, diet, and symbolism (Wadley 2001). Even the adoption of clothing can potentially be traced back to this period (Gilligan 2010; Toups et al. 2011). Naturally, the degree of innovation is neither constant nor homogeneous throughout the different sites, however, its significance and recurrence is sufficient to point towards the emergence of a recognizably modern hunter-gatherer way of life. Although the dates from these sites cannot be transferred to the whole of Africa (Soriano et al. 2007), they minimally indicate what was happening in some regions of that continent at the time. Furthermore, an increasing number of sites from North Africa seem to be corroborating the emergence of a pattern of modern human activity by 100,000 years BP (Balter 2011; Vanhaeren et al. 2006).

Although sufficient palaeoenvironmental data for the complete African MSA is still scarce, the existing information suggests that environmental factors may somehow be correlated with the appearance of the various changes in hominin behaviour mentioned above. Our period of interest within the MSA falls into a

climatic phase called Marine Isotope Stage 5 (MIS 5, 127-70,000 BP)[33]. This period is itself subdivided in five stages in which conditions kept changing from warm and wet to cold and dry (Barham & Mitchell 2008:239-40; Borroughs 2009:82-3).[34] The period previous to MIS 5, from 135-127,000 BP was one of very arid conditions, which may have driven human populations to occupy wetter regions, for instance along the coastal margins (Barham & Mitchell 2008:238). The beginning of MIS 5 constitutes an interglacial period (MIS 5e 127-116,000 BP), during which conditions were much like they are today. This was followed by a period of increased aridity (MIS 5d 116-105,000 BP). The next phase, MIS 5c (105-94,000 BP), was a warmer period, followed by a colder and dryer phase (MIS 5b 94-84,000 BP), and again by a warm period in MIS 5a (84-70,000 BP). After that, there was a general decline in temperature that can perhaps be attributed to the eruption of the Toba 'supervolcano' in Indonesia (Borroughs 2009:84-5). The eruption took place somewhere between 73,500 and 71,000 BP and brought about extremely dry conditions that had a great impact on African human populations, which may have been reduced almost to extinction (Ambrose 1998b; Barham & Mitchell 2008:262).

In brief, the environment of the human populations that produced the earliest traces of visual art in Late Pleistocene Africa was anything but undemanding, which probably led them to develop a wide array of behavioural and cultural strategies to cope with constantly changing conditions that ultimately had important effects on cognition (Shultz et al. 2012). Among others, for example, broadening the scope of exploited foodstuffs, occupying preferably resource-rich regions, such as coastal margins, and creating social safety networks of exchange. The possibilities and implications of some of these changes for human social interaction will be explored in chapter 6.

The European Early Upper Palaeolithic (EUP)

In Europe, the Upper Palaeolithic follows the Middle Palaeolithic, which lasted from around 300,000 to 50-40,000 BP. The transition between these two periods is marked by various populational and cultural changes that are manifested in the archaeological record as novelties in technological techniques and artefact types, differences in settlement and resource exploitation patterns, and the emergence of visual art, among others (Mellars 2004).[35] Many of these changes seem to coincide with the appearance of modern human populations in this

33 The Marine Isotope Stages (MIS) or Oxygen Isotope Stages (OIS) are "the designated climatic stages in the standardised ocean-sediment records. There are 19 stages defining the principal glacial and interglacial periods since the Matuyama-Brunhes reversal of the Earth's magnetic field around 750 kya" (Borroughs 2009:319).

34 MIS 5 "Encompasses a sequence of alternating sub-stages of warmth and cold, each lasting about 10,000 years" (Barham & Mitchell 2008:239).

35 For a detailed up-to-date review of the Middle to Upper Palaeolithic transition, see: (O. Bar-Yosef 2002, 2007; Roebroeks 2008).

territory, and the (cultural or biological) demise of the native Neanderthal groups, who thrived in Eurasia during the Middle Palaeolithic. The process of 'colonization' by modern humans, who probably entered Europe from the Middle East, may have begun as early as 50,000 BP (Hublin 2012).

The Upper Palaeolithic of central and western Europe is broadly subdivided in four successive archaeological phases: Aurignacian (45-28,000 BP), Gravettian (28-23,000 BP), Solutrean (23-16,000 B), and Magdalenian (16-10,000 BP). This survey will focus mainly on the first two phases (the Early Upper Palaeolithic), and particularly on the Aurignacian, for the earliest examples of visual art in Europe go back to his period.

The Aurignacian

The term 'Aurignacian' refers to both an assemblage of archaeological traits, and a chronological unit referring to the earliest Upper Palaeolithic phase extending from ca. 45,000 BP up to 27,000 BP (Davies 2001), and as mentioned, it is usually seen "as a proxy for the first expansion of modern humans into Europe" (Hublin 2012:13471). As an archaeological complex, its origin is believed to lie in Asia, the Northern Middle East or the Levant, where it is recognized as early as 47,000 or 45,000 BP (Kozlowski & Otte 2000; Davies 2001:195; Mellars 2004:463, 2005). In Europe, its earliest manifestations date back to ca. 45,000 BP in the south and 40,000 BP, or earlier, in the Western central regions (Higham et al. 2012; Hublin 2013; Mellars 2005:19). The latter will receive special attention here, since it is there where the earliest traces of visual art are found.

Despite the advances in absolute dating techniques over the last years, setting a fixed time range for the Aurignacian in Europe has remained a highly controversial subject. This is mainly due to problems with radiocarbon dating and what archaeologists Nicholas Conard and Michael Bolus have named the "Middle Paleolithic Dating Anomaly", produced by the "fluctuations in the production and deposition of radioisotopes in various media over the period from 30-50 k calendar years ago" (2003:356), which causes radiocarbon dates to appear at least 2,000 and up to 6,000 or more years younger than their calendar age (Churchill & Smith 2000:68; Conard & Bolus 2003; Mellars 2004: 462; Gamble 1999:273). While this so-called anomaly has been a relevant subject of debate on the chronology of the Aurignacian (Verpoorte 2005; Zilhão & D'Errico 2003), new dating techniques and calibration methods for existing dating datasets seem to confirm an early start of the Aurignacian in Europe, by 50-45,000 BP (Higham et al. 2012), which also "matches what we know of the dispersal of modern humans to the east, into Asia and toward Australia" (Hublin 2012:13472).

Much research has focused on tracing this complex geographically and chronologically since, "if one assumes that modern humans produced Aurignacian artefacts, dating the earliest Aurignacian could be viewed as equivalent to dating the arrival of modern humans in Europe" (Conard et al.

2003:166). This assumption has been questioned, mainly because so far no modern human remains going back to the early dates of the Aurignacian have been found in Europe. The earliest ones come from Romania and are dated to 36-34,000 BP, but lack any archaeological association (Hublin 2013:234; Verpoorte 2005). However, no Neanderthal remains have been found with Aurignacian artefacts yet; whereas modern humans recurrently have (Churchill & Smith 2000; Hublin 2013).

Regarding the lower chronological limits of the Aurignacian, there are several sites that have now yielded dates of 40,000 BP, and older. For example, the Catalan rockshelter of Abric Romani, which has given radiocarbon (AMS) dates of 37,000 BP, and Uranium-series dates going as far back as 43,000 BP. The marked difference in results between these dating techniques is attributed to the assumption that radiocarbon ages are underestimates by several thousand years. On these grounds, other Iberian sites such as L'Abreda (c. 38,500 BP), in Cataluña, and El Castillo (c. 38,700 BP), in Santander, may also be as old as 43,000 BP (Gamble 1999:273). Another set of early dates comes from the German region of Swabia. The site of Geissenklösterle, in the Ach Valley, has long been known for its rich Aurignacian levels. Radiocarbon (AMS) results for the lower Aurignacian layers of the cave have given an age of ca. 38,000 BP; while Thermoluminescence (TL) dates from burnt silex go back even further, to 40,000 BP (Richter et al. 2000; Conard et al. 2003; Conard & Bolus 2003:353). Also, bones from the adjacent cave site of Höhlenstein-Stadel yielded dates of ca. 42-34,000 BP (Conard & Bolus 2003:342). These and a new series of radiocarbon dates now suggest that the early Aurignacian of the Swabian region may date to 43-41,000 BP (Higham et al. 2012).

All in all, the Aurignacian of Western Europe is now recognized as of indisputable modern human authorship, and seems to have had a start prior to 40,000 BP (Hublin 2013), spanning up to 29,000 BP (Bocquet-Appel & Demars 2000:552). The emerging picture suggests that modern humans arrived early into Europe from the East, perhaps following the Danube river (Conard & Bolus 2003; Higham et al. 2012), and spread stepwise through the continent, possibly absorbing indigenous Neanderthal populations (culturally and/or biologically) along the way (Hublin 2013:242).

Most known early Aurignacian sites in Western Europe seem to be clustered in three general regions or "nodes of concentration, separated by vast zones which are either empty or with a negligible population density" (Bocquet-Appel & Demars 2000:551). These clusters are found in Aquitaine, the Franco-Spanish Pyrenees area, along with Cantabria and Catalonia, and Belgium Wallone, German Swabia, the Paris basin and the South of France. Apart from these, significant Aurignacian groupings are also found in Eastern Europe. Later sites spread north and south of these regions but seem to keep approximately the same pattern of distribution throughout the whole duration of the Aurignacian

and into the Gravettian (Bocquet-Appel & Demars 2000:554). It is possible that these clusters represent early foci of modern human occupation.

Climate-wise, the conditions of the European Early Upper Palaeolithic, like those of the MSA, were also full of 'ups and downs' (Borroughs 2009:115). The period of our interest (45-25,000 BP) falls within Marine Isotope Stage 3 (MIS 3, 60-24,000 BP), a period of rapid climatic fluctuations. The relatively mild conditions at 40,000 BP were immediately followed by a cold event at 39,000 BP, and again a stage of relative warmth from 38-32,000 BP, followed by cool-warm oscillations until the continuous decline in temperature that marked the start of the Last Glacial Maximum (the coldest period of the last Ice Age) which lasted roughly from 24-16,500 BP. Although there were 'strikingly cold periods' during MIS 3, when temperatures may have been 10° to 12°C below modern values, and precipitation rates were low (Churchill & Smith 2000:70), Eurasia remained habitable (Borroughs 2009:86). In fact, the cold conditions caused an increase of grasslands, arctic steppe and tundra environments, known as the European mammoth steppe, which supported large communities of grazing herbivores such as woolly mammoth, woolly rhinoceros, reindeer, red deer, horse and bison, whose large herds constituted prime hunting game for Palaeolithic humans (Gamble 1999:280-283; Guthrie & Van Kolfschoten 2000:17). So, although conditions during the Early Upper Palaeolithic may have been harsh in terms of climate, they were not in terms of resource availability, and human population numbers remained low but stable (Bocquet-Appel & Demars 2000:551; Forster 2004:261).

In sum, compared to the relatively mild and constant climatic conditions of the Holocene, the Late Pleistocene was a period of fluctuations that undoubtedly influenced the lifestyle and behaviour of modern humans, as geologist and palaeoclimate expert John Lowe explains (2001:18):

> For the last glacial-interglacial cycle […] at least 24 abrupt oscillations, from cold stadial conditions to warm interstadial conditions (almost as warm as those of the present day) and back to cold conditions again, characterize the interval between 110 and 14 [thousand years] BP. Some of these irregular oscillations lasted only 1 to 3 [thousand years], while some of the cold-warm transitions occurred within a few decades. [These events] may have had important influences on the survival, distribution and migration of human populations.

The shifting environmental circumstances of the mid MSA and the EUP, on the one hand indicate that we cannot really speak of *a* human evolutionary environment, except as one of variability and frequent change. On the other hand, these circumstances might help explain the discontinuous mosaic-like pattern of the archaeological record of visual art, since cultural traits, like the human communities themselves, likely fluctuated according to the demands of every new shift.

2.2 Pleistocene visual art: Identification and attribution

In this section, I discuss some of the problems of identifying artworks in the archaeological record. I argue that, to a point, these issues may be avoided by adopting a more specific definition of Pleistocene visual art and a better description of the types of items and practices that constitute it.

One of the questions that preoccupies (prehistoric) visual art scholars is how to recognize an artwork as such. As philosopher of art Stephen Davies wonders, "How can we distinguish culturally significant practices in which art is absent from those in which it is present?" (2000:206). This problem is particularly pressing when dealing with artworks from the remote past because in the archaeological record – inversely to Ernst Gombrich's famous statement – there are no artists, only art. Hence, we will only be able to say anything about the development of art in the Pleistocene provided we can recognize it among other traces of past human activity. To be art, according to art philosopher Gregory Currie, it suffices that an artefact be "produced with the intention that it have aesthetic features" (2011:17); i.e. qualities that amount to 'beauty', like symmetry, balance, elegance and vivacity. Under these terms, Currie postulates that (visual) art-making may have ancient roots in the manufacture of stone tools, particularly the (often) oval-shaped cutting tools known as handaxes.[36] Whereas such a broad characterisation has the intention of allowing the inclusion of archaeological examples into the art category, it is not infallible. Firstly, it is so broad that it may well include a great deal of human material culture, from stone tools to pencils, taking us back to the original problem of how to distinguish artefacts from artworks. In second place, despite its broadness, it leaves out 'found' objects, which can be used or displayed as visual art, like in the case of seashells which often occur in the archaeological record, as the following survey will show. Thirdly, and most importantly, an aesthetic element is not sufficient to define art, as Wilfried van Damme has noted, "art is more than aesthetics, and aesthetics is more than art" (2006:154), and by the same token, the 'aesthetic' is not limited to beauty. Rather, aesthetic features include all perceptible, attention-grabbing properties, in this case all visually-arresting properties, whose effects need not necessarily be positive (i.e. beautiful, pleasing). Art philosopher Stephen Davies, for his part, has suggested that although pleasing aesthetic qualities do not exhaust (visual) art, they can

36 Handaxes are the most abundant and longest used stone tool ever made; they first occur in the Lower Palaeolithic by 1.4 million years ago and prevail up to the late Middle Palaeolithic, around 50,000 years ago (Mithen 2003). Millions of such multipurpose tools were produced over time by at least four different hominin species: *Homo ergaster*, *H. erectus*, *H. heidelbergensis* and *H. neanderthalensis* (Kohn & Mithen 1999). Handaxes are found in Africa, Europe, North Asia and the Middle East, and come in different shapes, sizes and materials, but the most distinctive ones have a symmetrical oval shape. Many of these artefacts seem to have been worked beyond functionality, which has led some scholars to think that their makers were producing them from aesthetic conventions (Currie 2011; Kohn & Mithen 1999; Lycett 2008; Mithen 2003; Zahavi & Zahavi 1997).

help us identify it minimally. That is, although the visual art of any given culture may include a variety of (non-pleasing, non-modified, non-aesthetic) items difficult to recognize as artworks, at least those which have been produced to comply with gratifying aesthetic properties will be identifiable as such to cultural outsiders (Davies 2000:209). This indeed has been a common criterion used by researchers looking for traces of art activity in the archaeological record. To a great extent, visual art is identified archaeologically by analogy to what is considered visual art in the context of the researcher (Moro & González 2010).

A second criterion often used is 'non-utilitarianism', that is, whenever researchers "cannot think of any function, other than communicative or symbolic" (Chase 1991:200) then they tend to include artefacts in the category of artistic or symbolic artefacts (D'Errico & Villa 1997:28). However, identifying with any certainty whether some item is utilitarian or not is problematic. For instance, many of the objects usually classified as beads or simply body ornaments, may well have been used as buttons or garment closures (Gilligan 2010:52), but its function would not diminish their aesthetic or art-like qualities. For many archaeologists, artworks should not only have aesthetic properties, but should also be 'symbolic', i.e. "imbued with meaning" (Henshilwood & D'Errico 2011:76; Mithen 1996a:175). But identifying symbolism in the archaeological record is just as difficult. In our "symbolic species", to paraphrase Terrence Deacon (1997), everything and anything can be immersed in symbolism. This includes not only human-made or transformed items, but also basic human necessities such as food exude symbolic references (Levins & Lewontin 1985:262). Furthermore, symbolic ability by itself might not be a good measure of artistic behaviour since our closest primate relatives, the chimpanzees and bonobos (or pigmy chimpanzees), are able to successfully learn and use, however limitedly, gestural, graphic, and language-based symbols – e.g. sign language, numerals, and lexigrams (Gillespie-Lynch et al. 2011; Heimbauer et al. 2011; Matsuzawa 2009; Tomasello & Hermann 2010). This indicates that symbolic capacity, even if incipient, might be a shared hominin trait (Shea 2011:14; Wadley 2001:20) and thus should be expected to appear at least sporadically in the archaeological record predating the emergence of our species (Henshilwood & Marean 2003:644; D'Errico & Nowell 2000:146).[37] In relation to the evolution of modern humans, what should be explained is not when the (likely ancestral) capacity to use symbols appeared, but the circumstances under which humans engaged in the systematic *production* of symbol systems and how these became incorporated into the human cultural

37 However, this does not necessarily mean that there has been a gradual and continuous development of 'symbolic thought' culminating in visual art. We should be wary of notions of 'partially', 'proto-', or 'semi-' symbolic hominins or artefacts, which are frequently discussed by archaeologists. Symbolism (or the capacity for it) is not a gradable property. As Wobst explained (1977:326), something is either symbolic or it is not, but it cannot be 'slightly' or 'halfway' symbolic. Therefore, I reject the use of terms such as 'fully symbolic' (Henshilwood & Marean 2003:644) to describe modern human behaviour.

repertoire (Donald 1991:160; Vygotsky 1992:56; Wadley 2001:205).[38] Thus, most researchers agree that visual art minimally has aesthetic and symbolic properties. Nonetheless, neither the aesthetic or symbolic characterizations are sufficient to define it, nor do they offer an answer to Davies's question of how to distinguish art from non-art.

Having defined visual art as a human communication signal, I suggest that an important criterion for identifying visual art is *display*. That is, to function as a signal visual art must be presented or 'emitted' to potential receivers. Therefore, when display may be inferred as a primary function of aesthetic or symbolic artefacts, then we may include them in the category of visual art. Furthermore, because signals are conventional and shared, visual artworks should have certain recurrence within a given context, thus repeated occurrence offers another criterion for classifying objects as visual art.

Ethnographical analogy can also be a source of information for interpreting the archaeological record of visual art. Because Pleistocene humans had an appropriation economy based on hunting and gathering, data from historical hunter-gatherer groups can help in assessing some assumptions, for instance about the context, use and production of visual art-making practices. I am well aware of the methodological and ethical issues of using ethnographical data from historical groups to interpret Pleistocene human behaviour (Conkey 1987; Inglod 1996, 1999; Myers 1988). However, ethnographical analogies are central to archaeological interpretation, which relies on the principle that "in the past as in the present, there is a correlation between behaviour and material culture that allows us to reconstruct the former from the latter", and that there "are some general patterns to the ways humans use and discard artefacts" (Gándara 1990:74, *my translation*), which in turn are much influenced by economic and social organization. So, looking at how those patterns emerge and change among historical hunter-gatherers might tell us something about how they developed among extinct ones (Kuhn & Stiner 2001b:100).

Everything considered, the three main inclusion criteria for this survey are anthropic origin, (inferred) display purpose, and repeated occurrence in the archaeological record. The first of these requirements, that the object in question show evidence of having been made, modified, or used by humans (van Damme 2008:30), is not always easy to determine in archaeological materials, especially among non-tools from early sites. However, archaeologists have developed various techniques that allow them to indicate with more precision whether an object has been purposefully handled or modified, such as experimental replication, use-wear analysis, and enhanced electronic and digital photography and microscopy. For example, some pieces believed to be

38 As ethologist Desmond Morris concluded after comparing the 'artistic' behaviour of chimpanzees and humans, "both men and apes possess a sense of design and composition although [...] it was only man the hunter whose needs led him to utilize this talent and so develop picture-making as an active part of his natural existence" (1962:148).

engraved bones from the Lower and Middle Palaeolithic, upon closer technical examination, have turned out to be of natural (e.g. vascular groves), or animal origin (e.g. predator activity) (D'Errico & Nowell 2000; D'Errico & Villa 1997). Whereas in the case of MSA shell beads, these techniques have helped corroborate human manipulation and suggest probable uses (Bar-Yosef Mayer et al. 2009; Vanhaeren et al. 2013). All the objects included in this survey, as far as research indicates, have been collected, transformed or made by humans.

A display purpose is also difficult to resolve, as in the case of ochre use (see below), however, the combination of aesthetic properties, labour investment, context, and ethnographic analogy, strongly suggest that the five categories discussed in this survey were in principle produced to be displayed.

Finally, conceiving of visual art as part of a cultural system implies that it should appear as a recurrent practice in the archaeological record, and not only as an accumulation of isolated or 'one-off' cases. Cultural traits are typically socially shared, persistent, and variable in a population (van Schaik & Pradhan 2003). Therefore, continuity and/or recurrence in a constrained chrono-geographical span is used as an inclusion criterion. As a result, the present survey of Pleistocene visual art includes forms occurring at more than one site within the same time range (of at least 10,000 years) and within a particular geographic region; forms that occur at more than one archaeological level in one site (suggesting transmission of cultural behaviour over time); and, forms that are quantitatively significant at any given site or period (suggesting that they were used and/or produced by several individuals, i.e. culturally shared behaviour). Overall, the corpus includes evidence related to activities such as the colouring and painting of surfaces, personal and artefact ornamentation by various techniques, and the inferred intentional transformation of materials towards decoration or representation.[39]

39 The existing literature on prehistoric art often discusses a handful of artefacts as potential 'firsts' of visual art forms. The three most prominent examples are the Makapansgat pebble, and the Berekhat Ram figurine, and the Tan Tan statuette. These objects apparently show intervention by hominins, and are said to represent "the earliest example of some kind of aesthetic sense, or at least evidence for recognition of a likeness" (Bahn & Vertut 1997:23). Therefore, they are worth mentioning although they are excluded from this study for not complying with the criteria given above. The Makapansgat cobble, which resembles a human face, was found in the context of 3-million-year-old site belonging to Australopithecus. The Berekhat Ram statuette was recovered in Israel and estimated to be 250-280,000 years of age, predating the emergence of or species by some 50,000 years. The piece is made of volcanic tuff and was artificially enhanced by some hominin apparently to make it look like a female figure, which incidentally resembles the later Upper Palaeolithic 'Venuses' (D'Errico & Nowell 2000). The Tan Tan figurine is an anthropomorphic quartzite fragment found in a 400,000-year-old site in Morocco. Like the previous piece, this one also seems to have been partly shaped through human intervention, and further has some minuscule traces of red pigment (Bednarik 2003). Although these alleged cases of early art-like objects cannot be readily dismissed (Bahn & Vertut 1997:26; D'Errico & Nowell 2000:146), the interpretive problems and the lack of academic consensus surrounding them cannot be ignored either. Furthermore, even if such artefacts did represent an early aesthetic or formal recognition sense, as argued by Bahn and Vertut, as far as we can tell they did not constitute a systematic

I reiterate that my focus will be on (purported) *Homo sapiens* contexts. As mentioned before, so far as we can tell, our species is the only hominin sort to have produced artworks of sufficient quantity and kind to leave a definite, identifiable trace in the archaeological record. Even when the behavioural and cognitive complexity of Neanderthals is increasingly being recognized and understood, evidence for the regular production and usage of visual art among Neanderthals remains ambiguous and controversial (Álvarez & Jöris 2008:32; Howell 1999:226; Roebroeks 2008:923; White 2001). A detailed examination of purported artworks from the Middle Palaeolithic attributed to Neanderthal populations is, unfortunately, beyond the scope of the present study, and therefore will not be discussed in the inventory.[40]

Now, I finally turn to the survey of Pleistocene art forms, which will further map out the development that visual art, with the intention of recognizing trends and patterns in this process. At the same time, this survey will provide a basis for identifying potential factors that may have shaped and supported the emergence of visual art behaviour.

2.3 Tracing the origins of Pleistocene visual art: A general survey

This survey, as mentioned before, will focus not on examining the whole record of Pleistocene visual art, but on what is currently known as the earliest evidence for the five categories established above (ochre, engravings, ornaments, carvings and painting) . This evidence falls mainly within two periods: the midpoint of the African Middle Stone Age, and the early stages of the European Upper Palaeolithic. It must be noted that although we must rely on archaeological data (e.g. dates, geographical distribution) for the earliest evidence of visual art forms, these may not necessarily correspond with the *actual* original occurrences of art practices, that is, we should not immediately assume that the first appearance of art in the archaeological record truly reflects the emergence of art behaviour. It is more probable that, as philosopher Kim Sterelny has pointed out (2012:811):

> We do not see origins in the record, but the cultural effects of innovations as their effects accumulate. We do not see the first instance of an innovation; we see it once it has become a routine feature of the community toolkit.

Visual art became prominent in the Late Pleistocene, and as the survey shows, it often (though not always) intensified, diversified, and became more complex over time. The earliest traces of possible visual art activities are found in the

cultural practice nor do they seem to be in any way related to the development of visual art among modern humans (Davis 1993:346). And because it is the latter which I aim to explain, I have excluded the three discussed objects from my inventory of Pleistocene visual art.

40 For a review of this sort see: Langley et al. (2008); Roebroeks (2008); Zilhão (2007).

form of ochre extraction and processing. This is followed by the simple modification of materials, and later by the crafting of beads and finally, there is the systematic production of visual art objects and traditions. Nonetheless, this development is not assumed to have happened in strict linear chronological succession. The various visual art forms and techniques frequently appear, disappear, and reappear in the archaeological record, and 'simple' forms usually co-occur with more 'complex' ones. The apparent trend in the development of visual art – from simple to more complex forms – has been recurrently attributed to the enhancement of human cognitive capacities over the Pleistocene (e.g. Coolidge & Wynn 2005; Mithen 1996a; Morris-Kay 2010). However, the increasing diversification of visual art forms, media and techniques may also be interpreted in terms of increasing technological sophistication. As I will argue, the 'progression' of visual art forms may represent a growing labour investment in visual art which means that visual art production became an increasingly important practice to which more and more time, effort, knowledge, skill, and people were devoted. In other words, over the course of the Pleistocene visual art forms became progressively more frequent, complex and specialized (see discussion in section 2.4). Again, this need not imply a linear progression where simple forms gradually gave way to more sophisticated ones. Rather it probably involved a process of diversification, where existing types and practices provided 'scaffolds' for novel – and more complex – forms. According to the chronological order in which they first appear in the archaeological record, and the amount labour investment they entail (time and effort), I have grouped Pleistocene visual art forms into five groups: ochre pigments, personal ornaments, incised objects, carved and sculpted figures, and painting.

Evidently, the five categories suggested here are a simplification for the purpose of our study, and there is some overlap, for example, there is ochre on ornaments, there are engravings on ochre, some carved figures seem to have been used as pendants, and cave art usually includes a combination of techniques such as engraving, finger tracing, and painting. Furthermore, there are surely several other art forms we can think of which have been lost to archaeology, such as sand drawings, designs on wood, fibres or leather, and body art. Many researchers in fact agree that the human body must have been the first canvas of visual artistry (Donald 1991:277; Schildkrout 2004; Turner 1980). Ethnographic examples of body art include several techniques applied to the skin, teeth and hair, like shaping, cutting, piercing, scarifying, tattooing, branding, and painting. We could also include here hairstyles and clothing (Gilligan 2010). Traces of these practices are naturally lost with the decomposition of the human body and biological materials, however, some indirect evidence can be used to infer them, like the presence of ochre pigments, which will be the first category to be discussed.[41]

41 Body art (e.g. tattoos, scarification, painting) and the use of garments can also be inferred from figurative art. For example, the 'Venus' figurines have proven a valuable source of information about

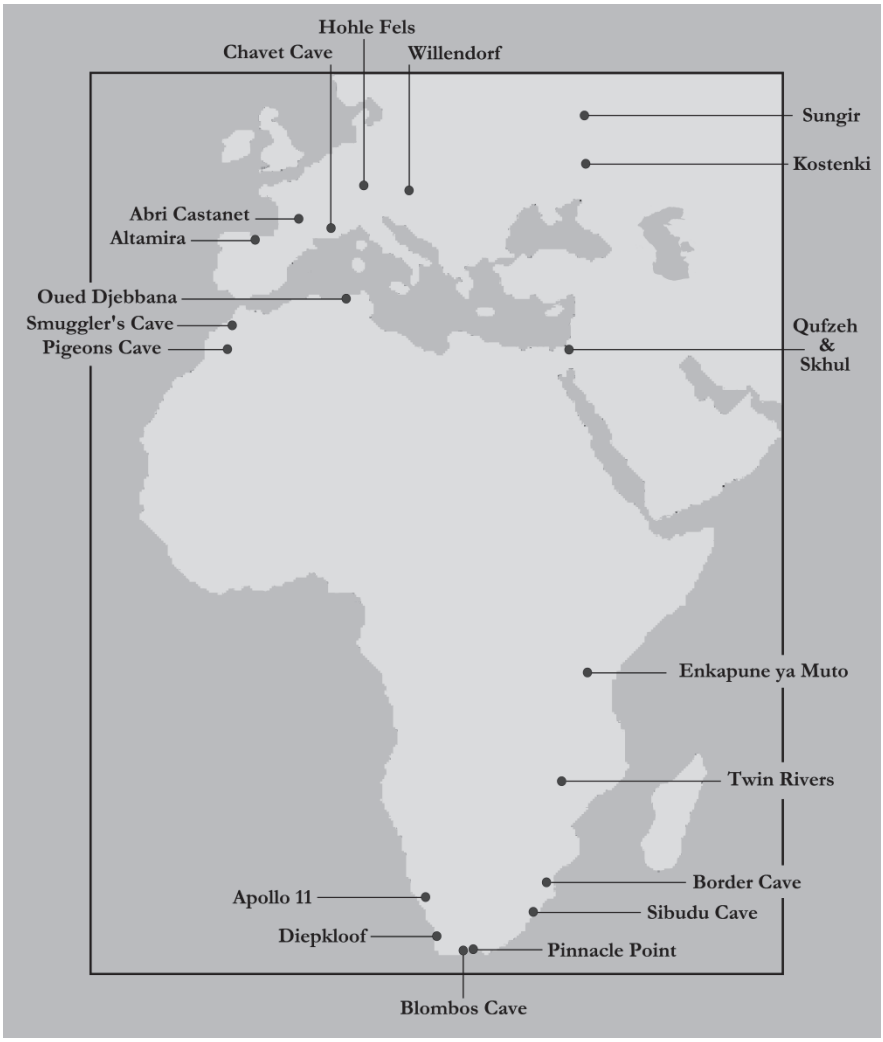

Figure 2. *Geographical location of the most important sites included in this survey.*

Ochre pigments

Ochre is a generic term that encompasses several naturally occurring minerals with high contents of iron oxides that produce a range of hues in yellow, brown, orange, and red. Typical ochre minerals like limonite or hematite can be rubbed directly on surfaces to apply colour or be crushed to produce powders of reddish shades that can then be used as pigment (Henshilwood et al. 2011:219). Other

Palaeolithic female hairstyles, headgear, and garments, and of possible body art patterns (Soffer et al. 2000). Rock art from the European Palaeolithic has also provided some clues about the use of complex clothing and hats (Gilligan 2010).

naturally occurring minerals which may be used for pigment production include, among others, gypsum and kaolin (white), charcoal and manganese dioxide (black).

The archaeological evidence of pigment use is rather ambiguous in that we are normally presented with only traces of ochre processing, or merely the raw material itself. As observed by archaeologist Francesco D'Errico and colleagues (2012:943):

> Pigments found at archaeological sites in the form of modified chunks or residues adhering to objects are generally the by-product of a sequence of actions that is difficult to reconstruct. It is for this reason that the interpretation of early pigment use is often controversial in nature.

Although we do find some examples of pigment applied to objects in the record of early Pleistocene visual art, most of the time its final purpose has to be inferred by the researcher. Accordingly, this subsection is divided in two parts: one dealing with evidence for the extraction and processing of ochre minerals (possibly to produce coloured pigments), and the other dedicated to the different uses that we can observe directly or infer indirectly from the archaeological context.

Ochre extraction and processing

The earliest possible evidence of ochre exploitation in Africa actually is over 200,000 years old, predating the earliest fossil specimens of our species, and thus surpasses the time range set for this survey. However, the information is relevant because it suggests that our immediate hominin ancestors had "at the very least an awareness of these minerals and their properties and their availability in the landscape" (Barham 1998:708), which sets an important precedent for the development of ochre use as a regular behaviour among *H. sapiens*. Evidence from various sites, most notably Kapthurin in Kenya (Barham 2002:189, McBrearty & Brooks 2000:528) and Twin Rivers in Zambia (Barham 1998, 2002), includes the accumulation of large quantities of ochre minerals (e.g. limonite, hematite, specularite) some of which show traces of intentional abrasion, indicating that they may have been scraped and rubbed onto surfaces to obtain yellow and reddish hues (Barham 1998:705, 2002:188). Conservatively, the dates from these sites indicate that by 270,000 years BP African hominins already "had incorporated color into their lives" (Barham 2002:189).

The first example of ochre exploitation by *Homo sapiens* comes from the South African site of Pinnacle Point (Marean et al. 2007; McBrearty & Stringer 2007). In this location, archaeologists found an accumulation of over fifty pieces of red ochre, a dozen of which showed traces of use (grinding and scraping). This ochre find, dated to 164,000 BP, "has all the hallmarks of pigment for body-painting and perhaps colouring of other organic surfaces" (Marean et al. 2007: 907).

The evidence of ochre extraction in South Africa during the Late Pleistocene is abundant. Ochre use is recorded at the sites of Klasies River and Howiesons Poort going back to 100,000 and 80,000 years BP, respectively. The archaeological material from Border Cave includes 'hematite pencils' older than 100,000 years, and Blombos Cave has a record of ochre exploitation spanning multiple stratigraphic layers dated from 100 to 75,000 years ago (McBrearty & Brooks 2000:528; Watts 2009).[42] At the latter site, a recent find revealed an ochre processing workshop that includes two toolkits used for producing and storing an ochre mixture. The toolkits consist of two abalone shell containers, a stone cobble, probably used as a hammerstone, mineral residues from grindstones, crushed bones whose marrow could be used as a pigment binder, charcoal, and red ochre. This find has been dated to circa 100,000 years BP and is the best evidence that in the MSA humans were purposively exploiting ochre for pigment extraction (Henshilwood et al. 2011). It also gives an indication of the sorts of activities and materials involved in ochre-processing.

There are other early examples of ochre extraction and use beyond Africa. In the site of Qafzeh Cave, in Israel, several lumps of red ochre with traces of scraping have been recovered from stratigraphic layers dated to 92,000 BP (Hovers et al. 2003). These pieces of ochre were transported into the site from outward locations where intense red hue minerals (hematite) could be found, indicating purposive selection and preference for particular raw materials. The ochre lumps were found alongside some smaller bits, possibly debris, suggesting a work area or ochre processing-workshop. There also is a possible association of ochre occurrence with human burials and marine shells at this site (Bar-Yosef Mayer et al. 2009; Hovers et al. 2003). Incidentally, Qafzeh constitutes the first modern human occupation outside Africa, although it may be considered an extension of habitat range, rather than a 'migration' (Borroughs 2009:109). This modern human enclave in the Levant, however, did not flourish for long, and its members soon went extinct leaving no traceable descendants in any existing gene pool (Forster 2004:261; Mellars 2004:461). The data from this site offers further support that ochre extraction and use was established as a customary activity among *H. sapiens* populations by 100,000 BP.

In Europe, the use of ochre minerals is well documented in the Neanderthal archaeological record of the Middle Palaeolithic, particularly towards the end of that period between 60 and 40,000 BP (Caron et al. 2011; D'Errico 2008; D'Errico et al. 2010; Soressi & D'Errico 2007; Roebroeks et al. 2012; Zilhão et al. 2010). Iron oxides producing orange, yellow and red were exploited, although in low quantities. The most common colour mineral used among these hominins was manganese dioxide, which produces a black pigment (D'Errico 2008:170). The differences in ochre use between the Middle and Early Upper Palaeolithic,

42 The sites mentioned here only include the earliest samples of ochre exploitation but the actual record is much more extensive. For a general overview, see: Watts (1999).

however, are both quantitative and qualitative. Not only is the frequency of ochre exploitation in the later period much higher, but also a preference for the colour red is quite marked (Watts 1999, 2009). Furthermore, in the Early Upper Palaeolithic, especially in the Gravettian, red ochre is often found in burials (Riel-Salvatore & Gravel-Miguel 2013:330).[43]

Ochre applications

Whether ochre use qualifies as evidence of human visual art behaviour has been hotly debated among archaeologists. Although the aesthetic, symbolic or ritualistic connotations of red ochre in particular have often been highlighted (e.g. Knight et al. 1995), ochre can have many different domestic (utilitarian) applications that would not necessarily involve any artistic intentions (Wadley 2005; Wadley et al. 2004). There is no need, however, to divorce the utilitarian from the artistic. Ethnographic data show that pigments may be used in both practical as well as symbolic contexts, and that these are not mutually exclusive (McBrearty & Stringer 2007:794; Rifkin 2012).

Some practical applications of ochre include, among others, the treatment and preservation of hides and production of leather objects (Dubreuil & Grosman 2009:948). Ochre can also be mixed with resins and wax to produce an effective adhesive to, for instance, attach stone tools like points, blades and arrows to hafts and shafts (Wadley 2005). Ochre clays are also known to have some medicinal properties, for instance antiseptic, astringent and deodorizing qualities; and when eaten they can have a purging effect and help against stomach pain (Velo 1984, 1986). Finally, ochre and other mineral pigments either mixed with oils or by themselves can offer skin protection against insects and the elements, as 'sunblock' (Ellis et al. 1997).

The fact that pigment use is also well documented in the Neanderthal record points to the possibility that it could have been a widespread hominin practice, either for its visual properties or as a useful adhesive for the production of composite tools or in the treatment of animal hides. The question of whether ochre was attributed any symbolic meaning applies equally to Neanderthals as to early modern humans (D'Errico 2008; Zilhão et al. 2010). Symbolism is not an intrinsic quality of coloured minerals, but rather it is a property given by social practice. Thus, as noted by archaeologist Wil Roebroeks and colleagues (2012:1893) the mere occurrence of ochre or other pigments should not immediately be taken as evidence for either artistic or symbolic behaviour.

43 The association of red ochre and human burial is also observed in one of the earliest known archaeological sites in Australia, Lake Mungo dated around 60-40,000 BP, where a modern human skeleton covered in red ochre pigment was found (Bowler et al. 2003; Klein & Edgar 2002:248; Stringer 1999). It is notable that the source of the ochre was about 200 kilometres away from the burial site, which implies that the material was specifically sought after and transported a long distance (Klein & Edgar 2002:249).

The issue remains whether ochre and other minerals were used as pigments in artistic activities. The ethnographic record shows that pigments have a generalized use in body ornamentation and ritual activities, as paint or dye applied to the face, body and hair, attires, and in tattooing. Body paint and these other examples of pigment application are unfortunately ephemeral activities that leave no direct trace in the archaeological record. But the generalized use of body painting among historical hunter-gatherers (both living and extinct), and its cultural relevance as a (primordial) marker of social identity strongly suggests that the use of pigments for bodily decoration was probably practiced at some point among Pleistocene humans (cf. Fiore 2008; Layton 1989; Power 1999; Turner 1980; Schildkrout 2004). So, if ethnographic data serves as an analogy, at least for modern humans, it is rather likely that throughout prehistory pigments were used as hide preservatives, adhesives, medicine, sun and insect protection, as well as for personal and artefact ornamentation and in ritual. The use of mineral pigments does not preclude at all the functional or the ceremonial, "ochre seems to have been a material with both symbolic and utilitarian functions" (McBrearty & Stringer 2007:794).

It is however significant that among the members of our species particularly red-coloured minerals were recurrently targeted and preferred over blacks or whites, which points to an intentional selection that would not be expected if pigment use had been strictly utilitarian (McBrearty & Stringer 2007; Watts 1999). The persistent presence of red ochre in Pleistocene funerary contexts furthermore points towards its probable importance in ritual activity. The relation between red ochre and human burial may be an ancient one as evidenced by the possible association at Qafzeh (Hovers et al. 2003:507). Red ochre is also a frequent element in funerary contexts from the Gravettian in Upper Palaeolithic Europe – e.g. Sungir, Russia; Krems-Wachtberg, Austria; Dolní Vestonice, Czech Republic (Einwögerer et al. 2006; Formicola 2007:446; Riel-Salvatore & Gravel-Miguel 2013:330). It may be argued that the incidence of red ochre in human burials may be related to its preserving and deodorizing qualities, but symbolic references to blood, life and death can hardly be avoided in light of ethnographic and historical records showing that red pigment often plays an important role in the symbolic lives of many human groups, in Australia, Africa, and the Americas (Knight 2009; Morris 2010:10; Wrenschner 1980). Anthropologist Ernst Wreschner has noted that there might be an evolutionary perceptual/aesthetic bias towards the colour red because of its potential emotional association with blood, and conceptions of life and death (1980). Similarly, Ian Watts, who has analysed the Pleistocene ochre record extensively, has highlighted that beside redness, ochre properties such as lustre and brilliance might also act as sensory stimuli that produce an 'aesthetic effect' in humans (1999:129).[44] The aesthetic appeal of red ochre is also suggested by the

44 Anthropologists Chris Knight, Ian Watts and Camilla Power have attempted to explain "why red ochre became the cultural species marker of *Homo sapiens*" (Power 2009:257) by suggesting

fact that Pleistocene ornaments (beads and pendants) often show traces of having been rubbed with it (see below), which shows that they were either purposefully coloured, or they acquired the ochre by contact with coloured surfaces (e.g. skin, hair, garments).

In conclusion, ochre use seems to be an ancient human practice. Moreover, in both Africa and Europe the appearance of modern *H. sapiens* is accompanied by an increase in the frequency and quantity of red ochre exploitation. So, even if by itself it remains ambiguous as evidence for visual artistic behaviour, as Watts has argued convincingly, the habitual occurrence of red ochre minerals (for pigment production) may be considered a defining archaeological marker of our species (2009:80).

Personal ornaments

Archaeologists usually classify as personal or body ornaments those "small, durable objects that are somehow modified for suspension or attachment to

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that early modern human females developed the bio-social strategy of faking menstrual blood with red ochre pigments for their own benefit (Knight 1991; Knight et al. 1995; Power 1999, 2004; Watts 1999, 2009). Their 'sham menstruation' or 'female cosmetic coalition' model proposes that the costs of pregnancy and child rearing on females and decreased mobility of mothers due to the high dependability of their infants, constraining their access to resources. Therefore, human females needed to secure maximum male cooperation in subsistence and parental investment. Males are likely to direct their interest and resources to fertile females. And since human females have lost physical signs of oestrus, menstruation works as the only reliable indicator of female fertility so, women would want to advertise and amplify that signal to attract males and entice them to provide for them (and their offspring) with the promise of future mating opportunities. Using visual signalling as a collective deception strategy would also entail the foundation of symbolism and ritual. On the one part, 'faking' involves convention and displaced reference in which a group (in this case the female coalition) agrees that a signal stands for something that is not. And on the other, that agreement would have to be made public and reinforced by costly collective rituals that display commitment to the coalition. The 'sham menstruation' hypothesis, so briefly sketched here, faces various problems. Firstly, it assumes the loss of oestrus in the human lineage, which supposedly triggered changes in reproductive strategies; but it is possible that oestrus signs such as the genital swelling of chimps is a separate development that humans never presented, or that its loss goes back a long time, to the evolution of bipedalism (Pawlowski 1999). Either way, it should not be given weight as the direct cause of human socio-sexual organization. Secondly, although sham menstruation is documented ethnographically, there is no evidence that it was generally practiced by early *H. sapiens* groups (Hovers et al. 2003:510). Utilitarian, rather than symbolic explanations for the presence of red ochre in Middle Stone Age African sites cannot be discarded, as discussed in the text (Boyd et al. 1995). Thirdly, it assumes that the strategy would invariably succeed, but fails to explain satisfactorily why men would 'fall for it' (Taylor 1996:104). Furthermore it does not clarify, for example, why non-related males would be tolerant of each other, or why female coalitions did not end up in a gender segregated matriarchal system, as among elephant groups. Finally, hominin females probably did not have to come up with a scheme to 'force' men to provide for them and help them rear their offspring, since male-female bonds and intersexual cooperation is near-universal among higher primates (van Schaik & Dunbar 1990). Thus, the sexual division of labour probably is not a result of early *H. sapiens* female coalitions, but more likely is an ancestral form of social organization, as it is also common among social carnivores (Guthrie 2005).

other materials" (Kuhn & Stiner 2007b:43), including beads, pendants, and 'charms', which are referred to generically as 'beads'. These could have been used as object decorations (e.g. garments, batons, baskets) as well as for jewellery (White 1992:554).

Once considered mere 'trinkets', archaeologists now recognize the artistic, symbolic and social potential of these items and the important role that they might have played in the lives of Pleistocene humans (Moro & González 2010). This re-evaluation acknowledges that ornaments can be imbued with specific social functions. Several authors agree that body ornamentation is a good medium for social communication, particularly to convey messages of ethnicity and identity (Coe 2003; Kölbl 2009; Kuhn & Stiner 2007a, 2007b; Vanhaeren 2005; White 1993; Wiessner 1983, 1984; Wilkins 2010; Wobst 1977; Zilhão 2007). Furthermore, because personal ornaments "are the most characteristic artifacts that help to trace human symbolic behaviour" (Álvarez & Jöris 2011), they are also considered a hallmark trait of modern humans (D'Errico 2007:130; McBrearty & Brooks 2000:521).

Body decoration in ochre and other pigments (body painting) can also carry social messages (Fiore 2008). But, as noted by archaeologists Steven Kuhn and Mary Stiner, beads, pendants, charms and jewellery perform better than pigment as a technology for information transmission because they free communication from direct face-to-face interaction and can encompass a wider range of messages. Thus, the emergence of body ornamentation might indicate "an expanded scale of social interaction, with messages exchanged over larger areas and among a wider variety of people" (2007a:51). This implies a qualitative change in the way people used ornaments to engage in communication. I will elaborate on this in chapter 6.

According to the criterion of labour investment, I have divided personal ornaments in two subcategories. The first, modified ornaments, includes natural items (e.g. shells, teeth, fossils, etc.) that have been selected and frequently, though not always, slightly modified presumably for display. The second subcategory, manufactured ornaments, is constituted by those ornaments which have been fully shaped by a more complex production process that includes selecting a raw material and subsequently working and modelling it to obtain the desired form. These include, for instance, beads made 'from scratch' using ivory, antler, stone, and bone.

Modified ornaments

The type of ornaments discussed in the following paragraphs entail in most cases natural objects that have been collected and slightly altered by humans to fulfil their new function, for instance by polishing, perforating, or stringing them. In any case, the amount of labour applied to the materials after collection was not considerable, although the modification process might still have required special knowledge of the materials and certain skill (see: Tátá et al. 2014).

Modified ornaments, then, are human-altered natural objects such as shells, stones, animal teeth, etc. that often have been interpreted as beads or pendants, for use in jewellery, but that could equally have been braided in the hair, sewn to pieces of clothing, or attached to personal items like bags, baskets, or domestic utensils (White 1992:554).

This kind of items has recently become centre stage in discussions on the origins of visual art. Since the discovery of a collection of shells dating from 75,000 BP at the site of Blombos Cave in South Africa in the early 2000s (Henshilwood et al. 2004), the number of finds, and the age of the shells has only increased. The evidence now indicates that at the least by 100,000 years ago, humans were using modified marine shells for display purposes, likely as personal ornaments. Most of these early beads come from coastal sites in the North and South of Africa, but there are also significant examples from the Middle East and the Levant. The latter region has in fact yielded potentially the oldest objects of this kind. Excavations at the cave site of Skhul in Mount Carmel, Israel, during the early 1930s exposed a rich archaeological context that included the buried remains of ten (modern human) individuals, lithic artefacts, and a few seashells. The site has been dated between 135 and 100,000 BP. A recent analysis of the shells, now housed in the natural History Museum in London, revealed that at least two perforated *Nassarius gibbosolus* specimens were probably used as beads. The cave, high up from sea level, could not have been reached by the sea so that the shells could not have been naturally deposited, also animals would not have transported them that far, and there are not enough shells to consider human consumption. Therefore, it is likely that the cave dwellers selected and transported the shells to the site, and given that they are perforated, it is probable that they were used for suspension (Vanhaeren et al. 2006). At the nearby site of Qafzeh Cave (92,000 BP) ten marine bivalve shells (*Glycymeris insubrica*) were found. As in the previous case, the presence of the shells is best explained by human agency, since the cave is some 40 km away from the coast. Also, most of the shells have perforations, traces of use wear, signs of stringing, and some of them also bear red ochre stains (Bar-Yosef Mayer et al. 2009). Finally, archaeologist Steven Kuhn and colleagues (2001) have reported a series of shell beads from the sites of Ksar ‘Akil in Lebanon, and Üçağizli Cave in Turkey, dating back between 41 and 43,000 BP. Most of the specimens correspond to the species *Nassarius gibbosula* and *Columbella rustica*, although the bivalve *Glycymeris* and other small gastropod shells are also present. Many of the shells are perforated presumably for suspension. Again, the presence of the shells can be attributed to human intervention, and it is notable that the inhabitants of these sites, as in the other cases, “were selective in their choice of shells for ornament making, preferring comparatively rare varieties with luminous white or brightly colored shells, some with arresting patterns” (Kuhn et al. 2001:7642).

In Africa, small marine shells probably used as ornaments have been found in several Pleistocene sites. On the north of the continent, in Morocco, they

have been recovered at Smuggler's Cave, with a date of 108,000 years BP (Balter 2011), at Pigeons Cave, 82,500 years BP, at Rhafas Cave, 80-70,000 years BP, and at Ifri n'Ammar, 83,000 years BP (D'Errico et al. 2009). The 13 seashells (*Nassarius gibbosulus*) from Pigeons Cave were transported some 40 km, and show intentional perforations, signs of wear, and one bears red pigment residues (Bouzouggar et al. 2007). Finally, the collection from the Musée de l'Homme in Paris included a *Nassarius* shell from the site of Oued Djebbana, in Algeria, with an estimated age of 90,000 BP (Vanhaeren et al. 2006:1787).

In South Africa, the richest collection of MSA shell beads has been recovered at Blombos Cave. A total of 68 *Nassarius* shells from stratigraphic layers dated to c. 75,000 BP (Henshilwood et al. 2004). Here, too, the examination of the shells has discarded the possibility of natural deposition, leaving human action as the only explanation. Microscopic and experimental analysis has indicated that the shells with perforation were probably pierced with a bone point, and show traces of stringing and wear (Fig. 4). Most of the shells were found in groups, which is indicative that each group might have been part of single beadwork items (Vanhaeren et al. 2013:2). The shells form Blombos, in short, are the best evidence that in the mid MSA these objects were being used for display, probably as ornaments. Elsewhere in South Africa, six perforated *Afrolittorina africana* seashells were found at Sibudu Cave and dated to 70,000 BP (D'Errico et al. 2008), however further analysis has not yet confirmed that they were used as beads (Vanhaeren et al. 2013:501). Finally, Border Cave yielded a perforated *Conus* shell associated with a human burial, dated to 76,000 BP (Vanhaeren et al. 2013:500).

So far, there are no more finds of shell beads in sub-Saharan Africa after 70,000 BP. The next find of African personal ornaments is constituted by manufactured beads of ostrich eggshell dated *ca*. 40,000 BP (see below). In any case the evidence further suggests "that soon after 100,000 years, and possibly even earlier, personal ornamentation became a widespread practice in Africa, and adjacent areas of southwest Asia" (Bouzouggar et al. 2007:9968).

In Europe, personal ornaments begin to appear at high frequencies in the Early Upper Palaeolithic, at the time related to the spread of modern humans into this region.[45] Throughout the Aurignacian (45-28,000 BP), there are abundant modified ornaments made from marine shells, often from small gastropods (including *Nassarius*) and mammal teeth, but also from a wide range of other materials, such as freshwater, terrestrial and even fossil shells, fish vertebrae, animal bone, minerals, crystals, and amber (Álvarez & Jöris 2011; Kuhn & Stiner 2007b:44; White 2007). Clearly, eye-catching lustrous (and often

45 Zilhão and colleagues (2010) have reported the presence of shells in Neanderthal occupations in Spain, dated to ca. 50,000. At Cueva de los Aviones, 4 *Glycymeris insubrica* shells were found, and Cueva Antón a shell of *Pecten maximus* with pigment remains has been recovered. The authors suggest that these must have been used as personal ornaments. In my opinion, however, the evidence is not as conclusive as it is for the MSA and EUP sites.

exotic) raw materials were selected to be modified into ornaments (Álvarez & Jöris 2011:35; White 1993). The use of modified natural objects as ornaments continued during the whole of the Upper Palaeolithic, but along these, manufactured beads also became common.

Manufactured ornaments

In contrast to the previous category of objects, the following paragraphs deal with ornaments which have gone through a more elaborated and exhaustive manufacturing process, where the raw material has been collected, worked (sometimes extensively), and shaped to create the final artefact.[46] This process entails a greater investment of labour as well as time, a good knowledge of the qualities of the raw material and the tools and techniques to modify it. These kinds of personal ornaments made 'from scratch' appear in the archaeological record later in time than the modified sort. Like the previous, manufactured ornaments may have been used as body decoration, to adorn artefacts, or even as buttons (Gilligan 2010:57; White 1992:554).

In Africa, the oldest of these manufactured ornaments, as mentioned before, are ostrich eggshell beads. At the site of Border Cave, in South Africa, 14 of these have been found in layers pertaining to 44-41,000 BP (D'Errico et al. 2012). To create them, people first cut and shaped 'blanks' of ostrich eggshell, which were then perforated and reduced to round discs. At Enkapune Ya Muto rockshelter in Kenya, in a layer dated to around 41,000 BP, 25 ostrich eggshell beads in different stages of the production process were excavated, revealing the laborious manufacturing method. As noted by archaeologist Stanley Ambrose, these items "may mark the dawn of an era of new artefact manufacturing techniques (drilling and grinding) and of personal adornment" (1998a:388). At times, the beads were further modified by heating, to turn them dark (D'Errico et al. 2012), or by applying ochre (Ambrose, *pers. comm.*) (Fig. 5)[47]. Ostrich eggshell beads have been found at other locations in Africa with similar dates (e.g. Mumba rockshelter in Tanzania), suggesting a widespread cultural tradition (Ambrose 1998a; D'Errico et al. 2012). Incidentally, ostrich eggshell beads are very important in the economy of the contemporary !Kung San hunter-gatherers of the Kalahari, constituting the core of their gift exchange system – the *hxaro* (Wiessner 1982). This suggests a function for the Pleistocene examples, and also creates the possibility of some cultural continuity in the region (D'Errico et al. 2012; Deacon 1992).

46 Randall White has used the term "purposely fabricated beads" (1989:218), for what I have called "manufactured ornaments".

47 Fig. 5 shows: on the top two rows, finished eggshell beads, some with traces of ochre and burning (the second bead from the right on the second row is bone). The next three rows show earlier stages in bead manufacture. The middle disk on the bottom row has traces of red ochre, suggesting that it might be a finished artefact, rather than a preform. I thank Prof. Stanley Ambrose for this detailed information.

In Europe, as with modified ornaments, there is a high occurrence of manufactured beads in archaeological sites from the Aurignacian onwards. The most common raw material used in this region for making beads was mammoth ivory, but other materials like bone, antler, minerals, limestone, and amber were also habitual (Álvarez & Jöris 2011).

The fabrication process of ivory beads has been well-studied and reveals that these ornaments were semi-mass produced, creating standard shapes, some of which show regional patterning. For example, in France the most common form in the Aurignacian is the so-called basket-shaped bead (White 1989:223, 1993:280) (Fig. 6), whereas in German Swabia it is the tear-drop-shaped and the two-holed bead that are typical (Barth et al. 2009; Kölbl 2009; White 1993:283) (Fig. 7). Ivory pendants could be created individually by carving and scraping a piece of ivory into shape, but more commonly beads were produced in series. This process involved preparing an ivory rod, dividing it in segments by thinning to produce preforms or blanks, perforating each preform, and then smoothing and polishing each blank into the final form (Barth et al. 2009:16; White 1989:224) (Fig.3).

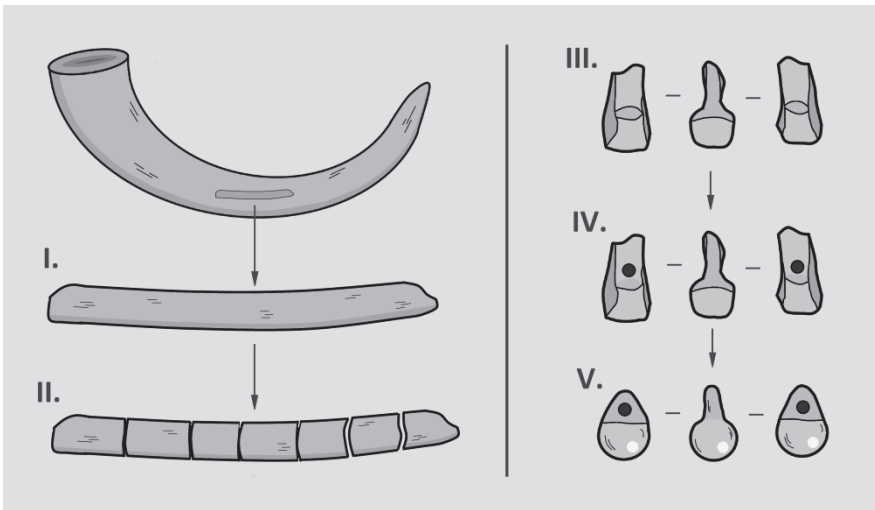

Figure 3. *Five discrete stages in the production process of Aurignacian ivory beads.*

Greater variation in form is to be expected in beads produced from scratch, as the makers are not as constrained by the original form of the raw material as in the case of modified natural objects like shells or animal teeth. The fact that some forms, materials and production techniques were localized even within regions (Kölbl 2009) indicates that the knowledge involved in bead-making was socially transmitted and, as reproduction experiments have revealed, it required considerable time and skill. Archaeologist Randall White, who has studied and reconstructed various techniques for fabricating ivory Palaeolithic beads, has estimated that “well over one hour of labor per bead is required by this process”

(1993:282). The reconstruction of beads reveals on the one hand a labour-intensive sequence, but on the other hand, it also shows that people were maximizing production by using techniques that allowed the creation of several beads from a single piece of raw material, reducing waste and time investment. This, along with the remarkable standardization of Aurignacian beads, hints "at incipient craft specialization" (White 1989:223).

The use of these artefacts as personal ornaments during the Early Upper Palaeolithic is supported by the fact that manufactured beads have often been found in burials. The most remarkable example is the multiple burial site of Sungir, in Russia. This grave, which dates back to the Gravettian (ca. 28,000 BP) or the Aurignacian (ca. 32,000 BP), contained the remains of five individuals, three of which were lavishly ornamented with thousands of beads that were originally sawn on their clothes and headgear, and also strung as jewellery. The bodies also bore modified ornaments (fox teeth and schist pendants), showing that these two kinds of decorations were used side-by-side (White 1993:287- 294). The Sungir burial is, of course, exceptional. However, a recent comparative analysis of Palaeolithic mortuary practices has shown that actually ornaments and ochre are "notably more frequent" in Early Upper Palaeolithic burials (namely from the Gravettian), than in graves from the later Palaeolithic (Riel-Salvatore & Gravel-Miguel 2013:330).

In the funerary sample from the EUP, manufactured beads are commonly found in the graves of adults and infants, usually in low quantities per individual, and often near the head, neck, torso, and arms, indicating that, as in Sungir, these were most probably attached to headgear and items of clothing worn in daily life (Riel-Salvatore & Gravel-Miguel 2013:330), that is, the ornaments probably were not grave goods created especially for the funeral occasion. The possibility that both adults and children were frequently buried with their everyday ornaments supports the idea that these items had strong personal connotations of individual identity.[48]

48 The close association with garments could also be an ancient one. As Ian Gilligan has suggested, it is possible that the emergence of personal ornaments correlates with the introduction of complex sawn clothing (2010). Blombos Cave has yielded bone awls that could have been used for garment production as early as 84,000 BP (Gilligan 2010:50), and studies on the divergence between head and clothing lice suggest that humans may have started wearing clothes systematically by 170,000 BP. (Toups et al. 2011). Garments certainly provide an excellent medium for displaying beads and charms.

Figure 4. *75,000-year-old shell beads from the site of Blombos Cave, South Africa.*

Figure 5. *Ostrich eggshell beads from the site of Enkapune Ya Muto, Kenya, dated to ca. 41,000 BP.*

Figure 6. *Aurignacian basket-shaped mammoth ivory beads from Abri Castanet, France*

Figure 7. *Aurignacian two-holed mammoth ivory beads from the site of Vogelherd, in Swabia, Germany.*

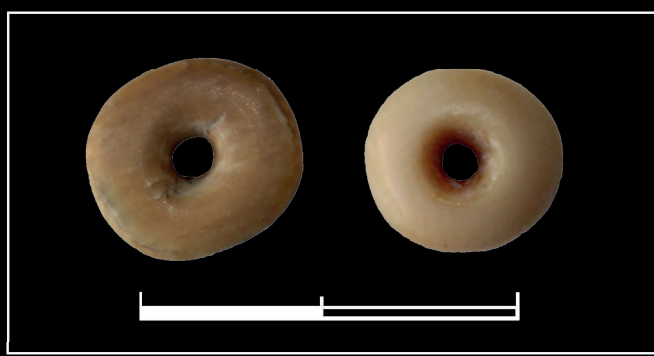

Figure 8. *Disk-shaped mammoth ivory beads (reproductions).*

Incised objects

This category includes all objects showing traces of intentionally made designs, generally by incision or engraving, on various materials.[49] In principle, the labour investment involved in making these patterns may be no greater than that required for modified ornaments. Although it might take more dexterity and precision to create a discernible design on a surface (Henshilwood & D'Errico 2011:77). Minimally, "an external understanding of conventional tools, techniques, and gestures, raw materials, tool breakage patterns, stability of working surfaces, and special strategies for engraving is required" in engraving or incising actions (White 1996:219).

The earliest reliable examples of this category come from various Middle Stone Age sites in Africa (Cain 2006; Henshilwood & D'Errico 2011). Most notably, in Blombos Cave a collection of over a dozen engraved pieces of ochre dated between 100 and 75,000 years ago has been recovered (Henshilwood et al. 2009; Henshilwood & D'Errico 2011:78). Several bone fragments incised with linear patterns have also been found at this site (Henshilwood et al. 2002). While some of the grooves on these objects may seem random scratches, many of the pieces in the collection clearly show deliberate, geometric, patterned marking. Furthermore, a few pieces portray clearly organised geometrical arrangements. The best known example is the rectangular piece of reddish-brown siltstone which bears a deliberate double chevron design, recovered from a layer dated between 78 and 74,000 BP (Fig. 9). Closer examination has shown that the piece was faceted and ground in preparation for the engraving (Henshilwood et al. 2009:33), indicating that the incising involved more than a spontaneous action.

Incised or notched fragments of ostrich eggshell have been recovered from the basal strata at Apollo 11, Namibia, dating back to at least 83,000 years ago (Wilkins 2010:110). Another remarkable collection of ostrich eggshell pieces, of no less than 270 fragments, comes from the rock shelter of Diepkloof in South Africa, and has been dated to around 60,000 years BP (Texier et al. 2010). The pieces on this collection show deeply engraved, well-arranged linear motifs. Close analysis has indicated that a standardised engraving technique was used for the markings, with the long parallel lines done first, and the shorter, crossing

49 There are a number of incised pieces of bone from Lower and Middle Palaeolithic sites which have been claimed to be intentional and of a symbolic nature. The most notorious of these is the bone from the German site of Bilzingsleben, which bears some parallel markings (Mania & Mania 1988). However, as with other cases of 'early symbolism' the origin of this piece remains debatable and ambiguous (Mithen 1996a:175). For example, it proves difficult to determine whether the incisions were made intentionally or were a by-product of other actions such as sharpening cutting tools or defleshing the bone (Davis 1993:344). As the reader will note, these kinds of markings are qualitatively different from those discussed in these section, which show clear design patterns and therefore allow to infer some intentionality and a display function, which are two of the inclusion criteria given at the beginning of this survey.

lines, second. The incised eggshell fragments have been interpreted as the probable remains of ostrich egg water containers, like the ones known from San ethnography. San hunter-gatherers traditionally use ostrich eggs to collect and store water in different locations throughout the landscape. Often, these containers are marked with geometric patterns, similar to the ones on the archaeological examples, to indicate ownership or content (Henshilwood & D'Errico 2011:80; Texier et al. 2010).

The early archaeological assemblages of the European Early Upper Palaeolithic typically include incised objects such as engraved pieces of bone, ivory and stone which have generally been classified as mobiliary or portable art (Bahn 1998:84). Some of the earliest examples from the Aurignacian show linear patterns, dot arrangements, crosses and some schematic motifs (Mellars 1996:398; Zilhão 2007:34). For instance, the bone and ivory shafts engraved with parallel and criss-crossed lines from Vogelherd, Germany and Mladeč, Czech Republic, and the bone fragments engraved with linear motifs from Arcy-sur-cure in France (Mellars 1996:395, 415). Later engraved pieces – from the Gravettian, Solutrean and Magdalenian periods – frequently feature figurative motifs as well, including human and animal figures. Engraved motifs are also a common component of European rock art. Cave and open-air rock art sites generally include numerous instances of linear, geometric, or representational patterns engraved on rock (Bahn & Vertut 1997:166).

Objects incised with linear or geometric patterns could be interpreted as strictly 'notational', for instance as mnemonic aids, records, tallies, or time-keeping purposes (D'Errico 1998; Marschack 1972), rather than as artworks. 'Notational' objects are well known from the ethnographic record, for instance the 'message sticks' among Australian hunter-gatherers (Howitt 1889) and the record-keeping notched sticks of the Irkut Buryat of Mongolia (Luria & Vygotsky 1992:77). For some authors, having a notational function would disqualify incised objects as visual art (Elkins 1996:200). However, we again cannot rule out artistry on account of functionality (White 1996). Moreover, according to the criteria used for this survey, the relevant aspect is not whether the incised objects are notational or decorative, but rather that they represent the human intention to mark particular objects in a precise way for display, and that these markings were part of a conventional communication system (cf. Henshilwood & D'Errico 2011:92).

Carved and sculpted objects

The production of carved or sculpted two- and three-dimensional objects frequently involves a much greater amount of work and expertise than the art forms that we have discussed so far. It requires a good knowledge of the base material, appropriate – perhaps specialized – tools, and, in the case of figurative motifs, artistic skill and understanding of conventions to properly depict the desired subject.

Carved figures are still absent from the archaeological record of Late Pleistocene Africa.[50] The Eurasian Upper Palaeolithic, in contrast, includes several impressive examples of such items. Recently, remains of what seems to be an ivory anthropomorphic figurine have been recovered at the Russian site of Kostenki. The possible human head has been dated to 42-45,000 BP (Anikovich et al. 2007; Cook 2013:56), which would make it the oldest example of figurative representation yet found. However, identification is uncertain due to the worn condition of the piece.

The German region of Swabia, has yielded what so far is the earliest tradition of figurative art, consisting of over 40 figurines carved in mammoth ivory, found in various Aurignacian contexts dated between 40 and 30,000 BP (Conard & Bolus 2003; Porr 2010:92). The cave sites of Hohle Fels, Geissenklösterle, Vogelherd, and Höhlenstein-Stadel, among others, have yielded the dozens of figures depicting Pleistocene fauna (mammoth, horse, bison, lion, bear, water fowl) and a few anthropomorphic and therianthropic (human-animal) representations (Cook 2013:48; Rau et al. 2009). The oldest of these so far is a female 'Venus' figurine from the basal Aurignacian layers at Hohle Fels, estimated to be some 40,000 years of age (Fig. 10). The small figure, carved in ivory, is just 6 cm by 3.5 cm, and shows a female body with exaggerated sexual features, it has a loop for a head which shows use wear, indicating that it was suspended and presumably carried or worn as an ornament or charm (Conard 2009). Its body is marked with grooves and the right arm has some linear marks that suggest a body art design — e.g. tattoo, scarification, or paint (Cook 2013:38).

One of the most notable of the Swabian carvings is constituted by the therianthropic figure of the *Löwenmensch*, or Lion Man, from the site of Höhlenstein-Stadel. This sculpture was originally excavated in 1939, and was first published thirty years later, instantly becoming an icon of Swabian prehistoric art. It depicts a standing character with human and feline features. The body is very anthropomorphic, but the head, hands and feet are clearly catlike. Like the Hohle Fels Venus, the Lion Man's upper left arm bears a linear design that could be depicting body art. Archaeologists recently explored the original excavation spot of the Lion Man and were able to find some missing pieces, such as fragments of its right arm, neck and back. The figure, now dated ca. 35,000 BP, has since then been carefully restored and is now nearly complete, measuring 31.1 cm in height (Ulmer Museum 2013) (Fig. 11). The figure was carved on a single mammoth tusk, and replication experiments have indicated that it would

50 In 2006, Sheila Coulson from the University of Oslo announced that Rhino Cave in the Tsodilo Hills of Botswana contained a large rock whose surface had been carved by humans to make it resemble a python, and purported a 70,000-year-old 'python cult' at the site. This would have made it the earliest instance of figurative carving world-wide. Although the cave does contain numerous rock engravings, and the natural rock formation resembles a serpent, archaeologists who have worked at this site for years have seriously challenged Coulson's claims as largely speculative (Robbins et al. 2007). Therefore, I have not included it in this survey.

have taken up to 400 hours of meticulous work to create it (Cook 2013:33). To some scholars, this therianthropic figurine denotes the emergence of truly modern abstract thought, where the fusion of unrelated concepts (animal-human) give way to a novel idea (Mithen 2007:22; Wynn et al. 2009). To others, the blending of animal and human properties supports interpretations of shamanic beliefs and practices among Pleistocene hunter-gatherers (Conard 2003:831; Dowson & Porr 2001; Lewis-Williams 2002:202). It is remarkable that at the nearby site of Hohle Fels a second much smaller Lion Man figurine, of just a couple of centimetres in size, has been found (Fig. 12). This exemplar, also in ivory and of an estimated similar age as its larger counterpart, strongly indicates that the Aurignacian population of Swabia can be understood as a cultural unity who shared a common system of artistic conventions, and most likely of customs and beliefs (Conard 2003; Conard & Bolus 2003; Porr 2010).

Other remarkable ivory figurines from the Swabian cave sites include the small but very detailed representations of mammoth and a horse from Vogelherd, with an estimated date of 35,000 BP (Cook 2013:52-4) (Fig. 13). The largest of the mammoth figurines, 5 cm in length, probably depicts a young animal with rounded back and no tusks (Fig. 13C). The polished body of the mammoth has deliberate geometric markings along the back and belly, and it has a small gap between the front and hind legs, through which it could have been strung or sawn to a garment. The second mammoth figure, of only 3.7 cm, shows an adult animal and is complete with tusks and tail, this one also bears some geometric pattern along the back (Fig. 13A). The highly polished horse figure is 4.8 cm long and shows an animal in profile with details of the face and mane, and also has markings on the body (Fig. 13B). Experimental replication suggests that it would have taken some 35 hours to make the horse figure (Cook 2013:54).

All of the carved figures from Swabia show tremendous craftsmanship and dedication, and although each is unique and seems to reflect individual choices and idiosyncrasies, as a whole, they constitute the earliest figurative art tradition in Europe (Porr 2010). The Aurignacian assemblages from Swabia are of further interest because there seems to have been a population 'vacuum' between the Middle and Upper Palaeolithic (Hahn 1987), meaning that Neanderthals had already abandoned the region before the start of the Aurignacian period (Conard 2004; Conard & Bolus 2003:361; Gamble 1999:377). In consequence, the makers of the figurines could only have been a population of modern humans.

After 30,000 BP, figurines and other carved objects become more common in the European Palaeolithic record. Generally grouped under the category of 'portable' art, examples include figurative sculptures and decorated tools (e.g. batons, awls, shafts, spear-throwers) carved on ivory, bone, antler, horn, stone, and various minerals (Cook 2013).

Figure 9. *Engraved ochre piece from Blombos Cave, South Africa, dated to ca. 75,000 BP.*

Figure 10. *40,000-year-old 'Venus' from the site of Hohle Fels, Germany, carved on mammoth ivory.*

Figure 11. *The Löwenmensch (Lion Man) from the site of Höhlenstein-Stadel, Germany. Sculpted from a single piece of mammoth tusk.*

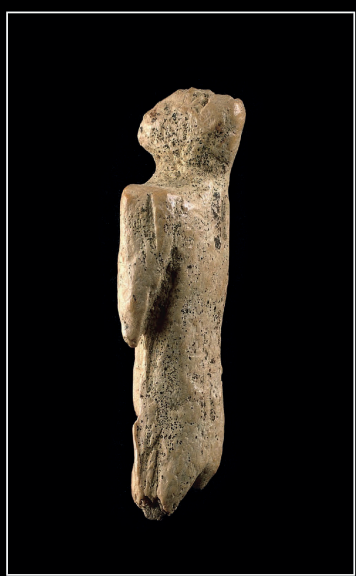

Figure 12. *The tiny Lion Man from the site of Hohle Fels, Germany.*

Perhaps the best-known group of Palaeolithic sculptures are the female statuettes commonly known as 'Venuses', which have been found throughout a vast extension of the Eurasian continent. In their majority, these female statuettes pertain to the archaeological period known as Gravettian (28-23,000 BP), although female figures continue to be found up until the end of the Pleistocene (Cook 2013:61-107). The stereotypical 'Venus' figurine (e.g. Willendorf) is a small female representation, naked or scarcely clothed, with accentuated breasts, hips, thighs and buttocks, and contrastingly minimized upper limbs and facial features (Fig. 14). In actuality the term is (mis)used to denote any female figurine from the European Palaeolithic, underestimating their variability and thus giving the wrong impression that they comprise a cohesive group of artefacts similar in appearance and function (White 2003). The 'Venuses' have been subject to a great variety of interpretations; among many: as fertility idols (Bégouen 1925), as sexually-arousing aids or 'palaeo-erotica' (Absolon 1949; Collins & Onians 1978:14; Guthrie 2005:325), as fertility imagery used in rituals (Guthrie 2005:337; Taylor 1996:123), female self-representation used as pregnancy charms (McDermott 1996), and as representations of a mother-goddess (Gimbutas 1981). These 'readings' are however highly dubious since, as mentioned before, the 'Venuses' are not a cohesive category but include figures and fragments of different sizes, forms, materials, styles, geographies, and ages (White 2003). Some of them, however, show clear regional and temporal variations, which perhaps would allow for more specific interpretations (Gamble 1982).[51]

Because of their often figurative nature, carved and sculpted objects lend themselves more easily to any number of interpretations, as in the case of the 'Venus' figurines. But interpretations aside, these artefacts represent a new category in terms of labour investment, requiring for their production more time, effort, knowledge and skill than the forms of personal adornment discussed before (Porr 2010:96). The particular case of the Aurignacian figurines from Swabia also allows us to recognize clear sets of cultural conventions identifiable by the recurrent use of materials, themes and forms in a restricted time-space. These may therefore be considered as a veritable Pleistocene visual art tradition.[52]

51 Although most archaeologists are now critical of the term 'Venus', it is hard to avoid. After more than a century of having been in use, it is so strongly associated to Palaeolithic female figurines that any new find of this sort is immediately and inevitably so named, and interpretations of ritual and sexuality are unnecessarily but invariably called forth. Such was the case with the Hohle Fels 'Venus', said to reinforce the "sexual-symbolism aspect of the art" in the Palaeolithic (Conard 2009).
52 Another interesting group are the 26,000-year-old clay-modelled figurines found at the Czech sites of Dolní Věstonice, Pavlov and Predmostí, and the Austrian site of Krems-Wachtberg. These animal and anthropomorphic figures may comprise a second example of an early Palaeolithic cohesive artistic tradition (Bahn 1998:90).

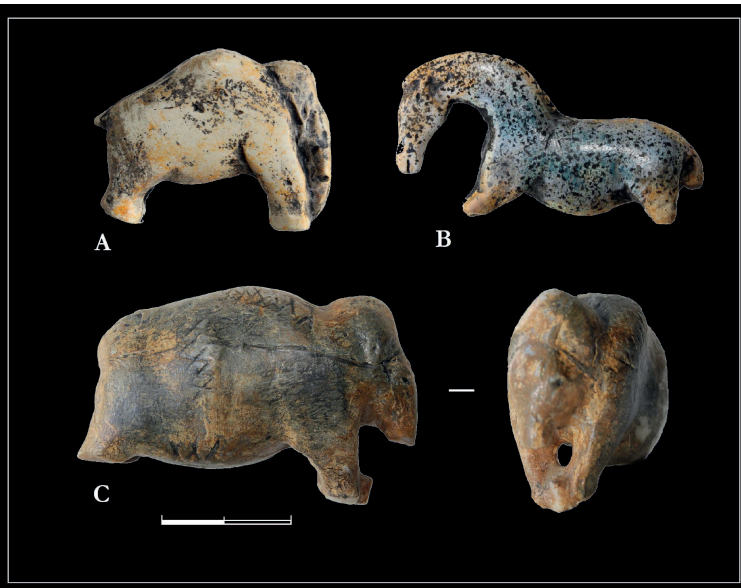

Figure 13. *Mammoth ivory figurines from the site of Vogelherd, Germany (reproductions). A) Adult mammoth. B) Horse. C) Young mammoth.*

Figure 14. *The 'Venus' of Willendorf, Austria. Carved from limestone, it shows traces of red ochre coloration. Dated to the Gravettian, ca. 25,000 BP. (Reproduction).*

Painting

Here I refer specifically to the practice of painting on large surfaces, such as rocks and walls, otherwise known as rock painting. This art form, like the rock art traditions of Palaeolithic Europe and Australia, is probably the most complex and labour-intensive of all Pleistocene visual art. Wall painting requires not only skill, but also a large amount of social and natural knowledge. Palaeolithic painters minimally needed to know the landscape well in order to choose the sites where they would work, they needed to know where to obtain the pigments and other raw materials required, and know how to mix and apply them. Not to mention, the amount of time and effort invested in the execution of the paintings themselves (Conkey 1993). The span of some styles of Palaeolithic painting also indicates that the makers had to be well-versed in social and artistic conventions to reproduce particular themes and motifs repeatedly.

As with the previous category, early Pleistocene examples of wall painting are lacking from the African continent. The earliest known example of painted art in Africa is the figurative image of an animal (eland?) on a rock slab found in the Apollo 11 Cave in Namibia, dated to 27-25,000 years BP (Wendt 1976), although some authors speculate it might be as old as 40,000 years (Masson 2006:61). It has been suggested that some rock art traditions from Australia (e.g. the Bradshaw paintings at Ubirr and the petroglyphs at Dampier), might also extend as far back as 40,000 years or more, making it potentially older than Palaeolithic cave art (Morell 1995:1908; White 2003:183), but this chronology remains inconclusive. Currently, the earliest accepted dates for the so-called Bradshaw style at Ubirr lie between 25-17,000 BP (Brumm & Moore 2005:160). For now, the earliest instances of systematic rock painting come from the European Palaeolithic.

In 1994 the announcement of the discovery of Chauvet Cave, in Vallon Pont d'Arc, Ardèche, France, made world news. This site has become renowned not only for its impressively realistic painted panels depicting numerous animals (cave lion, bear, horse, woolly rhino, bison, and mammoth, among others), but also because it has changed the standard view of the development of figurative art in the Palaeolithic (Fig. 15). Some of the most spectacular painted caves from France (e.g. Lascaux) and Spain (e.g. Altamira) have been attributed to the Solutrean and Magdalenian periods, which had always been considered the 'heyday' of Palaeolithic painting. However, Chauvet yielded Aurignacian dates, going as far back as 32,000 BP, indicating that figurative cave art was not only older than expected, but also quite magnificent from very early on (Clottes 2003). However, the accuracy of the dating of Chauvet has been questioned on various grounds (Pettitt 2008; Pettitt & Bahn 2003). Firstly, most of the samples for the radiocarbon dates were taken from the cave floor, therefore they may be representative of human activity in the cave, but not necessarily of the paintings (Pettitt 2008). Second, the styles, themes, and techniques used in the painted panels are typical of later periods (Gravettian and Solutrean), but absent in other

Aurignacian-age sites (Combier & Jouve 2014). Finally, Aurignacian occupations are in general scarce in the area around the cave, making Chauvet an unlikely isolated site (Combier & Jouve 2014; Pettitt 2008). Nevertheless, other scenarios must be considered, apart from the possibility that the dates may indeed correspond to the actual age of the panels. For example, that the paintings were created in various moments, with some images pertaining to the Aurignacian and some to later periods or, that other Aurignacian caves of similar quality and age have yet to be discovered. Some scholars have suggested that the overlap of themes between the Swabian figurines and the Chauvet panels (both depicting Pleistocene fauna like cave lion and bear) may support the Aurignacian age of the latter (Conard 2003, 2009; Zilhão 2007:34). But beside the faunal content, these two art traditions are very dissimilar, not only do they involve different forms and techniques (carving vs. painting) but also the context in which they were used and produced is divergent (Pettitt 2008:911). The ivory sculptures were all made, used and discarded in domestic spaces, and were found among occupation debris alongside personal ornaments, suggesting that their production and use was embedded within everyday activities and were probably connected to individual persons (Porr 2010). Whereas, Chauvet Cave has the characteristics of a non-residential ceremonial site, more likely associated to the organized collective activity of a group (Broglio et al. 2006:7).

Despite the caveats, the Aurignacian origin of the Chauvet paintings has been generally accepted (Pettitt 2008), and in any case the paintings must be at least of Gravettian age, since the entrance to the cave seems to have become blocked by 21,000 BP (Sadier et al. 2012). Furthermore, there are now indications that figurative painting may have been a usual practice during the Aurignacian. The site of Fumane Cave in Italy has yielded rock fragments that seem to have detached from the cave ceiling which bear ochre and some simple schematic paintings going back to 35-32,000 BP (Broglio et al. 2006). Another roof-collapse with traces of paint depicting a zoomorphic figure and an engraving of a vulva at the site of Abri Castanet, in France, has given a date of ca. 36,000 BP (White et al. 2012). Also, a recent dating project covering several well-known painted caves in Spain, including Altamira, El Castillo, and Tito Bustillo has yielded dates going back to the Aurignacian in all of the sites (40-34,000 BP), suggesting that the caves were visited throughout the Upper Palaeolithic for artistic motives (Pike et al. 2012). Similarly, the Spanish site of Altxerri B, in the Basque country, includes painted motifs of various animals (feline, bear, horse) and has been dated to 34-30,000 BP (González-Sainz et al. 2013). These results support the suggestion that painting practices have a deep temporality in Europe, where they seem to have developed locally among modern human populations (Jöris & Street 2008:797).

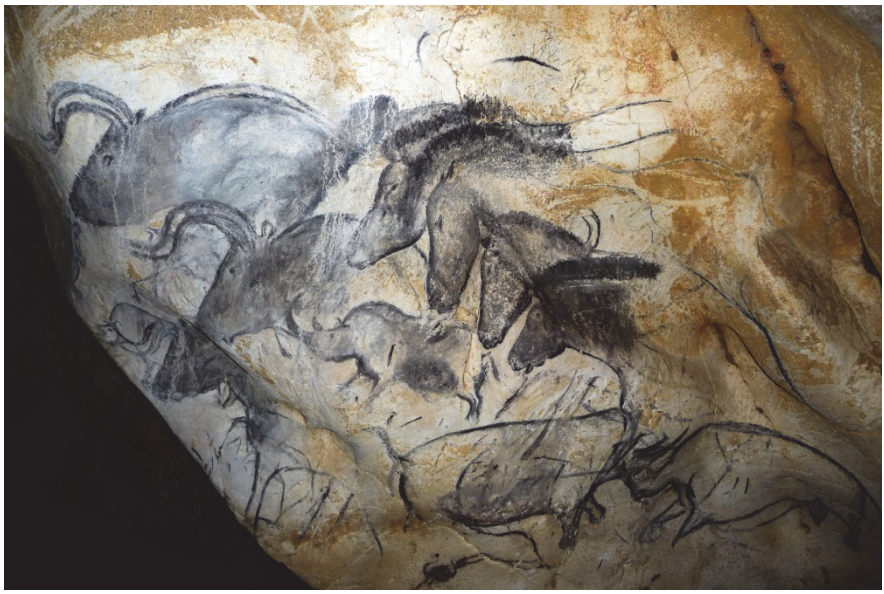

Figure 15. *The horse panel at Chauvet Cave, France. An early example of a complex figurative rock art tradition from the Early Upper Palaeolithic.*

As in the case of carved and sculpted objects, instances of rock painting become more common in Europe after 30,000 years. Wall painting practices seem to have peaked towards the Magdalenian period (18,000-10,000 BP), in the coldest phases of the last Glacial era with most painted caves clustered around the Périgord region in France and the Spanish area of Cantabria suggesting that cave-painting might have been a localized artistic tradition. Although at the moment few examples from other regions are known (e.g. Kapova Cave in Russia, and Coliboaia Cave in Romania), it is probable that other Palaeolithic painted sites are still to be discovered.[53] The improvement of dating methods and the increasing sample of dated caves also may start clarifying the development of rock painting traditions in the European Pleistocene. At the moment, it seems that Palaeolithic painting increased in complexity over time, from the early Aurignacian to the developed Aurignacian and Gravettian, and later. Alistair Pike and colleagues, for instance, noted that the motifs which yielded the earliest dates at the Spanish sites of Altamira, El Castillo and Tito Bustillo were simple, abstract, non-figurative and monochrome designs, for instance geometrics and hand stencils. Whereas, the later panels become more concerned with figurative art, particularly animal depictions (Pike et al. 2001:1412). This pattern of increasing sophistication towards figurative art in Palaeolithic painting, however, need not be correlated with increased human

53 Coliboaia Cave in Romania, whose date is currently estimated at 35-23,000 BP, is stylistically and thematically, highly reminiscent of Chauvet Cave (Ghemis et al. 2011).

cognitive abilities, creativity or imagination (e.g. Mithen 2001). Rather, it can be explained more parsimoniously by an increasing specialization of visual art practices. This is supported by the highly conventional regional and chronological styles of figurative painting, and the use of distinct locally distributed techniques and 'paint recipes' (Clottes 1993; Conkey 1993:109). As I discuss below and further in chapter 6, specialization of artistic practices likely correlates with larger mean population sizes and more intensive inter-group interactions as the Palaeolithic progresses.

2.4 Trends in the development of Pleistocene visual art

At a first glance, it would seem that the archaeological record of Pleistocene visual art evolved in a linear fashion, making it easy to assume that the development of visual art occurred in an uninterrupted progression from simple (pigment use) to complex (figurative painting). But in reality, the development of Pleistocene art is more intricate than that. As we have seen, visual art has been recurrently present as a human behaviour for at least the last 100,000 years of our history. However, there are periods where it is almost invisible in the archaeological record, and others where it is abundantly present and varied (McBrearty & Brooks 2000:529). Furthermore, not all forms are found in all regions during the same time periods, and the presence of one form does not compel nor preclude its co-existence with another.

The emergence of visual art hinges on some basic abilities (dexterity, knowledge of raw materials, labour investment in material culture, and the social use of artificial signs – i.e. symbolism) that to some extent were already in place early in hominin evolution (McBrearty & Brooks 2000:486). But the convergence of such traits in the systematic practices that we now recognize as visual art only started to leave clear traces by 120,000 years ago, if we consider the estimated date for the Skhul beads – or even earlier if we consider the evidence of ochre pigment production – and was certainly in place by 100-75,000 BP (Barham & Mitchell 2008:256).

The pattern of episodic bursts and gaps in the early record of visual art may be in part attributed to a 'taphonomic bias', that is "the tendency for younger things to be over-represented relative to older things in the archaeological record due to the operation of destructive processes like erosion and weathering" (Surovell et al. 2009:1715). Differential processes and conditions of deposition and preservation play an important role. For instance, certain types of sites (e.g. open air, coastal, reoccupied, urbanized, etc.) and certain soils (e.g. acidic, moist) do not favour the survival of archaeological materials. In Pleistocene coastal sites, visibility in the record is largely affected by the changes in sea level over the past glacial and interglacial events (Blome et al. 2012:584). Also intrusive elements like fauna and roots can disturb the sites over time and produce the mixture of archaeological material from different

moments. Evidently, the older the site the greater these issues become. Other factor affecting the shape of the archaeological record of Pleistocene visual art is constituted by the researchers' biases. For example, at sites where archaeologists are not expecting to find certain materials (e.g. personal ornaments), evidence may be overlooked or misclassified. Also, some regions have been historically more accessible for study than other potentially rich areas that remain underexplored. Furthermore, dating techniques are continuously improving but are not infallible, particularly when dealing with materials of great age, as exemplified by the 'Middle Palaeolithic dating anomaly', and the difficulties of dating rock art, discussed above. It is important to note that all of these factors intervene in archaeological interpretation, as philosopher of archaeology Raymond Corbey explains (2005:114-5):

> Take five meters of sediment in an *abri*, a shallow cave in Southern France, consisting of a few score of perturbated layers, some of which contain knapped flint, fragments of animal bones, and traces of fire. The layers may represent some two hundred thousand years of hominid activities. Now take one of those layers with archaeological material, approximately five centimeters thick. It may not be clear whether this is the sedimentation of weeks, months, or centuries of occupation; of one continuous period of use of the cave or of a number of visits to the spot. Nor may it be clear whether that layer is 80,000 years old, 120,000 years, or a mixture of remains from several periods. Such date provide rich playing fields for archaeological interpretation, not unlike the inkblots in the Rohrschach projection test used by psychologists. There are various preconceptions with respect to what a 'camp site', 'language', a 'ritual deposition', or a sequence of technological acts are and how these phenomena should be conceptualized. Such preconceptions, together with the ambiguous data, make up our reconstructions of the past.

But in spite of these 'epistemic disadvantages' (Turner 2007:7), archaeologists, and historical scientists in general, can and do build (partial) explanatory models of past events, based not only on inferences and deductions made by examining the traces of past activity, but also on observations of current patterns of activity, techniques for simulating, modelling, and comparing data, and the general existing corpus of scientific knowledge. These models, evidently, are themselves also biased and influenced by personal and academic preferences and backgrounds, that is why continuous reassessment in light of new data and theories is advised.

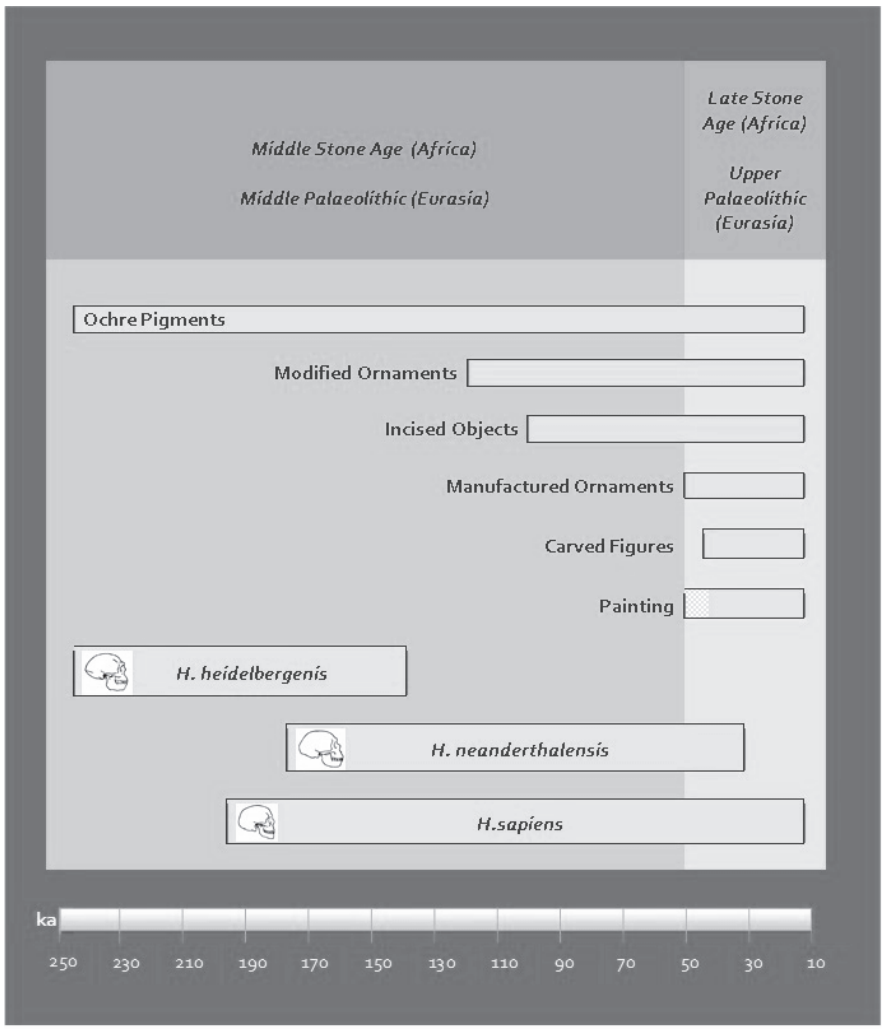

Figure 16. *Chronological relation of archaeological periods, hominin species, and visual art forms from the Late Pleistocene.*

Going back to our subject, the current state of the record, despite the problems mentioned, still allows us to make some general inferences about the development of visual art forms in the Pleistocene. The first is that personal ornaments are the earliest (preserved) form of visual art and, probably the most widespread as well. All historically recorded human groups, even those with the 'simplest' technologies and smallest population sizes, have engaged in bodily decoration, as noted by evolutionary scholars, from Charles Darwin

([1879]2004:640) to Merlin Donald (1991:277).[54] This suggests that personal ornamentation may be considered a veritable universal human behaviour, deeply rooted in our species. Other forms of visual art are, in contrast, not that common. For example, art forms such as figurative carving and painting, have not always been recorded either archaeologically (e.g. in the mid MSA) or ethnographically (e.g. among the contemporary Amazonian Pirahã and Huaorani). These differences should also be accounted for by origins-of-art models. As I mentioned before, some models have explained the absence of these forms in the archaeological record prior to 45,000 BP in terms of cognitive ability, that is, they suggest that before that time humans simply did not have the mental capacity to produce figurative sculpture or painting (e.g. Coolidge & Wynn 2005; Klein & Edgar 2002; Mithen 1996a; Morris-Kay 2010). However, such discrepancy can also be explained in terms of technological involvement, that is the purposeful manipulation of raw materials and the application of (previously acquired) knowledge, skill, and technique (Gibson 2012; Ingold 2000:299). In this manner, I have suggested that what the development of visual art may reflect is increasing labour investment and specialization in art-making activities, that likely correlate with changing modes in social organization (as I further discuss in chapter 6).

In a broad manner, labour investment in visual art may be understood as the number of actions or 'steps' minimally required to produce a finished artwork or design. For example, ochre use may require 2 to 4 steps, depending on the application. If applied directly to a surface, we may talk minimally of two steps: finding and extracting the raw material and applying it. If the surface requires modification before ochre may be applied to it, or the ochre piece is itself modified (e.g. shaped into a 'crayon'), it would entail a third step. In the case of pigment production, an extra step would involve grinding or crushing (Henshilwood et al. 2011:222). Similarly, the production of modified personal ornaments like the shell beads discussed above would require at the least 3 steps: finding/selecting the raw material, modifying it (e.g. through piercing or drilling with an awl or burin), and finally stringing or hanging (Tátá et al. 2014), but occasionally it also involved rubbing, polishing, or colouring (with ochre). Making beads 'from scratch', incising objects, and carving require even a larger chain of operations that includes selecting the raw material, preparing the surface, making or selecting adequate tools for modification, and engraving,

54 For example, the extinct foragers from Tierra del Fuego (Argentina), Baja California (Mexico), and Tasmania, who depended on a very simple tool-kit, all had rich traditions of bodily decoration. The Fuegians are said to have been fond of wearing necklaces, pendants, bracelets and other jewellery made of shell and bone, and were known for their intricate tradition of body painting (Fiore 2008; Garson 1886). The Californians wore complex headdresses, hair and body decorations made of pearls and feathers hung from fibre strings, and only occasionally may have practiced rock painting (Aschmann 1959). The Tasmanians, for their part, had a complex system of bodily decoration through scarification and wore a variety of body and hair ornaments, while lacking the rock painting traditions of the mainland groups (Ryan [1943]1996:11-2).

carving or reducing the material until the final product is obtained, not to mention the processes of learning and practicing of skills implied beforehand. For example, the production of ivory beads minimally requires five discrete stages (Barth et al. 2009:16; White 1989:223). Incising objects involves material selection, preparation of the surface, and the elaboration of a design with a tool (e.g. a burin), either of a simple abstract or geometric pattern, as in the Blombos ochre (Henshilwood et al. 2009), or a complex figurative representation, as in the engraved portable art pieces of Palaeolithic Europe (Cook 2013:186). Carving figurines, for instance on ivory or wood, would entail a more laborious process, as would modelling in clay or stone (Cook 2013:148). As discussed before, even the small ivory figurines from Swabia would have taken up to 35 person-hours to make (Cook 2013:54). Finally, figurative rock painting seems to have been the most labour-intensive of all Pleistocene art forms. First, the maker would have needed to obtain and prepare the pigments for the paint, for instance through grinding and mixing with some binder to create a coloured liquid or paste, or shaping coloured minerals into 'pencils' or 'crayons'. Then, the maker would have required to know or find an adequate spot in the landscape and in the target surface itself. The latter also would have required preparation such as lighting aids — for example, in Lascaux several oil lamps have been found (Ruspoli 1987:28). Often the wall surface or background was primed through rubbing or scrapping, as in Chauvet Cave (Clottes 2003). Finally, creating the paintings themselves also required various steps, according to the motif. Faunal images were frequently outlined first by engraving, tracing or drawing (Cook 2013:180). Then, the figures could be filled in, sometimes with aid of brushes or pads of fibres or hair (Clottes et al. 2003:157). Overall, the amount of effort and time involved make it highly probable that the production of figurative cave paintings, from beginning to end, involved the joint endeavour of more than one individual, perhaps over a long period of time (Conkey 1993; Cook 2013:182; Lewis-Williams 1995). It is also relevant to point out that Palaeolithic cave painting seems to have taken place mostly in formal spaces reserved for such activity (ritual spaces), whereas all the other art forms appear to have taken place in domestic environments.

In addition, many of the art practices I have described overlapped. Blombos Cave, for instance, offers an extraordinary record showing that some MSA populations were simultaneously making use of ochre pigments, modifying shells for ornamentation, and creating engraved designs by 80,000 BP. In the European Upper Palaeolithic, too, people who were making wall paintings were also producing carvings and personal ornaments. This invites the questions of how people could afford the time and effort to invest increasingly in visual art practices, why these diversified into the media left in the record, and how come that certain forms (e.g. painting) moved from the domestic to the formal. In my opinion, the growing degree of investment in visual art is likely correlated to specialization in the division of labour in larger groups. Division of labour refers to "the degree to which different individuals within a social group specialize on

different tasks" (Fewell et al. 2009:484). The division of labour by sex and age is the basis of the hunter-gatherer economy, where men, women, children, teenagers, and elders typically perform socially assigned activities related to resource acquisition and processing, artefact production, domestic activities, social engagements, etc. (Kaplan et al. 2000). There are, however, a small number of specialized tasks – that is, tasks that are done "by a single or a few individuals" (Ehn 2009:13). Ethnographic data from small-scale hunter-gatherer groups (e.g. the San) suggest that ritual performance (e.g. healing), instrumental music-making, and visual art practices such as rock painting are specialized activities, whereas the production of tools and personal ornaments (e.g. beadwork) are not — although they can be gender-related (Lewis-Williams 1995; Wiessner 1983, 1984).

For their part, labour studies indicate that there is a positive relationship in human societies between the number of specialized traits and group size (Ehn 2009:17; Jeanson et al. 2007:290). Therefore, if we assume that the patterns of organised labour that we see among contemporary hunter-gatherers might have been somewhat similar in the Pleistocene, we may (albeit sketchily) explain some of the patterns in the record of visual art. The earliest art forms (modified objects such as shell beads and engraved objects) did not involve much work. In the case of the shells, for example, perhaps the most laborious task involved their acquisition. Manufactured ornaments, in contrast, entail more effort, skill and time and, in some cases (Aurignacian beads), formalized manufacturing processes that already hint at insipient technical specialization, i.e. a single or few ways of producing an artefact. The time-consuming practice of ivory carving in Swabia, with its conventional themes and forms, might also indicate technical specialization. However, all of these visual artworks seem to have been produced, used, and discarded in domestic environment by various sorts of individuals. In contrast, figurative cave painting is not only formalized and labour-intensive, but also probably involved the joint work of several individuals, and took place in non-habitational spaces. This activity only comes into view in the developed Aurignacian and the Gravettian, coinciding with a higher incidence of sites and artefacts that suggest larger human populations (Davies 2001).[55] So, the appearance of figurative painting in the European Upper Palaeolithic may reflect the emergence of visual art as a specialized activity (done by a few individuals). The specialization of non-subsistence practices, in turn, may imply the specialization or reorganisation of resource acquisition and other tasks that allowed to free time and effort to invest in visual art practices. These issues will be revisited in chapter 6.

55 This does not mean that whenever group sizes increase, complex artistic traditions will arise. Specialization depends not so much on group size as on social organisation (i.e. institutions). Even when population numbers fall, if the institutions remain, specialized work and knowledge can survive. Conversely, if the social institutions collapse, despite stable population numbers, specialization will likely be lost to a great extent (Stymne 2009).

This admittedly prosaic labour-based model can explain, for example, why figurative painting did not appear earlier, without having to invoke any changes in cognitive ability (e.g. Mithen 1996a), memory (Coolidge & Wynn 2005), or consciousness (Lewis-Williams 2002).

2.5 Conclusion

The archaeological record, despite its incompleteness, biases, preservation issues, and other flaws, remains our best source of information for tracing back the early history of human artistic practices. As I reviewed in this chapter, so far this record indicates that by 100,000 years ago, at the latest, humans were consistently engaging in some forms of visual art.

Four main conclusions may be drawn from the record review carried out above:

1) Visual art is a reliable archaeological marker of *H. sapiens*, since it is "the only noteworthy difference" between the record of modern humans and other hominins, particularly Neanderthals (D'Errico 2007:130).
2) The practice of ornamenting the body truly is a universal human behaviour, and as far as we can tell, it constitutes the earliest form of visual art.
3) Visual art did not come "with a bang" (Pfeiffer 1982:11), nor did it evolve sequentially from simple to complex forms, as Leroi-Gourhan foresaw it ([1964]1993:372). Rather, like any other human technology, visual art co-evolved with social organization which in the Pleistocene, as today, varied across geography and time.
4) The intensification of visual art production and the emergence of novel forms of visual art (e.g. figurative painting) in the European Early Upper Palaeolithic record may be explained by a model of growing labour specialization.

3. THE ART OF COURTSHIP: GEOFFREY MILLER'S MATE CHOICE MODEL

Courage, pugnacity, perseverance, strength and size of body, weapons of all kinds, musical organs, both vocal and instrumental, bright colours and ornamental appendages, have all been indirectly gained by the one sex or the other, through the exertion of choice, the influence of love and jealousy, and the appreciation of the beautiful in sound, colour or form; and that these powers of the mind manifestly depend on the development of the brain.

CHARLES DARWIN, 1871

In 1860, Charles Darwin wrote in a personal letter to botanist Asa Gray: "The sight of a feather in a peacock's tail, whenever I gaze at it, it makes me sick!" (Hiraiwa-Hasegawa 2000:12). This now legendary quote reflects the problem that conspicuous animal traits posed for Darwin's principle of natural selection, since these properties did not seem to contribute towards the survival of the individuals that possessed them, being even detrimental at times. Later, however, he arrived at the mechanism of sexual selection to explain those exaggerated traits that had defied him – such as the colourful plumage of the males of several bird species, and the huge antlers of many male ungulates –, as armaments or ornaments used in courtship displays (Anderson 1994:XV).

The origins-of-art model that will be reviewed in the present chapter maintains that a work of art, like the peacock's tail, is a personal advertisement of one's physical, mental, and social condition. In this model, art is thus a striking feature that does not increase survival chances, but is imposing to rivals and attractive to the opposite sex, and thus increases mating opportunities. It further suggests that, like those animal armaments and ornaments, art evolved as a strategy for mating competition, to entice sexual partners and outcompete opponents.

In recent years, the main representative of this hypothesis has been American evolutionary psychologist Geoffrey Miller, whose work will be examined in this chapter. Miller's model is based on two complex theoretical frameworks: evolutionary psychology and sexual selection theory. The first section of this chapter will lay out a general background regarding some key concepts of sexual selection and mate choice theory. The next section will then describe the main line of argument of his model, placing special attention on its treatment of visual art. This will be followed by a discussion of Miller's hypothesis in light of data from biology, anthropology and developmental psychology. Finally, the model will be compared with what is known about

mating preferences in relation to human evolution, and the visual art record in Pleistocene archaeology. To this aim, I will formulate some predictions derived from the model regarding the emergence of visual art, and see whether these are consistent with what is indicated by the archaeological record. This exercise will elucidate whether the model can offer a plausible scenario for the emergence of visual art.

3.1 Sexual selection and mate choice theory: The background

In *On the Origin of Species*, Darwin presented not only his renowned thesis on natural selection, but he also introduced the principle of sexual selection, which "depends not on a struggle for existence, but on a struggle between the males for possession of the females" ([1859]2006:56). He would further elaborate on the evolutionary effects of sexual behaviour in *The Descent of Man*, from 1871.[56] In broad lines, he argued that whereas success in natural selection depends on the survival of individuals in relation to the conditions of life, in sexual selection success is measured by the reproductive advantage of certain individuals over others of the same sex and sort in relation to the propagation of the species (Darwin [1879]2004:243; Taylor 1996:35). The environment and competition for resources are major factors of natural selection, but sexual selection is mainly driven by intra-species competition over mates and mating opportunities (Andersson 1994:8).

Sexual selection includes several mechanisms, one of which is mate choice or "the outcome of the inherent propensity of an individual to mate more readily with certain phenotypes of the opposite sex (i.e., mating preference or bias) and the extent to which an individual engages in mate sampling before deciding to mate (i.e., choosiness)" (Kokko et al. 2006:49). The other six mechanisms of sexual selection that biologists have identified so far are: contests, endurance rivalry, scrambles, coercion, sperm competition, and infanticide (Andersson & Iwasa 1996). Darwin focused primarily on contests (fight over mates) and mate choice when he coined the term 'sexual selection', and to this day, that meaning remains its most simple and useful application (Andersson 1994:9) but sexual selection neither equals nor is restricted to these two strategies (rival battle and mate preference).[57] However, mate choice is of

56 Darwin is often quoted as the first researcher to have drawn a link between sexual selection and the arts, but he actually dedicated few paragraphs to this issue and his opinions concerned mostly the occurrence of song and music, e.g.: "I conclude that musical notes and rhythm were first acquired by the male or female progenitors of mankind for the sake of charming the opposite sex" ([1859]2006:638, footnote 39).

57 It should then be clear that whereas all mate choice is sexual selection, there reverse is not true. Notwithstanding, scholars, particularly in the humanities, often use both terms indistinctively. With the rising popularity and application of evolutionary theory in the human disciplines, this confusion might lead to misuses and misunderstandings. For example, art historian George L. Hersey writes: "Humans, like many other animals, have always made sexual choices. In this sense all the phrase

special interest precisely because it seems to be directly correlated with the evolution of the 'ornaments' and the extravagant traits which Darwin struggled to explain through natural selection (Kokko et al. 2003).

Because the sexes generally invest unevenly in offspring, there will be some conflict of interest between males and females leading to different reproductive strategies (Trivers 1972:173). Usually, the females invest considerably more than the males so they will tend to be the choosier sex, whereas the males will compete among themselves for mating opportunities. Hence, the most common mating dynamics in the animal world involve male-male competition and female choice (Geary et al. 2004:27), although these in no way exhaust the array of mate choice strategies. Mate choice can take several forms (Andersson & Simmons 2006; Jones & Ratterman 2009). The two best-known are mate choice for direct benefits and for indirect benefits. In the first, individuals choose for an *immediate fitness advantage*, that is, for direct phenotypic effects such as the procurement of resources, territory, parental care, protection, fertility, disease avoidance, etc. In the second case, individuals choose for *indirect benefits* (fitness advantages bestowed on the offspring in the long-run) on the basis of some trait that correlates with the desired advantage. For example, when a trait – such as an ornament – serves as an indicator of the genetic quality of the individual, potential partners can use that trait as a cue of quality and may evolve a preference for it, as in the case of the peacock's tail. In addition to selection strategies for benefits, mate choice may be based, among others, on sensory biases – when the selected trait exploits some perceptual preference that originated in a non-sexual context (Andersson & Simmons 2006:297; Jones & Ratterman 2009:10004),[58] or on social information, i.e. 'mate copying' (Dugatkin 1992; Mery et al. 2009). Through these various strategies, sexual selection has provided a theoretical framework to explain conspicuous anatomical, cognitive and behavioural traits, like the colourful plumage and intricate song of many birds, and the 'weapons' of several mammals, such as antlers, tusks, and horns.[59] These features apparently contribute little to survival effort, and at times even hinder it, but are essential for mate acquisition.

'sexual selection' means is that two potential partners consider each other more desirable, or at least less impossible, than other potential mates, and act accordingly" (1996:2). Similarly, art scholar Barbara Larson states: "Sexual selection refers to an individual of one gender making a choice between two or more potential mates of the opposite gender" (2009:174). Clearly both authors mean mate choice when they talk about 'sexual selection', and although such inaccuracies might seem harmless, they may become problematic when used as the basis for evolutionary explanations.

58 For example, the preference of female guppies (fish) for more intense orange-tailed males might be traced back to a wide-species feeding preference for orange fruit (Rodd et al. 2002).

59 See: Anderson & Iwasa (1996:53, Table 1). Sexually selected traits, however, are not exempt from natural selection, which can always counter them. In fact, sexual selection is sometimes seen as a 'special case' or subset of natural selection (Anderson 1994:7). But as Prum has rightly noted (2012:2255), Darwin formulated sexual selection precisely to account for those cases which could

As I explain in the next section, Miller clearly favours mate choice for indirect benefits,[60] where the preferred trait is assumed to be a reliable indicator of the individual's overall genetic quality.[61] In the classical example of the peacock, the large, colourful, eye-spotted feathers of the long, heavy tail incur a huge energetic investment and, while attractive to the peahens, it makes the male bird less agile and more noticeable to predators. Because the state of the tail is correlated with the general physical condition of the male, the trait will be more elaborate among strong, healthy individuals. Therefore, the peacocks that despite the costs and risks of the tail can afford to sustain and display it conspicuously will be preferred by the peahens as high-quality mates; i.e. the tail serves as a wasteful or costly signal (Zahavi 1975:211),[62] and becomes a reliable indicator of general genetic quality (Jones and Ratterman 2009:10004). In Miller's view, many characteristics of human cognition, behaviour, and culture, including language, humour, music, art, and altruism (1997, 1998, 1999, 2000a),[63] evolved precisely, like the peacock's tail, as fitness indicators "for a courtship function" (2001:20).

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not be explained by natural selection, that is as an alternative to, not a special case of, natural selection.

60 Models of mate choice for indirect benefits also called 'good-genes' models, 'costly signalling', or as in Miller's work, 'fitness- indicator' models.

61Simply defined, fitness is "an organism's expected contribution to the next generation's gene pool" (Sterelny & Griffiths 1999:157), meaning its capacity to survive, reproduce and pass on its genes.

62 However, alternative explanations have been put forward. Berglund et al. (1996) have suggested that the elaborate tail of the peacock might constitute an armament for intrasexual competition, rather than an ornament for courtship, and thus shaped by male-male conflict instead of female choice. Another recent study (Takahashi et al. 2008) has raised doubts about the categorization of the male peafowl's tail as a costly signal shaped by sexual selection; and suggests that the tail might actually be an ancestral trait that has been lost in the females who, in fact may not even choose mates on the basis of their tail. Instead, it is more likely that a whole set of behaviours, including shivering displays and vocalizations, influence peahen preference. The study concludes that there seems to be no absolute correlation between the size of the tail, or the number or symmetry of its eyespots, and the mating success of the bird. Also, a bigger and heavier tail does not make the peacock more susceptible to predation. If at all, it is the peahens who suffer more predation, being more vulnerable while nesting on the forest ground.

63 A similar argument has been posed by archaeologist Timothy Taylor in the past: "Culture provided sexual selection with a massive new scope. Mate choice was no longer solely a matter of sizing up the relative merits of the basic inherited personality and appearance of a prospective partner. Now learned skills – singing, hunting, dancing, and painting – came to play an ever greater role in sexual attraction. The human brain continued to enlarge, from 1.6 million years to sometime just after 150,000 years ago, when 'anatomically modern' humans first appeared. Since the period does not seem to have presented any obvious environmental challenge that only larger brains could meet, the enhanced cultural capacities of ever larger brains could have been a sexual fit. Love songs and nicely arranged bouquets may have been at least as important as aggression in the life of the species" (1996:7).

3.2 The bowerbird and the artist: Key arguments

When discussing the effects of sexual selection in The Descent of Man, Darwin alluded to a probable correlation between the human 'passion for ornament' and the affairs of choosing a mate. In a comparative exercise with the animal kingdom, he suggested that just as the vivid colours and patterns of some male birds, like the peacock, serve them to lure females, humans turn to decoration to enhance their natural qualities and make themselves more attractive to the opposite sex ([1871]2004:640).

Miller elaborates on Darwin's thoughts (2000a:11) and suggests that the origin and proliferation of visual art probably are the product of sexual selection through mate choice, or a 'courtship adaptation' (2000:258, 2001). Human art-production, Miller claims, is costly and wasteful, requiring energy and resources that could be better invested in survival efforts like foraging, rest, or defence. Therefore, to him, art making is not easily explained by natural selection, which is an economizing process that would not promote the persistence of an apparently superfluous behaviour. Sexual selection, on the other hand, often results in the development of exaggerated and seemingly useless but attractive traits, like the plumage of the birds-of-paradise. So for Miller, a strategy of mate choice that selects for indicators of 'good genes' provides a reasonable basis to explain the evolution of visual art.

Human mating preferences and strategies

Human mating preferences and mating strategies have been a frequent topic of research for evolutionary psychology. Unlike social scientists who usually claim that mating choices are a function of socio-economic pressures and culturally-shaped gender roles (Wood & Eagly 2002), evolutionary psychologists defend the view that mating preferences are innate psychological adaptations that guide individuals in choosing high-quality partners (Gangestad et al. 2006). Likewise, mating strategies are seen as the result of the reproductive problems faced by humans throughout evolution (Buss 1994); for example, whether to invest in offspring quantity or quality, or whether to invest in parental care or in multiple mates, etc. As in most mammals, human mating strategies are constrained by parental-investment, which determines that "the sex that invests more in offspring is selected to be more discriminating in choosing a mate, whereas the sex that invests less in offspring is more competitive with members of the same sex for sexual access to the high-investing sex" (Buss1994:240). Thus women are expected to be choosier, and men are expected to engage in sexual rivalry and prowess displays.

According to Miller, visual art evolved in the context of human mating strategies, in response to the problem of assessing the genetic fitness of a potential mate. He argues that because, for women in particular, it would be detrimental to incur the energetic costs of rearing unfit children, selecting a

mate on the basis of fitness indicators would have been more advantageous than selecting for direct benefits (1998:109):

> Choosing males for their provisioning and protection abilities eases the energetic burden of motherhood, but choosing males for their indicators of genetic quality and aesthetic displays reduces the risk of producing sickly, unattractive offspring that may never reproduce.

He argues that the mental and physical abilities required for art making (e.g. creativity, concentration, coordination, dexterity, etc.) are condition-dependent indicators; that is, they are costly traits that correlate with the general condition of the individual, and thus are reliable indicators of genetic quality. Therefore, since artistic skill could serve as a cue of genetic fitness, people, especially women would be expected to evolve a preference for it. Seen in this light, artworks could actually be understood as fitness displays, "an occasion for demonstrating one's ornamental skills and aesthetic taste" (2000:274). But, Miller states, our pronouncements regarding artworks have an effect beyond sexual selection. When formulating a judgement about a work of art, knowingly or not, one is also assessing the maker's intelligence, creativity, skill, sociability, etc. which influence not only mate choice but also friendships, alliances, and all other types of social relations. In this sense, aesthetic judgments help us make "biologically significant decisions about other individuals on the basis of observable behavioural cues" (2001:24).

To illustrate how evolution could have moulded artistic behaviour in a sexual context, Miller draws a parallel with the courtship displays of the bowerbird. To woo a mate, the males of this bird family build an elaborate arrangement out of twigs called a 'bower'. They further garnish their construction using colourful and lustrous materials, like berries, shells, bones, nuts, feathers, flowers, shiny insects, glass, and even plastic objects. The males lure females to their bower construction through displays of dance and song. Each individual bower is different, and the birds spend much time attending to it and protecting it from the elements and rivals.[64] Because of the use of specifically arranged and colourful items, reminiscent of decoration, since Victorian times bowers have often been referred to as 'true artworks' of the animal kingdom. Darwin himself said that the bowers "are tastefully ornamented with gaily-coloured objects; and this shews that they must receive some kind of pleasure from the sight of such things" ([1879]2004:115).[65] Human

64 The bower of the polygamous bowerbird is not a nest, its only function being for courtship display. Once a female approaches a bower and mates with its maker, she will leave to build a nest, hatch and care for the chicks on her own.

65 This kind of statements, however, have been disputed since the early 20th century: "No one will deny that structures, such as, for instance, the gardens of the atlas birds [vogelkop bowerbird *Amblyornis inornatus*], which have been depicted by Beccari, are most wonderful specimens of animal industry. But it is undoubtedly misleading to speak of them as artistic. [...] It has been noticed that the cock of the great bower bird amuses himself by flying to and fro in the bower carrying a shell in his bill, which he picks up on one side and carries to the other. On an

artistic behaviour, Miller says, is somewhat similar to bower building. Both are expressions of fitness located outside the body, and intended to attract mates (2000:267, 2001).[66] Male bowerbirds tend to be dull coloured, so instead of displaying their fitness through striking plumage –like other related species do – they make use of their bowers. Similarly, he says, humans use art (2000a:270):

> The bowerbirds show the evolutionary continuity between body ornamentation and art. They happen to construct their courtship displays out of twigs and orchids instead of growing them from feathers like their cousins, the birds-of-paradise. We happen to apply colored patterns to rock or canvas.

In that sense, works of art are extensions of a person, they are 'extended phenotypes' or out-of-body manifestations of the individual's self (2000a:270). Examples of extended phenotypes from the animal world include a spider's web, a bird's nest, or a beaver's dam, which are essential components of the genetic and phenotypic makeup of these organisms, as much as their sensory or vital organs. These features, Richard Dawkins explains, must have an evolutionary purpose, for much time and energy is expended in their making: "whatever its benefits, a beaver lake is a conspicuous and characteristic feature of the landscape. It is a phenotype, no less than the beaver's teeth and tail, and it has evolved under the influence of Darwinian selection" (1989:248). Miller suggests that, as a personal display of fitness like the bower, visual art must have evolved originally as an individual activity whose resulting products were kept in the intimate socio-personal space of the maker for all to see and judge. Positive valuations of visual art displays would then bring reproductive as well as social success to the artist (2001:25). In section 3.4 I will consider this prediction in light of the archaeological record of visual art.

In addition to being displayed for courtship purposes, according to Miller, visual art is consistent with a sexually selected trait in two other important aspects: Artistic skills appear late in ontogeny and are more prominent in sexually mature adults; and they are more frequently displayed by males who, as predicted by parental-investment theory, are generally more active in courtship than females (1998:117, 2000a:14).

In short, Miller's hypothesis states that art is a uniquely human behavioural trait that evolved through mate choice to serve a courtship function by signalling

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anthropomorphic interpretation such a behaviour would perhaps indicate a desire of trying some new decorative effect. But it seems more natural to assume that brilliant objects, even after they have been stored up in the nest, still exercise their irresistible attraction, and thereby tempt the birds to repeated trifling with them. If the supposed redecorations of the gardens be accounted for in this manner, then there is no reason for considering the collecting impulse in the Australian birds as anything more than a higher development of the same tendency which shows itself in our common magpies and jackdaws" (Hirn 1900:194-195).

66 For an alternative explanation, see: Madden & Balmford (2004); Madden & Tanner (2003). These authors suggest that bower preference may be based on perceptual biases for food, not mate fitness.

the artist's fitness. This intriguing idea has generated both interest and opposition in the field of art studies, as reviewed below.

The response to the ideas put forward by Miller has been rather mixed. His book *The Mating Mind* (2000a) has been well received by the general public, becoming a popular science bestseller. In the academic world, some scholars have followed his lead in using mate choice to explain various human cultural behaviours. For instance, Laura M. Bolt has published *Musical Matings: Sexual Selection and the Origins of Music* (2008). Literary scholar Jonathan Gottschall has applied the principles of sexual selection to explain universal themes in literary narrative, using Homer (Gottschall 2008), and global folktales (Gottschall et al. 2004) as examples. And in *The Art Instinct: Beauty, Pleasure and Human Evolution* (2009), the late philosopher of art Dennis Dutton built on Miller's argument to suggest that the arts may well be seen as costly signals.[67]

Then again, Miller's hypothesis has been criticized for being too broad an explanation (Brown 2000:247). In Miller's own words, "sexual selection through mate choice can potentially explain anything you can ever notice about evolved human behaviour as something that needs explaining. This is because anything you can notice about other people, your ancestors could have noticed too, and perhaps favoured in picking their sexual mates" (1999:80). Certainly, he has had no reservations using mate choice for fitness indicators to account equally for language, music, religion, altruism, literature, visual art (2000a) and, more recently, consumer behaviour (2009). But the applicability of his model has been challenged for many of these aspects. For example, Steven Brown has opposed his ideas regarding music (2000:244), Tecumseh Fitch has refuted sexual selection's involvement in the origins of language (2005a:211) and music (2005b:12), Joseph Carroll (Carroll 2004:XX) and Brian Boyd (2009a:208) have both raised doubts about the influence of mate choice in the evolution of literature, and Catherine Driscoll (2006) has criticized Miller's model for art and altruism, respectively.

The span of Miller's account is certainly too ample and the aim here is not to evaluate its applicability to each of the themes the author has dealt with, nor to human culture in general, but to assess the theoretical soundness of his key arguments regarding particularly the visual arts.

67 Art-making, Dutton says, requires skill and coordination, insight and planning, and other demanding aptitudes as well as access to resources. Therefore artistic behaviour, and creativity in general, are indeed good markers of overall intelligence. The latter, in turn, is one of the most prized traits in human mate choice preferences. For this reason, Dutton suggests, art is proudly displayed, and the more costly and wasteful it becomes, the better it signals the artist's quality, augmenting his/her status. Dutton follows Miller in granting that the arts may have evolved in courtship contexts but in his view, art is nowadays better characterized as a conspicuous social signal that enhances the status of those engaged with the arts.

3.3 Visual art as a courtship display: Critical assessment

Geoffrey Miller's research has followed the revival and success of Darwin's sexual selection theory in biology, where this topic has become a prominent research theme over the past two decades. In this trend, mate choice preference patterns have been thoroughly examined and used to explain a great deal of animal behaviours and traits, beyond weapons and ornaments (e.g. territorial behaviour, life history patterns) (Anderson & Iwasa 1996; Anderson & Simmons 2006). For our species, mate choice makes a strong case for explaining certain anatomical features of the human body, such as body hair distribution, and the primary and secondary sexual characters of both sexes (Darwin [1879]2004:652).

Miller suggests that the influence of mating preferences might extend to mental and behavioural traits as well, and even artefacts. With animal examples like the peacock's tail and the bowerbird's bower, he builds up an analogy for human visual art. Such analogy has been around since Darwin's time. In 1900, art scholar Yrjö Hirn already noted: "The attraction of the Darwinian theory is of course obvious. After having realised the important part which sexual selection plays in the 'artistic' activities of animals, one is naturally tempted to apply the same principle to all similar activities in men" (1900:238). However, there are several problems with this proposal, as discussed below.

For this assessment, I focus on five key arguments put forward by Miller to support his model of visual art as a sexually selected trait: 1) late ontology of artistic behaviour; 2) sexual dimorphism in artistic production; 3) the function of visual art as a courtship tool; 4) the role of fitness indicators in human mating preferences; and 5) the evolution and structure of human mating systems. It is important to note that this assessment is intended for Miller's hypothesis regarding the origins of visual art only, not its applicability to other traits; nor is it meant to evaluate the theories of sexual selection or mate choice. Some of the issues mentioned in this section have already been pointed out by other scholars regarding Miller's ideas on music (Brown 2000), language (Fitch 2005a), culture (Jablonka & Lamb 2005:217), and the arts (Dissanayake 2007; Driscoll 2006), but are equally compelling for his model of visual art, and thus are also included in this review.

1) Late ontology of artistic behaviour

Miller has emphasized that visual art, like other sexually selected traits appears late in life and is only fully developed by the age of reproductive maturity, often being displayed by adults during courtship (2000a:14). This argument is contradicted by the fact that the faculty to produce visual art is present in normally developed individuals of pre-reproductive age (i.e. children). The development of drawing abilities in children has been well-studied, indicating that this skill is often cultivated by the 2nd year of life and is generally mastered

by 8-10 years of age (Milbrath 1998:31). If visual art were indeed a secondary sexual characteristic, artistic ability would somehow influence or be influenced by the onset of sexual maturity. However, there seems to be no correlation between the two; the latter is determined by energetic, nutritional and hormonal signals (Harris & Ross 1987:24; Short 1976:9), whereas the first depends largely on genetic endowment and developmental circumstances, particularly the sociocultural context (Rostan et al. 2002:128). Also, visual art activities remain effective and important among individuals of post-reproductive age. Furthermore, while displays of visual art may certainly be involved in adult courtship, they are equally if not more prominent in other contexts, especially in collective rituals, ceremonies and festivities that often include individuals of all ages (Dissanayake 2008).

2) Sexual dimorphism in artistic production

The mate choice model observes that, while the capacity to produce art is similar in both sexes, there is a certain degree of sexual dimorphism in art so that males will be either more productive or be "much more prone to publicly broadcast their cultural production" (1999:87) because they would be under greater pressure to show off their fitness (1998:108; 1999:72; 2000a:275). For Miller, this explains the predominance of male artists throughout (Western) history (1998:119, 1999:86, 2000a:275). This conclusion, however, is based on the questionable assumptions that the historical situation has evolutionary weight, and that men indeed produce more art than women.

First, we cannot simply transplant the historical situation of male artistic dominance onto the Pleistocene. Among various traditional societies, women play a prominent role in art production. For example, among the San hunter-gatherers, ochre and body painting are widely used in female initiation rites (Knight et al. 1995:93) and the rock art associated with these groups often depicts or refers to female-related themes (Solomon 1992), which makes it possible that women could have been the painters. Traditions of rock painting done by females during initiation ceremonies are known elsewhere in south central Africa (Zubieta 2014). Although projecting this ethnographic observations onto the past is also questionable, they do show that the Western situation is by no means universal. Second, male public visibility may be better explained by gender roles and the sexual division of labour than by male motivation to display fitness. Maternal care constraints the sorts of activities that women can carry out excluding, for example, those which require high mobility and continuous occupation, favouring home-based activities (Wood & Eagly 2002:708). This would limit the 'public broadcast' of female cultural production. Perhaps for this same reason, labour specialization is overwhelmingly a male domain. It has been recurrently observed that whenever a craft shifts from a household activity to the public or market domains, it tends

to become increasingly male dominated (Ehn 2009; Stymne 2009:23).[68] But if we dismiss the divide between artist and artisan, and between public and domestic craft, it becomes clear that women are as productive as men in the visual arts.[69] Gender differences in artistic output may then be purely contextual.[70]

In support of his argument, Miller has contended that human cultural behaviour has a lot in common with the courtship behaviour of animals, such as birdsong, which is used in courtship, develops alongside sexual maturity, and is differentially produced by males and females. Therefore (1999:88):

> Parsimony demands that if we see the same age and sex profiles for animal courtship behaviour and for human public cultural production, and if these behaviours show many of the same design features (e.g. high cost, aesthetic appeal, heritable variation in production ability, importance in mate choice), we should admit that the same theory, sexual selection through mate choice, might explain both phenomena.

The main problem with Miller's analogy is that whereas biologist have a good working definition of animal 'courtship behaviour', there is no comparable definition of what constitutes 'cultural behaviour' among humans; but even if we limit the argument to 'artistic behaviour', the similarities with animal courtship displays are not as straight forward as Miller suggests. Let us take birdsong as an example. Most biologists do agree that the primary function of birdsong is courtship (Naguib & Riebel 2006), but it is not limited to it. Singing in birds serves various functions besides sexual display, such as territorial defence, and individual recognition. So 'importance in mate choice' may well be a relevant 'design feature' of birdsong, but so are other aspects that are more susceptible to natural rather than sexual selection. Furthermore, birdsong is a trait that varies a lot between species (Naguib & Riebel 2006). For instance, among some birds, only the males sing and only during the mating season, whereas in others, singing takes place all year round and the females also sing. In the case of species where there is sexual dimorphism in song production, the disparity is correlated with differences in functional brain anatomy, i.e. the

68 Interestingly, even among Western academics, child rearing affects female productivity (Hunter & Leahey 2010), and women tend to specialize less than men (Leahey 2006).

69 Following Miller's argument, one could easily invoke the history of *haute cuisine* to argue that cooking evolved as male sexual display, since it is well-known that most top-chefs are men. Whereas, universally, domestic food processing and cooking are, and probably have always been, predominantly female activities (Wrangham 2009:147).

70 Like artistic production, technological production need not have been a male domain throughout evolution. Recent research has shown that among our closest primate relatives of the *Pan* genus – chimpanzees and bonobos – it is the females who exhibit a more extensive and avid tool-making and tool-using behaviour, often transmitting their knowledge and skills through the female line, from mother to daughter (Gruber et al. 2010). At least among these primates, then, technological 'output' is not male-biased. And if we suppose that some of the skills and abilities used in visual art production were co-opted from tool-making, as they must have, there is no reason to exclude the possibility that women produced many of the early artefacts found in Pleistocene archaeological sites, or even that visual art production might have had a female-based origin, as suggested by Camilla Power (1999, 2004) and Kathryn Coe (2003).

brains of males and females are different. Such neural differences between the sexes have never been observed among humans despite the supposed difference in artistic output. Therefore, as Steven Brown argued for music (2000:250), until convincing functional evidence suggests otherwise, we must take as our null hypothesis the biological equivalence of the two sexes in ability, motivation, and production.

Miller contends that his model explains the similarities between animal courtship and human cultural behaviours like art, but as the above example of birdsong shows, the resemblance is often only superficial. Even if courtship and artistic behaviours had the same patterns and features, it does not follow that sexual selection be the best explanatory framework, other alternatives might still apply. Going back to birdsong, research has shown that in many species of songbirds the song repertoires are not innate, but acquired during development and thus song is highly sensitive to the natural and social environment of the birds. In this aspect, birdsong in fact resembles spoken language (Naguib & Riebel 2006). Hence, if the similarity criterion points to the best research framework, as Miller argues, then "we should admit" that biological communication "might explain both phenomena" just as well.

Miller does in fact acknowledge the role of visual art as a communication signal, however, he sees its function as restricted to sexual selection (2001:20):

> From the viewpoint of current animal communication research, art is a signalling system. There is a signaller (the maker of the art), and a set of receivers (who perceive the work of art). The prototypical functions for animal signals include long-range sexual attraction, short-range sexual courtship, sexual rivalry, territorial conflict, begging by offspring to solicit parental investment, warning signals to deter predators, and alarm signals to alert relatives of danger.
>
> Out of these standard function for signalling, sexual selection for courtship produces the most complex and aesthetically pleasing signals. Insofar as we praise human art for its complexity and aesthetic value, it seems reasonable to focus on sexual courtship as the most likely adaptive function of human art-production – at least in prehistory, if not in modern society.

Although the prototypical functions of animal signals mentioned by Miller may indeed be the best known, and more commonly studied, this is but a small sample. Animal signals simply are "traits that are specialized for the purpose of communication" in general, and their diversity "is enormous" (Johnstone 2009:155). Sexual signalling is just one of many signalling modes. To be sure, courtship displays are often complex, striking and 'aesthetically pleasing' but so are other signals, like the bright colours of some frogs and insects whose primary function is to deter predators. Good genes mechanisms (e.g. ornaments) do not exhaust aesthetic evolution (Prum 2012:2259). Moreover, unlike the bowerbird's bower, many conspicuous animal signals frequently

operate in various contexts. For example, the bioluminescent displays of some cephalopods are used to entice prey, scare off predators, and for communication with conspecifics, as well as to lure mates (Mather 2004). Likewise, the impressive ability of chameleons to change colour serves as a social signal, as well as for camouflage, and sexual display (Stuart-Fox & Moussalli 2008). So, the fact that visual art is complex and visually pleasing is not sufficient to maintain that it originated in courtship. Rather, and more interestingly, its potential use in mate choice points towards the versatility of visual art as a communicative signal.

3) Visual art as a courtship tool

Miller supports his mate choice hypothesis by drawing an analogy between the 'artistic' behaviour of the bowerbird, whose function like that of birdsong is clearly courtship, and human art-making (Miller 2000a:273). Superficially, as in the case of birdsong, the similarity is clear. Both the bower and visual art may be seen as artificially created displays of pattern and colour. However, there are again more fundamental differences than parallels between the two. Firstly, bower-building is an instinctive behaviour, which means that even captive male bowerbirds that have never seen another member of their species will still construct bowers, even if there are no females around. In contrast, visual art production is not instinctive but, like language, must be learned and prompted by the human social milieu.[71] What is more, bowers are clearly restricted by their function to a particular form (specific to each bowerbird species) and a courtship context, whereas visual art can take place in a number of non-sexual situations, may take several forms, and be manifested in various media.

Moreover, the bower itself might not even be an infallible example of a fitness indicator. Some studies indicate that bowers may have nothing to do with the genetic quality of the male bowerbird (Madden & Tanner 2003). Some evidence suggests that the preferences of the female bowerbirds for bower decorations may have evolved originally through regular natural selection, as a sensory bias for efficient fruit foraging, and was co-opted in male sexual display. It may be that the females favour the bowers that for instance include more of their preferred berries or objects of that same colour. So, researchers have concluded that "the consistency of the proportional use of decorations across sites, and the similarity of objects that occupy similar positions, for example white stones and white shells, suggests that the bower conforms to a specific visual pattern, whose evolution can better be explained by invoking models of sensory bias" (Madden & Balmford 2004:594).

But even if the bower were in fact correlated to the overall fitness of the male bowerbird, its analogy with the human case of visual art would remain

71 The cases of neglected and feral children clearly show that lack of exposure to art in childhood will result in difficulty to produce and perceive art in adult life (see: Candland 1993).

unjustified. So far there is no concrete evidence that genetic quality in humans is in any way correlated with visual art production. As yet, there is no convincing data to support the notion that artistry may actually serve as a fitness signal or a relevant cue in human mate choice (Driscoll 2006:513).[72] For example, a recent study originally designed to show that "creativity is desired in a potential mate" (Clegg et al. 2011:1), in fact ended up showing that artistic success, measured as high social status, is what people actually value as an attractive trait, not artistic creativity or skill, as predicted by Miller's model. In conclusion, the bowerbird analogy is likely a classic case of projecting biological data onto human behaviour (Bolhuis & Wynne 2009).

4) Role of fitness indicators in human mate choice

Miller's model assumes that 'good-gene traits' guide human mating preferences, particularly in women. Research has shown that some such traits do play a part in mate choice (Gangestad et al. 2006), but sexual selection for fitness indicators remains controversial, as explained by biologist Malte Andersson (1994:28):

> Several empirical studies have provided support for indicator models, but the evidence can be interpreted in different ways. Indicator traits may be correlated with some direct (nongenetic) material benefit to the female or offspring, such as food, protection, or parental care. It has not yet been convincingly shown that an indicator process based on genetic benefits for offspring is involved in the selection of any secondary sex trait.

In many cases, indeed, the apparent preference for fitness indicators might be at least equally explained by mate choice for direct benefits, as in the case of human hunting. Anthropologists Kristen Hawkes and Rebecca Bliege Bird have suggested that human hunting might have evolved primarily as a form of male display (2002), and not for meat provisioning, a scenario also suggested by Miller (1998:108). As Hawkes and Bliege Bird clearly show, hunting certainly is a central arena for male competition in forager societies, and good hunters have a high social status and often father more children than other men. On that basis, the authors favour the idea that hunting might be a costly signal, or handicap, that could work as a reliable indicator of male genetic quality (2002:65).[73] However,

72 Some studies suggest that women prefer 'creative' men at the peak of their fertile cycle (Haselton & Miller 2006), and that there might be a correlation between intelligence and sperm quality (Arden et al. 2009), but more research is needed before any relevant conclusions on the subject can be drawn.

73 Costly signal or handicap models suggest that when a preferred trait, like an ornament, is energetically costly, only "males closer to the optimum with respect to the viability trait will be in better condition and will be able to maintain a more elaborate version of the ornament. Female choice evolves because females choosing males with more elaborate ornaments produce offspring with higher viability or that will be in good condition as adults [...] Because the ornament is condition dependent, it is always a reliable indicator of genetic quality" (Jones & Ratterman 2009:10004). However, as Gambetta has noticed, it is not necessarily the case that all honest signals

their work also reveals that whereas better hunters do seem to have more offspring, the survival rates of their children is not particularly higher (2002:61). So, hunting might truly be a form of male contest but that need not support an indirect benefits model. Women could be choosing better hunters as mates not for the higher genetic fitness of their offspring (indirect benefits) but for social prestige and securing of provisions (direct benefits). The latter is actually more compatible with data that fertility and fitness are greatly influenced by resource allocation to women, because this will determine their available energy for reproduction and parental investment (Harris & Ross 1987:24; Kaplan 1996). Selection for direct benefits is also better-suited with the general pattern of human reproduction which involves not only producing high quality offspring but also reducing the risk of early mortality (Hopkinson et al. 2013:62; Kaplan & Bock 2001).

In fact, cross-cultural studies on human mating preferences suggest that the mating choices are guided not by indicators of 'good genes' (indirect benefits), as suggested by Miller's model, but by direct phenotypic benefits instead, i.e. people generally choose potential partners on the basis of immediate returns, such as resource allocation, parental investment, disease avoidance, status, fertility, etc. Men, for instance, have been observed to show preference for young women, with a low waist-to-hip ratio – which are cues of imminent fertility and good general health (Buss 2004; Singh 2002; Zaadstra et al. 1993). Women, for their part, tend to prefer men who are expected to provide resources, protection, and/or parental care (Geary et al. 2004; Todd et al. 2007). This means that the correlation between certain behavioural traits and mate choice may still hold, but on the grounds of direct returns, not genetic fitness (e.g. hunting success). The types of direct benefits that are preferred, though, will vary across cultural contexts. So, if women prefer 'artistic types', as observed by Miller (2000a:273), it is probably due to the status of artists in today's society rather than to a 'universal preference' for creativity (cf. Clegg et al. 2011). In my view, there is just not enough evidence to support Miller's central premise that fitness indicators and aesthetic displays play a fundamental role in human mate choice.

Furthermore, natural selection may offer an equally good explanation for some of the patterns attributed to sexual selection. For instance, Miller argues that throughout human evolution male-male competition shifted from physical encounters to cognitive displays and signalling through 'extended phenotypes' (1998:115, 2000a:208). Following the work of archaeologists Marek Kohn and Steven Mithen (1999), Miller suggests that instead of direct physical competition, early hominins may have used stone tools, like the handaxe, to advertise their fitness to potential mates, and this in turn, may be a behavioural

are costly for the honest signaler. For example, showing one's face is a costless honest signal of one's identity (2009:182).

precedent for visual art (2000a:290).[74] The comparative values of hominid canine size and body mass indicate that indeed the frequency and intensity of male-male aggression and competition decreased progressively in Australopithecines and early *Homo* (Plavcan & van Schaik 1997:364). And certainly, handaxes and reduced male aggression might be correlated, but on the basis of natural, not sexual, selection pressures. As Hillard Kaplan and colleagues suggest (2000:161), a change in the hominin dietary niche towards more meat consumption would have produced coevolutionary selection pressures for tool-making technologies, food sharing, male parental investment, and larger group sizes, all of which required a reduction of male-male aggression.

Lastly, Miller simply assumes that all through evolution humans would have invariably chosen the fittest partner around (1998:108). However, recent studies have confirmed that social input and self-assessment are crucial in mating decisions. For instance, mate-choice copying is a common strategy among several species, including humans (Mery et al. 2009). This means that individuals often use social information (on the choices of others) to guide their own mate selection (Little et al. 2008). An individual's own fitness also plays an important role in mate choice. Studies show that in humans (as among zebra finches, incidentally), low-quality females prefer low-quality males as mates (i.e. women with low self-perceived attractiveness prefer less attractive men). This strongly suggests that individuals may be able to adjust their mating preferences according to their own developmental and contextual circumstances, and this may be a general aspect of mate choice across species (Holveck & Riebel 2010:158). Evolutionary psychologist David Geary and co-workers arrived at a similar conclusion (2004:33):

> Women's ratings of men's physical attractiveness are influenced by social comparisons and other social processes, including their own attractiveness and thus value as a mate, above and beyond his actual physical traits.

It seems to me that the relevance of potential fitness indicators in human mate choice is often overestimated by Miller, whereas the actual importance of cultural input and context has been generally overlooked.

74 The "sexy-handaxes hypothesis", as it has become known, suggests that handaxes were made and used in the context of mate choice, acting as indicators of the maker's quality by advertising traits such as good health and physical ability (Kohn & Mithen 1999; Mithen 2003). Furthermore, the handaxe would exploit innate perceptual bias towards symmetry, in turn increasing the attractiveness of its maker (Mithen 2003). Miller agrees that "handaxes must have been to hominids what bowers are to bowerbirds: part of their extended phenotype, a genetically inherited propensity to construct a certain type of object" (Miller 2000a:289). For a detailed criticism of this argument see: Nowell & Chang (2009).

5) Evolution of human mating systems

Regarding human mating systems, Miller seems to presuppose that throughout evolution these ran on the principle of male display and female choice, which are characteristic of polygynous species (like the bowerbird, and lekking birds like the peacock), in which the male offers no parenting effort (Jones & Ratterman 2009:10003). That is actually how Miller envisions hominin mating dynamics throughout the Pleistocene (1998:108):

> For the most part, adult male hominids must have been rather peripheral characters in human evolution, except as bearers of traits sexually selected by females for their amusement value or utility.

However, the mating strategies of Pleistocene humans are more likely to resemble the primate pattern, which is very different from that of bowerbirds and peacocks. Primate mating strategies are much more varied and complex (monogamy, but also polygamy and polyandry, are relatively common among primates), and the male often provides at least some parental care (Fuentes 1999). Moreover, the primate male-female pair-bond often lasts beyond copulation and involves more than mere reproduction, it actually constitutes the basis of the social system, as does the pair-bonded family in the human case (Aureli et al. 2008:648; Eldredge 1989:180). The evolutionary history of primate pairbonding, again, seems to be more closely related to mate choice for direct benefits – e.g. territoriality, protection, and sexual selection mechanisms other than mate choice, such as intrasexual competition (van Schaik & Dunbar 1990).

Likewise, there is strong evidence that in hominin evolution it has been in fact the females who have been more prone to selective pressures for the physical and energetic requirements of bearing increasingly larger, big-brained babies. This is particularly evident in the marked escalation of female size from *Australopithecus* to *Homo erectus* and onwards (Aiello & Key 2002; Wood & Eagly 2001:702). In turn, this suggests that natural selection pressures in response to changing environments and nutritional stress were probably more significant than mate choice preferences in shaping the anatomy and behaviour of the two sexes in our genus (Pawlowski 1999).

However, there is also something to say about the generally presupposed correlation between the costs of mating strategies and mating preferences. As biologist Richard O. Prum has observed, this is usually assumed but rarely well-supported (2012:2263):

> Just because females are exposed to predation risks during mate searching, have limited energy budgets, or risk exposure to sexually transmitted diseases, etc., does not mean that variation in mating preferences will be correlated in any way with avoiding or minimizing any of these costs. The existence of costs of mating is not evidence of differential cost of variations in mating preferences, which are absolutely required for natural selection on mating preferences to occur. We will all die someday (i.e. viability is not infinite), but that fact

> itself does not mean that we are under natural selection. To demonstrate natural selection on mating preferences, one has to show that natural variations in preference have consequences for the viability of the female, the number of her offspring or their viability. Natural selection cannot be merely assumed to exist.

So it may well be that human females have been under greater stress of natural selection pressures, but that need not bear any consequences for their mating strategies and preferences, as is usually assumed, for example in Hawkes and Bliege Bird's 'costly hunting' model discussed above. Prum's point is that in either case, whether one argues for natural or sexual selection, the predicted effects on mate choice should be well substantiated.

Finally, Miller also supposes that in evolution mate choice has been mostly a matter of free will and individual decision-making, merely on the basis of personal preferences (1998:110). However, it is quite likely that the social mediation of reproduction and the institutionalization of sexual relations happened early in human evolution (Deacon 1997; Dunbar & Shultz 2007; Harris & Ross 1987; Knight 1995), which would imply that mate choice has been, from early on, bound to cultural normativity (e.g. restrictions on marriage, exogamy/endogamy patterns, offspring affiliation and kinship rules). Certainly, in historical kin-based societies, human action is generally compelled to follow social roles and expectations, hence we must specially consider the influence of the social system on mating behaviour instead of the reverse (Meillassoux 1972:95). On this point, Miller overlooks a great deal of anthropological data indicating the relevance of the social environment in human sexual selection, particularly the influence of parental and close kin preferences (Apostolou 2007; Buunk *et al.* 2010). In arranged marriages, for example, where parental choice is predominantly exercised, physical traits and attractiveness are generally less important, while family history and personality traits gain prominence. Studies of parental choice reveal that desired traits in a son-in-law often include being hard-worker, a good provider, and having good family provenance, and a daughter-in-law is valued for her hard work and good family origin above physical appearance (Apostolou 2007:407).

In general, our understanding of human mating systems, past or present, is perhaps still too imperfect to make any universalist claims or suggest that humans have followed a single set of mating strategies throughout evolution (e.g. Buss 1994). In this regard, Geary and colleagues concluded (2004:37):

> There is not one reproductive strategy for women and another for men, as the strategies adopted by both sexes often vary across contexts, historical periods, and characteristics of the individual.

In sum, although there is no consensus regarding the mating systems of Pleistocene humans,[75] there is abundant evidence that modern human mating strategies are not universal, but widely varied and flexible, changing according to specific cultural, ecological and economic circumstances (Fuentes 1999:897; Kaplan 1996:127; Rival et al. 1998:316; Schmitt 2005:273; Wood & Eagly 2002:709). Thus, there is little ground to favour a single mating pattern as evolutionary prevalent. In fact, the diversity and flexibility of human mating strategies may indicate that sexual selective pressures were "never so significant in the evolution of the Homininae as to require selection for any strictly defined type of reproductive strategy in *Homo*" (Pawlowski 1999:266).

In the following section, I examine the extent to which Miller's model stands against the archaeological evidence from the Pleistocene.

3.4 Test against the archaeological record of visual art

As I have discussed throughout this chapter, the general hypothesis put forward by Geoffrey Miller states that many cognitively complex human behaviours evolved as courtship displays (1998, 1999, 2000a, 2001). More specifically, his model suggests that art evolved under the selective pressures of mate choice preferences, and predicts that visual art will be most salient in the context of mate acquisition and reproductive competition.

But testing Miller's model against the archaeological record poses a challenge since, as the author himself acknowledged, he did not incorporate specific archaeological data into his account of the origins of art (2000a:22):

> Anyone presenting a theory about human mental evolution is usually expected to present a speculative chronology of what evolved when, and to show how the current fossil and archaeological data support that chronology. I will attempt neither, because I think these expectations have too often led theorists to miss the wood for the trees. The human mind is a collection of biological adaptations, and an evolutionary theory of the mind must, above all, explain what selection pressures constructed those adaptations. Chronology is of limited use, because knowing when an adaptation arose is often not very informative about why it arose. Fossil and archaeological evidence has been enormously important in showing how many pre-human species evolved, when they evolved, where they lived, and what tools they made. This sort of evidence is crucial in putting human evolution in its biological and geological context, but it has not proven terribly useful in

[75] Scholars often diverge in their views of primate and human mating systems. For instance, Agustín Fuentes states that there is no indication that monogamy "is the predominant form of social grouping or mating system in *Homo sapiens*" (1999: 897); whereas Wendy Wood and Alice Eagly state that there seems to be enough evidence that "humans evolved with minimal competition between males and a monogamous rather than a polygynous mating system" (2002:702).

> explaining why we have the mental adaptations that we do – and in some cases can be misleading.

Miller is to some extent right that archaeological evidence by itself cannot explain human behaviour, but it is hardly a justification not to take the Pleistocene art record into account. It is how researchers interpret and use that evidence to infer behaviours and test those inferences which can eventually provide a reasonable account of cognitive evolutionary processes. Therefore, Miller's choice not to integrate archaeological or fossil evidence in his model is questionable. As archaeologist David Lewis-Williams has stated, any explanation of the origins of art "must relate to verifiable, observable, empirical data" (2002:48), which in this case is provided by the archaeological record. The goal of the present section is precisely to assess Miller's claims in view of the material evidence from the Pleistocene.

As mentioned, Miller suggests that visual artworks originated as cultural displays for attracting mates and outcompeting rivals (1999, 2000b, 2001). According to parental-investment theory (Trivers 1972), due to the energetic load and physical constraint of pregnancy and childcare, women are the major investors in reproduction and as a result will be more selective in their mating choices. Following Miller, female choosiness renders males more motivated to produce competitive fitness displays, like visual art. So, *an intensification of visual art production in the archaeological record will correlate with periods of increased male-male competition and greater female choosiness* (prediction 1). We can actually suggest two opposing scenarios in which male competition and female selectiveness are high: in a harsh environment and in a situation of abundance. As I discuss below, the second scenario would be in accordance with Miller's proposal of mate choice on the basis of fitness indicators. The first is more in agreement with the hypothesis of mate choice for direct benefits.

The first scenario states that women become choosier in harsh environments. Because resource allocation determines the energy that females can invest in reproduction and parental investment (Harris & Ross 1987:24; Kaplan 1996), women will tend to choose males that are better at provisioning them and their offspring. So, female choosiness will increase in periods when conditions require greater parental investment, to increase the survival chances of mother and infant; for instance, in situations when there are more people than resources available (Geary et al. 2004:38; Kaplan 1996:108). Thus, under harsh conditions, partner provisioning to mother and child becomes crucial for survival, so finding a reliable, resourceful partner would be a female priority. Mate choice studies do indicate that in difficult or demanding environments where infant mortality might be high, women seek to pair up with long-term partners (Schmitt 2005:273). And, according to research of human mating strategies, women hold higher standards of selection when choosing a long-term mate (Buss 1994). In conclusion, this scenario predicts that *an increase of visual*

art in the archaeological record would correlate with periods of low resource availability (prediction 1a).

In the second scenario, consistent with mate choice for fitness indicators, women are expected to choose prospective mates on the basis of indicators of genetic quality and courtship displays and, contrary to the previous situation, would become choosier in conditions of prosperity (Miller 1998:109). When there is abundance of resources, there will be more fit males who can afford complex courtship displays. Some mate choice research indicates that, like female zebra finches,[76] women tend to become choosier when exposed to a greater number of potential high-quality mates with high fitness display rates.[77] So, in favourable environments women will have more fit potential partners to choose from and become choosier. This in turn induces male rivalry, increasing the quantity and quality of fitness displays. In brief, this scenario predicts that *an intensification of courtship displays, such as visual art, would correlate with periods of high resource availability* (prediction 1b).

Both predictions may now be contrasted with the data reviewed in chapter 2 from the African Middle Stone Age (MSA) between 130-70,000 years BP, and the European Early Upper Palaeolithic (EUP) between 45-25,000 BP.

Several of the MSA sites with early presence of visual art (e.g. Blombos Cave, Sibudu, Klasies River) have yielded evidence of resource exploitation. Unfortunately, the data is not detailed enough to get a clear picture of the complete range and frequency of the species extracted. However, some trends can be observed. At Blombos Cave, for example, the phases contemporaneous with the finds of shell beads, dating to 75,000 BP, indicate that diet was broad and included both mammals and shellfish. At the time, this coastal site was surrounded by forest, which means that humans could make optimal use of terrestrial and marine resources (Dusseldorp 2012; Langejans et al. 2012). As seen in chapter 2, the period of the MSA when the earliest evidence of visual art becomes visible was a time of high climatic variation. However, by occupying locations near different sources of food (e.g. coast-forest), humans could have maximized their access to supplies. It then seems that the time and location of early visual art production is correlated with potentially favourable conditions. That in the MSA visual art production may have been correlated to propitious circumstances is further supported by the fact that it seems to decline after 70,000 BP, when it is thought that conditions took a turn for the worse as consequence of the Toba eruption (Ambrose 1998b; Borroughs 2008:86).

In the European Early Upper Palaeolithic, personal ornaments may not be a good indicator to quantify visual art production over time, since they are present

76 Experiments with these birds (*Taeniopygia guttata*) have shown that females elevate their mating preference standards after having been exposed to various males with high display rates (Collins 1995).

77 Women do seem to become choosier when there is an oversupply of men, being better able to enforce their preferences (Geary et al. 2004:38).

in large quantities throughout the whole period. Archaeologist Michael Barton and colleagues have used figurative portable and rock art as a measure (1994). They observe that in the climatic downturn episode leading up to the Last Glacial Maximum (27-21,000 BP), when mean temperature deteriorated and glaciers advanced continuously, there was comparatively little figurative art production. In contrast, during the Last Glacial Maximum itself (21-13,000 BP), visual art became abundant, only to wean again at the beginning of the Holocene. As reviewed in chapter 2, visual art seems to have flourished during the Aurignacian and Gravettian periods (40-28,000 BP). On the one hand, it would seem that a decrease in art production during the downturn episode could be related to harsh climate change and a decline in available resources. During the Last Glacial Maximum, on the other hand, may correlate with the stabilization of the new cold conditions, where despite the low temperatures there was great availability of faunal resources to be exploited, specially of large grazing herbivores (Gamble 1999:280-283; Guthrie & van Kolfschoten 2000:17).

In sum, although the data available for the MSA and EUP in relation to resource availability and art production may be sketchy, it seems to better support prediction 1b that an intensification of visual art would correlate with periods of greater resource availability. This, in turn, would support Miller's model that in prosperous circumstances females will have more choice of high-fitness partners, becoming choosier and thus prompting male-male competition which will result in an increase of courtship displays, including visual art manifestations. However, I have argued against Miller, that visual art is unlikely to constitute a courtship display. So, the correspondence between a rise in visual art production and favourable environments for Pleistocene human groups should have an alternative explanation to a sexual competition scenario. For example, the decrease of food resources could imply a similar decrease in raw material access. Likewise, in changing or harsh climatic conditions social relations may be affected. In chapter 6, I suggest precisely that the correlation observed above might instead have to do with changes in demographic patterns and their consequences for human social organisation, as also proposed by Barton et al. (1994).

Miller has also argued that art evolved through mate choice to advertise the genetic fitness of an individual and so, visual artworks may be seen as 'extended phenotypes' of their makers. On this basis, he suggests that *visual art initially emerged as an individual practice in which people could show off their personal skill and creativity to attract potential sexual and social partners* (prediction 2). If that were the case, we should expect that *the earliest examples of visual art show a great deal of internal variation* (prediction 2a).

The earliest instances of systematic visual art activity found in the archaeological record of Pleistocene visual art – possibly body painting and ornaments (i.e. beads) – do indeed point towards personal display. As it was discussed in chapter 2, the evidence for body painting is difficult to assess.

However, the data for beads is more abundant and concrete. And contrary to the prediction, the increasing corpus of early body ornaments (seashell beads) recovered from sites in North and South Africa show a low degree of internal variation, and a high level of standardization and formal redundancy instead (Kuhn & Stiner 2007a:48). In all cases, the beads were made of the shells of a small sea snails (often of the genus *Nassarius*). The consistency of raw materials across sites despite chronological and geographical differences is particularly remarkable. This seems to indicate that even when the production and use of early Pleistocene beads was personal, their makers were probably being guided by established social conventions regarding the use of specific materials and natural forms, and not by their own individual choices, resources or skills. This of course, does not exclude the possibility that people displayed the ornaments in their own particular way (as discussed in chapter 6).

Finally, the fitness indicator argument implies that, *in order to function as proper extended phenotypes the earliest visual artworks would have been kept on or in the vicinity of their maker at all times so that they could be seen and judged by potential mates and allies* (prediction 2b).

The archaeological record of the MSA does not provide a clear answer, since in most cases it includes only isolated finds of ornaments and beads. And even when these artefacts are found in association to human remains, presumably as grave goods, it is almost impossible to know if the buried individual either made or wore the ornament in question. However the record of the European Upper Palaeolithic is more informative. In this period there are clear examples of personal ornaments that were not being used exclusively by their makers, or in courtship contexts, as the recurrence of beads in children's graves demonstrate (e.g. Krems-Wachtberg, Sungir). Furthermore, by analogy with contemporary hunter-gatherer societies, it is very likely that Pleistocene ornaments had a high exchange value and were much esteemed as gifts, transferred in trade networks and/or passed down the generations (Kuhn & Stiner 2007a:50). So it is unlikely that ornaments would have been invariably kept and displayed by their makers only, or that they were employed primarily for courtship. This does not mean that body ornaments do not convey information –however limited– about who made or wore them, on the contrary. It is precisely the fact that beads can transmit information in spite of being detached from their maker or wearer what probably incited humans to produce them systematically. In this manner, visual art might nonetheless play an important role in human mate choice. If visual art conveys identity and status – as suggested by Dutton (2009) – and, if these are important factors in mate choice, then we could expect individuals (male and female) to invest in visual art to influence potential partners, among other motives. In such case, visual artworks would work as indicators of a person's social identity, rather than their genetic fitness, and might be better described as artefact-signals than as extended phenotypes. These possibilities will be explored further in chapter 6.

3.5 Conclusion

Geoffrey Miller argues that visual art is a unique human adaptation that evolved to help humans solve the ancestral problem of finding and keeping a fit partner. In his courtship scenario, visual art is conceived as an indicator of individual quality to guide mate choice. Although I agree with Miller that visual art has the characteristics of a signal, in this chapter I have argued that contrary to his courtship hypothesis, visual art does not seem to have evolved under pressure of sexual selection. Moreover, I have pointed out that the cross-cultural studies on human mating systems do not support the premise that human mate choice is primarily informed by 'fitness indicators', but rather indicate that mate preference is based on direct benefits. The latter is actually more compatible with data that fertility and fitness are greatly influenced by resource allocation to women, because this determines their available energy for reproduction and parental investment. Mate selection for direct benefits is also better-suited with the general pattern of human reproduction which involves not only producing high quality offspring but also reducing the risk of early mortality.

The assessment of Miller's model in view of the archaeological record showed that the Pleistocene data do not coincide with the mate choice hypothesis either. The earliest manifestations of visual art are constituted by an increasing corpus of body ornaments (seashell beads) that show a low degree of internal variation, and a high level of standardization and formal redundancy, which is the opposite of what one would expect if the makers were 'showing off' their choices, resources, or skills. This contradicts Miller's ideas of visual artefacts as fitness displays and the notion of visual art as an 'extended phenotype'. Therefore, I suggest that the function of visual art as a signal includes but goes beyond a courtship context, and an evolutionary explanation should then account for both the functional diversity and formal evolution of visual artworks.

4. LIFE ARTIFIED: ELLEN DISSANAYAKE'S ETHOLOGICAL MODEL

It seems abundantly clear that representations appearing in ritual may evoke emotion and may affect cognition through their aesthetic qualities. Ritual places themselves may be works of art, and they have, since time immemorial, been embellished by works of art.

ROY A. RAPPAPORT, 1999

Across all human cultures, special occasions like weddings, funerals, seasonal festivities, contests, and even sport matches are adorned with lavish displays of music, oratory and visual arts. American scholar Ellen Dissanayake has argued for almost four decades that this is more than a curious coincidence of cultural traditions. She has suggested that there must be a biological functional explanation for the generalized presence of artistic activities in human ceremonies, where the latter may be seen as art's original source and fuel.

Having adopted the aims and views of ethology since the early 1970s, Dissanayake has recurrently made a case for art as a human universal adaptive behaviour. As I will explain in this chapter, she argues that art is innate and pleasurable, like eating or sleeping, and that like those behaviours, art too must have been evolutionarily advantageous and always functional. Dissanayake's argument for the origin and proliferation of the arts is firmly grounded in studies of human ritual activities. Humans universally perform rituals to mark socially important situations in the life of a person or a group, and these rituals are invariably accompanied by artistic displays. Because of the crucial role that artistic performances play in ritual ceremonies, Dissanayake has hypothesized that the arts must have originated within that context in the remote past. In ritual, art acts as an expressive outlet that allows people to express and cope with emotion and uncertainty, on the one hand, and instigates a sense of unity between the participants, on the other. These functions, she argues, were beneficial at both the individual and group level, contributing to the survival of those who participated in ritual and art. In this way the arts were retained and flourished throughout human evolution. On this basis, she maintains, artistic behaviour constitutes a true, naturally selected, human adaptation.

Over her prolific career, Ellen Dissanayake has produced numerous papers and three seminal books elaborating her proposal: *What is art for?* (1990), *Homo Aestheticus: Where art comes from and why* (1992), and *Art and Intimacy: How the arts began* (2000). Her ideas have been highly influential not only in evolutionary studies of visual art (Aiken 1998; Coe 2003), but also of language (Fitch 2010), music (Brown 2000), literature (Boyd 2009), and religion (Wade

2009). She is a prolific and dynamic scholar whose ideas have been developing continuously through four decades. For this reason, offering a detailed discussion of her complete work is beyond the scope of this review. In this chapter I will focus mainly on those aspects of her proposal that are relevant to the visual arts, and particularly on her most recent work. The aim of this chapter is to assess Dissanayake's ideas on the origins of visual art in light of the archaeological evidence from the Pleistocene.

The first section of the chapter introduces the discipline of ethology – the biological study of behaviour – which has served as Dissanayake's theoretical foundation. The next section lays out her specific hypothesis on the origins of art, highlighting key concepts and arguments, with special attention to her most recent work. The third section provides a critical assessment of her main arguments, particularly concerning the visual arts. Finally, the last segment of the chapter tests some predictions derived from Dissanayake's model against the data from the Pleistocene record of visual art, an undertaking that has not yet been carried out by the reviewers of her work.

4.1 The biological study of behaviour: The background

Throughout the first half of the past century, the study of behaviour was predominantly a field of psychology. Behavioural psychology as represented by figures like Ivan Pavlov and B. F. Skinner, explained behaviour as a reaction to external stimuli and thus emphasized the study of so-called stimulus-response mechanisms. By the second half of the century, the discipline of ethology had become consolidated as the study of behaviour from a biological perspective. In contrast to the stimulus-response approach of behavioural psychology that focused on the mechanisms of behaviour, ethology turned to using the methods of biology to explain the causes of behaviour, its development at the individual level, and its evolution in a population (Lorenz 1966). In this light, ethologists set out to study behaviour patterns as if they were 'organs', that is "as attributes with special functions to which they were intricately adapted" (Tinbergen 1963:413), assuming that, like the organs that constitute an individual, behaviour "evolved phylogenetically and is very resistant to any individual modification" (Lorenz 1981:107).

In ethology behaviour is perceived as a set of naturally evolved action patterns characteristic of all the members of a species. Thus, it will be observable, specific and universal to a species. As explained by one of the co-founders of ethology, Dutch Nobel laureate Niko Tinbergen (1963:414):

> Each animal is endowed with a strictly limited, albeit hugely complex, behaviour machinery which (if stripped of variations due to differences in environment during ontogeny, and of immediate effects of a fluctuating environment) is surprisingly constant throughout a species or population.

Following the precepts set by biologist Ernst Mayr to study the evolution of biological traits (1961:1502), Tinbergen established that a comprehensive biological explanation of any behavioural trait should include an account at four distinct levels of explanation: causation, survival value, evolution, and ontogeny (1963:411). *Causation* refers to the immediate physiological and psychological mechanisms that trigger and control behaviour. *Ontogeny* refers to the developmental aspect of how a behaviour pattern emerges and changes through the life-course of the organism in its interaction with the environment. *Survival value*, or *function*, refers to the role the behaviour plays in the life of the organism, that is, how the trait contributes to its survival and reproductive success. This level is generally formulated as the question: "What is the behaviour for?", and often constitutes the primary basis of ethological explanation, as Konrad Lorenz summarized (1966:274):

> If we ask 'what for'? about a cat's hooked retractile claws, and answer 'to catch mice with', this is no profession of mystical teleology, but shorthand for a query concerned with causality, namely 'what is the function whose survival value exerted the selection pressure which produced cats with this kind of claw?'

Lastly, *evolution* or *phylogeny,* refers to the history of the behaviour, and includes explanations of origin and of the plausible selective pressures that shaped the behaviour, with the aim of explaining how the behaviour pattern arose and was retained in an ancestral population. The first two levels of causation and ontogeny are referred to as proximal explanations as they correspond to the immediate mechanisms that underlie behaviour, whereas function and phylogeny are called ultimate explanations because they attend to the evolutionary history of the behaviour pattern (Mayr 1961:1503). These four levels of explanation have become a sort of 'golden rule' in evolutionary analyses across disciplines (Sterelny & Griffiths 1999:19).

The first attempt to use the principles of ethology to account for art was undertaken by British zoologist Desmond Morris in his book *The Biology of Art*, where he suggested that art may well be seen "as a biological, or behavioural, phenomenon" (1962:141).

The arts as ritualized behaviours

One of the most prevalent subjects among ethologists has been the ritualization of behaviour.[78] Ritualized animal behaviours typically include repetitious, stereotyped movements, gestures, and vocalizations displayed for instance in

78 In 1965 this was precisely the topic of a big discussion meeting organized by British ethologist Sir Julian Huxley – "Discussion on ritualization of behavior in animals and man"- and attended by the most renowned behaviour experts of the time, such as Konrad Lorenz, Erik Erikson, and Desmond Morris. The 1966 proceedings of this meeting, cited at length in this section, reveal how the ethological approach became consolidated as the standard framework of research in animal and human behaviour.

play, courtship, aggression, or under stress, such as the chest-beating of gorillas, or the 'dance' displays of many male birds. These 'action patterns' or behaviours are presumably adaptive, generally innate, and characteristic to each species (Lorenz 1966:274). These types of behaviours are also identifiable among humans, where they take on a new dimension in relation to mental capacity, as Julien Huxley argued (1966:259):

> The process of ritualization in man is far more complex, elastic and various than that in animals, and leads to a much wider range of results.
>
> In man, we find not only the adaptive canalization and ritualization of overt behaviour, but also that of thought or 'inner behaviour', resulting in motivated idea-systems and in internal (psychological or mental) organizations.

In humans, ritualized behaviours include a variety of everyday actions such as greetings, manners, stereotyped gestures of aggression, affection, and emotion. The formalization of such behaviours through collective convention constitute 'proper' ritual and ceremonial activities (Erikson 1966:523). The latter have been described in anthropology as "conventional acts of display through which one or more participants transmit information concerning their physiological, psychological, or sociological states either to themselves or to one or more of their participants" (Rappaport 1971:25).

In both the animal and human cases, ethologists suggest, the three main functions of ritualized behaviours are to communicate the condition or disposition of the individual, to canalize emotions and to form or reaffirm bonds between individuals (Lorenz 1966:279). However, as psychologist Erik Erikson clarified, although human rituals include a combination of ritualized behaviours, not all ritualized behaviours qualify as ritual (1966:523).

Erikson further suggested that the ontogeny of human ritualization begins with the mutuality and the bond between mother and child, and in time includes a wider range of individuals and groups. So, according to Erikson, the minimum requirements of ritualized behaviours in humans are found in mother-infant interactions (1966:337):

> Behaviour to be called ritualization in man must consist of an agreed-upon interplay between at least two persons who repeat it at meaningful intervals and in recurring contexts; and that this interplay should have adaptive value for both participants. And, I would submit, these conditions are already fully met by the way in which a human mother and her baby greet each other in the morning.

Similarly, John Ambrose proposed that the dyadic routines of greeting, smiling, kissing and hugging between mother and baby constitute innate ritualized human behaviours whose adaptive function is to maintain a strongly cohesive bond between the two, as a result enhancing the infant's survival and establishing the baby's basic social capacity (1966:360). In the "rites and rituals

conducted by communities of adults", whose purpose is often to mark "recurrent events as the phases of the year of the stages of life", the infantile feelings of security, unity and awe experienced in the mother-baby relationship are re-evoked for all their comforting and bonding effects through actions like repetitive utterances and gestures (Erikson 1966:340).[79]

There seems to have been a consensus among early ethologists that there were some common elements between artistic creation and ritualization, such as bonding, communication, symbolism, and the manipulation of affect (Erikson 1966:524). It was agreed that the arts –i.e. human practices such as dance, song, music-making, oratory, poetry, drama, and visual representation– could count as part of the set of ritualized behaviours of humans.[80] Huxley himself wrote (1966:259):

> The arts involve ritualization or adaptive canalization of the creative imagination. […] Creative works of art and literature show ritualization in this extended sense, in being 'adaptively' (functionally) organized so as to enhance their aesthetic stimulatory effect and their communication function.

In the works of scholars like Morris, Lorenz, Tinbergen, Huxley and Erikson, we already find the seeds of Ellen Dissanayake's ideas and the basis of her 'artification hypothesis' (2007, 2008, 2009, 2010), founded on the notion that the arts may be seen as human ritualized behaviours (1979:27). Dissanayake adopted an ethological approach (1974, 1979) and aimed at explaining the evolutionary origin of human artistic behaviour in terms of phylogeny, ontogeny, causation and function, as summarized below.[81]

4.2 The artification hypothesis: Key arguments

Having adopted the evolutionary ethological view, Dissanayake set out to explain "how art arose and why it was retained" (1982:146). Her starting point would be that art, having been observed in all human cultures, is a universal feature of our species, and therefore it must have a selective value.

79 Erikson's work, as much of early human ethology (Cairns & Cairns 2006), was highly influenced by the Freudian theory of psychoanalysis (see for example Erikson 1966:340). Thus, there is a general tendency to over-emphasize the influence of early development in the behaviour of the individual.

80 Art historian Ernst Gombrich, who also attended the discussion meeting, disagreed that art and ritual could have a common purpose. He recognized that "the schema used by artist is generally pre-formed in ritual and that here as elsewhere art and ritual, using the word in its narrow cultural sense, cannot easily be separated". But he later objected: "Important as are the areas of contact between ritualized behaviour in animal and man, and far reaching as is their bearing on a study of art, I could not agree to an equation of that discharge of emotion that occurs in ritual with the motivations of human art" (1966:396-7).

81 Dissanayake has made this aim explicit. However, she is not always clear about which aspects of her hypothesis precisely correspond to which level of explanation (see for example: Dissanayake 2008). The present analysis is partly my personal reading of how her model matches each level.

Indeed, an evolutionary maxim dictates that evolved species-specific behaviours, particularly complex and costly ones, probably improve survival chances otherwise, if their cost were higher than their benefit, natural selection would tend to eliminate them over time. As anthropologist Roy Rappaport explains (1971:23):

> Anything which is universal to human culture is likely to contribute to human survival. Phenomena that are merely incidental or peripheral, or epiphenomenal to the mechanisms of survival are hardly likely to become universal, nor remain so if they do.

Dissanayake's first premise, then, is that art-making is a universal innate human behaviour, meaning that any normally developed individual of our species, will be able to make art (independently of any judgment of quality), and what is more, will have a natural predisposition towards it.[82] So, to have persisted as it did, she argues, art must have served an important function that throughout human evolution somehow contributed to the survival and reproductive success of the individuals that presented it. To find out what this function may have been, she first asks what is 'the core' or the common element to all the arts, and concludes that it is a sense of 'specialness' (1980:401):

> If there is such a thing as a 'behavior of art' we must assume that it developed in human evolution from an ability or proclivity that our pre-paleolithic ancestors could have shown. I should like to suggest that this root proclivity is the ability to recognize or confer 'specialness,' a level or order different from the everyday.

The proclivity for specialness, which she calls "making special" (1982, 1990, 1992, 1999, 2000) and more recently "artification" (2007, 2008, 2009, 2010), refers to the act of transforming something ordinary (e.g. an activity or object) into something extra-ordinary by treating or making it in a special manner. To her, this universal tendency towards artification has been moulded by natural selection (1992:56), and is "the ancestral activity or behavior that gave rise to and continues to characterize or imbue all instances of what today are called the arts" (2008:252).[83] Hence, her model attempts to unravel the human tendency to 'make special' or to 'artify' in terms of Tinbergen's scheme of four levels of explanation.

82 With the term 'art' or 'art behaviour' Dissanayake denotes 'all the arts': music, dance, performances, storytelling, and the various forms of visual ornamentation and representation, or visual art (1999). Her evolutionary model further makes no distinction between art and craft, nor between 'great', or 'fine' Art and kitsch, or 'folk' art. To be sure, the aesthetic value of artworks is irrelevant to the discussion of the evolution of art as a trait, just like the correct spelling of modern languages would be of no concern to research on the evolutionary origins of human speech.

83 To draw a sketchy biological analogy, if the different arts were emotions, 'making special' or 'artification' would be the nervous system.

Phylogeny

This level of explanation refers to the evolutionary history of the behaviour, that is, its origin in an ancestral population, its development through time, and the potential selective pressures that shaped it.

Dissanayake has suggested that the ancestral interactions between mother and child constitute the evolutionary behavioural basis of artification (2008:253). She situates the origin of this behaviour early in human phylogeny, by the time of *Homo erectus*, some 250,000 years ago (1979:29, 1982:148, 1992:51). Most researchers agree that the human pattern of growth and development, otherwise known as 'life history', started to take its present form among *H. erectus,* who shows a significant increase in brain and body size with respect to previous hominins (Hopkinson et al. 2013:62). These changes had major implications for hominin females (Aiello & Key 2002). On the one hand, the energetic costs of motherhood became higher as infant growth slowed down. And on the other hand, the extended period of child dependency strengthened the human mother-child bond, which is the strongest and longest-lasting among all primates (Bell 2001:226). According to Dissanayake, the most important component of the mother-infant interaction, which creates and structures the bond between the two, is baby-talk. In her model, baby-talk, with its typical stereotyped, exaggerated and ritualised movements and vocalizations constitutes a human universal adaptation that underlies both ritual and art behaviour (1980:401).

Like the ritualization of behaviour, the process of artification is achieved through the operations of formalization, repetition, exaggeration, elaboration, and manipulation of expectation (Dissanayake 2007:9).[84] For instance, bodily movements when repeated and exaggerated become dance; speech, patterned and embellished, becomes poetry; song emerges from elaborated, amplified vocalizations; and in visual art, regular objects and surfaces are made special by emphasizing their shape, pattern, texture, and colour (1999:36, 2008:252). The roots of these basic operations, as Erikson noted, are already present in the communications between mother and baby (Dissanayake 2008, 2009, 2010). In baby-talk the participants formalize, repeat, exaggerate, elaborate, and manipulate their expressions, sounds, and movements to engage and sustain each other's attention. The mother (or caregiver), for example, employs baby-talk to attract the child's interest, to which the baby responds with loud vocalizations and exaggerated movements. Furthermore, this interaction generates the release of pleasurable prosocial hormones (oxytocin), reinforcing the bond between mother and infant (Dissanayake 2010:3), and generating an emotional response that is also found in the aesthetic response to the arts (Dissanayake 2001:98).

84 At least three of these operations – formalization, repetition, and surprise – are also cited by Erikson as basic elements of ritualization (1966:339).

In sum, Dissanayake suggests that the typical stereotyped, exaggerated and repeated actions that constitute the mother-baby dyad served as the evolutionary basis for ritual and artistic behaviour, they constitute art's phylogenetic precedent (2001:98, 2008:253, 2010:4).

Ontogeny

This level of explanation relates to the development of a behaviour in the life-course of the individual, from infancy to maturity, and how it shows up in interaction with the environment. It refers to questions of innateness, learning, conditioning, etc.

In Dissanayake's model, art is understood as an innate proclivity that shows up in early infancy becoming increasingly complex with age. As mentioned before, the operations that constitute the basis of artification are first exercised in babyhood during spirited interactions with caregivers (i.e. formalisation, repetition, exaggeration, elaboration, and surprise). These are further developed during childhood in play (Dissanayake 2010:4).[85]

Regarding practical ability for visual art, Dissanayake argues that humans also show an inborn impulse to manipulate objects and make artefacts. This is prominently present in visual art-making, where children from an early age spontaneously begin playfully exploring form and composition. In this manner, "children's drawings emerge from a self-propelled impetus to initiate and then follow their mark-making impulse where it leads – often to the operations of artification" (2010:5).

Thus, in Dissanayake's view, the ontogeny of art is mostly innate, and intensely developed in early infancy and childhood, whence it becomes later co-opted in normalized adult artistic behaviour (Dissanayake 2010:6).

Causation

This level of proximal explanation refers to the immediate mechanisms and motivations or 'causes' (e.g. physiological, psychological) that trigger a behaviour.

Dissanayake understands the arts as a derived category of human ritualized behaviours that in several aspects overlap with play and ritual, but which involve a particular aesthetic dimension. Huxley noted that "human ritualized activities have a strong autesthetic or self-rewarding component" (1966:259), which has been also highlighted in artistic behaviour (Morris 1962:158). As discussed above, ethologists and psychologists have often used the term 'ritualized

85 For Dissanayake, play is very similar to art in various aspects. Both are 'removed' from reality, carried out in special contexts with special rules, both are pleasurable and encourage novelty and creativity, and both develop innately (1974:215). In fact, in her earlier work, she suggested that art may have evolved from play (1974, 1979).

behaviour' to refer to repetitive, stereotyped actions of a pathological nature, like the compulsive movements of caged animals and distressed children.[86] Many animals turn to ritualised behaviours to release tension, that is to canalize and reduce anxiety in stressful situations (Rappaport 1971:25). Humans, too, perform repetitious movements to calm down under stress. Erikson suggested that because this type of behaviour arises in similar circumstances among both animals and humans, it "seems to provide a 'natural' link with a possible phylogenetic origin of ritualization in its more stereotyped and driven forms" (1966:337).

According to Dissanayake, as the cognitive capacities of hominins increased with encephalization, individuals would have become progressively concerned with vital life-changing and life-threatening situations (e.g., birth, death, puberty, marriages, seasons, hunts, migrations, etc.), which caused uncertainty and stress. Ceremonies, Dissanayake argues, were developed in hominin evolution as a communal strategy to cope with the anxiety and uncertainty generated by those situations, and because artistic behaviours were innately pleasurable, they were eventually co-opted in ritual ceremony (1992:59-60):

> The arts, biologically endowed predispositions, have been physically, sensuously, and emotionally satisfying and pleasurable to humans. By using elements that pleased and gratified the human senses […] and arranging and patterning these elements in unusual 'special' ways, early humans assured the willing participation in, and accurate performance of, ceremonies that united them. The arts 'enabled' ceremonies because they made ceremonies feel good. Before they were ever consciously used to make things special, the satisfactions of rhythm, novelty, order, pattern, color, bodily movement, and moving in synchrony with others were fundamental animal pleasures, essential ingredients of life. Using these bodily pleasurable elements to make ceremonies special –elaborating and shaping them– the arts, and art, were born.

In ceremonies, which involve a collective and emotion-laden event that marks significant occasions in the life of an individual or a group, many of the artifying operations and behaviours take place because they replicate the comforting feeling of the mother-child interactions, thus "relieving tension and anxiety and instilling a sense of coping with uncertainty" (2007:10). So, the naturally pleasurable and soothing ritualized behaviours of the mother-infant dyad were collectively re-enacted by jointly engaging in repetitive and stereotyped actions, displays, utterances, and movements, some of which eventually constituted what we now call 'the arts' (1999:36, 2008:252). In time, different media were incorporated to reinforce the effects of ceremonies. These new components, intended to attract and sustain attention, were embellished to make them

86 Although Morris and Erikson, for instance, oppose the use of the term 'ritualization' in this clinical sense (Erikson 1966:523).

perceptibly extra-ordinary:[87] "In the visual arts, ordinary objects like the natural body, the natural surroundings, and common artifacts are made special by cultural shaping and elaborating that make them more than ordinary" (Dissanayake 1999:36). In this manner, Dissanayake sees ritual ceremony as the probable context in which the arts originally evolved and flourished (2008:257), and sees the canalization of emotion along with its pleasurable and therapeutic effects against uncertainty as the original motivation or proximate cause of art behaviour (2001:98; 2008:254, 2009:156).

Function

In evolutionary terms, function refers to the survival value of a behaviour, or the effect for which it was selected. It accounts for the plausible ways in which the behaviour may have conveyed a survival and reproductive advantage to the organisms that manifested it.

In Dissanayake's model, as explained above the aesthetic elements that constitute the arts were innately gratifying to humans but offered no real survival or reproductive advantage until they were incorporated in ritual. In this context, she explains (2001:98):

> The arts may serve […] as ways of creating and sharing emotional communion with other humans, thereby transmitting group knowledge and instilling a sense of 'coping' that could relieve individual anxiety, and foster one-heartedness and social solidarity.

Hence, besides providing an emotional outlet and being self-rewarding, ritual interactions have the effect of forming a bond between participants (Erikson 1966:524; Lorenz 1966:276). And the arts, by attracting and directing collective emotion and attention in ritual, also give rise to or support shared feelings and ideals, thereby strengthening social cohesion among the partakers in a ceremony. For Dissanayake, this may have added adaptive value (1992:52):

> Groups whose individual members had the tendency to make things special would have had more unifying ritual ceremonies, and thus these individuals and groups would have survived better than individuals and groups that did not.

Dissanayake, thus, argues that the arts coevolved with ritual ceremony, acquiring adaptive value and social function by providing psychological relief and promoting social cohesion, which can potentially enhance survival of individuals and groups (1999:39, 2001:98).

Summarizing, Dissanayake's model for the origins of art states that the ritualized behaviours that constitute artistic activities are a human biological adaptation with a) [phylogeny] a deep evolutionary history in the hominin lineage that may go as far back as *Homo erectus*; b) [ontogeny] a developmental

87 The process of "making special" or "artification".

basis in mother-baby interaction and infant play whence; c) [causation] they became co-opted as self-rewarding emotional outlets; d) [function] whose psychological effects of reducing anxiety and promoting unity between individuals ultimately conferred adaptive benefits to those who engaged in them.[88] It should be noted that this model refers to the origins of the 'behavioural basis' of all the arts, that is of 'making special'. So, on the one hand, Dissanayake envisages the emergence the human tendency for making special early on in human evolution, but on the other hand, she perceives the origins of visual art, in particular, as a late development, unique to our species (2007:12).

4.3 What is art for? Critical assessment

Ellen Dissanayake's model states that art behaviour is a natural human proclivity towards making things special – or 'artifying'. Thus, she has argued that adopting an ethological approach will help to explain the evolution of this behaviour of art, as well as the origin of all the practices we now know as 'the arts'. The following assessment concentrates on three main problems in her model. First, it may not be viable to formulate a unified explanation for the evolution of the arts as a whole because they constitute different traits. Second, the evidence for visual art does not support a view of art as an innate biological predisposition expressed in a universal pattern of ontogenetic development. And lastly, the ethological framework adopted by Dissanayake, by overemphasizing function and adaptive value, and asking 'what is art for?' might not be an appropriate strategy to solve crucial questions of emergence and development in evolution. Nevertheless, the assessment also indicates that the model does identify important effects and selective pressures that might have contributed towards the retention and success of human artistic practices.

The evolutionary diversity of the arts

As mentioned before, the artification hypothesis is concerned with explaining the origins of a general behaviour of art, which includes all the arts. Dissanayake has defended the view that an ethological explanation of the origins of art should account for all its forms, and that models that are based only on one of the arts (e.g. music, storytelling, visual art) are inadequate (2008:250). While I agree that research on the evolution of one art form should not be used to

88 This is how the four aspects work together in her model: "Adult aesthetic response (to arts like poetry, music, and dance, which unfold in time) is built upon the same fundamental or innate competencies and sensitivities to temporal and dynamic elements that are spontaneously used by mothers in babytalk to engender and sustain affiliative emotion and accord. If this is so, engaging in the arts may serve [...] as ways of creating and sharing emotional communion with other humans, thereby transmitting group knowledge and instilling a sense of 'coping' that could relieve individual anxiety, and foster one-heartedness and social solidarity" (Dissanayake 2001:98).

formulate a general model for all the arts, I also believe that a monolithic explanation of art is both unattainable and undesirable. The main reason for this is that music, storytelling, and the visual arts, i.e. the manifestations that Dissanayake considers as variants a single behaviour of art, may in fact constitute very different traits in themselves, which evolved at different moments, under different selective pressures, with their own cognitive mechanisms and functions.

For example, several researchers have suggested, as Darwin did, that music and dance may have a very long evolutionary history, perhaps pre-dating language ability (Brown 2007; Cross & Morley 2008; Dunbar 2004; Fitch 2005b; McDermott & Hauser 2005; Mithen 2009). In fact, some scholars suggest that singing might have constituted an early proto-linguistic communication system that eventually supported the rise of speech (Dunbar 2004; Fitch 2005b; Mithen 2009). The origin of musical abilities has recently received much attention from evolutionary and cognitive scientists (Brown 2007). As a result, several important advances have been made towards an evolutionary explanation of music.[89] These studies in fact seem to support Dissanayake's model. Cross-cultural evidence indicates that there are some innate components to music perception and production. Humans are responsive to music and rhythm from early infancy (Fitch 2005b). Moreover, McDermott and Hauser (2005) have noted that music is nearly universally produced from an arrangement of pitches similar to the pentatonic and diatonic scales. And, at least one genre of human music has been identified as truly universal: lullabies, slow in tempo, simple, repetitive and infant-directed. All three points seem to support a scenario of music origins related to human mother-infant interactions (Cross & Morley 2008; Dissanayake 1992, 2000; Fitch 2005b). In contrast, as Dissanayake herself (2007:12) and others have noted (Coe 2003; Lewis-Williams 2002; Zilhão 2007), the visual arts evolved later and separately. From our review of the archaeological record in chapter 2, it becomes evident that visual art certainly did not flourish until the Late Pleistocene, which in itself requires clarification.

Finally, neuroscience research has shown that linguistic abilities, musical faculties, and visual art-making (e.g. drawing and painting), each involve different cognitive mechanisms, and are located in different areas of the brain (Fitch 2005b; Zaidel 2010). This is most clearly observed in persons with Parkinson's and Alzheimer's diseases whose memory, as well as visual and linguistic capacities are often impaired, but generally are still be able to remember and even learn songs and melodies, as the curious neurological anecdotes of Oliver Sacks ([1985]2011) illustrate. This indicates that musical memory is independent of visual and linguistic memory (Prickett & Moore 1991). Neuroimaging studies of music perception and production point towards the possible existence of music-specific cognitive processes and circuitry in the

89 Music is minimally defined as "structured sounds produced directly or indirectly by humans" (McDermott & Hauser 2005:30).

human brain (Brown 2007; McDermott & Hauser 2005). Similarly, patients with impeded linguistic faculties (e.g. dysphasia, apraxia) can retain normal visual-artistic abilities (Donald 1993:742; Humphrey 1998), which are more related to visual-motor skills. This implies the dissociability of language and visual art; i.e. that language and visual art are not neurologically interconnected. Therefore, if the aim is to account for the evolution of 'the arts', they should be separated as independent sets, each with their own ontogenetic and phylogenetic history and mechanisms. In this assessment I concentrate particularly on Dissanayake's views related to the emergence and development of visual art.

Against the innateness of visual art

Dissanayake has often argued that art is likely to be a human adaptation because it is an innate behaviour; i.e. it arises spontaneously in children – is unlearnt, it follows a fixed pattern of development, and it is universal (1992:xix; 2007:2).[90] There is, however, little ground to support at least the first two of these three statements with regards to visual art. First, visual art does not arise spontaneously in ontogeny. Certainly, when stimulated, children are highly motivated to engage in visual art-making. In literate societies where the development of drawing skills is particularly encouraged from an early age, children do acquire this aptitude relatively easily (independently of talent). For this reason, some researchers have suggested that the development of drawing skills to some extent mirrors the gradual process of language acquisition (Kellog 1970; Morris 1962). However, neither visual art nor language are unlearnt. Several studies in deaf (Mayberry 2010) and socially isolated children – neglected and 'feral' children (Candland 1993) – confirm that there is a critical period for language learning, meaning that "a lack of language acquisition in early life impedes the ability to learn language throughout life" (Mayberry 2010:286). And although I am not aware of comparable studies for visual art-making, at least the cases of neglect also indicate that children do not 'spontaneously' engage in, for instance, drawing (Candland 1993:34). Visual art, like language, is a behaviour that depends on human social interaction.

Second, Dissanayake follows the classical Piagetian models of child development which suggest that visual art production follows a fixed pattern of progressive stages. These models, based on the maturation of children's drawings (Baker & Kellogg 1967; Kellogg 1970; Morris 1962), suggest that the achievement of visual representation follows an inner scheme of universal succesive phases that start with making marks and lines (scribbles), to geometrical shapes, to composite figures, and culminate with representational sketches (Dissanayake 2010:5). Certainly, most children in modern literate societies are encouraged to start experimenting with drawing by the age of two,

90 Innate traits are "determined by factors present in and individual from birth, even though the traits in question may not emerge until later in development" (McDermott & Hauser 2005:30).

when they begin to develop the muscle co-ordination required for the manipulation of tools like crayons or pencils (Morris 1962), producing only lines, scribbles, and eventually circles. Between the ages of three and five, they gradually go from typically drawing circles, to cross circles, to 'mandala' and 'sun' motifs, to making more complex aggregates eventually arriving at representational images. Over the next few years children will master drawing, independently of their talents. However, this pattern does not seem to be either innate nor universal. The 'scribble' stage, may be parsimoniously explained by the development of motor skills (e.g. hand-eye coordination and dexterity). As for the others, more recent data from developmental psychology suggests that there is a strong social component to children's art-making, and thus the content of these supposed stages more likely correspond with the instructor's influence and expectation, and even peer-pressure. For example, when infants develop Theory of Mind and a sense of their social self, the influence of their cultural environment grows stronger, constraining individual 'creative freedom', as developmental psychologists Francesca Happé and Pedro Vital explain (2009:1370):

> Typically developing (TD) children lose aspects of originality in, for example, their art as a result of acquiring stereotyped forms from their peers (think, for example, of rays drawn on a sun or birds drawn as 'ticks'). Without doubt, the obligatory and automatic recognition of others' mental states, and the desire to be viewed by others as part of the in-group, place blinkers on most TD young people.

Furthermore, despite the universalist claim, the model is based on Western case studies (e.g. Kellogg 1970). However, (figurative) representation should not be seen as the highest level of development of visual artistic behaviour either at the individual or the species level, as psychologists Jeniffer Drake and Ellen Winner make clear (2010:167):

> At the heart of artistic talent is the ability to master one's culture's representational conventions. It is a mistake […] to see Western-style realism as the prime sign of artistic talent, when this style is but one of the many possible representational conventions.

In contrast to innateness, the statement of universality is better supported. As explained in the previous chapter, there is enough evidence to claim that some forms of visual arts are, at least since the Late Pleistocene, truly universal (e.g. body ornamentation). But if this claim is meant to include all forms of visual art, it becomes weaker. The above does not necessarily disprove that visual art constitutes a human adaptation. As philosopher Nicholas Shea has recently discussed, evolutionary research on human behaviour needs to detach innateness from adaptation, and being an adaptation from being unlearnt, and do away with explanations of the type "X is an adaptation → X is innate → X's development does not depend upon learning" because "many recent human adaptations depend crucially on learning" (2012:2235). Early ethologists also

recognized that much of human behaviour depends upon "man's unique learning capacity" so that "the process of human ritualization in psychological evolution has a primarily ontogentic, not a phylogenetic basis; is directed mainly by psychological selection, not by the genetic mechanism of natural selection" (Huxley 1966:258). So, visual art may be universal, though not innate, and it may have adaptive value, without necessarily being an adaptation.

Following Erikson, Dissanayake has also suggested that the interactions between mother and child constitute the behavioural basis of artification, especially baby-talk, which she also considers a human adaptation that underlies ritual and artistic behaviour (Dissanayake 2001, 2008:253; Miall & Dissanayake 2003). Nonetheless the assertion that baby-talk is a universal human parenting strategy has been disputed by cross-cultural studies of parental caregiving and child development (Tomasello et al. 2005:688). Some scholars have pointed out that many cultures do not interact with infants in this manner, but that on the contrary, the most common pattern of infant care found in ethnography shows that babies are often fed and further left alone to rest (Lancy & Grove 2010:147). In general, young babies and toddlers are not usually talked to or interacted with, for they are perceived as lacking understanding. In some extreme cases, as among the Korowai of West Papua, newborn babies are seen as 'inhuman' or non-persons (Stasch 2009:165). Frequently it is not until children become relatively independent (at 4 or 5 years of age) and can assume a social role that they become incorporated into day-to-day social interactions (Lancy & Grove 2010:152). Moreover, the ways in which mothers communicate with their infants also vary, and do not always comply with the typical high-pitched kind of baby-talk Dissanayake describes; for example among the Amazonian Pirahã, mothers use humming, or 'hum speech' when addressing their babies (Everett 2010:186). Dissanayake's, and Erikson's, assumptions seem to be modelled after an archetypal idea of motherhood. As developmental psychologist Suzanne Gaskins has noted, in childhood studies, "many of the underlying assumptions and many specific patterns of interaction (such as social games, face-to-face interaction, and motherese) experienced by Euro-American infants that have been assumed to be universal are not" (2006:288).

Another issue is that the mother-infant relationship in the *Homo* lineage probably is not 'a unique adaptation', but part of a caregiving behavioural control system present in all mammals (Bell 2001; Panksepp 1998). This neuro-affective system is mostly driven by hormonal cues that promote emotional preference and attachment between mother and offspring. In primates, and even more so in humans, the scope of the system incorporates not only primary care and safety of the offspring, but also the teaching of survival skills, emotional security, and life-long mutual support (Bell 2001:224). The consequences of the long phylogeny of the mother-infant relationship have been noted by Rappaport (1999:390):

> It may be suggested, in the light of both Erikson's account and the pseudo-infancy prevailing in some rituals, that ritual recaptures a state having its ontogenetic origin in the relationship of pre-verbal infants to their mothers. […] There are also phylogenetic implications. If ontogeny has a phylogeny and if the mother-child relationship among humans is but a variant of the primate or even mammalian pattern, it may be that the basis of the numinous is archaic, antedating humanity.

Indeed, if the human mother-infant bond is but an extension of the mammal or primate pattern, it would not be, as Dissanayake has suggested, "an adaptation in hominins that evolved to address the problem of ensuring continued care of highly altricial infants" (2010:3). And whereas this does support her argument that making-special behaviour has a deep evolutionary history in the hominin lineage, it still leaves unexplained why clear evidence of ritual and art-making only appears in the Late Pleistocene.

The problems of function as explanation

As a final discussion, various scholars have taken issue with Mayr's and Tinbergen's four levels of evolutionary explanation, upon which the ethological analysis of Dissanayake's model is also based. To recapitulate, these are the 'proximate levels' of causation and ontogeny, and the 'ultimate levels' of function and phylogeny. Criticisms have focused particularly on three points: the conflation of correlation and causation, the problems of 'reverse engineering' from current function, and the division between 'proximate' and 'ultimate' causes.

The first point, is that in trying to identify the causes of a behaviour, researchers often point to the preceding conditions that accompany it, but these do not necessarily hold a causal relationship, in other words "what causes something to happen has nothing to do with the number of times we have observed it happening" (Sayer 2000:14). Furthermore, identifying the conditions in which a behaviour or trait evolved is not sufficient explanation for its evolution. In this case, Dissanayake's observation that ritual ceremonies always incorporate artistic displays and that both art and ritual share many characteristics (e.g. 'specialness') is not sufficient to support the argument that the latter acted as cause for the evolutionary development of the first. Pre-existing conditions are not the same as causes, and the fact that two phenomena are observed to co-occur recurrently does not mean that they are causally linked.[91]

The second issue has been raised by palaeontologist Stephen J. Gould and biologist Richard Lewontin, who noted that asking the question "what did a

91 This is a logical fallacy known as *cum hoc ergo propter hoc*. For example, up until the 19th century people used to think that 'bad air' or miasma (i.e. bad odours) caused diseases like cholera and plague, evidently there is a connection between the two but as we now know, bad odours are more usually an effect or a symptom of disease-prone conditions, rather than a cause of disease.

behaviour evolve for?" can generate hypotheses that fail to distinguish between current function from cause of origin (1979:581). To take one of Gould's classical examples, by observing the current function of feathers in birds, one could easily assume that feathers 'evolved for' flying, or alternatively for display, and be satisfied with either explanation. However, feathers may have evolved in dinosaurs for thermo-regulation and were only later repurposed, i.e. exapted, for flight and courtship in birds (Gould 2002:1226). So, the fact that a trait or behaviour functions in one way or context in the present, does not necessarily indicate what it 'evolved for'.[92] Therefore, "one must not confuse the fact that a structure is used in some way with the primary evolutionary reason for its existence and conformation" (Gould & Lewontin 1979:587). For this reason, answering the question "what was art selected for?" by 'reverse-engineering' on the basis of the current function of the behaviour may not be the best approach, since it can easily lead to 'just-so-stories' of phylogenetic origin. As Dissanayake herself has noted (2007, 2008), there are currently a dozen 'competing scenarios' on the adaptive function of art, all taking different effects of art as a starting point. Additionally, even if a current function could be traced back in phylogeny, it would not imply that the trait is a specific 'adaptation for' that function. Evolutionary processes are generally not that simple, there may be selection without adaptation, adaptation without selection, random drift, and 'secondary' adaptation – a.k.a. exaptation. In sum, evolutionary explanations need not couple function, selection and adaptation in a linear relationship. So, even if visual art does have self-rewarding, therapeutic and bonding functions, and even if these were originally developed in ritual contexts, it cannot be said that art was 'selected for' these effects.

Finally, as in the first point, the 'proximate' and 'ultimate' levels of explanation are often said to refer to the immediate and the evolutionary causes of a behaviour, respectively. But as Martin Mahner and Mario Bunge explain, this is problematic (1997:40):

> The distinction between *proximate* and *ultimate* causes has become common-place in biology. In order to explain any morphological or behavioral feature, such as the behavior of migrating birds, we would have to take two levels of (alleged) causation into account. The proximate level consists in the physiological mechanisms that produces or triggers the behavior, such as the effect of diminishing daylight and temperatures on the phsysiology of the bird, or the developmental pathways in the case of a morphological character. The ultimate cause, by contrast, would be the evolutionary history of the organ or behavior as contained in the 'genetic program', which thus has to be regarded as a material as well as final cause.

92 Gould coined the term 'exaptation' to denote "the cooptation of a preexisting character for an altered current utility", as opposed to adaptation, which is "the origin of a character directly for its current utility" (2002:671). Exaptation then involves "the re-use by natural selection of a structure with previously different purposes" (Pievani & Serrelli 2011:3).

> As will be obvious from the previous considerations, what is called 'proximate causes' may indeed be such, but there are no such events as ultimate causes. Undoubtedly, the history of an individual and, particularly, the history of its genetic material are determinants of the developmental processes leading to its current morphology and behavior, but they do not cause it. What is true is that the history of a system provides some of the *condition*s or *circumstances* of the system's possible changes. Therefore, the expression 'ultimate cause' should be replaced by the expression *historical condition*, or *distal cause* in the case of a genuine past cause.

Certainly, phylogenetic history is relevant for understanding the origins of a trait, but it does not offer a cause of origin.

Finally, Kevin Laland and colleagues have recently noted that Mayr's model, by conceiving of causation and ontogeny as 'proximate' causes, diminishes the importance of developmental processes in evolution. Whereas, it is now recognized that developmental and epigenetic mechanisms can have strong selective powers (Laland et al.2012:1515):

> Mayr's proximate/ultimate distinction has proven problematic because it builds on an incorrect view of development that fails to address the origin of characters and ignores the fact that proximate mechanisms contribute to the dynamics of selection.

The implications of the three issues raised above is that while separating evolutionary accounts in different levels of explanation may be a useful heuristic tool of analysis, in reality these four aspects do not work separately, they are all integrated in the organism, its current functioning and its history.[93] These criticisms also have an impact on Dissanayake's model for the evolutionary origin of art. Especially, the point that a trait's function should not be equalled to its evolutionary cause. Whereas selection does work on effects (Gould 2002:672), pointing these out does not inform us about how the behaviour arose. Indeed, the effects, results or outcomes of artistic practice (e.g. stress reduction, social cohesion, aesthetic pleasure, etc.) may have acted as selective pressures towards retaining art behaviour, but they do not explain either how visual art came about, or how it developed into its observable forms, and the latter questions should be the focus of evolutionary explanation.[94]

93 As philosopher of science Brett Calcott has noted, the proximate-ultimate dichotomy is also not useful for explaining how group-level properties emerge from individual-level interactions (e.g. cooperation, complexity), or the mechanisms that are involved in such a process (2013:260).

94 Therefore an account in terms of mechanisms is preferred to one in terms of function: "Mechanismic explanation differs also from functional or teleological explanation, as in 'feature A evolved (or was set up) for function B, which is necessary for (biological or social) viability.' Indeed, conjecturing that a certain system is driven by such-and-such mechanism(s) involves no reference to adaptation or value, particularly usefulness to the given system or some other system – all the more so since certain feature of either organism or social systems can be maladaptive. The emergence of an interesting new thing or property of a thing should certainly be explained in terms of some mechanism or other but not necessarily by reference to its value, which may be nil or even negative

In conclusion, while Dissanayake's model probably points out some significant selective pressures for human artistic behaviour, it is not sufficient as an explanation of how (visual) art emerged in human evolution (the specific circumstances under which it is expected to have arisen). Pointing to a correlation with ritual, where in time the visual arts were just 'added' to enhance ceremonies (2007:12) says little, in any case, about why visual art developed when and where it did (the forms and changes observed in the archaeological record).

However, it is possible to retain the notion of the visual arts as ritualized behaviours without having to allude to a ritual origin. In fact, what early ethologists like Huxley and Lorenz called 'ritualization' was the process by which an ordinary movement, gesture, or vocalization acquires a communication function, i.e. becomes a signal. They suggested that the arts also went through such a ritualization process, and for this reason had a lot in common with animal ritualized behaviours (i.e. signals). However, as Erikson well said (1966:523), not all ritualized behaviours are (what anthropologists call) ritual or involved in ritual. In its original connotation, I agree that visual art may be seen as ritualized behaviour, in other words, that it may have originated from common behaviours that later became co-opted in communication. I elaborate on this in chapter 6.

4.4 Test against the archaeological record of visual art

Dissanayake's account for the origins of art, like Geoffrey Miller's, incorporates little archaeological evidence. She has focused mainly on suggesting a biological motivation for artistic behaviour, rather than 'reconstructing' the emergence or development of 'the arts' (1992:37). And like Miller's, her model is difficult to contrast against the early archaeological evidence of visual art. However, by following the author's line of reasoning, again it is possible to deduce some predictions to be tested against the Pleistocene record.

The hypothesis laid out by Dissanayake suggests that visual art evolved in collective ritual contexts, selected for the adaptive function of reducing stress under uncertainty, while promoting intra-group social cohesion. This model predicts that art will be most prominent in the context of communal rituals and ceremonies. Therefore, *a noticeable increase of visual art will correlate with an increase in communal ceremonial activities* (prediction 1a) *and signs of emerging group identity* (prediction 1b). And because, Dissanayake argues, "groups whose individual members had the tendency to make things special would have had

rather than positive [...] To be sure, some human actions are purposive, but indicating their (known or conjectured) purpose, function, or usefulness performs only part of the job. We also need to know (or guess) something about the mechanism(s) likely to bring about the desired goal" (Bunge 1997:413).

more unifying ritual ceremonies, and thus these individuals and groups would have survived better than individuals and groups that did not" (1992:52), *the model would expect artistic behavoiur to be under strong selective pressure of environmental stress and intensive group-group competition* (prediction 2).[95]

Unambiguous evidence for ritual and ceremonial activity is difficult to identify in the material record, and is often a point of debate in archaeological interpretation (Ross & Davidson 2006). It is clear that not all ceremonies leave an archaeological print, but by analogy some remains are interpreted as traces of ceremonial behaviour. From ethnographical and historical data, it is known that rituals and ceremonies may take place on a daily basis, and in a domestic environment; take for example the keeping of a home altar, morning prayers, or collective dining. But the types of ceremonies Dissanayake actually seems to have in mind – e.g. public gatherings with lavish displays of visual and other arts – are special-purpose activities that generally require special preparations and a determined time and place (Rappaport 1971:28).

Ian Watts has argued that the notable intensification of red ochre exploitation in the record of African Middle Stone Age sites "permits the inference of habitual collective ritual" (2009:80). But, as I explained in the review of the ochre record, this evidence is ambiguous. An increase in ochre use, even if used for body painting, need not imply that humans were carrying out the kind of communal ritual ceremonies Watts and Dissanayake seem to have in mind. For instance, body painting could have been an everyday, non-ceremonial (although highly symbolic) custom, as it is today among the Namibian Himba women whose hair and bodies are permanently covered in a mix of butter and red ochre. Also, many African Middle Stone Age ochre finds come from contexts with traces of multiple activities. They have often been found along with stone tools and food remains that indicate the sites were likely base camps where people carried out day-to-day subsistence activities rather than special ceremonial ones, for example at Pinnacle Point (Marean et al. 2007) and Blombos Cave (Henshilwood & D'Errico 2011:82).[96] Naturally, the fact that the ochre has been found in these locations does not preclude its use in other places; it is still possible that the ochre was processed in these domestic locations and the pigments obtained were applied and/or displayed elsewhere.

The repeated occurrence of ochre in Late Pleistocene burials (Watts 2002:1) does seem to suggest the probable use of red pigment in funerary ceremonies, but the data from ochre can be ambiguous, as we have already discussed in chapter 2. So, depending on how the evidence is interpreted, the prediction that

95 Dissanayake recognizes, though, that some scholars report the opposite: that abundance of resources promotes the need for competitive ceremonial displays of prestige items (e.g. visual art). However, for her, the emergence of art is better explained by its contribution to social cooperation rather than competition (1992:238, 2010:6).

96 With the exception of a recent find of 100,000 year-old ochre-processing toolkits at Blombos Cave, which have been interpreted as evidence of an ochre-processing workshop (Henshilwood et al. 2011).

an increase of visual art production should indicate more intensive ceremonial behaviour (1a) might find some support in the African MSA record of ochre use (cf. Power 1999, 2004, 2009).

It is not until the Upper Palaeolithic in Europe that we observe better-defined signs of the ceremonial use of space. For instance, the painted caves of France and Spain do not show evidence of having been used for regular habitation, which indicates that they often were reserved for the special purpose of painting and associated activities, which probably included some ceremonial activities (Conkey 1993:108).

The Pleistocene shell bead finds from Middle Stone Age sites like Blombos Cave in South Africa and Pigeons Cave in Morocco have been interpreted by some scholars as indicators of group identity (Wadley 2007:682). However, these items seem to be too standardized over time and space to signal group differences (Kuhn & Stiner 2007a:48). As discussed in the record review, many of the beads from different sites are made of the same marine snail family (*Nassarius*) and show similar perforation and modification patterns. Objects that are meant to tell groups apart from one another should be easily identified as distinct.[97] Like linguistic dialects, which clearly signal specific group affiliations, material social markers should show relative regional and temporal stylistic variability (Wobst 1977). Instead, the formal redundancy and stylistic consistency of these earliest ornaments might relate to individual within-group social identity in the African Middle Stone Age before 75,000 BP (Kuhn & Stiner 2007b:46; Malafouris 2008b:408), as I will discuss in chapter 6. Again, it is in the record of the European Upper Palaeolithic, especially from the developed Aurignacian onwards, where we clearly see regional stylistic variations in material culture (like tool types and personal ornaments) that might speak of interaction between distinct groups (Gamble 1999:363; Gilman 1984; Vanhaeren & D'Errico 2006). The idea that the earliest signs of visual art might correspond to emerging group identity (prediction 1b) is thus not well supported by the art record of the African Middle Stone Age up to 75,000 BP, but might apply to the evidence of the European Upper Palaeolithic particularly after 30,000 BP.

As mentioned in Chapter 2, the living conditions in Africa around 100-75,000 BP seem to have been relatively favourable for modern humans, with small populations benefiting from diverse productive environments. Under such circumstances, group-group competition is not generally expected to act as an important selective pressure. At the same time, because bands in a rich and stable environment are relatively self-sufficient and scattered, cooperation between groups and across large distances is weak (Ambrose 2010:140). In the absence of intensive inter-group competition or cooperation, group identity would remain underdeveloped, and markers of group affiliation would be

97 Nonetheless, we cannot discard the possibility that it was how these items were displayed by separate groups which made them different (as jewellery, sewn on clothing, as part of a headdress, etc.).

unnecessary (Wobst 1977; Wiessner 1983). Hence, the conditions of precariousness and group-group competition expected by Dissanayake's model (prediction 2) are not met for the African MSA before 75,000 BP.

The archaeological predictions deduced from Dissanayake's artification hypothesis are not entirely consistent with the earliest record of visual art in the African Middle Stone Age. Nevertheless, some of the circumstances assumed by Dissanayake seem to apply well to the conditions of the European Upper Palaeolithic. So, her model appears to better explain not so much the origins of visual art as the emergence of particular (collective/group) art forms. For instance, the conditions of intensified intergroup interactions, either through competition or cooperation, that might select for internally cohesive groups and collective identity might be reflected in the regional styles of Upper Palaeolithic tool technology and visual art (Gilman 1984). This prospect will be revisited in chapter 6.

4.5 Conclusion

In this analysis, I have argued that Dissanayake's artification hypothesis is too broad in trying to account for all 'the arts' as a single behaviour of art (see also Davies 2005:304; Lewis-Williams 2002:67). I have suggested that, on the contrary, what she calls the arts may be better approached as different behaviours with individual evolutionary histories. Furthermore, I have pointed out that an ethological approach is desirable and useful to enquire about evolutionary origins, but that it should avoid relying too heavily on 'reverse-eingeneering' from current function and on *a priori* assumptions of the innateness of behaviour, for these blur the importance of ontogenetic development in evolution. Finally, I have shown that the original ethological connotation of art as 'ritualized behaviour' actually refers to its role as a communication signal, but not necessarily to ritual in the anthropological sense, and it is in that original sense that it should be understood.

The assessment of Dissanayake's hypothesis against the archaeological record of visual art in the Pleistocene revealed that it cannot satisfactorily explain the origins of visual art behaviour in the African Middle Stone Age prior to 75,000 BP, although it might account for the emergence of new (collective) art forms in the European Upper Palaeolithic by 30,000 BP which indeed might be related to an increase of ritual behaviour and inter-group competition. This point will be taken up again in chapter 6.

5. ART IN MIND: STEVEN MITHEN'S MODEL OF COGNITIVE EVOLUTION

We have both reason and need to search for a link only if there is something to be linked, only if, for example, it has been decided that there is a space to be found that separates chimpanzees from human beings. The Mental Ladder was the chain, of course, just as the fossil record has come to be the supposed chain that links all living beings, past and present, extinct or breathing on today's ladder. Each new fossil find of a supposed hominid fossil brings new guesses as to the nature of the link in structure and behavior between ourselves and those very remote genetic ancestors.

DOUGLAS K. CANDLAND, 1993

Over two decades ago, British archaeologist Steven Mithen, armed with a broad knowledge of prehistory and psychology, set himself the difficult and ambitious task of proposing an evolutionary model not only for the origins of art, but for the modern human mind, in his seminal book *The prehistory of the mind: A search for the origins of art, religion and science* (1996a). His proposal – well informed by archaeology, palaeoanthropology, evolutionary psychology, cognitive science, artificial intelligence, and philosophy of mind – emphasizes the symbolic nature of human cognition and conceives of visual art as a cognitive faculty intended to encode and communicate ideas between individuals, and has had a great impact in the fields of cognitive archaeology, and in studies on the origins of art.

The aim of this chapter is to carry out an assessment of the key arguments in Mithen's proposal as presented on *The Prehistory*. Although I will also use relevant work in which he has developed the arguments expressed in *The Prehistory*, the latter contains the core of Mithen's origin-of art model. Moreover, even when the author has somewhat modified his position since that publication, this is still his most influential work and continues to be widely cited. For this reason, it constitutes the main focus of this assessment.

The chapter development includes an overview of the ideas that underlie Mithen's model in the realms of archaeology and cognitive science, a description of his main arguments regarding the evolution of the modern mind and the origins of visual art, and a discussion and evaluation of some of the key features of his model in view of recent data from cognitive and evolutionary science. Finally, I examine some predictions from his proposal in light of recent archaeological data.

5.1 The evolution of human cognition: The background

Mithen's model for the evolution of cognition and the origins of art, firstly, belongs to a long scholarly tradition in archaeology concerned with explaining the changes in the archaeological record of the Late Pleistocene, and in particular of the European Upper Palaeolithic. He attempts to account for the differences in the material culture of extinct and living humans in terms of the evolution of cognitive abilities in the *Homo* lineage. In second place, it fits within the domain of cognitive archaeology, the aims of which is explained below.

As discussed in chapter 1, for most of the past century, prehistorians were preoccupied with explaining the seemingly abrupt changes observed in the archaeological record of the European Upper Palaeolithic, which pointed to a sudden 'explosion' of several objects and traits that define modern human populations (Pfeiffer 1982:42); among others: specialized tools (e.g. harpoons, knives, awls, nets), the use of various raw materials for tool-making (e.g. bone, wood, antler, ivory), the structured use of space, the exploitation of a wide array of resources for food (e.g. plants, seeds, small animals, aquatic resources), burials with grave goods, exchange, personal ornaments, and visual art. [98]

To many scholars, Mithen included, these changes were best explained by an enhancement in human cognitive ability that allowed the populations of the Upper Palaeolithic to create and exploit culture at a rate never before reached by any other hominin group. Thus, explaining the archaeological record could not be decoupled from explaining the evolution of human cognition.

Cognition encompasses all the mental processes involved in the way organisms learn about and interact with the world. For humans, these include perception, attention, memory, language acquisition and use, problem-solving and decision-making, among others. Explaining how cognitive processes work is a key theme in psychology and neuroscience. Up to the 1960s, psychological research was dominated by the behaviourist approach which explained behaviour as a reaction to external stimuli and thus emphasized the study of so-called stimulus-response mechanisms.[99] However, by that time some cognition scholars including George Miller, Noam Chomsky and Jerry Fodor, started to see behaviour in a different light, as the result of cognitive operations triggered by environmental inputs. They were attracted by the idea that the mind could be modelled after a computer, "both the computer and the human mind should be thought of as 'symbol systems' – physical entities that process, transform, elaborate, and, in other ways, manipulate symbols of various kinds" (Gardner 1987:34). Under their influence, psychological research gradually shifted away from behaviourism and toward a cognitive information-processing position, which focused on investigating mental representations and the 'inner workings

98 For a full list of Upper Palaeolithic innovations, see: O. Bar-Yosef (2002, 2007).

99 Behaviourists considered psychology to be the science of the physical, observable movements organisms make in space, i.e. observable behaviour (Baars 1986:7).

of the mind'. This conceptual change is known as 'the cognitive revolution in psychology' (Baars 1986; Gardner 1987; Miller 2003). As psychologist Howard Gardner explains, the cognitive paradigm is the belief that talking about human cognitive activities is to speak about mental representations, separate from the biological/neurological and sociological/cultural aspects of behaviour; that the computer is a good model of how the human mind works; and, that cognitive research should focus on operative mechanisms and de-emphasize affective, cultural, and environmental factors (1987:6). The study of language, understood as the primordial symbol system, is also central to the cognitive paradigm.

The cognitive view then, promotes a view of cognition as symbol-processing. Here, the mind's function is to create and process symbols which themselves are generated in the brain to represent knowledge or reality. Hence, symbolism is detached from the traditional semiological sense of a code or system of meanings, and redefined as a psychological (cognitive) mechanism and a form of knowing (Sperber 1975).[100] The priority given in this perspective to symbolism as the most relevant aspect in the evolution of human cognition is summarized by cognitive psychologist Merlin Donald as follows (1993:737):

> Symbolic representation is the principal cognitive signature of humans and the main phenomenon whose arrival on the scene has to be accounted for in any scenario of human evolution.

The cognitive paradigm has also had a profound effect in how art has been approached since. Whereas behaviourism had generally understood art as a non-cognitive or affective activity, the cognitive perspective established the processes of art-making and art perception as mental activities originating in the brain (Efland 2002:56).

In archaeology, the cognitive view generated a branch concerned with "the study of the ways of thought of past societies (and sometimes of individuals in those societies) based upon the surviving material remains" (Renfrew 1993:248). Cognitive archaeology, or the 'archaeology of mind', has two main fields of study: reconstructing past symbolic systems through the analysis of material culture, and reconstructing the evolution of human cognition (Renfrew 1993:249). The work of Steven Mithen is well positioned in the latter area of research. One of his main aims has been to put forward an evolutionary scenario for the human mind, using the archaeological record "to reconstruct the past thought and behaviour of our ancestors, and the selective pressures for cognitive evolution" (Mithen 1998a:9). The evolution of human cognitive traits and their manifestation in the archaeological record is a recurrent theme in the work of Mithen and other prominent cognitive archaeologists like Iain Davidson (Noble & Davidson 1996) and Thomas Wynn (Coolidge & Wynn 2009), and of

100 The basic premise is that language – as a symbol system – structures human thought, and thus "symbolic elements organise the mental representation of systems of which they are parts" (Sperber 1975:70).

palaeoanthropologists and Pleistocene archaeologists such as Richard Klein (Klein & Edgar 2002), and Francesco D'Errico (Henshilwood & D'Errico 2011).

Mithen's own ideas on cognitive evolution will be presented in the following section. For the moment, it suffices to mention that in general terms, his work follows closely the model for the origins of the human mind proposed by cognitive psychologist Merlin Donald (1991, 1993). Donald suggested that the evolution of mind had developed through the hominin line from apes to modern humans in three stages of increasing complexity. The three transitions between stages were marked by shifts in the nature of consciousness which turned the 'episodic' primate mind into the 'mimetic' mind of early hominids, into the 'mythic' mind of early *Homo sapiens*, and eventually into the 'theoretic' modern human mind. According to this model, the episodic mind that still characterizes primates and our close ape relatives changed with the emergence of what Donald calls 'mimesis', a representational form of communication through gesture and mime that made possible, among other things, the voluntary expression of emotion, the transmission of skills, the planning of actions, and the coordination of group behaviours. Mimesis would have been the main means of communication among early hominins and acted as a foundation for linguistic ability. The next shift towards the mythic stage was brought about by the development of phonology, or speech. In Donald's view, this was a late development, as recent as 45,000 years ago. But its consequences were enormous. Speech allowed for a more complex social life, and a faster means of transmission and accumulation of cultural knowledge. Narrative originated in this phase and myths became the basis of social structure. The mythic mind would have been characteristic of early 'sapient humans'. The final and most complex of all stages, the theoretic stage, is typical only of recent historical human cultures and is characterized by the use of symbolism and of artefacts as external 'memory storage and retrieval' devices. The ultimate cultural development of this stage is represented by the recent invention of writing systems. In sum, Donald argues that "During the past two million years humans have passed through three major cognitive transitions, each of which has left the human mind with a new way or representing reality and a new form of culture" (1993:737).

Mithen follows Donald in seeing symbolism as the most important human cognitive capacity, in placing the evolution of (syntactic) language late in human evolution, and in seeing external symbolic storage as the key innovation that drove the development of modern human culture and cognition. Mithen uses the archaeological record to illustrate the process of human cognitive evolution (1996a:227).

5.2 The prehistory of the mind: Key arguments

Mithen has made a name for himself as one of the few archaeologists who have ventured into the domain of the cognitive sciences. His model of the evolution and workings of the human mind and of how these processes are reflected in material culture has been highly influential in archaeology and across disciplines. In this section, I will lay out what are the central premises of that model.

The evolution of the human mind

One of the most dominant views in cognitive studies since the late 1980s has been that of modularity. This is the hypothesis that the human mind is constituted by specialized domains or modules shaped by natural selection to solve the different problems faced throughout evolution (e.g. foraging, mating, competing, cooperating, etc.). Evolutionary psychologists, for instance, have often compared the human mind to a Swiss army knife, meaning that it may be thought of as one device made up by different specific problem-solving mechanisms (Pinker 1994, 1997; Tooby & Cosmides 1992). Mithen instead suggests that the Swiss army knife mentality, composed of separate working modules, was typical of Early Humans (all *Homo* ancestor species),[101] but not of Modern Humans. In his view, modern cognition is characterized precisely by an 'intermodular' mind. To explain the evolution of modern cognitive intermodularity, Mithen invokes the metaphor of the mind as a cathedral built in three stages (1996a:64).[102]

Accordingly, the construction of the 'mind's cathedral' consisted of laying down a foundation upon which to build the mental edifice. This basis corresponds to general intelligence, i.e. a general-purpose learning and problem-solving mechanism. General intelligence is common to all apes, and for this reason Mithen supposes that it must have a long time depth in the primate order.

In a second stage of construction, chapels for special purposes were built around the central nave of general intelligence. In Mithen's view, this change occurred early in the evolution of the hominin line, where there was a trend towards increased mental modularity, i.e. cognitive specialization. The 'chapels'

101 With the term 'Early Humans', Mithen denotes *Homo erectus, H. heidelbergensis, H. neanderthalensis,* and 'archaic' *H. sapiens*. (1996a:116).

102 In this aspect, Mithen's model is well within the Western tradition of modelling the evolution of cognition: "Curiously, theories of the mind have often been divided into three parts, the number 'three' appearing to hold a magical import for intellectual philosophers. The three-category notion arose during the Middle Ages and reappeared in nineteenth-century thought, when it became known as faculty psychology. Each of the three aspects, or faculties, of the mind – reason, emotion, and will – was now thought of as a separate faculty. Cognition (reason), emotion, and motivation (the will) remain central in our times, as examination of any university curriculum in the study of psychology will show" (Candland 1993:193).

would constitute the cognitive domains evolutionary psychologists refer to, but whereas the latter conceive of a virtual infinity of such specialized modules, Mithen argues that throughout evolution hominins managed relying on four basic cognitive domains or intelligences: social, natural, technical and linguistic. Like the chapels in a cathedral, these stood apart and functioned independently of each other. The first chapel to have been erected was social intelligence for interacting with others. This is already present in chimpanzees and thus must have been the earliest mental module to arise. The second to emerge was a natural history intelligence for understanding the natural world and for foraging. Then, technical intelligence evolved for making and using tools.[103] It is in this long 'second stage of construction', Mithen suggests, that the preconditions for the eventual development of visual art were set (2001). These were: a) the ability to make intentional marks, which probably became established with the use and fabrication of tools; b) the capacity to recognize and classify natural signs, such as the sights and sounds of other individuals and properties of the environment; and c) the faculty of communicating intentionally with conspecifics.

In Mithen's view, the mind of early *Homo* and all derived species, including Neanderthals and the first *H. sapiens*, ran mainly on general intelligence and the modules of social, natural history and technical intelligence. These humans eventually excelled on each of these domains, and so we see that, for instance, Neanderthals were highly social, had an extraordinary understanding of their environment, and produced very complex and efficient tools. However, their material culture remained more or less static throughout their thousands of years of existence. Mithen attributes this apparent cultural stagnation to the fact that they were unable to make connections between their mental domains, so that they could not bring different types of information into a single idea, restraining their capacity for innovation (2005:232).

For Mithen, the human mind worked in this way until recently in evolutionary time when, sometime in the evolution of our species, linguistic intelligence emerged specifically for spoken language acquisition and use. Mithen reckons that earlier hominins, including Neanderthals, must have had some sort of prosodic 'proto-language' that was probably used only to regulate social situations, that is only to communicate with and about other people.[104] So, language was present in the hominin mind but lacked modern syntax and was restricted to the social domain (Mithen 2005:264).[105] The evolution of fully modern syntactical language (with grammatical rules and structures) would have

103 This scheme is partially based on the work of cognitive psychologist Howard Gardner, as presented in his book *Frames of Mind: The Theory of Multiple Intelligences* (1983).

104 Mithen has recently suggested that Neanderthals, and perhaps other extinct hominins, had a communication system based on holistic, manipulative, multi-modal, musical and mimetic utterances: music-like, emotion-laden vocalizations used as part of social interactions, which were accompanied by body gestures, mimesis and dance-like movements (2005:175, 2009:9).

105 As in Robin Dunbar's scenario of language evolution (Dunbar 1996a).

caused the walls that separated the cathedral's chapels from the central nave to collapse, allowing the flow of information between them. This means that language could now be used to talk about anything: tools, animals, social interactions, or the weather. In this manner, knowledge from one domain of intelligence could be applied to another in novel ways, triggering creativity and innovation. The 'creative explosion' of the European Upper Palaeolithic would reflect the transition from a social to a general-purpose language (1996a:192):

> As soon as language started acting as the vehicle for delivering non-social information and ideas into the domain of social intelligence, reflexive consciousness could also get to grips with the non-social world […] As a result, the whole of human behaviour was pervaded with the flexibility and creativity that is characteristic of modern humans.

Mithen calls the ability to use information across mental domains 'cognitive fluidity', a concept that is central to his hypothesis for the origins of visual art.

Chronology

Like Donald, Mithen favours a late chronology for the full development of modern human cognition. Based on the archaeological evidence of the Late Pleistocene, he places this transition at 50,000 years ago (1996a:20, 2000a:217, 2001:47). The latter date refers to the minimum age for the colonization of Australia, which serves as an indicator of modern cognition as this event involved planning, abstract thinking, organization and the manufacture of complex sailing technologies (as discussed in chapter 1).

In keeping with 'cognitive transition' models (e.g. Klein & Edgar 2002; Coolidge & Wynn 2009), Mithen's work highlights a 'lag' between the emergence of anatomical and cognitive modernity. It argues that even though the fossil record shows that before 100,000 years BP there already were populations that probably looked much like present-day people (e.g. Qafzeh, Klasies River), the archaeological evidence indicates that they did not start thinking and behaving like present-day people until much later. Signs of 'modern' practices like ritual, planning, abstract thinking, and art-making are only sporadic among early humans. For example, there are 'flashes' of modernity in sites like Blombos Cave, but they are few and far between. Even after the colonisation of Australia, some 60-50,000 years ago, the signal remains weak until the European Upper Palaeolithic (40-30,000 BP), whose innovations in culture and technology finally indicate a 'fully developed' modern mind. The discontinuity of the evidence for modernity poses a problem, as he explains (2000a:211-2):

> It is not until between 60,000 and 30,000 years ago that the archaeological record is transformed in a sufficiently dramatic fashion to indicate that a distinctively modern type of behaviour and mind had evolved […]

> [However,] if we wish to align ourselves to the notion of a pan-human psychology then we would have to place this mutation happening at 100,000 years ago at the very latest. For after that date modern humans had become dispersed and most probably existed in fragmented populations throughout the world. Any universal biological trait would by necessity have had to have appeared before this date.

Mithen's solution has been to argue that either prior to 60,000 years ago, "the mentality of the Early Modern Humans appears to drift in and out of cognitive fluidity" (1996a:183) or, more recently, that the changes in the record after that date may be attributed to socio-demographic factors such as group size and rates of social transmission (2005:262). Mithen has characterized his position as "gradualist, with regard to the cognitive capacities that allow symbolic behaviour, and discontinuist as regards the manifest appearance of such thought, this arising from one further step in the gradual evolution of such capacities" (2000b:149).

The origins of visual art

Mithen suggests that out of the cognitive evolution sketched above, visual art emerged as an external support for symbolic ideas (1996b, 2001, 2007). It should first be clarified that Mithen's conception of art is different from that held by the models discussed in the two previous chapters. Mithen defines art as "visual symbolism" (1996c:149) and delimits it as the group of artefacts "which are either representational or provide evidence for being part of a symbolic code, such as by the repetition of the same motifs" (1996a:175). He then focuses on visual art, and representational art in particular.

Mithen's model of the evolution of visual art somewhat parallels his scenario of the evolution of human cognition. He argues that before the emergence of our species, hominins had developed four mental abilities that eventually supported the emergence of symbolic thought and visual art: intentional mark-making, the classification of signs, intentional communication, and attribution of meaning (1996c:175). First, the ability to make intentional marks probably became established with the use and fabrication of tools. Then, the capacity to recognize and classify natural signs, such as the sights and sounds of other individuals and properties of the environment, is probably an ancient trait as well. Third, the faculty of communicating intentionally with conspecifics is also present in apes and thus must have been available to our earliest ancestors. Finally, the ability to attribute meaning to marks and objects arose exclusively in our lineage. These four elements, Mithen concludes, "could only have been integrated to form the high level cognitive process of visual symbolism after accessibility between the social and non-social cognitive domains had arisen" (1996c:150); i.e. after the emergence of syntactic language.

For Mithen, language and cognitive fluidity made visual art not only possible but also necessary. The appearance of symbolic and abstract thought brought

about by a fluid mind required new ways of expressing symbols beyond vocal language. It called for external material supports in which ideas could be stored or 'offloaded'. This made it possible to "reduce the computational load on individual minds, expanding the possibilities of information storage, and enabling information and ideas to migrate between different individuals" (1998b:182). He has suggested, for example, that the prehistoric art of Europe encodes information about the natural resources that were available for exploitation to Palaeolithic hunters. Once set in a material medium, this information could be used to instruct young members of the group, and to plan optimal foraging strategies (1988a, 1988b, 1990). In this sense, art objects may be conceived of as "a tool for storing information and for helping to retrieve information stored in the mind" (1996a:192). In Donald's model, the 'externalization of memory' also constitutes the ultimate transition that led to the cognitive reorganization of the modern mind (1993:745).

For Mithen visual art flourished in response to that novel communicative need, and as the result of humans being able to use artefacts as signifiers. In this manner, the visual arts became "not only the products of a new way of thinking, but also their source" (2001:49), constituting a veritable 'extension' of the human mind (1998a, 2000, 2007). Through using material culture as a means to store and transmit information, there started "a positive feedback loop that generated a transformation in human mind, behaviour and culture within a short period of time – the creative explosion" (1998b:181). Archaeologically, this event is manifested in the diversification of technology (the incorporation of raw materials other than stone, new tool types and artefacts) the exploitation of a wider range of resources for food, the population of new territories, and the creation of figurative art.

Finally, Mithen explicitly describes art-making as "creating artefacts or images with symbolic meaning as a means of communication"(1996a:183). So, he sees art basically as a medium of communication through which people could better discuss and exchange information with one another about, for instance, animal behaviour or the weather, and use that information to their advantage. This, he explains, would have had a highly adaptive value by allowing humans, for example, to monitor environmental conditions, better plan foraging strategies, or facilitate landscape exploration (1996a:195, 2001).

The completion of the sequence of mark-making, classification and communication only became possible with the advent of language and cognitive fluidity (1996b:213). In Mithen's view, these two components working together are what allowed humans to acquire the unprecedented ability to encode ideas and meanings in material culture and develop imagination and creativity (2007).

Mithen's model, in conclusion, suggests that the basic capacities for art-making were established in our hominin predecessors, and converged gradually at a time before 50,000 BP. In contrast to the two models reviewed in the previous two chapters, Mithen's scheme allows for the possibility that art, along

with other modern human practices such as religion and science, be an exaptation or "non-functional by-product from an integration of the cognitive domains that had evolved in the early human mind" (1998b:183). This is a prospect that I will revisit in chapter 6.

To recapitulate, Mithen's proposal (1996a, 1996b, 1998b, 2000, 2001, 2005, 2007) suggests that modern complex behaviour is the result of a major redesign of the human mind – cognitive fluidity – brought about by modern language. This cognitive change caused different domains of intelligence (technical, social, natural, linguistic) to interact and pass information between them, recombining it in new creative ways. One of the main implications was that humans became able to 'extend their minds' into material culture, i.e. communicate through symbols, by attributing meaning to objects and using them to express and exchange ideas. Visual art (in its representational variety) was the product of such ability.

5.3 A mind for art: Critical assessment

The present section aims to present current debates on the main aspects that structure Mithen's hypothesis of the evolution of the human mind and the origins of visual art. This assessment focuses in particular on two points: Mithen's scenario of cognitive evolution and the problems of inferring cognitive capacities from technology and art.

The prehistory of the mind revisited

Mithen's view, as laid out in the previous section, involves minimally three stages of cognitive evolution: 1) from primate general intelligence, to 2) hominin domain-specific intelligence, to 3) modern inter-modular general intelligence (2007). Using data from neuroscience, I argue that Mithen's assertions about modern primate and human mentality seem to be correct, but that his ideas about the cognition of extinct hominins are not that well supported, which weakens the basis of his general argument.

The first stage of Mithen's model involves the evolution of general intelligence, common to all primates and highly developed in apes (1996a:89, 2001:33). Certainly, comparative cognitive research on primates suggests that general intelligence is prevalent across species (Reader et al. 2011). Studies with great apes (chimpanzees and orang-utans) indicate that their cognition is actually not that different from ours regarding perception and the understanding of the physical world (Hermann et al. 2007; Tomasello & Hermann 2010). For example, apes, like human children, are able to understand the intentions, goals and perceptions of others and how these affect their actions, that is, they "understand that others have goals and behave toward them persistently, and that this is governed by what they perceive" (Tomasello

et al. 2005:685). Thus, general intelligence does seem to be deeply rooted in primate phylogeny, as indicated by Mithen (e.g. 2001:50).

In the second stage of Mithen's model, members of the *Homo* lineage evolved a specialized, compartmentalized intelligence for specific problem-solving, constituted by natural history, technical, and social intelligence (1996c:148):

> It is most reasonable to infer relatively high degrees of social, technological and natural history intelligence prior to the transition. In many respects these appear to be similar to those of modern humans, and consequently we find considerable evidence for continuity across the transition. However, there also appear to have been major differences. Natural history intelligence does not appear capable of achieving the same degree of fine grained environmental adaptation as found among modern humans, and to be separate from technical intelligence. Similarly, the cognitive processes involved in the working of stone appear to be restricted to that material, although the working of bone or antler appears to require similar skills of manipulation and special thought. Overall, we may suggest that while high levels of social, technical and natural history intelligence were present, the cognitive abilities within each were restricted to that specific domain, i.e. Lower and Middle Palaeolithic hominids had high degrees of mental modularity. Their intelligence is most appropriately characterized as 'domain specific'.

Mithen argues, thus, that in the Early Human mind, tool-making pertained to the domain of technical intelligence and, for its part, 'proto-language' originated in and was limited to the module of social intelligence (1998b:181). He further claims that it was not until these two modules converged, late in human evolution, that cognitive modernity became possible. However, recent research indicates that, on the contrary, tool production and language ability may very well have a shared neural foundation, as suggested by James Rilling (2008:26):

> Human tool use depends on a network of left hemisphere cortical regions that overlaps extensively with regions involved in language and gestural communication, supporting a common evolutionary origin for these abilities.

These results are supported by functional brain imaging carried out on individuals while they were engaged in making simple stone tools, and which show a significant overlap in the patterns of activation of brain circuits between language and tool-making, suggesting that these "are likely to have evolved in a mutually reinforcing way" (Stout et al. 2008:1947). And while, as discussed in the previous chapter, musical and linguistic ability seem to be disassociated, the contrary seems to apply to motor and linguistic ability. For instance, language impediments often co-occur with some motor disabilities in both children with inborn and developmental disorders and in adult stroke and cerebellar lesion patients, pointing to shared cognitive processes between the two (Hill 2001;

Schmahmann 2004). As Tomasello and colleagues have suggested, the uniqueness of human cognitive abilities probably owes more to the way in which we deal with social situations and work together towards common goals, aspects that likely evolved "in the context of the imitative learning of complex tool-using and tool-making activities" (2005:687). Hence, Mithen's idea that for most part of our evolutionary past technical and social intelligence were separate domains seems unfounded. Rather, throughout human evolution new behaviours often have co-opted the neural networks of other functions (Jablonka & Lamb 2005:308), so that communication between cognitive domains has probably prevailed in the hominin brain.

Finally, Mithen suggests, between 100-50,000 years ago, the three modules or cognitive domains of the hominin mind started working together through cognitive fluidity, which brought about our modern type of mentality. Indeed, the human mind does seem to be intermodular rather than domain-specific. The existence of mental modules of the type put forward by evolutionary psychology (Tooby & Cosmides 1992) has not been confirmed by cognitive neuroscience. Neuroimaging studies do indicate that there is some degree of neural localization of various brain functions (perceptual and cognitive). For instance, visual-spatial attention (involved in face recognition, object recognition, and reading, among other operations) is regulated by at least three brain areas: the posterior parietal lobe of the cerebral cortex, a portion of the thalamus, and areas of the midbrain related to eye movement (Posner *et al.* 1988), and constitutes a separate subsystem from auditory-spatial attention (Bushara et al. 1999). But functional localization does not equate to the specialized domains envisioned by the 'Swiss army knife' hypothesis, rather, specialization is a gradual constructive process in which "every module is functionally connected to at least one other module" (Bunge 2010:166), as neuroscientist Olaf Sporns makes clear (2010:195):

> Functional integration in the brain must be able to cut across cognitive domains and is thus essentially intermodular in character. Brain modules must therefore be able to influence each other, through 'weak ties' that enable globally efficient information flow. Modules of brain networks define communities of structurally and functionally related areas, but they do not represent or support discrete mental faculties.

Seen in this light, a module would be like a 'hub' where various neural networks interconnect. So, modularization is not inborn "but emerges in the course of individual development" (Bunge 2010:166). The neural plasticity implied by the brain's ability to perform separate functions without the necessity of specialized domains had already been observed by the founder of modern neuropsychology, Alexander Luria ([1967]2002:22):

> The fact that in the course of human history, man has developed new functions does not mean that each one relies on a new group of nerve cells and that new 'centres' of higher nervous functions appear like those so eagerly sought by neurologists during the last third of the

> nineteenth century. The development of new 'functional organs' occurs through the formation of *new functional systems*, which has never happened in animals and which is a means for the unlimited development of cerebral activity. The human cerebral cortex, thanks to this principle, becomes an organ of civilization in which are hidden boundless possibilities, and does not require new morphological apparatuses every time history creates the need for a new function.

Mithen's cognitive fluidity or 'intermodularity' may then actually be understood in Luria's terms, or in the interactive-network view suggested by Sporns,[106] and it seems to be in accord with the findings of neuroscience, as is his suggestion that the present-day human mind is structured mainly by a general-purpose intelligence. To be sure, "most of the higher aspects of the human brain/mind arise largely from the interaction between general-purpose neural systems of the multimodal cortical association areas and the very basic life experiences encoded by more ancestral emotional/mind systems that all mammals share" (Panksepp & Panksepp 2000:116). So, as Mithen suggests, it appears that modern human cognition is guided by general-purpose mechanisms (e.g. learning and memory) that regulate both brain function and behaviour, but that are flexible enough to combine and allow for new operations to occur (Bolhuis et al. 2011:3). At the same time, this plasticity – largely shaped by developmental and sociocultural experience (Heyes 2012:2095) – can help explain cognitive variability across human populations without appealing to differences in mental capacity.

In short, Mithen's conclusions regarding general intelligence and the modern human mind seem to be consistent with current neuroscientific data, but his scenario of a previous domain-specific, modular stage does not. Moreover, if general intelligence is prevalent among primates, as is in modern humans, by the law of parsimony and because stasis is more common than change in evolution (Eldredge 1989; Gould 2002:884), it is more likely that general intelligence has been the standard mode of cognition throughout the whole of hominin evolution.[107] This point weakens Mithen's model because he sees the change in cognition as the cause, and the explanation, of modern human culture (1996a:195):

> The critical step in the evolution of the modern mind was the switch from a mind designed like a Swiss army knife to one with cognitive fluidity, from a specialized to a generalized type of mentality. This

106 This suggests the possibility that brain functions are not controlled via a central system nor by independent mechanisms but by networks that interact and work together towards specialization (Sporns 2010).

107 As philosophers of biology Kim Sterelny and Paul Griffiths explain: "The most parsimonious hypothesis about an evolutionary tree is the one that requires the fewest possible evolutionary changes, for change is rare in comparison to non-change. Such a hypothesis is assumed to be most likely to capture the actual sequence of past changes" (1999:200).

> enabled people to design complex tools, to create art and believe in religious ideologies.

So, if the initial assumption that early humans had a modular mind compartmentalized in different domains of intelligence is inconsistent, then there is no need to invoke a radical 'transition' towards a cognitive fluid mind. In fact, it is quite possible that cognitive fluidity has been an important factor in the evolution of human cognition, not its result. Evidently, it is very difficult to assess whether extinct humans had a specialized modular type of cognition or not (Langbroek 2012; Lewis-Williams 2002:110). However, the available evidence, in my opinion, does not support Mithen's view that cognitive evolution went from primate general intelligence, to hominin domain specific intelligence, to modern intermodular general intelligence (2007).

Technology and art: Products of the mind?

In this section, I will review the tenet that cultural objects and behaviours (e.g. languages, symbols, artefacts) are in themselves the direct products of mental activity. To be sure, I do not question that the human mind is involved in the realisation of all human action, but I do question the notion, recurrent in Mithen's work, that the form of material culture follows from cognitive capacity. In the paragraphs below, I argue that the objects and traces of activities that are found in the human archaeological record are not just the products of ideas, but more importantly of human actions and interactions (Ingold 1993).

In his interpretation of the hominin archaeological record, Mithen takes the presence or absence of technological traits as a relatively direct reflection of cognitive ability, that is, he sees technological sophistication (i.e. complexity and diversity) as constrained by the mental capacities of the tool makers. Along these lines, for instance, he states that the Neanderthals "were unable to design specialized hunting weapons because they could not bring their technical and natural history intelligence together into a single 'thought'" (2005:233). In this way Mithen often ascribes the apparent technological 'stagnation' of technology up to the Late Pleistocene to the way the hominin mind worked (2001:39):

> There should be little doubt that Early Human society was highly competitive, and a more efficient hunting technology would have provided individuals with considerable advantages. They seem not to have been constrained by technical skill from making these, and consequently one must conclude that the constraint was on their imaginative capacity to invent better weapons.

He attributes this constraint to the notion that the hominin specialized cognitive modules constituted separate intelligences (technical, natural, and social) that could not work in unison, restricting creativity and imagination. Two issues arise from this proposal, on the one hand, as discussed above, there is no evidence that the human mind was ever structured in separate mental domains. On the

other hand, among modern humans, technology is in no way a direct indicator of cognitive capacities, so there is no reason to believe that hominin tool types were constricted merely 'by imagination', disregarding economy, diet, or social organization. This was precisely one of the issues raised by philosopher of mind John Sarnecki and evolutionary anthropologists Matthew Sponheimer in their critique of Mithen's work. They rightly argued that (2002:176):

> Changes in behaviour [e.g. tool production] do not necessarily issue from changes in biology [e.g. brain structure], and since archaeology bespeaks behaviour, it cannot *ipso facto* be used as evidence of biological change. This does not mean, of course, that biological changes could not engender observable changes in the archaeological record, but only that archaeological changes are not sufficient to demonstrate changes in hominid biology.

Surely, in human evolution "biological and technological advances do *not* go hand in hand" (Tattersall 2009:112), i.e. there is no one-to-one correspondence between cognition and technology. The importance of cultural constraints must also be taken into account in the development of technology. Likewise, "having the cognitive capacity and use for a given construct is by no means a guarantee that the construct will become available. Moreover, the availability of technological advances does not mean that they will be inevitably adopted" (Sarnecki & Sponheimer 2002:182). Sociocultural constraints, for example, also have to be considered, that is, although cognitive capacities are necessary for technological innovation, the absence of the latter is not a reliable indicator of the state of the former. Other factors such as tradition and convention are just as, and perhaps more, important in shaping material culture, at least among modern humans. This means that socio-economical explanations of the archaeological record may work just as well as cognitive ones, and have the advantage of being potentially more testable than the former.

As for visual art in particular, Mithen emphasizes figurative representation, i.e. image-making, (1996a:175) as the core characteristic that indicates highly developed mental capacities. But as I have argued for technology above, these cannot really be taken as a measure of cognitive ability. For example, in archaeology it is well-known that the pottery of Europe's earliest farmers (e.g. Linear Pottery Culture, or LBK) is decorated predominantly with linear, abstract and geometric patterns (Bahn 1992:292). We know that Neolithic peoples were well perfectly capable of making images because they did produce them in other media, but if we were to look only at their pottery in the light of Mithen's reasoning, we could argue that they were constrained by their imagination and 'could not think of making images on pottery', which of course would be an erroneous conclusion. A contemporary example is provided by the Pirahã (mentioned already in chapter 4), who have been taught to draw by missionaries and are clearly able to do it, nevertheless have not adopted any type of image-making into their cultural repertoire (Everett 2005). These cases show that the absence of representational art cannot simply be attributed to absence of

certain mental abilities (e.g. intermodularity, syntax language) or to cognitive constraints on 'imagination' or 'creativity'. As Lyn Wadley noted "artwork [as in representational art] is the most obvious example of symbolic storage outside the human brain yet it is not universally practiced by hunter-gatherers and it cannot therefore be used as the sole criterion for modern symbolism and modern behaviour" (2001:215). To be sure, Wadley has also pointed out that Donald's model is useful in archaeology because it allows cognitive and cultural 'modernity' to be recognized in the record (2001:208). As I noted in chapter 2, I agree that symbolism can be a useful identification criterion, however, the archaeological absence of symbolic objects cannot be used as a reliable indicator of mental evolution.

Mithen has also argued that the key element in the transition towards a modern human mind was not the onset of symbolic thought itself, but the invention of symbolic artefacts, that is, a new class of objects that could serve for 'storing' memories, information, and ideas (1996a:180). Hence, whereas Donald's model focuses on "visuosymbolic invention" as the highest development of 'external symbolic storage systems' (1993:745-6), Mithen's encompasses all of material culture. Indeed, he suggests that, somewhere between 100 and 30,000 years ago, the human mind 'extended' into material culture (2000:208).[108] The changes in the archaeological record of the Late Pleistocene, for Mithen, reflect the point at which (the different populations of) modern humans 'discovered' how to use material culture as an 'extension' of the biological mind (2000:217), i.e. as symbols. Accordingly, this novel way of using material culture opened the possibilities of saving, exchanging, and disseminating ideas among individuals and populations which, in turn, allowed for new and increased mental abilities, setting off a continuous feedback loop between material culture and cognition (Mithen 1998b, 2000, 2001, 2007).[109] I

108 In the sense of Andy Clark's 'extended mind' hypothesis (Clark 1998, 2003, 2004; Clark & Chalmers 1998). This is the proposal that human cognition is not constricted to the brain and its processes, but rather extends into the external environment by incorporating material supports, like cultural artefacts, into its functions. It is argued that these objects then become as much part of the cognitive process as the computational operations of the brain themselves. For instance, a notebook used to retrieve information can play the same role as memory thus, according to the 'extended mind', the notebook becomes part of the cognitive system. However, I would argue that remembering and reading information on a notebook actually entail different processes, even if the result (recalling) be the same. Furthermore, as Bunge points out, all of material culture has an effect on its producers and users, so if one sees the notebook as part of the 'extended mind', "why not generalize, and regard the kitchen as belonging to the 'extended gut', the gym as part of the 'extended musculo-skeletal system, and so on? This won't do, as brains cannot be replaced, repaired, or set aside like tools." (2010:167). A similar criticism has been made by Kim Sterelny (2010:467-8). Indeed, although material culture unquestionably has an impact on the cognitive process, and vice versa, they are not the same.

109 In recent research, Mithen has proposed that not only is material culture an extension of the mind, but also that the brain may be understood as a cultural artefact. Since the time of the 'explosion', the human brain, like any technological device, has continued to evolve under the pressures of the cultural environment. During a person's lifetime, the plasticity of the brain allows it to change and adapt according to the individual's needs and the stimuli provided by the

do not question the mutual impact of 'artefacts and brains', this dialectic has long been acknowledged (e.g. Engels [1876]2012) and studied (e.g. Vygotsky [1930]1978), and is one of the main premises behind the topical concept of the 'human niche' (Whiten & Erdal 2012:2126). However, I do contend the suggestion that cognition leads and culture follows. Cognitive capacity is evidently a necessary condition for behaviour, but not a sufficient one. The emergence of symbol systems, as suggested by Vygotsky, should be understood in the light of human technological and social histories as well (Luria & Vygotsky 1992:84).

Mithen, for his part, attributes the advent of symbolism to cognitive fluidity, which in turn, he explains as "a consequence of (syntax) language" (2005:264). Because he, like Donald, sees the latter as a recent development, he directly attributes the lack of art and 'advanced' technology among Early Humans to their lack of language and intermodularity. For example, he says that among Neanderthals, "the absence of symbolic objects must imply the absence of symbolic thought, and hence of symbolic utterances. Without these, by definition, there was no language" (2005:229). And elsewhere he states: "words are symbols and so if the Neanderthals were using audible symbols, I find it inconceivable that they were not also using visual symbols. The converse must also be the case: no visual symbols, no spoken symbols" (2009:9).[110] However, the lack or scarcity of visual symbols from the archaeological record of either Neanderthals or early *H. sapiens* may be clarified by several factors other than cognitive constraints and the pre-supposed absence of modern language.

Furthermore, there is now sufficient evidence from palaeoanthropology, neuropsychology, genetics, linguistics and archaeology to argue for a long chronology of language, going as far back as half a million years. Several lines of research indicate that speech may well be a shared derived trait of several lineages, including at least Neanderthals and *Homo sapiens*, inherited from a common ancestor (*Homo erectus, ergaster,* or *heidelbergensis*). Around 500,000 BP some hominins already presented basic anatomical features involved in the production and perception of speech. *H. erectus, ergaster, and heidelbergensis* possessed a modern-like hyoid bone (Martínez et al. 2008), which regulates the movements of the tongue and larynx allowing the production of speech sounds in extant humans. They also possessed enlarged hypoglossal and thoracic

environment. Equally, throughout evolution, cultural inputs literally and metaphorically shaped the human brain and the mind (Mithen & Parsons 2008).

110 Mithen's argument may be expressed in the conditional form "if p then q", i.e. If there are visual symbols, there are spoken symbols. If the second premise is not-p, or there are no visual symbols, the conclusion not-q, or there are no spoken symbols, commits the logical error of inversion, which "is made by denying the antecedent and leads us to (incorrectly) deny the consequent. Given the two premises 'If p is true then q is true. p is not true,' it would be fallacious to conclude that 'q is not true'" (Bennett 2004:130). Indeed, the conclusion not-q is erroneous because the relationship between the premises is one of condition, not of causation, so q being true does not depend on p being true. Thus, if not-p, q may still apply, or not.

vertebral canals (Ambrose 2001:1751; Dunbar 2004:123) which allow fine respiratory control during speech. The morphology of their inner ear was also similar to that of modern humans (Martínez et al. 2004), making it adept to perceive speech sounds. Furthermore, casts made from skulls of the mentioned species show that the size and form of their brains must have sufficed to accommodate the neural regions known as Brocca and Wernicke areas, where much of the linguistic operations seem to take place (Bruner 2010). Another clue may be found in the foraging and technological techniques of archaic humans. For instance, the 400,000 year-old wooden hunting spears found in Schönningen, Germany, show that sophisticated cooperative big-game hunting took place (Thieme 1997). This complex activity is thought to have been impossible to carry out without the support of linguistic exchanges (Pathou-Mathis 2000). On the same lines, the sophistication of some Neanderthal lithic industries has been taken to reflect a degree of cognitive complexity that must have allowed for articulate language (Ambrose 2001). Finally, recent genetic data has shown that Neanderthals possessed a similar variant of the FOXP2 gene as modern humans do; this gene is supposed to be largely involved in linguistic capacity and its presence in the Neanderthal genome may suggest that these hominins were capable of speech (Trinkaus 2007). Taken individually, none of these pieces of evidence can be said to positively demonstrate the occurrence of spoken language among other hominin species (Buckley & Steele 2002; Dediu & Levinson 2013; Fitch 2009), but taken together they hint at the possibility that this trait was already in place long before the emergence of our species. On the one hand, given the evidence, models that rely too much on the incidence or absence of language to explain the archaeological record have become increasingly suspect. On the other hand, it has been noted that assessing what these different lines of evidence actually mean in regards to the evolution of linguistic ability and cognition is extremely difficult. That is, the presence of some language-related features does not necessarily mean that they were involved in speech production; many of the mentioned traits also take part in other functions. However, perhaps the initial assumption should be that spoken language is a derived trait of considerable time depth in the *Homo* genus (Dediu & Levinson 2013).[111]

Also, as I discussed in the case of technology (and elaborated further in chapter 6), among modern humans factors like labour investment, demography and social organisation offer better and more testable explanations than language.[112] Regarding Neanderthals, archaeologists Wil Roebroeks and

111 Linguists Dan Dediu and Stephen Levisnon (2013) have recently presented a convincing case for attributing full-fledged language abilities to other hominins: minimally Neanderthals, Denisovans, and our common ancestor *Homo heidelbergensis*. Their paper also offers a good review of the evidence for and against seeing language as a shared hominin trait. For a counterargument see: Berwick et al. (2013).

112 This is not to say that language has not played an important role in the evolution of human cognition and culture, it surely has, but that when it comes to language and visual art "the two

Alexander Verpoorte have argued for example that energetic constraints may have played an important role in the types of activities that these hominins invested in. Neanderthals had a larger body mass and high activity levels related to their dependency on big-game hunting, which means they had higher energetic requirements than modern humans (2009:160). The latter in combination with their high mobility and small groups could mean that it may not have been cost-effective for Neanderthals to invest in stylisation since they probably "had little need for durable symbols of group membership and individual identity, and they seldom exchanged distinctive durable goods to maintain relationships across territorial boundaries" (Kuhn & Stiner 2001b:124). In contrast, as I will discuss in chapter 6, modern humans might have developed visual art precisely as part of a social strategy to solve the same problem of energy acquisition, by means of cooperation with others.[113]

To summarize, Mithen ultimately explains the appearance of 'modern' cultural traits in the archaeological record of the Late Pleistocene (e.g. technological diversification and sophistication, and visual art) as result of a neural/biological change, and sees the change as swift and abrupt. The alternative I will explore is that the Late Pleistocene record is the result of the long coevolutionary history of cognition, material culture and social organization, and thus should be seen in a broader perspective, for, as Bunge suggests, "every major social change is likely to be biological, psychological, demographic, economic, political, and cultural – either simultaneously or in succession" (1997:417). Thus, attributing a complex phenomenon such as the emergence of symbol systems among Pleistocene humans to a single cause or event (e.g. language or cognitive fluidity) is potentially flawed.

5.4 Test against the archaeological record of visual art

One of Mithen's main aims throughout his work has been to make sense of the prehistoric archaeological record by coupling it to hypotheses on the evolution of human cognition. As discussed above, the main neural changes he suggests as causes for the development of the Pleistocene archaeological record have left

phenomena appear to be mutually independent" (Deregowski 1993:758). The 'advent of modern language' cannot by its own explain the changes in the Late Pleistocene archaeological record (Roebroeks 2010), which we now know to be more complex than most existing models of human cognitive evolution, including Mithen's, concede. More importantly, as I mentioned at the beginning of this section, the very idea that language should be considered a cognitive ability may be put into question. Topical perspectives suggest that language had rather be understood, first and foremost, as a communication system (Bunge 2010:196), but may also be explained as a social strategy (Dunbar 1996, 2003), a technology (Dor & Jablonka 2010) or an emergent feature of human cooperative interactions (Tomasello 2008). I would argue that the same would apply to visual art.

113 As Geoffrey Miller points out, innovation is costly (2000b). So perhaps, instead of asking why Neanderthals did not innovate, as Mithen does, we should ask how modern humans became able to overcome the costs of innovation.

no trace in fossil remains (Mithen 2000:212). Nevertheless, his model does make some general predictions about the *effects* that those cognitive changes may have brought about in the material culture, and it is these expected consequences which may be contrasted with recent archaeological and palaeoanthropological data.

Mithen's proposal suggests that cognitive fluidity should be manifested in the archaeological record as greater technological diversity (e.g. more artefact types, use of various raw materials, and an increase of composite and specialized tools) and cultural complexity (e.g. evidence for religious ritual and art) in comparison to previous periods. He maintains, for example, that tool diversity arose "owing to a new connection between natural history and technical intelligence" (1996a:169), and once this connection was made "it resulted in a constant innovation of new technology" (1996a:170). Visual art (e.g. personal ornaments), for its part, would have resulted from "an integration between technical and social intelligence" (1996a:173). From these statements, we can formulate the prediction that, according to Mithen, *the earliest evidence of visual art will co-occur with an increase in technological innovation and diversity* (Prediction 1). Accordingly, once visual art is present in the archaeological record, novel tool types and raw materials are expected to appear as well, and existing forms are expected to present greater variation. We can now examine whether this proposition is consistent with the archaeological data, as reviewed in chapter 2.

The confirmation of prediction 1 is problematic. It seems that in most instances visual art does co-occur with a wider variety of artefacts than in sites with no art, but this is not consistent. For example, in one of the earliest occurrences of shell beads, in Pigeons Cave in Morocco (c. 82,000 BP), the ornaments were found alongside typical Middle Palaeolithic artefacts (Bouzouggar et al. 2007:9966). However, the evidence from the African Middle Stone Age, reviewed in chapter 2, seems to be more in keeping with Mithen's expectations. In sites like Klasies River Mouth and Blombos Cave, by 75,000 BP different forms of visual art (pigment use, personal ornaments and engraved objects) coexist with innovative stone tool types (e.g. blades, bladelets, microliths, bone tools), carefully made in fine-grained raw materials (Henshilwood & Dubreuil 2011:371; Soriano et al. 2007; Wadley 2001:203). These MSA sites also have provided evidence that their inhabitants had a broader dietary niche than earlier humans, and that they had a formal division of space at camps with separate habitation and work areas, suggesting "symbolically organized behaviour" (Wadley 2001).

For its part, the overall archaeological record of the European Upper Palaeolithic in principle fits the prediction of Mithen's account better, particularly regarding the co-development of figurative art and greater technological variability in relation to the Middle Palaeolithic (Bar-Yosef 2002, 2007), but when examined in more detail, some inconsistencies appear. For one,

the record of the Middle Palaeolithic associated with the Neanderthals is not as static as presented by Mithen, and there actually was some temporal and geographical technological variability in that period (D'Errico 2007; Jöris & Street 2008; Roebroeks 2008). Furthermore, art aside, the archaeological composition of earliest phase of the Upper Palaeolithic in Europe, the early Aurignacian (45-30,000 BP), is actually not that different in composition from the previous Mousterian, the record shows equally low typological diversity (Davies 2001:205), and a similar scope of resource exploitation as the Middle Palaeolithic (Bar-Yosef 2004). The real break in the record described by Mithen in fact comes much later, around 30-28,000 BC (at the end of the Aurignacian and the beginning of the Gravettian). In the latter phase indeed all of the 'markers' of modernity identified by Mithen co-occur, but this is some 15-10,000 years after the assumed colonisation of Europe by 'cognitively modern' *H. sapiens* (Higham et al. 2011).

The previous prediction, that the emergence of visual art will coincide with an increase in technological diversity and sophistication actually stems from the a more general implication of Mithen's hypothesis, which is that *once cognitive fluidity is 'fixed', all its potential should be released generating a sort of cultural 'big bang' that should be observable in the archaeological record* (Prediction 2).

However, as seen in chapter 2, the archaeological record from the African Middle Stone Age indicates that many of the traits that the cognitive fluidity model uses to identify modern behaviour (e.g. artefact diversity, specialized tool types, the use of organic raw materials, personal ornaments, exchange networks, etc.) show a mosaic-like pattern of incidence and often did not co-occur. So, it is more probable that, as Sally McBrearty and Alison Brooks have argued (2000:531-2):

> The transition to fully modern human behavior was not the result of a biological or cultural revolution, but the fitful expansion of a shared body of knowledge, and the application of novel solutions on an 'as needed' basis. The complex content of human cultures has been built incrementally, with cognitive equipment present since at least 250 ka.

Therefore, no fundamental neural restructuration need be invoked to explain the differences in the archaeological record of modern humans. The hypothesis of a piecemeal evolution of modern human cognition, which coevolved with modern anatomy, is better supported by the archaeological data.

In brief, it is possible that whereas the co-occurrence of visual art with technological innovation and variability, and with other 'modern' behaviours may indeed indicate changes in the ways human populations lived and interacted, a) these changes need not necessarily be cognitive, and b) the absence of one is not prescriptive of either the presence or absence of the other, which, in turn, c) indicates that the correlation is not causal.

Finally, Mithen's model and main premise suggests that once the earliest symbol systems appear in the archaeological record, we may speak of human cognitive and behavioural modernity. As suggested in chapter 2, modified body ornaments could provide such evidence, as Mithen himself has also suggested (1996a:194):

> Describing beads and pendants as 'decoration' risks belittling their importance. They would have functioned to send social messages, such as about one's status, group affiliation and relationships with other individuals, just as they do in our own society today. […] To have produced such artifacts required not only specialized social and technical intelligences – as possessed by Early Humans – but also an ability to integrate these.

Hence, according to Mithen's own hypothesis, cognitive modernity should have begun before 100,000 years ago. This is in fact what he has argued in recent work (2005:251), attributing the changes of the Late Pleistocene to changes in demographic conditions (2005:261-2):

> In summary, amid a continuation of tool-making traditions that stretch back at least two hundred and fifty thousand years, there are sporadic traces of new behaviour in Africa of the type that archaeologists associate with modern, language-using humans.
>
> It was not until after 50,000 years ago that many of the new behaviours became permanent features of the human repertoire. This date was once taken to be when language and modern behaviour first appeared. That was before the African archaeological evidence had become well known, before the genetic studies and fossil discoveries confirmed the appearance of modern humans by 195,000 years ago, and before the significance of the FOXP2 gene for language had been revealed. But the date of around 50,000 years ago nevertheless marks a striking change in the archaeological record.
>
> This is now explained by the passing of a demographic threshold after *Homo sapiens* had become entirely dependent upon compositional language for communication.

Most researchers have also turned to explaining the cultural patterns of the Late Pleistocene in terms of demography and social organization instead of attributing these changes to biological transitions (D'Errico & Stringer 2011). This is precisely the possibility that will be explored in the next chapter.

5.5 Conclusion

In the tradition of cognitive archaeology, Mithen's model lays emphasis on mental capacity as the key feature that determined our development as species, and uses cognitive criteria to make sense of the archaeological record so that the earliest occurrence of visual art is attributed to the emergence of 'cognitive

fluidity', and ultimately to language. In the same manner, the model sketches progressive stages of cognitive evolution ascribed to particular species of hominins in a type of 'mental ladder' from chimpanzee to modern humans.

I have argued in this chapter that such a model is incompatible with current views in evolutionary thinking, which highlight variation, diversity, and contingency as important aspects of the evolutionary and developmental processes (Langbroek 2012; Levinson 2012; Shea 2011). Also, I have argued that 1) the proposed switch from a modular hominin mind to an intermodular modular mind is not well supported by current comparative neuroscience; 2) the absence of alleged markers of cognitive fluidity and 'mental modernity' – tool variability and visual art – is not necessarily correlated with cogntive evolution, and 3) visual art perhaps should not be understood primarily as the product of mental ability, but of human technological activities and social interactions.

To conclude, Mithen's model is based on the assumption that material culture is the product of cognition, therefore it requires cognitive fluidity to be an exclusively modern human trait because without it, the model is unable to account for the technological and cultural differences between modern and 'archaic' humans. However, if we see material culture for what it actually is, namely the product of a mixture of factors like social organization, environment, economy, demography, and history, we should be able suggest explanations that do not need to invoke any sudden neural changes to account for the development of modern human culture.

6. ART SIGNALS: COMMUNICATION, COOPERATION, AND THE ORIGINS OF VISUAL ART

A fundamental characteristic of man, one that distinguishes him from animals, is that he endures and separates from his body both the apparatus of technology and that of scientific knowledge, which then become the tools of society. Art is the social technique of emotion, a tool of society which brings the most intimate and personal aspects of our being into the circle of social life.

LEV VYGOTSKY, 1925

The present is an interesting period in the study of the origins of visual art. New data is rapidly becoming available thanks to the efforts of research teams and the advance of analytical techniques in various fields. In chapter 2, for example, I reviewed recent finds from Africa that now situate the earliest systems of personal ornamentation beyond 100,000 years ago, and new dates and discoveries from the European record, which also suggest a greater antiquity and diversity than previously thought for the visual art of this region. It is perhaps a good moment to reconsider received views and suggest novel scenarios able integrate these recent data with topical theoretical issues in human evolution studies. This chapter is a first attempt at that. In it, I will argue that the earliest forms of visual art coevolved with characteristically human modes of social organization and cooperation strategies.

The first section includes a brief recapitulation of the main problems raised by the assessment of the models examined in chapters 3, 4, and 5, a discussion of communication signals, and the implications of defining visual art as such. Subsequently, I propose a tentative scenario for the early production and use of visual art as a signal by suggesting that it may have acted as a marker of social identity in cooperative interactions. To this aim, I discuss the role of individual recognition and memory in cooperation, and the possible function of ornaments as visual aids for identifying potential cooperative partners. Finally, the propositions of this scenario are examined according to the archaeological record of the Late Pleistocene.

6.1 Introduction: Visual art as a communication signal

In the previous three chapters, I have presented and examined three different evolution-based views on the origins of visual art. In chapter 3, I reviewed Geoffrey Miller's model, which places the emergence of visual art in the

evolution of human mate choice strategies, and defines it as a fitness display. In the next chapter, I went over Ellen Dissanayake's proposal that visual art coevolved with ritual to promote communal unity. Finally, in chapter 5, I looked at Steven Mithen's model, which sees visual art as a mental extension or material medium for ideas, brought about by cognitive evolution.

These models, as I have discussed, mainly attend to the question of what art is for and hypothesize answers by looking at some of visual art's current effects. The issue is that all three offer accurate descriptions. Clearly, some visual art practices may and do affect human mate choice, as pointed out over a century ago by Hirn: "there is no reason to doubt that the savage beaux and belles really have increased their chances by putting wooden slabs in their lips and ears or pins of bone through their nose" (1900:208). Similarly, a quick look at the ethnography of forager groups – and at our own lives – would soon make it evident that the visual arts, as Dissanayake argues, are closely associated to ritual and religion, and are often pleasurable. Lastly, the use of signs and symbolic systems, such as visual art, as tools of cognition (to recall, teach, inform, learn, etc.) has long been known to psychology (see Vygotsky [1930]1978), and play an important part in human existence, as suggested by Mithen. Given that all of the effects of visual art described above are known to exist, how to asses which of the three models, if any, can best inform us about the circumstances in which visual art originated? I have suggested that the best manner is to weigh them against the archaeological record.

Once put side by side the evidence from archaeology, it becomes evident that none of the models can fully account for three pressing issues in the explanation of visual art's origins:

1) Timing; or why visual art arose when it did – as far as we now know, between 130-100,000 BP.
2) Uniqueness; or why visual art seems to have flourished only among *Homo sapiens* populations.
3) Form; or why it developed into the varieties and media that we find in the archaeological record.

Whereas Miller and Dissanayake do not address any of these issues specifically, Mithen's cognitive model accounts for the first two, but fails to deal with the third. Therefore, we are left with three accurate descriptions of the various functions and effects of visual art, some of which may be ancestral, but no explanation for origin and development, as inferred from the material evidence.[114] Furthermore, the very fact that visual art is able to fulfil different functions and have several effects on behaviour and cognition (attract attention, enhance beauty, lure mates, express ideas, evoke emotions, promote unity, aid memory, etc.), also remains largely unexplained.

114 For more on this issue, see also: De Smedt & De Cruz (2010:706).

In sum, like the proverbial blind men and the elephant, each accurately describing one of its features but failing to understand the whole, the three models reviewed in the previous chapters have worked on describing different aspects of visual art, its effects, and its history, but often without reflecting on what visual art is, or how it came about. In this chapter, I sketch out a tentative model that can potentially reconcile evolutionary functional accounts of the origins of visual art with the archaeological record by defining visual art as a communication signal.

I have noted before that implicitly or explicitly all of the models I have discussed, at some point, refer to visual art as a signal. Miller in fact calls visual art a 'fitness signal'. Dissanayake, for her part, conceives of it as 'ritualized behaviour', which is another term that ethologists have used for 'signalling behaviour' (Lorenz 1966); and Mithen describes visual art as a material medium for storing information, that is to say, as a stimulus that conveys information – a signal. This is not coincidental but indicates that visual art complies with the characteristics of a communication signal and, like most signals; visual art can have many functions and effects. As Alexander Alland pointed out (1977:93):

> Art can be used in a number of ways, to differentiate social groups, to hoard wealth, to mark the boundaries of an ethnic group, to reinforce religious beliefs, or to provide individual pleasure to artist and observer alike. Most of the functions listed are culture-dependent, however, and rest upon the ease with which art can be used to carry a sign load because of its ancient relationships to language and communication.

Conceiving of visual art as a communication signal not only clarifies its array of functions, but can also account for its origin and development, and provide exploratory answers to the issues of timing, uniqueness, and form, as I elaborate throughout this chapter.

This view has larger implications for Pleistocene art studies as well. First, it refutes the idea that visual art is by nature non-utilitarian and demystifies its emergence .[115] In other words, it does away with the non-question of 'why would visual art have emerged and been retained in evolution, when it has no apparent practical purpose?'.[116] Second, it allows us to build an account for the

115 In their encyclopaedic World History of Art, art historians Hugh Honour and John Fleming, for example, state that early Homo had already taken a first step towards the making of art by acquiring awareness of form and function through stone-tool making. Then they suggest that Neanderthals may have gone even further, as indicated by the burial from the site of La Ferrassie in France, which included some grave goods and "a kind of monument – a large stone from which pairs of concave cup-like marks had been pecked out. It is impossible to be certain of this, of course, but if the markings on the stone had a commemorative, magic or at any rate non-utilitarian purpose, the second step towards the making of art had been taken" (2005:24, my emphasis).

116 Although often posed as a heuristic device, this non-question still gives away that a main motivation for investigating the origins of art is in fact its apparent lack of practical use. Certainly, far fewer researchers have concerned themselves with explaining the origins of spear points or of cooking utensils. For example, in 1900 Finn aesthetician Yrjö Hirn wrote "How is it that mankind has

development of visual art based on the available material evidence, and to suggest plausible scenarios for the relations between visual art, maker, and perceiver and how these could be manifested in various contexts. Third, it helps us to overcome the 'myth' that visual art is unique to our species because we are 'special'.[117] This implies seeing visual art minimally as 'just another' (albeit remarkable) mode of human communication, and not as a 'special product' of human cognition, since, as anthropologist Ruth Finnegan has said, "animals draw on combinations of communicative modes, suitable for their own environments, lifestyles and bodily potential", and "humans are no exception" (2002:26). From such perspective, visual art is precisely just one particular way in which our species, due to its singular evolutionary trajectory, performs the widespread biological operation that is communication (Finnegan 2002:52). Finally, because communication is a dynamic process, this view expects visual art and its conceptualization to change across time and geography, and also provides the tools to better understand those variations.

Overall, conceiving of visual art as a communication signal can offer both a definition and a framework to understand its different functions and effects in human cognition and behaviour.[118] It also allows us to understand visual art as a purposeful and meaningful practice, and to put it in a broader evolutionary perspective, alongside other communicative behaviours.

In this chapter, I offer a preliminary outline for an alternative explanatory model for the origins of visual art, based on a definition of visual art as a communication signal. I draw on Martin Wobst's model of style as information (1977) to suggest that visual art arose as an indicator of identity in social networks of distantly related individuals. It may seem evident that items of

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come to devote energy and zeal to an activity which may be almost entirely devoid of a utilitarian purpose is indeed the riddle, sociological as well as psychological, which would seem in the first place to claim the attention of the philosopher" (p.15). It is still so today, for example, physiologist Gillian Morris-Kay recently wrote: "One important question remains: art is a wonderfully enjoyable aspect of human culture but not essential to survival, so why did artistic creativity arise?" (2010:174, my emphasis).

117 We evidently tend to think of modern humans as unique and special, the only survivors or a long hominid lineage, and we tend to attribute our 'success' to exclusive modern human traits, such as language, intelligence, art, religion, etc. (Gould 2002:912). To illustrate this, Misia Landau (1991) has drawn an excellent analogy between narratives of human evolution and hero folktales.

118 There are some parallels with other authors who have explained the evolution of visual art as part of human communication, either as signal, as information, or information-enhancer (e.g. Alland 1977; Coe 2003; Dissanayake 1982; Eibl-Eibesfeldt 1988). The main difference, though slight, is fundamental: for these authors, visual art has been selected or adapted 'for' a specific content or function (information exchange, altruism, cohesion, etc.). In other words, it is the content or function which provides the selective environment for visual art. However neither content nor function exist independently of form, since they are properties and "every property is a property of (possessed by) some thing or other" (Bunge 1977:502). Conversely, in the present argument, it is the effectiveness of form, dictated by the process of signalling-response, which provides the selective environment of visual art, allowing for existing forms to acquire novel functions, which in turn can generate new forms.

personal ornamentation can signal social identity, such as membership to a certain group or class (e.g. age group, gender, position, status, occupation, etc.). On this basis, various scholars have suggested before that visual art originated as a means of expressing identity (Kuhn & Stiner 2007a:47; White 1992), and marking social membership, for example to distinguish the in-group from the out-group (Coe 2003; De Smedt & De Cruz 2012). However, they have not clarified the basic issues of why would signalling identity matter at all, and how material culture became a medium for it. All other primates rely only on facial and vocal recognition and still have complex social lives. Monkeys, for example, are able to recognize all the other members of their group and that suffices to manage their social relations (Pokorny & de Waal 2009). Humans, in addition, can identify themselves through language, and have the ability to remember the faces and names of hundreds of other people (Haxby et al. 2002) so, why use artefacts to communicate identity, and why do it increasingly frequently by 100,000 BP? As a possible answer, I revisit Polly Wiessner's work on style investment among hunter-gatherers, and particularly her prediction that signals of social identity would "appear first in the archaeological record with the origins of regular, delayed, and unbalanced reciprocal relationships" (1983:258), because they help mediate cooperative interactions. That is, I explore the idea that visual art arose as one of these signals to convey not only identity but also certain qualities such as trustworthiness, initiative, and intent, which are relevant for engaging in cooperation.

In brief, I argue that humans are a 'cooperative species' (Bowles & Gintis 2011), which means that we often have to make decisions on the basis of others' properties, behaviours and what we know about their history of interactions. In the case of our intimate group, we are most probably well acquainted with the other member's personalities and activities. However, we can hardly keep track of everyone else's actions and, unfortunately, people's properties, behaviours, and histories most often are not directly observable; that is where signals come into action (Gambetta 2009:169). Via signals, we are able to perceive and display those unknown and unobservable qualities that affect how people interact with each other. Within a person´s immediate social circle, signalling identity is likely to be relatively redundant. But when individuals interact with people outside their familiar group, signalling identity will become more relevant. As Wobst suggested (1977), this relevance is proportional to the quantity and quality of interactions with out-group individuals, reaching a peak among 'middle-distance' targets, i.e. people with whom one is sufficiently familiar so that the outcome of the interaction matters socially, but not familiar enough so that the history of past interactions with one another is completely transparent. Therefore, when engaging in cooperation beyond the effective network of daily interaction, people will often rely on reputation to make decisions about whether or not to engage in reciprocal cooperation with others (e.g. give, ask, or expect help). Reputation, in turn, is closely linked to (social) identity. However, neither reputation nor identity are visible or explicit. For this reason, when

people interact with individuals beyond their core social group, they are likely to contrive signals that convey or display identity, from which reputation can be inferred. Visual art, I suggest, functioned as such a signal.

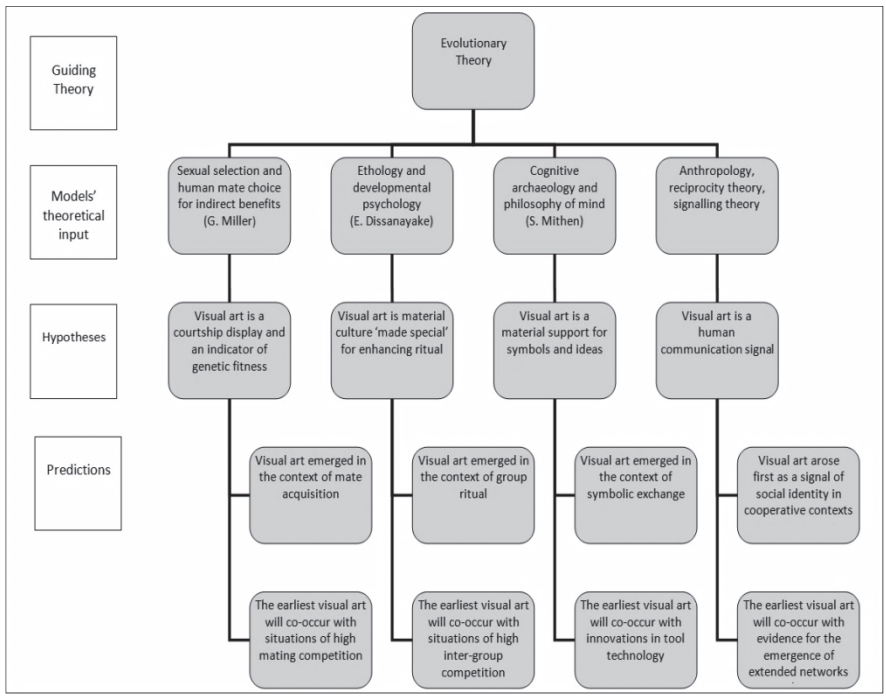

Figure 17. *Theoretical structure of the models analysed previously and the one sketched in this chapter.*

In this manner, the model outlined in this chapter does address the issues of the relevance of identity signalling and the use of artefacts for this purpose, by linking visual art to individual recognition in cooperative strategies, and offers a novel scenario to explain the emergence and development of visual art practices in the Pleistocene. In support of the model, I first argue that visual art has all the characteristics of a communication signal and in the following section, I discuss the proposed coevolution of human reciprocal behaviour and visual art.

Signal evolution

The concept of the signal is pervasive in many natural and social disciplines, from microwave signals in physics, to animal warning signals in biology, to digital signals in computer technology, to status signals in sociology. I will focus here on the concept used in biological communication studies, where a signal is understood as any act or structure (stimulus) that conveys information to other organisms and affects their behaviour (Otte 1974).

Animal signals are often intentionally emitted and inform others about, for instance, the identity, presence, state, or intention of the sender, or about an element in the environment (Croft 2000:98; Endler 1993; Otte 1974). In this way, a signal reduces uncertainty and 'instructs' an agent on how to behave in a given situation (Sinha 2004:224). Because signals coevolve with their effects, they are effective to the extent that the response they produce is affected by the signal (Johnstone 2009). That is, signals are the result of a coevolutionary process between the signaller's intentions and the signalee's response (Scott-Phillips 2008). Signals must be detectable so they will not only coevolve with the sensory and cognitive systems of emitter and receiver, but also with the signalling environment. The latter will co-determine which signals ultimately become successful (Endler 1993). So, effective signals must be within the hearing or visual range of conspecifics, and must be distinguishable against the background and avoid interference. Signals, therefore, are usually under selection to comply with certain properties that increase their detectability, discriminability, and memorability (Guilford & Dawkins 1991). Some attention-grabbing, memorable components include typical signal properties like redundancy, conspicuousness, stereotypy, contrast, pattern, novelty and exaggeration, which perhaps not so coincidentally are often listed among the characteristic properties of art (Dissnayake 2007:9; Dutton 2009:52).

Signals must stimulate the receiver's perception (Endler 1993; Otte 1974), therefore it should make sense that visual art incorporates and exploits sensorial biases and preferences (Aiken 1998, 1999; Hodgson 2006; Prum 2012; Verpooten & Nelissen 2010). Detectability is particularly pressing in visual signals, whose efficacy often rests on emphasizing elements like colour, contrast, movement, intensity, and size, to draw attention. Visual signals are most common among terrestrial diurnal animals, and are often displayed on or through the body. However, as in the case of the bowerbird, some species also exploit exatrasomatic resources in signalling behaviours, and this is an ability that humans have evidently developed to a maximum degree, providing "a prominent dimension of human visual communication" (Finnegan 2002:97). That humans make extensive use of visual signals is foreseeable since visual perception is central to primate cognition (Tomasello 2008:195). Primates have a "diurnal lifestyle based on color vision" and "vision-based communication may be the key feature that has spurred on the dramatic development of the primate neocortex" (Dunbar 1998:183), a brain area involved in sensory perception, social skills, and language.

Visual art then, makes use of the visual properties of materials and objects, such as colour, size, texture, shape, etc., all of which can often be altered by human intervention, to grab attention and influence the viewer. As ethologists have noted, some human perceptual biases have deep biological roots, whereas others are culturally bound (Eib-Eibesfeldt 1988). For instance, stimuli that display redundancy, rhythm, and exaggeration are effectively attended and recalled by humans (Rossiter 1982) but also by most mammals and

birds (Krebs & Dawkins 1984:386), and the response to certain visual stimuli like bright colours, and lustrous textures is shared by all primates (Dominy 2004; Fernandez & Morris 2007). However, whereas colour perception is also an ancient trait (Regier et al. 2005), colour categories and connotations tend to be culture-dependant (Roberson et al. 2005). So, visual art also uses cultural systems of affective and aesthetic values as an arresting strategy – i.e. that which is socially considered relevant, good, pleasing and beautiful (Grammer et al. 2003:401; Verpooten & Nelissen 2010). The latter are particularly important for memorability, since the evoking emotion increases the likelihood of recalling objects and events (Dissanayake 2008:257; Levine & Edelstein 2009). Visual art is a successful signal precisely due to the (positive or intense) aesthetic, affective and cognitive responses it induces in the perceiver.

Because signals must draw attention, most often they are exapted from pre-existing behaviours (through the process that ethologists called 'ritualization'),[119] making use of the organism's pre-established perceptual capacities and biases (Krebs & Dawkins 1984:386). If visual art is indeed a signal, then it is likely that, as most signals, it originated from the functional co-opting of pre-existing biases and behaviours, i.e. as an exaptation.[120] Naturally, visual perception has been co-opted and shaped into visual art as a communication signal, but also have certain behaviours. For instance, various authors have indicated that the playful behaviour of chimpanzees by which they 'decorate' themselves with twigs or leaves must have been present in our *Homo* ancestors, and may constitute a precursor of body ornamentation (Alland 1977:39; Dissanayake 1974:215; Luria & Vygotsky 1992:29; Morris 1962:164). As discussed earlier in chapter 2, the use of coloured pigments (primarily red ochre) has a deep presence in hominin contexts going back some 200,000 years, or more (Barham 1998). This might have started as a strictly practical behaviour that later became 'recruited' for signalling purposes, as suggested by Tomasello and colleagues: "media that were used for symbolic group marking are expected to enter the archeological record for utilitarian functions initially" (2012:690). Moreover, behaviours most often precede and shape cognitive and anatomical changes (Jablonka & Lamb 2005:290), for example dietary habits such as meat-eating and cooking are likely to have greatly influenced the development of the hominin brain and body (Aiello & Wheeler 1995; Wrangham 2009). So it is plausible that practices such as applying coloured pigments to the body for utilitarian reasons and 'playful' decoration tuned human cognition towards the use of colour and ornaments for symbolic communication. Finally, the manipulation of form in the production and use of tools and artefacts is a basic hominin ability (Coward & Gamble 2008) that provided a further context to imbue objects with visual references and meanings that could be used in communication (Finnegan 2002:175). So, the

119 As discussed in chapter 4, in ethology 'ritualization' is related to the transformation of a common behaviour into a signal. And it is precisely in this way that some ethologists explained the human arts (Huxley 1966:259).

120 For a lengthy discussion on the concept of exaptation see: Pievani & Serrelli (2011).

cognitive, motor and social skills involved in visual art making were already in place since early on in the evolution of our species (Gibson 2011), and built upon each other over time until they eventually converged in the practices and artefacts that we now identify as visual art, as suggested too by Mithen (1996a).

Signal-response coevolution may also account for two of the most salient aspects of visual art: its aesthetic appeal, and the affective response it provokes.[121] The aesthetic aspect of visual art refers to the use of existing visual biases to grab the attention of the viewer towards the signal. The process of aesthetic evolution in biological signals requires two minimal conditions a) a signal perceptible by another individual, and b) sensory/cognitive evaluation by the receiver leading to preference/choice. The action of preference will result in differential success among signals. Thus, aesthetic evolution may be understood as "an emergent property of choice based on sensory and cognitive evaluation of a signal" (Prum 2012:2259). Signal preference need not rely on the relevance or 'honesty' of the signal content at all, but can derive from pre-established biases, and detectability. As discussed above, in evolution behaviours often shape anatomy and cognition. In the same manner, perceptual biases can shape signals: "preference evolves before traits, and traits evolve in response to pre-existing preferences" (Prum 2012:2261). The affective aspect of visual art, for its part, relates to the reaction induced in the viewer and refers to the subjective experiential feelings triggered by perceptions, which are generally understood in terms of valence; i.e. goodness or badness, or positive and negative (Panksepp 2005:3). And, as mentioned before, whereas the aesthetic qualities have a clear biological origin, the affective properties of visual art will also have a strong cultural basis.

Finally, "once a signal comes into being, the stage is set for its diversification, i.e. the signal then may give rise to several functionally distinct signals" (Otte 1974:391). This 'branching out' of signals might clarify the various manifestations and functions of a complex signal like visual art.

In sum, as a signal, visual art manipulates the formal properties of objects to stimulate bio-cultural perceptual biases in order to make them increasingly detectable, discernible, and memorable, and thus effective as signals (Eibl-Eibesfeldt 1988:37). And very possibly, out of the convergence of pre-existing behaviours in the hominin lineage like playful exploration, symbol use, and

121 'Aesthetic' is meant here in its strict etymological sense, as referring to perception by the senses (OED online, consulted in August, 2011). The independence of cognitive/perceptual and affective/emotional systems is a key topic in neurology (Panksepp 1998:26; Sacks 1985; Zajonc 1980, 1984, 2000). But the distinction made here between the aesthetic (perceptual) and the affective (emotional) aspects of visual art is mainly intended as a heuristic means to explore potential selective pressures that may have been involved in 'recruiting' certain artefacts as visual signals. In reality, affect and cognition ordinarily function conjointly (Zajonc 1984:117), therefore "aesthetic and affective responses cannot be understood in any depth as isolated phenomena" (Ulrich 1983:86). As Bunge explains, "cognition and emotion, though separate, are connected and modulate one another" (2010:170).

artefact production, visual art emerged, innovatively and effectively using aesthetic and affective resources for communication. All cultural traditions "exploit neuropsychological biases and processes, neglecting some of them, while amplifying others and building elaborate conceptual structures on top of them" (Levinson 2000:21), and visual art is no different.

Visual art, then, complies with all the characteristics of a visual communication signal: it is a stimulus intentionally emitted to convey information to others (about the sender or the environment) and influence their behaviour. Its key mechanisms are display (by the emitter) and response (by the receiver). Furthermore, visual art is clearly coupled to human visual perception and affect. As noted by Vygotsky, "any work of art is a system of stimuli, consciously and intentionally organized in such a way as to excite an aesthetic reaction" (1971:24). And because sensory systems, signals, and signalling behaviour coevolve, many of the general properties of signalling systems should be predictable from a knowledge of the environment, general behaviour, and neurobiology of a species (Endler 1993:222). In this sense, visual art is not extraordinary, on the contrary, it ought to be a somewhat foreseeable form of communication for an artefact-producing, symbol-using, highly visual, diurnal social hominin.[122] Lastly, the emergence of visual art as an exapted signal potentially explains, on the one hand, the early intermittent occurrence of visual art-like activities in the archaeological record, in a time before visual art became well-established as part of the human behavioural repertoire, and on the other, the relationship between visual art and perceptual biases.

Visual art, evidently, is neither the only human visual signal, nor the only form of material culture that participates in human communication. Other examples of visual signals include gestures, body movements and mannerisms, visual codes, and sign systems, among others. And in one way or another, all of material culture, which in broad terms includes all materials affected by human intervention (Ter Keurs 2006:6), actively participates in most aspects of human existence (Conkey 1985:305; Coward & Gamble 2008:1976; Finnegan 2002:137; Ingold 2007; Schiffer 1999:89). What I suggest in the following sections is that visual art, in particular, could have become a recurrent and meaningful human practice through its involvement in human communication, particularly within the context of cooperative strategies.

6.2 Who art thou? Cooperation, memory & identity

Recent thinking about biological communication has turned on the paradigm of communication as an 'arms race' (Krebs & Dawkins 1984), where animal communication is seen as process in which signallers basically seek to manipulate

122 This would also explain the independent 'invention' and development of similar visual art forms among different cultures at different times.

receivers for their own benefit. Current views instead see communication as an operation whose goal is to coordinate behaviour between sender and receiver, where "common interest explains why signalling is done at all" (Godfrey-Smith 2013:16). This sets cooperation alongside competition and conflict of interest as an important evolutionary force for communication. In group-living social animals, especially, cooperation towards common goals seems to be an important incentive for evolving communication systems (Fitch et al. 2010).

In the human case, topical approaches to language evolution stress that social interactions and organised cooperative activities were strong selective forces in the development of language and speech (Aiello & Dunbar 1993; Buckley & Steele 2002; Croft 2000; Dor & Jablonka 2010; Dunbar 1996; Fitch 2010; Gärdenfors 2004; Sinha 2009; Tomasello 2008). Moreover, as I discussed in chapter 1 (1.3), there is a growing consensus that cooperation has greatly influenced the 'human niche', in which our characteristic mental, communicative, and technological faculties evolved (Bowles & Gintis 2011:196; Coward & Grove 2011; Gardenförs et al. 2012; Moll & Tomasello 2007; Whiten & Erdal 2012), as stated by anthropologist Agustin Fuentes (2004:715):

> Cooperative behavior has been an important aspect of niche construction in humans for millennia. Human cooperative social interactions would have affected the environments humans inhabited, altering the very structure and pressures within those environments and, in turn, shaping the selection pressures early humans would have faced.

Cooperation, in brief, played an important role in the evolution of human cognition, communication, and culture. In particular, I will argue that if cooperation has been important in shaping human communication, and if visual art indeed is a form of human communication, it follows that visual art too, at least in part, might have been shaped by the effects of cooperation. I explore this possibility below.

Cooperation, individual recognition and reputation

Cooperation is the collective action by two or more individuals who interact or coordinate their behaviours to achieve some common goal for mutual benefit (Smith 2003:402). Cooperative behaviours are common among animal species; some examples include cooperative breeding, collective hunting, predator spotting, food sharing, grooming, group guarding and defence, among others (Dugatkin 1997). Modern humans are particularly good cooperators and have evolved unique forms and strategies of cooperation (Bowles & Gintis 2011; Tomasello et al. 2012).

As previously suggested (1.3), "human social interaction and organization are fundamentally cooperative" (Tomasello & Vaish 2013:239), and this is reflected in the human way of life, which often involves working together with

others towards a mutual goal. Among all cooperative strategies, reciprocity (help someone who might help you later) is the most salient form of human cooperation (Dugatkin 1997:167), and may well be considered as "the basis of all human economies, divisions of labor, and specialization" (Kaplan et al. 2000:173). Reciprocal interactions have some minimal requirements, as explained by social psychologist Nicholas Emler (1990:182):

> Human social existence leans substantially on patterns of cooperation that, as with other social vertebrates, involve contingent or reciprocal altruism: individuals exchange favours. However, reciprocation is often long delayed and, among humans, often imperfect; in other words, relations of credit and debt may endure for long periods. For such an exchange system to work individuals must be identifiable to one another, they must have a capacity to recall favours given and received, and they must have some continuity of association.

Hence, in multi-partner or delayed return contexts, there are some necessary conditions for reciprocity to be effective, which include: individual recognition of partners, recalling previous behaviour – in order to respond appropriately (Dugatkin 2002) –and, recurrent interaction between partners. The first two conditions, individual recognition and keeping track of past interactions, impose high costs on memory capacity. Since individuals benefit from recalling whether engaging in cooperative action with others may be beneficial or disadvantageous, memory is one of the most important cognitive devices involved in decision making related to reciprocity. Therefore, in social species the extent of cooperation is expected to increase with memory capacity and the ability for individual recognition (Crowley et al. 1996).

Over evolutionary time, modern human ecology combined a series of factors that have favoured the development of a way of life strongly based on cooperative relations (Tomasello et al. 2005). Many aspects of modern human subsistence, resource exploitation, and reproduction, among others, depend on the successful collaboration between several (related and unrelated) individuals. As I will discuss later in this chapter, the social organisation of Pleistocene humans is characterized by the hunter-gatherer band, which broadly consists of a group of individuals that often forage together, share resources with each other (e.g. food, tools, information), and live in close proximity to each other (Ingold 1999). We tend to think of the band as a household or collection of families (or domestic units), but actually, unlike the primate troop, the band is not necessarily constituted by related individuals, but can be based on friendships or partnerships. This is crucial for understanding the way human cooperation works and the motives that underlie it.

Like many other primates, human foragers typically exploit clustered seasonal food patches (Kaplan et al. 2000:167) so, bands separate or come together according to the temporal and spatial availability of supplies, forming so-called fission-fusion groups (Aureli et al. 2008; Grove et al. 2012; Hamilton et

al. 2007). These groups enhance foraging efficiency by finding and exploiting food resources in sync, fomenting cooperation instead of competition among its members (van der Post & Semmann 2011). However, because resources are spread in patches over large areas, cooperation partners do not often stay in each other's immediate vicinity. Rather, they cooperate briefly with many different individuals, increasing the size of the cooperation network to improve its efficiency. This promotes delayed reciprocity and with it, the necessity to encode information about 'who did what' and to remember such knowledge over longer periods (Aureli et al. 2008:637).[123] Therefore, individual recognition acts as a key mechanism that makes it possible to monitor the behaviour of various partners simultaneously (Crowley et al. 1996). Collaborative foraging further favours reciprocity as well as mutualistic collaboration and interdependence, because survival relies not only on individual skills but also on the ability to work together with partners and the skills of those partners. And the nature of band membership, based not on blood relatedness but on free association, would support the development of strategies to monitor others' behaviour and promote one's own (Tomasello & Vaish 2013:239).

In short, delayed reciprocal cooperation favours enhanced memory related to identifying others and recalling past behaviour whereas free partnership and partner choice promotes behaviour regulation strategies. The convergence of these factors gives rise to reputation-based cooperation. Reputation is a created social identity collectively constructed through communication (Emler 1990:181). That is, reputations are formed by the collective information about someone (or something), and generate an expectation of behaviour or interaction. Reputations are, then, collectively constructed but they become part of the social identity of individuals (or groups, objects, institutions, etc.).

Reputation is particularly important in systems of indirect reciprocity – e.g. "you helped my friend John, so I will help you". This form of cooperation is called 'indirect' because the reciprocal return is not obtained from the original recipient, but from another member of the community (Suzuki & Akiyama 2005). This typically human form of cooperation is fundamental to the functioning of social institutions, from trade, to apprenticeship, to child-rearing, to religion (Alexander 1986:107), and it depends heavily on reputational information, since the previous cooperative behaviour of the recipient has not always been directly observed by the helper.

As I discussed above, human subsistence hinges on the skills and abilities of partners as much as one's own. So, survival will depend to a great extent on

123 Reciprocal altruism, however, is not a uniquely human strategy. Apes and monkeys, many of whom also live in fission-fusion groups, have cognitive capacities that allow them to identify the members of their own group as well as those of rival groups, and remember how they have interacted with each other in the past (Dautenhahn 2003; Pokorny & de Waal 2009), and occasionally engage in delayed reciprocal altruism. The strategy of indirect reciprocity, in contrast, is uniquely human and both, more intricate and cognitively demanding.

choosing the right partners — and being chosen as a worthy partner (Tomasello & Vaish 2013:239). For this reason, "people should prefer to deal with others they know and know about or people about whom they can more readily become informed. And people should, in practice, seek to inform themselves about the people they know and deal with regularly" (Emler 1990:182). Consequently, people should invest in strategies for identifying others and learning about their reputations, on the one hand, and for building a good reputation for themselves, on the other (Tomasello 2008:200). In other words, we can expect people to monitor others' reputations (e.g. through observation or gossip) and manage one's own (e.g. through cultivation and promotion) in order to choose and be chosen as a good cooperation partner (Semmann et al. 2004). These strategies should be cost-beneficial since they increase the chances of receiving aid in the long-run (Nowak & Sigmund 1998:573).[124] In this sense, reputation may be seen as a social currency (Semmann et al. 2004), that is a "social credit that individuals can draw on to obtain advantages at a later time" (Blau 1964:269).[125]

Because knowing someone's reputation does not require direct interaction, but can be inferred or learned from third parties, social information, or gossip, might be an important regulator of cooperation systems (Dunbar 1996; Emler 1990:182; Enquist & Leimar 1993; Gärdenfors et al. 2012:208; Nettle & Dunbar 1997; Smith 2003:420). Moreover, it is probable that moral feelings and social emotions (e.g. gratitude, shame, guilt, pride) coevolved with human cooperation strategies as psychological mechanisms for guiding and monitoring altruistic behaviour (Bowles & Gintis 2003:438; Fessler & Haley 2003; Tomasello et al. 2012:684; Tomasello & Vaish 2013:240). Strategic investment in reputation is further reinforced by additional social mechanisms such as policing, coercion, and punishment against uncooperative behaviour (Richerson et al. 2003; Boyd & Richerson 2006:469), and social preference for cooperative individuals (Bowles & Gintis 2011:197; Tomasello & Vaish 2013). This clarifies why "humans' concern for reputation is an important incentive for cooperation" (Tomasello et al. 2012:679).

Considering the above, it makes sense that being able to recognize individuals and keep score of their interactions with others would have been crucial for the evolution of typically human cooperative strategies, such as delayed and indirect reciprocity. In the words of behavioural biologists Elizabeth Tibbetts and James Dale (2007:535):

> Humans seem to have the 'perfect storm' of selection pressures that might favor recognisability. We are extremely social, interacting repeatedly with large numbers of individuals, each with varying roles in our lives. We are extremely cooperative, and we make complex

124 In other words, "a good reputation in the community is like a high credit rating" (Blau 1964:259).
125 The 'rules' of cooperation based on reputation apply not only at the individual level, but also at the levels of communities, institutions, and even nation states (Downs & Jones 2002).

> decisions about whether and how much to cooperate based on kinship, friendship and social reputation […] These behaviors require accurate individual recognition and the cognitive ability to associate complex information with each individual's identity.

To conclude, it is likely that reputation played an important facilitating role in the evolution of cooperation in human societies (Bowles & Gintis 2011:94; Suzuki & Akiyama 2005). However, keeping track of others' identities and reputations is constrained by memory capacity (Gärdenfors et al. 2012:209; Rossano 2010). In the next section, I discuss some strategies that humans have developed to overcome this cognitive constraint, and the possibility that visual art may have evolved as one such strategy.

The social network

A network is constituted by the connections, ties, or relations that bind individuals in a social structure. These links and their nature, as well as the composition of networks are very relevant for understanding the evolution of human cooperation (Apicella et al. 2012; Fehl & van der Post 2011). Particularly interesting is the possibility that cooperation may originate as an emergent property of network structures (van der Post & Semmann 2011). This section explores a minimal set of human networks arranged in a nested hierarchy of four levels that range from the most intimate to the most distant.

It is still not clear how many people a regular person can know and know about, or how much. Some estimates indicate that an average (Western) adult knows some 500 people (Kosse 1990:289)[126] and may 'know about' up to 5000 others, at least by name (Emler 1990:179). There are various ways to arrange the different scales at which people aggregate and interact, but here I use the scheme developed by archaeologist Clive Gamble, which is a simple and descriptive classification of human networks applicable to Pleistocene societies that includes four network levels: intimate, effective, extended, and global, all of which "are derived from the emotional, material, and symbolic resources available to individuals to produce their social lives" (1998:426) (Fig. 18).

The first level is constituted by the so-called *intimate group*, which is basically a person's core network, and usually includes 3 to 7 members (mean of 5). We may think of the household, the task-group, the nuclear family, or circles of close friends as examples. Interestingly, the intimate group need not have a kin component, but is rather based on the frequency and intensity of interaction and mutual support among its members (Gamble 1998:434). At this level, all individuals are assumed to be familiar with each other's virtues, relationships, and histories of interaction, and usually (in expectation at least) they protect and

126 500 roughly coincides with the number of people that are recurrently said to constitute the maximum band in hunter-gatherer societies (Aiello and Dunbar 1993:185; Birdsell 1968; Gamble 1999:63; Marlowe 2005:59; Wobst 1974:173).

promote one another's reputation (Emler 1990:186). The next level of grouping, which Gamble calls the *effective network* (1998:434), is the social environment within which people carry out most of their day-to-day interactions and is mostly constituted by individuals who know each other and each other's 'business'. Although numbers differ, we may say that the effective network includes some 50 individuals. Next is the *extended network*, which is constituted by acquaintances and distant contacts (Gamble 1998:435). This can go from 100 up to 500 individuals. This level encompasses 'Dunbar's number' of 150, which according to psychologist Robin Dunbar is the average number of face-to-face relationships that a human is cognitively able to keep track of in detail. But, although less profoundly, human memory can easily surpass the 150 threshold (Haxby et al. 2002), so that we may think of the latter as a sub-level or 'grey area' between the effective and extended network levels. Perhaps, 150 may be thought of as a modal human social network size, (Dunbar 1992, 1995, 1996b, 1998; Dunbar & Aiello 1993; Hill & Dunbar 2003; Roberts et al. 2009). Its recurrence across several human contexts – from hunter-gatherer bands (Wobst 1976:50), to Christmas-card exchange networks (Hill & Dunbar 2003), to online social networks (Gonçalves et al. 2011) – does suggest that there may actually be cognitive constraints on human groups beyond this point "perhaps because the number or volume of neocortical neurons limits an organism's information processing capacity, and hence the number of social relationships that an individual can monitor simultaneously" (Hill & Dunbar 2003:54). Alternatively, it may be due to spatial proximity constraints, which also play an important role in network formation and management (Apicella et al. 2012). In any case, the extended network level includes some maximum limit of personal relationships, it is therefore at this level that signalling identity becomes most relevant (Wobst 1977). Beyond the extended network, lies the *global network* (Gamble 1998:436), where identities, reputations, and histories of interaction become difficult to trace with accuracy due to both cognitive and spatial constraints.

In very broad terms,[127] an approximate equivalence for these networks among historical hunter-gatherers would correspond with the task-group or domestic unit as the intimate network; the minimum band, often described as local or family group, as the effective network; the maximum or regional band, which often shares a dialect and a territory – defined by Wobst as a "mating network" (1976) – as the extended network; and the so-called ethnolinguistic group, which can go up to a few thousand individuals, as the global network (c.f. Aiello & Dunbar 1993:185; Gamble 1998:436; Grove et al. 2012:197).

[127] The reported composition and size of hunter-gatherer local and regional groups varies tremendously (see: Marlowe 2005:57).

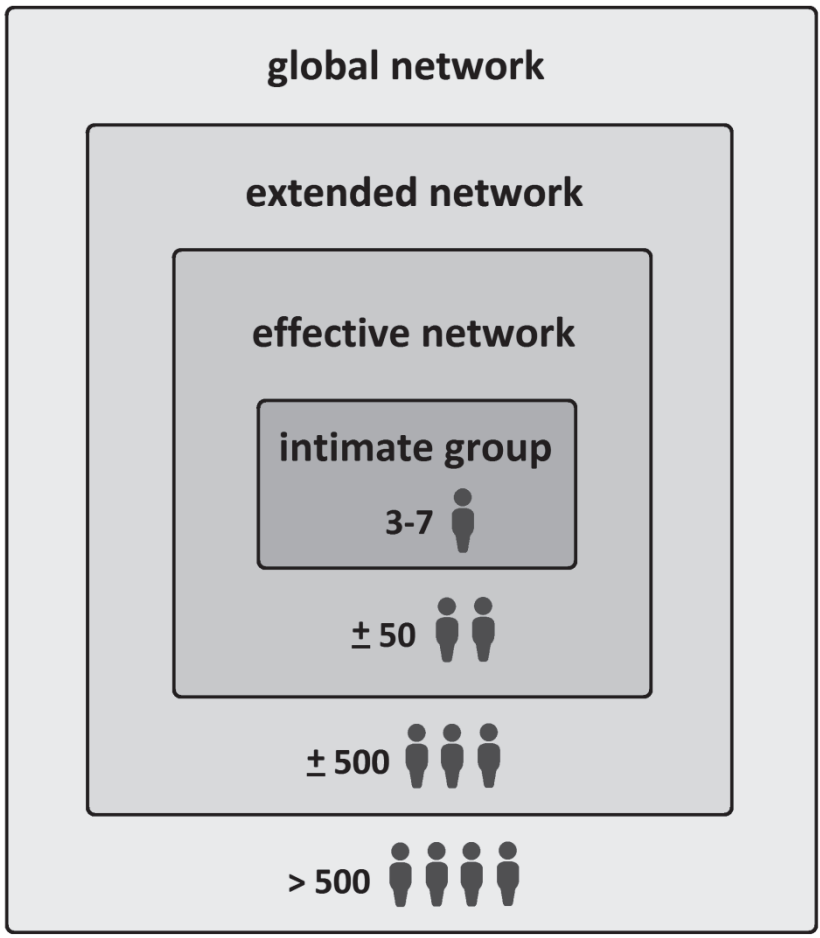

Figure 18. *Nested hierarchy of four social network levels, suggested by Gamble.*

Despite the fact that, even in contemporary industrialized societies, a person's intimate network remains relatively small in daily life (Emler 1990:180), people do interact and cooperate at a much larger scale (e.g. trade and exchange networks, information sharing networks, institutions, corporations, etc.), and often indirectly, which imposes pressure on memory because in a large group it is hard to identify and remember the reputation of each individual (Suzuki & Akiyama 2005). So humans, at some point, seem to have developed several strategies to economize cognitive processing in response to memory limits. One of these strategies may have been 'thinking in categories', as archaeologists Fiona Coward and Clive Gamble explain (2008:1975):

> As the number of individuals in any group increases, there is of course an exponential increase in the inter-individual relationships that are possible. But these social ties take time and energy to maintain, and they are also cognitively demanding in terms of integrating the relevant social information. It is simply not possible for everyone to have the kind of strong, complex relationship that characterizes kin relationships with everyone else in the same society. In larger groups, therefore, individual relationships become simplified, reducing the potential 'overload' of information, so that the relationships between people have fewer dimensions, being categorized according to a few key characteristics. Thus, knowledge of others whom you meet only in very particular contexts is categorical rather than simply biographical.

Thinking in categories, on the one hand, relieves cognitive memory and allows large-scale cooperation, but on the other, makes social relationships 'fuzzier' because in larger groups it becomes increasingly difficult to trace interactions with others, and this in turn makes it harder to present oneself as a good reciprocator. This dilemma, however, may be solved by assuming the identity of a social category, for instance of one's group. In such way, large-scale interactions are "not based on personal histories of individual with one another but rather on group membership alone" (Tomasello & Vaish 2013:239). In this context, displaying group membership, for instance through the use of social markers, acquires relevance, as suggested by Tomasello and colleagues (2012:681):

> The problem for the individual is to know who has the requisite skills and trustworthiness and, reciprocally, to make sure that others know that I myself possess these qualities. This is accomplished by individuals displaying various markers of group identity.

So, beside cognitive operations such as categorization, humans also appear to have developed cultural strategies, like markers of group membership, to surmount memory constraints. These social markers – such as dialects (Nettle & Dunbar 1997), emblems (McElreath et al. 2003), or material culture styles (Wobst 1977), convey information about the identity of a person or a group, helping to recall and recognize social categories and social relations. In this manner, human memory becomes more than a capacity confined to the cognitive domain, "as a creative and culturally-shaped human process, potentially multisensory and open to many human modalities including the use of material objects" (Finnegan 2002:251).

Accordingly, as the size of human cooperation networks increase beyond the close effective network, we can expect different ways of signalling identity (i.e. social markers) and investing in the good image of that identity (reputation) to become increasingly present and important. These markers can then act as 'tools' for memory and guide decision-making in cooperation or conflict of interest. The emergence of social markers such as dialects or cultural styles need not be particularly enigmatic, and does not have to invoke agency or

intentionality. These properties can arise spontaneously as a side-effect of grouping; that is by simply being in a community, sharing a living space, doing things together, learning from and copying each other, individuals can generate patterned behaviour distinctive of their group (van der Post & Hogeweg 2008). In this sense, different animal populations and communities also develop different behavioural 'styles'. For instance, bird populations develop regional song dialects (Catchpole & Slater 1995:196), and different populations of chimpanzees and orang-utans develop their own distinctive dietary and tool-use customs (Van Schaik et al. 2003). What is unique to humans, is that once certain patterns start being used in identical fashion by a group, they may become conventional and begin to serve for communication – they turn into a signal (Luria & Vygotsky 1992:57). That is, in our species, cultural styles tend to work as social markers and become traditions, passed down the generations, at times being normalized and institutionalized. The point is that, style or patterning in human material culture can be a reliable index of the people who make or display it, so it can easily become used as a strategy for individual or group recognition, i.e. identity (Rossano 2010; Wobst 1977).

Social markers, however, have some minimum and maximum efficiency values: at the level of the intimate and effective networks of a person, where agents are engaged in long-term interactions, the information contained in social marking becomes redundant because its content is likely to be already known (Wobst 1977). In such a small and clustered system "identity is virtually a constant" (Dugatkin 2002:537) and interactions take place repeatedly, mainly with kin and individuals who are in close physical proximity. In contrast, as discussed above, when size grows, groups become less dense, recurring interaction with familiar individuals becomes less frequent, but brief interactions with strangers increase, and "the combination of increased numbers and less frequent encounters incurs significant cognitive costs" (Coward & Grove 2011:119). So, social markers may become useful and necessary when the size of the cooperation network becomes too large for individuals to manage by direct personal interactions (Nettle & Dunbar 1997:98). However, there is also an upper limit to the functionality of social marking, because for an individual who is too far removed from the sender, the message becomes insignificant as the chances of receiving and decoding it will be very low. In sum, as Wobst suggested (1977:329), the relevance of the messages encoded in social markers should correlate with the size of the social networks that individuals participate in, so that the main communication target for social markers, are "strangers at a 'middle distance' of social relations", that is, individuals who share the same cultural background, or 'codes', but do not know each other personally (Gärdenfors et al. 2012:216; Kuhn & Stiner 2007a). In such context, social information becomes clearly important for deciding whether or not to interact and cooperate.

In conclusion, by using cultural signals of identity, people became able to manage a larger number of interactions than allowed by their cognitive capacity

alone. In other words, "as knowledge based on face-to-face, regular contact declines, so this is replaced by the increased use of symbolic/stylistic signalling" (Gamble 1999:57). This allowed for new and more extensive forms of human cooperation to take place, which in turn created a niche for new ways of communicating social identity (Gärdenfors et al. 2012:216). Visual art probably arose as one of these novel communication strategies, a scenario that I elaborate with more detail in the following section.

6.3 The borne identity: Visual art's origins

So far, I have outlined the proposal that visual art has all the characteristics of a visual communication signal, and I have suggested that it may have coevolved with human cooperation. In this section, I elaborate on the proposal that a shift in human social organisation towards cooperative systems of indirect reciprocity in the Late Pleistocene generated selection pressures to produce and invest in strategies of individual recognition and reputation-tracking in large non-kin groups. One of these strategies was the use of social markers, such as personal ornamentation, as signals of individual and group identity. These markers culturally extended human memory capacity, allowing the possibility of expanding cooperative networks, and helped manage emerging reciprocal relations by creating expectations of behaviour in cooperative interactions, particularly in the absence of previous experience. Following Wiessner (1983, 1984), I suggest that the earliest forms of visual art functioned in this way, to signal social identity and help build a good reputation in reciprocity systems.

Signalling in style

Communication signals are always conventional, that is, they emerge from interaction between agents, but there is room for variation, although always within the 'norm' of convention in order for the signal to remain effective (Gambetta 2009:184). This variation in the general form of the signal, i.e. 'style', can add to the content to convey specific information about the signaller, such as provenience, affiliation, and status. For example, it may be customary for all the unmarried girls in a village to wear a flower in their hair, however, they may differ from one another in the type of flower they wear, its colour, or the manner in which they arrange it. In this case, the flower would be a collective sign, or emblem, of the village's unmarried females. The variation in the flowers reflects personal preferences and supports the girls' individual identities. Anthropologist Polly Wiessner (1983), has coined the terms emblemic (collective) style and assertive (individual) style, respectively, to refer to these two modes of signalling identity. 'Assertive' style refers to variability that is person-based and conveys information about an individual's identity (status, affiliation, membership, etc.), and is generally displayed in intragroup contexts.

Note that both, assertive and emblemic, refer to the content of style. Items of material culture that better portray assertive style are visible personal utensils and body ornaments. The second type, emblemic style, for its part, corresponds to messages that typically refer to group norms, values, or attributes (can include messages of identification, territoriality, authorship, ownership, pre- and proscription, etc.), i.e. it refers to collective identity, and is generally useful in mediating intergroup relations. Flags, badges, tags, and all types of emblems and motifs associated with some specific social group are instances of emblemic style.

As I already discussed (6.1), visual art is a signal that purposefully exploits visual features of material culture style (variations in artefact form such as shape, colour, order, texture, etc.) for communication. Style evidently pervades most of material culture (Wobst 1977:326) to the extent that it is made 'in a certain way' (Sacket 1986:270). But whereas in many cases style may certainly be seen as a passive side-effect of manufacture, in visual art, style is active and central. That is, visual artworks use and display style "by definition" (Wiessner 1983:260), therefore they also implicitly convey information about the person who makes or bears them. And because people would want that information to be positive in the eyes of others, due to the importance of a good-image in reciprocal relations (discussed above), this will act as a strong motivation for investing in visual art, in which case this investment will be perceived as "an indicator of initiative and industry" (Wiessner 1983:258). Among the Kalahari San hunter-gatherers, Wiessner indeed found that the main stimulus for aesthetic investment in artefacts was to convey a positive image to partners in reciprocity and to members of the opposite sex (1983:258).[128] For example, people would make a greater effort and spend more time in decorating artefacts when they were being watched or knew that the object would be recognized as of their authorship (1984:204). The extra investment of labour in these objects achieves two effects: it assigns them a signalling function, and it adds to both their aesthetic and affective appeal (Eibl-Eibesfeldt 1988:52).

The observation that, world-over people seem to be 'inexplicably' motivated to allocate time and effort to visual art, drove biologist Amotz Zahavi to suggest that art might be a 'handicap' or costly signal correlated to genetic fitness, i.e. a 'good-genes' indicator – like the infamous peacock tail (Zahavi & Zahavi 1997:224). [129] As I discussed in chapter 3 (3.3), I believe that visual art may well be a costly signal, however not necessarily related to good genes but rather to social status. That is, it may be a conspicuous signal in Thorsten Veblen's sense, i.e. a social tool to obtain and convey prestige ([1899]2000). As a Veblenian signal, visual art could still have many of the effects suggested for

128 Darwin already noted that among 'savages', "self-adornment, vanity, and the admiration of others, seem to be the commonest motives" for the production and display of bodily decorations ([1879]2004:643).

129 For an elaboration of this argument see: Dutton (2009:191).

visual art as a Zahavian signal (e.g. attract mates, impress rivals), except not for the indirect benefits of optimal offspring, but for the direct benefits of acquiring and conveying a good image and social status.

As I pointed out earlier, certain criteria such as detectability, discriminability, and memorability guide the evolution of effective signals. The manipulation of visual properties to make objects more attractive, at the same time increases their affective value, making them more memorable, overall enhancing their effectiveness as signals. Wiessner, for instance, found a correlation between labour investment and esteem among the artefacts made by the San; items that were highly visible to others, and those with a long use-life, were made with care, very often had decorations, and were more esteemed (1983:260). Visible and durable objects, then, seem to be "particularly suitable" as signals. Interestingly, Wiessner also noticed that, contrary to a view of visual art 'as information', the stylized patterns or decorations applied to objects by the San usually did not carry or encode any specific messages, most often they were unique and made spontaneously. The decorations were said to be made for beauty, luck or display, to show off one's skills and dedication (i.e. for enhancing one's social image or reputation). Thus, in this case, it was not a pattern of ornamentation which sent any particular message nor the objects which transmitted information *per se* but, the action of art-making and its effect which formed a signal of identity, and enhanced status and reputation ultimately affecting others' behaviours (e.g. their opinion of the maker and their attitude towards him/her). This supports the premise that visual art "is important for what it *does* not for what it *means*" (Malafouris 2008b:408). I presume that it is due to this close relationship with individual reputation and social reciprocity that visual art forms reflect and produce not only aesthetic but also socio-affective reactions: the maker will invest more in the signal to produce a positive effect on the receiver, and the receiver will pay more attention in order to accurately assess the social and 'moral' qualities of the maker or portrayer of the signal (cf. Dutton 2009). In this sense, we could argue that the aesthetic/affective experiences generated by visual art may be seen as 'social emotions' (like gratitude, pride, guilt, and shame), which presumably coevolved with human social behaviours and cooperative interactions.

African Middle Stone Age origins

Regarding the correlation of the origins of assertive modes of visual art with the emergence of the systematic practice of indirect reciprocity/ cooperation beyond the effective network among Pleistocene humans, the evidence from the MSA is not clear-cut, but it does suggest that there indeed may be a correspondence between the two, as I discuss below.

One way to infer group movement and network interactions from the archaeological record is measuring the movement of raw materials across the landscape, which can be indicative of "action radii, boundaries of social units,

and long-distance contacts" (Hahn 1987:255). Spatial mobility patterns among hunter-gatherers are determined by the possibility of access to supplies such as fuel, raw material, water and food. Therefore, these groups are bound to move according to the natural seasonal distribution of the resources they exploit (Ingold 2000). So, as archaeologist Brooke Blades explains (1999:712):

> Organizational strategies are clearly indicated in the inverse relationship between the amount of material transported, which generally decreases with distance from the source, and the extent to which that material is utilized, which increases with distance. Lithic raw-material economy and faunal seasonality data provide perspectives on the extent of exploited territory and the degree of sedentism or seasonal mobility.

There are various reports on the average territory size or home-range of small-scale hunter-gatherer bands, and a great deal of variation within (e.g. Marlowe 2005; Whallon 2006; Wobst 1976). However, estimates suggest that the home range of the hunter-gatherer equivalent of the extended network, i.e. the maximum band, often spans 120-300 km. Therefore, archaeological evidence for the transport of materials over longer distances than that suggests indirect procurement and may indicate the existence of exchange networks between neighbouring groups (Marwick 2003:73).

For most of the African Middle Stone Age the pattern of material transfers rarely ever exceed 100 km, implying that groups probably moved locally and usually only interacted within the range of effective network, much in the way that primate troops do (Ambrose 2010). However, by the mid MSA, material transport beyond 100-120 km becomes more common, and there are even occasional cases of long-distance material transfer beyond 300 km, such as the transport of obsidian in East Africa at sites dated between 130-100,000 BP (Marwick 2003:72; McBrearty & Brooks 2000:531; Wilkins 2010:112). That material movement remained well within the range of 100-300 km elicits the conclusion that human populations may have started forming a new level of social organization beyond the smaller effective group, but within the limit of the extended network: known in anthropology as the maximum band, defined as "a loosely interlocking network of minimum bands maintained through ritual communication and exchange", which "integrate them into a more or less coherent social unit" (Wobst 1974:152). Archaeologists Steven Kuhn and Mary Stiner have indeed suggested that the typical ethnographic hunter-gatherer band economy, based on the social division of labour and cooperation within and between units, might have originated at this point in the MSA (2006:961).

This 'troop-to-band transition' was, then, mostly a change in social organisation (Ambrose 2010), in relation to the composition of the group. Whereas the primate troop is organized around intimate and effective groups, usually constituted by close kin, human band societies need not be based on blood relatedness (Gamble 1998; Hamilton et al. 2007:2196). The maximum

band is rather an assemblage of residential groups bonded by cultural rules of membership that give individuals an identity as members of that group; these cultural rules take the form of classificatory kinship systems (Barnard 2009:235). Not only does membership determine kin relations, language, and home-range, but also where people go, whom they are allowed to marry, whom they must help, and from whom they can expect aid. Therefore, the establishment of bands based on 'social' kinship must have borne large implications for cooperation, as Dwight Read explains (2002:7253):

> Kinship in human societies carries with it not only a constructed basis for transforming a group of individuals into a system of interconnected individuals, but also a commonly understood conceptual basis of expected, and expectable, behaviors. [...] Individuals may be expected to cooperate with one another simply by virtue of their kin relationship; that is, engaging in cooperative behavior is part of one's understanding of what a particular kinship relation entails, independent of individual experience, traits, or attributes.

Classificatory kinship could have also served as a cultural strategy for coping with the increase in the number of social relations that the emergent level of organization of the extended network brought about. It would have provided a way of categorizing all this new social information so that the cognitive constraints of memory would be overcome by the use of kin categories and terminologies (e.g. uncle, cousin, nephew, etc.) and kinship identities with specific obligations, rights and duties within the group (Barnard 2009:233). However, band affiliation among hunter-gatherers is highly fluid and permeable, meaning that people often freely change bands (Apicella et al. 2012; Aureli et al. 2008:648). That is, band membership "is not permanent but fluctuates as people freely shift their affiliations from one group to another in response to environmental conditions and the rise and fall of personal reputations" (Ingold 1999:402). So, the emergence of new social categories, imbued with social rights and obligations, coupled with individual mobility among networks could have been strong incentives to signal and support one's identity visually, for instance through body ornaments.

One of the benefits of signalling identity in the new extended network system was, possibly, reducing risk of aggression from strangers. That strange persons are perceived as a risk is suggested by the fact that the brain goes into a higher state of alert when perceiving an unfamiliar face (Haxby et al. 2002:64). It is therefore conceivable that humans would make use of cultural strategies to signal identity in advance in order to avoid dangerous encounters with strangers. As Ben Marwick has pointed out, among primates, social interaction with strangers often results in injury or death. In contrast, among humans encounters with strangers are mediated by symbol systems that build expectations of behaviour in the absence of personal information (2003:74):

> The ability to express symbolic categorizations of social systems allows individuals to identify and interact with unrelated individuals in terms

> of symbolic categories rather than as unique individuals. This allows for relationships based on mutual rights and obligations rather than the histories of interpersonal relations that require renegotiation at each encounter.

Body decoration can indicate at a distance whether an unfamiliar individual is an ally or a foe, helping foresee and avoid potential conflict (Eibl-Eibesfeldt 1988:51; Kuhn & Stiner 2007a). So, social markers of identity such as visual art may, on the one hand, help manage dangerous situations with out-groups, and on the other, they also can mediate social relations within the in-group, by reaffirming social roles. As a result, visual art signals potentially create expectations of behaviour, resulting in lower indices of conflict and enhanced cooperation (Ambrose 2010:141; Coe 2003).

Within the extended network, or maximum regional band, social contacts and exchanges (of materials, mates, information, etc.) take place regularly. In these networks, there would not be a strong pressure for signalling collective identities, since at this level people are likely to know or know about each other and are bound to interact with a certain frequency,[130] so that non-cooperation is generally not an option. So, "we would not expect to find evidence for social boundary processes in the archaeological record" – i.e. emblemic styles in material culture – but "a clinal distribution of stylistic variability without any marked discontinuities" (Wobst 1976:53). However, assertive style would be well developed (Wiessner 1983:258). As close effective groups (e.g. local group or minimum band), where everybody knows each other well, start interacting more frequently with other effective groups within the extended network, there would be pressure for signalling individual identity. The emergence of new social roles and categories would promote assertive modes of social marking, such as personal ornamentation, to support and manage intra-group interactions. In accordance with the expectations by Wobst's and Wiessner's model, the lithic industries of the MSA up to 75,000 BP are very homogeneous throughout the African continent, showing only expected gradual geographic variation characteristic of 'passive' style, resulting from formal reproduction (Wilkins 2010:116). Likewise the earliest body ornaments, such as the MSA shell beads, seem highly standardized, suggesting that variation may have resided in particular ways of displaying them, in assertive fashion (Kuhn & Stiner 2007a:48).

A final piece of evidence to support the idea that some important change had taken place by 100,000 BP among modern human populations is that there seems to have been a slight increase in brain power, perhaps "to deal with the complexities of living within a larger group" (Wilkowski & Chai 2012) and the cognitive pressure to track others' reputations and behaviours in the emerging level of social organisation (Shultz et al. 2012).

130 It is within the cognitive range of 500 people an adult can remember, according to Kosse (1990).

Taking everything into account, the transition in social organisation from a troop-type to band society is "considered to represent the establishment of intensive regional reciprocal information sharing, cooperation, and materials exchange systems" (Ambrose 2010:140). But the formation of band societies, as Wobst anticipated, "may not even extend back to early *Homo sapiens*" since, it "cannot have arisen before a certain population density threshold was reached over wide areas", when residential groups were in reasonable proximity (1976:54). Recent research has certainly highlighted demography, in particular increasing population sizes, as a key force in the emerging modern human biocultural signature in the Pleistocene (Powell et al. 2009; Shennan 2001).[131] One suggestion is that the very dry climatic conditions in Africa before the onset of MIS 5, between 135-127,000 BP, may have driven human groups to occupy certain regions more intensely, for example along the coast (Barham & Mitchell 2008:238; Marean et al. 2007:907). In consequence, populations would have become denser in these areas and interactions with distantly related peoples would have increased and intensified, potentially giving rise to extended network social structures. Cooperation at this higher network level would have not only prevented conflict between groups, but might have been a convenient economic strategy against resource shortages as well, by establishing 'security systems' based on indirect reciprocity, as explained by Robert Whallon (2006:261):

> The establishment and maintenance of regional and longer social ties has long been recognized as an important part of hunter-gatherer adaptations to uncertain environments. In fact, such social ties create a 'safety net' of contacts and relations that can be critical to survival in time of local resource scarcity or failure. The connections people have within these networks allow them to move from their own area of scarcity to places where adequate resources are available to support them through such times of stress […] The regular maintenance of the social networks that create such 'safety nets' is essential and critical to the long-term survival of many hunter-gatherer groups. Such maintenance may entail the establishment of new social ties as well as the reaffirmation of existing ones, and it must take place often enough to keep both social relations and information solid and reliable.

The implementation of these strategies during the Middle Stone Age "would also have acted to increase population" (McBrearty & Brooks 2000:532). Through exchange and reciprocity networks, these populations could have overcome ecological, demographic and technological deficiencies (Horan et al. 2005). Long-distance contact and exchange systems are common risk-management strategies which help maintain stable population numbers among historical hunter-gatherers. And by helping create and manage such networks,

131 Whatever the scenario, it is clear is that a series of factors must be involved, and it would be naïve to attribute the set off of this process to a single cause (D'Errico & Stringer 2011). For sure, a combination of different ecological and social aspects and levels are implicated (Bunge 1997:417).

visual art may have been adopted by human populations, directly contributing to shape the modern human way of life.

European Upper Palaeolithic developments

In accordance to the proposal put forward in this chapter, changes in demography and social organisation, like increasing population densities and the formation of larger interaction networks, and their impact on technology and material culture, including visual art production, could potentially explain the 'explosion' of visual art in the European Upper Palaeolithic. Furthermore, the figurative/representational art practices that emerged in that period, such as the Franco-Cantabrian cave painting traditions, would be understood as a historical development of emblemic art styles. Let us start by exploring the conditions of the Aurignacian period.

In view of a colonisation scenario in which groups of modern humans started occupying Europe over 45,000 years ago, archaeologist William Davies (2001, 2007) has suggested a two-phase process where the earliest settlers would have been spread, mobile, low-density groups, in time increasing in number and becoming more regionalized. This would correspond with the Early and Developed phases of the Aurignacian period, respectively (cf. Hublin 2013). The archaeological evidence is somewhat consistent with the view that in the Early Aurignacian modern human groups had small population sizes (Forster 2004:261; Wobst 1974:155). From then onwards, "the average rate of [population] increase, although very small, is always positive and rises continuously" (Bocquet-Appel & Demars 2000:551). Likewise, the earliest pioneering populations appear to have been highly mobile over the landscape, as indicated by the character and low intensity of occupation of Early Aurignacian sites (Gamble 1999:315). Finally, they relied mainly on local raw materials for their tool technologies (Hahn 1987; Gamble 1999:313).

In the Early Aurignacian, it seems, material culture is not as highly stylized as in succeeding periods of the Upper Palaeolithic, e.g. the Developed or 'classic' Aurignacian and the Gravettian (Zilhão & D'Errico 2003). For instance, lithic artefacts are general-purpose and although there are some diagnostic lithic types, "the majority of its tool types are relatively unspecialized, and can also be found in many subsequent Upper Palaeolithic industries in Europe" (Davies 2001:200). Body ornaments, such as beads and pendants, do occur with some frequency in the Early Aurignacian, particularly those of the 'modified kind', such as perforated shells and animal teeth (White 1992, 1993, 2001). However, these do not show strong conventional patterns of style, as later ornaments do (e.g. rgional styles of ivory beads). The stylization and regionalization of material culture starts unfolding in the Developed Aurignacian, by 34-33,000 (Gamble 1999; White 1993). This period shows signs of population growth and increased intensity of occupation, as one would anticipate for an in-fill phase (Davies

2007:264). Mobility patterns also seem to have changed throughout the Aurignacian. On the one hand, sites show a less mobile, more intensive occupation, in which human groups presumably resided within defined ranges and specialized in exploiting local resources (Blades 1999:716; Davies 2001:212). On the other hand, raw material transfer distances increase steadily after 33,000 BP (Gamble 1999:317). So, by this time there is an observable growth in the number of sites and the spatial extent and intensity of occupation of these, which indicates larger human residential groups (Mellars 1996:400), and probably more contact and trade between distant groups (Gamble 1999:365). Davies has hypothesized that, as modern human population increased (2007:272):

> The European landscape might have become more structured, with people retaining some high mobility, but within more restricted areas, e.g. circulating long-distance movements rather than open-ended migration across preferred terrain. Such a situation created the Developed Aurignacian phase, with higher population densities, at least in more productive areas. This combination of decreased and/or more structured, circulating mobility and higher relative population densities could have led to more acculturation, hence the social and symbolic developments in the Developed Aurignacian and then in the Gravettian.

Population density not only became higher, but apparently communities fused into larger aggregates as well (Gilman 1984:117; Stiner & Kuhn 2006). The geography of Europe, the natural distribution of resources, and marked seasonality might have contributed towards the rapid establishment of regional extended networks (Wobst 1976:55), as indicated by the regionalization of tool styles and evidence for long-distance raw material transfers (Gamble 1999:365).

During the course of the Aurignacian period there is an abrupt increase in the occurrence of personal ornaments, and by the Developed phase these start showing patterns of culturally transmitted material choices, manufacture processes, and regional styles (White 1993). This suggests that, by then, "the social mechanism for maintaining relationships between distant groups or individuals were already established" (Kuhn & Stiner 2001a:127). The emergence of well-defined regional collective identities related to increased inter-group interactions, in combination with higher population sizes probably provided the conditions for the emergence of highly conventionalized emblemic visual art traditions in some regions, such as the ivory carvings from German Swabia, and the cave painting in the French Périgord. These traditions, then, may be understood as local cultural developments (Bolus 2005; Jöris & Street 2008:797) – as opposed to cognitive transitions. These emblemic visual art forms also turn more common and widespread in later periods, presumably as modern human populations became well established throughout the continent, and vary according to the changing conditions, particularly in response to the effects of the last Ice Age (Barton et al. 1994). So, the appearance of material culture

styles in the Upper Palaeolithic, as Wobst (1974) and Gilman (1984) suggested, may mean that population densities had become large enough for neighbouring groups to be in regular contact, and regional cooperation between extended networks to be formed and sustained. As the Upper Palaeolithic unfolds, the patterns of regionalization and stylization of material culture also become more marked and retain a positive correlation with overall demographic growth and site occupation intensity until the end of the Pleistocene (Stiner & Kuhn 2006:706).

The adaptive benefits of visual art

I have argued that the constituent behaviours of visual art signals are likely to be ancestral traits, shared with other members of the *Homo* lineage. As noted by Mithen (1996b), minimally, the capacities for symbol comprehension and for making artefacts are derived traits involved in visual art-making. The convergence of these traits in the context of the social interactions of humans in the Late Pleistocene, likely propelled the emergence of visual art signalling systems. Consequently, visual art may not be a species-level 'adaptation', as suggested for example by Ellen Dissanayake, but more likely an exaptation, as most animal signals are (Otte 1974). But even if not a special adaptation, visual art could still have adaptive value.

Some of the most successful strategies that have shaped human evolution often involve those "factors that would have acted to increase infant survivorship and decrease overall mortality rates (due to starvation, injury or conflict)" (McBrearty & Brooks 2000:532). Indeed, many of the characteristic traits of our lineage (e.g. technology, intelligence, sociality) increase fitness by means of either improving subsistence and resource acquirement (hence, survivorship) and/or diminishing the risk of death (e.g. lowering predation, avoiding conflict) (Kaplan et al. 2000). Thus, if visual art somehow contributed to the fitness of Pleistocene humans, perhaps its adaptive effects are to be found in these spheres, rather than in increasing mating opportunities, as suggested for example by Miller.

I have suggested that visual art, as a signal of social identity, in fact could have enhanced the fitness of the humans who engaged in it by improving their chances of resource acquisition (e.g. facilitating cooperation) and by lowering risk of death (e.g. creating expectations of interaction, and conflict avoidance). I have also argued that visual art arises through convention and coordinated action between agents. Therefore, the adaptive benefits of visual art may not be strongly perceptible at the level of the single-individual, but should become more salient at the group level.

As discussed, at the level of the individual and the intimate network, signalling identity through visual art does not make much of a difference in social interactions of cooperation or conflict. However, the advantages of such

signals start becoming apparent as small groups aggregate and interrelate with other, larger groups. In this sense we may speak of visual art as a trait that conveyed an 'emergent fitness' to the human populations of the Late Pleistocene, in their interaction with their changing ecological and social environments. Emergent fitness can be conveyed by "traits that may not exist as adaptive characters of the species, but may impart fitness by upward causation from lower levels" (Gould & Lloyd 1999:11908). As in the case of visual art, these traits often characterize the species and influence its differential rate of proliferation in interaction with the environment in a manner that is irreducible to the fitnesses of component organisms (Gould 2002:659).

This is consistent with the topical view of cooperative behaviours and intergroup interactions as key elements in the construction of the human niche. Despite the apparent cost, "the impact of many individuals within a population, across groups, engaging in these behaviors may alter the patterns and contexts of environmental pressures such that they result in long-term benefits to offset short-term costs" (Fuentes 2004:716). So, visual art, as an exapted signal of identity in cooperation networks, could have had a long-term cumulative adaptive impact at the population level, at the same time altering the selective landscape for new forms of material culture and social organisation.

6.4 Test against the archaeological record of visual art

The account presented in this chapter for the emergence and incorporation of visual art as a recurrent human behaviour relies on three key aspects: a) In the Pleistocene, modern human populations became organised in networks of indirect reciprocal cooperation; b) Indirect reciprocity selected for cultural strategies of individual recognition, i.e. extended memory based on sign systems (social markers, such as visual art); and c) Visual art became a successful strategy to mediate and monitor social identities in cooperative contexts.

The hypothesis is that the sort of extended indirect reciprocal relations that typify human societies require a high memory capacity for individual recognition and tracking past behaviour. Due to cognitive constraints, large-scale indirect reciprocity favoured ways to overcome these limitations. Some solutions were cognitive (e.g. 'chunking' information to remember), and others were cultural (e.g. sign systems). Visual art arose as one of these strategies. Because (assertive) forms of visual art became a manner of displaying individual identity through convention, it became relevant to a person's positive social image, which is an important asset for engaging in cooperation. So, even if visual art turned out to be a costly strategy, its cost would have been compensated by pay-offs in future returns by reciprocity partners, hence this came to be a powerful motivation for people wanting to invest in it. Because recognition through visual art created expectations about behaviour, it helped manage interaction risks with out-group individuals, selecting for lower indices of stress

and conflict, and greater cooperation. As human populations became larger, more intensive interactions between social networks favoured the emergence of emblemic style forms and signalling collective identity. In turn, larger populations could support the specialization of visual art making, allowing for the development of increasingly complex and more labour-intensive artistic traditions. Two general predictions derive from this proposal:[132]

1) *Cultural practices directed to signalling personal identity ('assertive style') will be the first to appear in the archaeological record, and their emergence should correlate with the origins of regular, delayed, and unbalanced reciprocal relationships; i.e. indirect reciprocity systems*.
2) *The emergence of emblemic modes of visual art should be linked with population growth and an increase in the frequency and intensity of interactions across extended networks.*

Below, I examine whether these expectations correspond with the patterns inferred from the archaeological record of visual art.

As I have argued above, evidence such as the expansion of raw material transfer patterns and the intensification of occupation sites during the mid MSA suggests that by 100,000 BP modern humans had become organised in band societies somewhat similar to those of historical hunter-gatherers, which are structured by systems of indirect reciprocity. So far, the earliest traces of visual art in the form of personal ornaments seem to co-occur with this development, for example the seashell beads from sites like Pigeons Cave and Blombos. Several scholars have suggested that these finds may be interpreted as symbols of emerging group identity. I have argued, however, that they are more likely to have signalled individual within-group social identity within an extended network, which was by then probably the highest level of social interaction. However, once the hunter-gatherer way of life based on reciprocal cooperation among extended networks was established, there was further room for development. As mentioned in chapter 2 (2.1), the climatic period known as MIS 5 (127-70,000 BP) presented challenging changing conditions for humans. It seems, for instance, that groups expanded and retracted at different times, occupying wetter regions such as the coast in drier periods, and going inland during warmer and wetter phases. These changes would have invariably had an impact in the way different populations interacted with each other. The behavioural innovations observed in the archaeological sites of that time may well represent the way in which "communities responded to fluctuations in resources" (Barham & Mitchell 2008:252).

By the end of MIS 5 (70,000 BP), the Toba eruption brought about extreme arid conditions that may have driven human populations to congregate in the coastal regions (Henshilwood & Dubreuil 2011:379), perhaps increasing contact frequencies between previously distant groups, giving rise to cooperation across

132 These have been formulated primarily after Wiessner (1983:258).

extended networks. Such a situation would have favoured the development of emblemic styles in material culture because there would have been a growing "need to signal or symbolize ethnicity or group affiliation, distinctiveness from neighbors, and aggression (or suppression of aggression)" (Wobst 1976:53).

Certainly, whereas for most of the MSA lithic technology is relatively homogeneous, by the end of MIS 5, there are examples of cultural styles in stone tool production, such as the South African Still Bay and Howiesons Poort techno-traditions (Henshilwood & Dubreuil 2011:370). Also, "signs of long-distance connections do become more common" (Barham & Mitchell 2008:271). The appearance of regional styles in stone tools and increased distances in raw material transfers, both of which indicate that people were mobilizing resources over larger territories, point towards the emergence of exchange systems between extended networks by this time (Henshilwood & Dubreuil 2011:371; Marwick 2003:74; McBrearty & Brooks 2000:531). The production of body ornaments seems to have declined in South Africa after 70,000 BP, and regional styles in lithic technology also seem to wean by 59,000 BP. This may also be related to demography, and a possible depopulation event due to the climatic aftermath of the Toba eruption (Ambrose 1998b) and the deterioration of global conditions due to a cold event between 67-61,000 BP (Borroughs 2008:86).

Hence, the combination of denser populations and more contact among diverse groups may be key factors in understanding the proliferation of visual art production by the mid MSA (Kuhn & Stiner 2007a; Shennan 2001), and the discontinuous nature of its record could also be partially explained by consequent fluctuations in demography and the rupture and recovery of social networks at different points in time (Powell et al. 2009; Shennan 2001).

The record of the European Early Upper Palaeolithic (EUP) also seems to show a two-stage development in visual art, from predominantly assertive towards emblemic forms. As suggested by Davies (2001, 2007), the earliest modern human populations to enter Europe probably were small groups of bands dispersed over the landscape. These probably interacted within an extended network level, among related or known allied groups. But as populations began to thrive and settle throughout the continent, interactions with unrelated bands probably became more frequent and intensive, giving rise to regional emblemic styles in material culture. Archaeologists have recurrently noted that an explosion of styles and forms in material culture during the Aurignacian-Gravettian seems to correlate with the intensification of group interactions across different regions, as suggested for instance by patterns of raw material transfer and site distribution (Gamble 1999:317; Wobst 1974). The competition and cooperation generated by these relations may have selected for internally cohesive groups, supporting collective identities manifested in emblemic forms of visual art (Stiner & Kuhn 2006:705). As described in chapter 2 (2.3), this only seems to have happened in the mid-late Aurignacian. At this point, personal ornaments such as ivroy beads become very much regionalized

and semi-mass produced (Barth et al. 2009; Kölbl 2009; White 1993), which indicates both that they likely took on a collective identity and that their production had become a semi-specialized activity. The latter is symptomatic of a stable, 'robust' human populations (Stiner & Kuhn 2006:708). Changes in visual art towards emeblic forms in the European Upper Palaeolithic may then correlate with the stabilization of population numbers during an in-fill phase, as suggested by Davies. During this period we also have the first example of a distinct visual artistic tradition, in the ivory carvings of Swabia, which seem to reflect the collective artistic style of a regional population. Emblemic forms, highly conventionalized and structured, require specialized work and the corresponding group size and social institutions to support it (to manage and transmit knowledge). Work specialization arises and coexists with many social factors, mainly division of labour, population size and density, technology, exchange, the accumulation of knowledge, social stratification, political organization, and internal social institutions that manage the corresponding specialized knowledge and activities (Kuhn & Stiner 2006; Stymne 2009). This explains why complex, specialized activities like painting only emerge later in the Palaeolithic record, when social structure can provide the necessary supports. Elaborate painting traditions require arduous labour, skill and knowledge specialization, which is not the rule in small-scale groups with reduced population size and density (Conkey 1993). For example, the systematic production of standardized images such as observed in the Franco-Cantabrian cave paintings are characteristically themed, conventionalized, and stylised, and seem to have been made by one of few artists at a time (Clottes 1993; Lewis-Williams 2002). This points to a social institution or a select group of people who possessed and could transmit the required knowledge to carry out this artistic tradition. Work specialization seems to be linked to population density, although it is not entirely dependent on it. Rather, specialization hinges on institutions. Even when population numbers fall, if the institutions that support it remain, specialized work and knowledge will survive. Conversely, if the social institutions collapse, specialization will likely be lost, to a great extent (Stymne 2009). This may account partially for the discontinuity of technological and artistic traditions in the archaeological record. For example, it may clarify why Franco-Cantabrian cave art dies out at the start of the Holocene, despite an increase of population size in the region during the epi-Palaeolithic and Mesolithic (Stiner et al. 1999).

In sum, the evidence discussed from the archaeological record of the African MSA broadly seems to support the premise that the assertive mode of visual art would have been the earliest to develop among Pleistocene modern human populations and that, in turn, this development correlated with the establishment of a social organisation based on indirect reciprocal relations — — the 'troop-to-band transition' (prediction 1). Furthermore, the archaeological evidence from both the African Middle Stone Age and the European Early Upper Palaeolithic also appear to corroborate that emblemic modes of visual art and material culture systematically co-occur with stabilizing or growing population

densities and increased contact between distantly related groups — at the extended network level (prediction 2). Both predictions further support the hypothesis that visual art arose as a cultural strategy to support identity signalling in human cooperation networks.

6.5 Conclusion

Visual art seems to be a highly versatile form of material culture which may be used to attract mates, to bind social groups, to explain and exchange ideas, to invoke emotion, and to obtain and display social prestige. I have suggested that, instead of keep trying to come up with an evolutionary account for each of these effects, scholars should strive to formulate a more general hypothesis able to explain why visual art is precisely so widespread, but diverse and versatile at the same time.

In this chapter, I have argued that one such hypothesis may be based on the premise that visual art is a communication signal and that, as many communication signals, likely emerged in the context of cooperative behaviour. In particular, I have argued that visual art arose as a cultural strategy to support reciprocal relations among Pleistocene humans by signalling social identity. The scenario I have elaborated suggests that the sort of extended indirect reciprocal relations that typify human societies promoted cultural strategies for individual recognition and monitoring of behaviour. Visual art arose as one of these strategies. Signalling through visual art, then, became relevant to a person's social image, which is an important proxy for engaging in cooperation. As human populations became larger and more expanded, intensified interactions between extended networks favoured the emergence of emblemic style forms and collective identity. In turn, larger populations could support the specialization of visual art making, allowing for the development of complex artistic traditions like standardized image making in rock art. This two-stage development of visual art forms (assertive and emblemic modes) seems to be consistent with the late Pleistocene record, where personal ornaments are the earliest predominant form of visual art, whereas emblemic forms such as representational art appear only at a later stage.

The proposal presented above has an immediate advantage over other origins-of-art models. It accounts for the issues of timing, uniqueness, and form. That is, by incorporating the Pleistocene archaeological record, it attempts to explain why visual art emerged when it did, between 130-100,000 BP, at a time when scholars believe modern humans adopted a social organization similar to the bands of historical hunter-gatherer groups (timing). In addition, by situating the emergence and development of visual art in the unfolding social interactions of modern humans, it can potentially explain the relative absence of visual art behaviour among the earliest members of *Homo sapiens* and also among our closest extinct relatives, the Neanderthals, without having to invoke great

cognitive differences between the two or *scala naturae*-type arguments (uniqueness). Recent research suggests that the main differences between these two human groups might lie precisely in demography and social organisation, rather than cognitive capacity (Hayden 2012:12). Neanderthals, as specialized hunters of large terrestrial herbivores, probably lived in foraging groups requiring large territories, which combined with their overall low population density (Snodgrass & Leonard 2009:229) would have precluded repeated contact between unrelated groups, beyond the effective network range. Data from raw material and artefact mobility also indicate that Neanderthals rarely engaged in long-distance exchange, meaning that they were unlikely to have formed the sort of extensive cooperation networks observed among historical hunter-gatherers (Horan et al. 2005). These differences in group size and organisation would have acted as behavioural (not cognitive) constraints on the development of systematic visual art behaviours. I have earlier put forward interaction between extended social networks based on indirect reciprocity as a selective environment for visual art practices; in their absence, there is little chance that signalling in visual art would have had a significant role in Neanderthal society. The same seems to have applied to early *Homo sapiens* populations prior to 120-100,000 years ago (Zilhão 2011). Finally, the proposal offers a possible answer to the issue of form or why visual developed into the varieties and media that we find in the archaeological record by suggesting a two-stage evolutionary development (assertive-emblemic) based on the unfolding social and cooperative interactions of modern humans (form). From its 'humble' beginnings in personal ornamentation, visual art eventually spanned into other media and incorporated various complex technical processes, such as sculpture and painting. This suggests that visual art practices became increasingly important for human groups and the individuals in those groups, who invested more and more time, effort, and resources into them.

To conclude, the model sketched in this chapter suggests that visual art is an effective cultural strategy that potentially supports identity in human cooperative networks allowing us to interact with others at a large-scale. Perhaps, then, it should not surprise us that, since its origin, people have been so willing to engage in making and consuming visual art despite its costs and apparent futility.

CONCLUDING REMARKS

If certain of man's handiwork can be proved to be the result of a special human impulse of universal incidence, coeval with the earliest discovered human evidences; if it creates certain definable tendencies and explicit means of expression which, however varied their application, are identical in intention; and if these are peculiar to itself, it is essential to just and profitable conclusions to approach all works of art along the lines indicated by those conditions, if its place and significance in the evolutionary development of man are to be accurately comprehended.

W. PAGE ROWE, 1930

These last few pages briefly summarize the main points that have been made over the previous six chapters, indicate and describe the limitations of the research, and point out some important directions for future research.

General Summary

Throughout this book I have described that for over a century researchers from multiple disciplines have enquired about the psychological and biological foundations of visual art. Chapter 1 looked particularly to archaeological and evolutionary perspectives and to recent developments in the understanding of human behavioural evolution. The review revealed that in archaeology, visual art has often been portrayed as a by-product of human cognitive abilities, namely language. Whereas evolutionary views, for their part, have frequently suggested that visual art may be an adaptive trait that 'evolved for' some specific function such as mate choice or social bonding. I suggested that conceiving of art as a communication signal can potentially synthesize these views, allowing to formulate questions about the cognitive and behavioural effects of visual art and of how these come about in phylogeny and ontogeny. Characterizing visual art as a communication signal also makes it possible to better understand its biological foundations, as we can draw parallels with animal signals and account for its great formal and cultural variability across time and space, since human communication is context-bound.

The second chapter gave an overview of the current state of the archaeological record of Pleistocene visual art forms. It focused on evidence of pigment use, personal ornaments, incised objects, carvings and painting. I argued that the emergence of increasingly complex forms of visual art over the late Pleistocene may have to do with escalating labour investment in art practices and changes in the structure of social organization, rather than with growing cognitive capacity as has often been suggested in archaeology.

In chapters 3, 4, and 5 I carried out a critical assessment of three evolutionary models for the origins of visual art. Chapter 3 looked into Geoffrey Miller´s argument that visual art is a courtship display that evolved via sexual selection. Chapter 4 discussed the model of art as a ritualized behaviour whose purpose is to enhance social cohesion, suggested by Ellen Dissanayake. Chapter 5 examined the work of Steven Mithen and his proposal that visual art is a result of human cognitive evolution, i.e. the 'modern mind'. I pointed out that these have more in common with a communication framework than their authors have realized. Particularly, I have emphasized that in one way or another the three models somehow refer to visual art as a signal, but have been more concerned with reconstructing and interpreting the content and function of early artworks, rather than with accounting for their development as shown in the record.

Drawing on the suggestions by anthropologists Martin Wobst (1977) and Polly Wiessner (1983, 1984), in particular, in chapter 6 I suggested a scenario that correlates the emergence of visual art forms with the establishment of reciprocal networks among Pleistocene hunter-gatherer groups. Along these lines, I proposed that visual art coevolved with typically human ways of social organization and cooperation strategies. My argument, in brief, was that Late Pleistocene human groups became organised in band societies that established networks of indirect reciprocal cooperation, which favoured cultural strategies of individual recognition such as social markers, e.g. styles of personal ornamentation. These early forms of visual art, by conveying information about social identity, became important in recalling and assessing individual interactions in cooperative networks, creating expectations of behaviour, as a result enhancing collaboration among allies and reducing conflict among antagonists. I also argued that, as a cultural strategy, visual art could have been adaptive by reducing risk of aggression and increasing resource acquisition through trade. As other culturally evolved traits, like tool-making and cooking, visual art too could have had an important impact on shaping human cognition and behaviour. Finally, I suggested that this model is more consistent with the archaeological record of the Late Pleistocene than other proposals and can potentially explain why visual art is apparently restricted to modern human populations of a certain minimal size.

Furthermore, I indicated that visual art should not only be seen as a behaviour, or a cognitive ability, but as a "technological endeavour" (Gibson 2011:385), that is as a human- made artefact that requires for its creation tools, techniques, skills and knowledge that have been culturally developed, accumulated and transmitted. I also suggested that the emergence of visual art practice probably did not evolve as an isolate trait or set of traits, but more probably arose by convergence and co-option of various ancestral hominin traits such as tool crafting and symbol use. So making art, either in the Pleistocene or the present, implies more than creativity, intelligence, and imagination, it literally requires *making* art, hence art is in the making.

Limitations of the research

The greatest limitations of this research that I can so far identify refer to three issues common to archaeological research in general: a small sample size, reliability of the data, and lack of prior research within the suggested approach. I briefly discuss these problems below.

As I have described, it is only in the last couple of decades that researchers have realized the potential chronological depth of visual art. Therefore, the corpus of the earliest visual art forms has only just begun to take shape. On the one hand, the number of sites and artefacts with indications of visual art dating between 100 and 50,000 years has increased greatly in recent years as researchers have become more aware of their presence. On the other hand, the overall available sample size might still be too small to infer significant relationships from it. For instance, the proposal elaborated in chapter 6 is based on our current (limited) understanding of Pleistocene human demography, social organisation, and interactions across groups. Changes in our knowledge of any of these aspects could then have great implications for the suggested scenario. Also, I have mentioned that researchers often describe the record of visual art as 'patchy', but as the sample continues to become larger, the gaps may soon start to fill in and we might be able to acquire a clearer idea of the ways in which the different visual art forms occurred across sites and periods.

Another potential problem is the reliability of the data. This is linked to issues such as geographical research biases and material preservation. In chapter 2 I have discussed, for example, that due to the history of research, some areas will generally be more available to archaeologists than others. And, due to the history of deposition, older finds will be more scarce. Therefore, it is possible that the evidence we have are just indicative 'pulses' of the actual record, and that we are simply 'drawing lines through dots'.

Finally, I have discussed that often, researchers are more interested in interpreting the contents of visual art, or suggesting motivations for its production, than in accounting for its patterns of emergence and change. For this reason, there are few archaeology-based models that explore a possible correlation between the earliest patterns of visual art forms and other aspects of human activity that can be deduced from the record, such as population density, network interactions, resource acquisition strategies, etc. Hence, there are few specific hypotheses that this research could follow up on or be compared to.

These limitations, however, can suggest ways to develop future avenues of research.

Suggestions for future research

The general observations and proposals made in the previous chapters have the potential to be expanded and improved in terms of scope, testability, and definition.

The first suggestion is regarding the chrono-geographical scope. The two-stage model for the evolution of visual art, from assertive to emblemic mode, (as elaborated in chapter 6) may potentially be tested in various archaeological and historical contexts. In this book, I have focused mainly on the mid- African Middle Stone Age, and the European Early Upper Palaeolithic. However, there is room to expand the scope to the Asian, Australian, and American records, for example, and to check for consistency in historical ethnographic cases.

I also put forward some manners to further test the model suggested in the previous chapter. According to the prediction that the assertive and emblemic modes of visual art will be correlated with the incidence of interaction between and across human groups, there should be cases where, due to changes in either demography or social organization, the presence of collective forms of visual art (emblemic mode) will 'revert' to individual (assertive) forms. Identifying such cases could provide an interesting manner to test the model's predictions. Looking in more detail at the whole record of the Upper Palaeolithic in Europe, with its great variability of styles and forms of visual art across regions and periods, might provide some opportunities to test these suggestions – following up on the study by Barton et al. (1994). Similarly, cases such as those of the historical hunter-gatherers of Tasmania and Baja California provide interesting possibilities. In both examples, the assumption is that at some point there was an interruption in the pattern of cultural transmission that produced a marked quantitative and qualitative decline in material culture. These patterns should also be reflected on visual art practices, if the assumptions of our model hold true.

As for the more general suggestion that visual art should be understood as a communication signal, current research on the evolution of animal communication and studies of signalling systems should provide comparative material to better understand how visual art might have emerged and diversified, and the range of effects it has acquired. Signalling theory in biology and sociology should also provide a strong theoretical framework.

Finally, I suggest that future research on the origins of visual art needs to acquire better resolution. That is, researchers should be more specific about what they want to address, whether it is the emergence of a specific art form or technique (e.g. carving, painting), a content style (e.g. figurative, schematic), or a behavioural pattern (e.g. visuo-motor abilities, drawing skills). Also, studies should narrow down on the development and production of art forms over time, with all that this implies, such as changes in traditions, conventions, techniques, materials, styles, distribution, etc., trying to relate these to other aspects of the

archaeological record. For instance, network perspectives in material culture and archaeology (Knappett 2011, 2013) offer an interesting approach with potential application to the early record of visual art. Moreover, research into the evolutionary origins of human behaviour, in general, should reassess the importance of exploring cooperation strategies as an important selective context for human cognition, culture and communication.

Final reflections

In a way, the conclusions of the present research do not defer much from Hirn's, when he wrote (1900:304):

> And beyond the fact that art has been obliged to avail itself of media which have originally been called into existence by utilitarian, non-aesthetic needs, there lies another fact. To these external 'origins' we can also trace some of the most important qualities which we appreciate in a work of art. In this way it is open to us to explain how several of the virtues of art, as we know it, may be derived from the primitive needs which it subserved; how, for instance, the lucidity of art may find its explanation in art's use for conveying information; how the sensuous and attractive qualities of all art may be traced to the need for propitiating favour; how the power that resides in art to brace and stimulate the mind may be transmitted from the days when the artist was appointed to nerve his fellows for work or war.

Despite the fact that Hirn's observations are still very much valid today, I would like to think that we have made some progress in our understanding of the origins of visual art in the eleven decades since the publication of his enquiry. For one, a great archaeological corpus of Pleistocene visual art has been accumulated since then, going back over 100,000 years.

This rich record has the potential to offer a yardstick with which to test hypotheses on the evolution of human culture. Therefore, archaeology is "capable of providing the direct evidence for the actual patterns of development of different aspects of behaviour over the course of human evolution" and through it we can "engage actively in evaluating the alternative hypothetical models of cognitive evolution against a (more or less) empirical data base" (Mellars & Gibson 1996:1). But in spite of its unique position to provide a "temporal backdrop against which the actual course of historical events have been played out", researchers have not yet taken full advantage of archaeology and its potential to explain evolutionary patterns of human culture and behaviour and test evolutionary hypotheses (Eldredge 1989:173-4). In the same manner, scholars from all disciplines interested in the origins of visual art have to make better use of the archaeological data available to them. From this perspective, origins of art hypotheses may be evaluated according to two criteria: a) how well the main arguments agree with what we do know about the biological and cultural evolution of humans; and b) the extent to which the

empirical archaeological evidence for visual art meets the conditions that would be expected if the hypotheses were correct, i.e. their predictions.

As I have reviewed in the previous pages, the frequent disregard for archaeological evidence is partly due to the scholarly tradition of putting forward explanations of behavioural evolution based on current function, and partly by clinging to a notion of visual art as a unique human achievement, as special as our own species. But as Gould remarked (2002:912):

> However much we may yearn to regard ourselves as the apotheosis of an inherent tendency in the unfolding of evolution, we must someday come to terms with our actual status as a discrete and singular item in the contingent and unpredictable flow of history. If we could bring ourselves to view this prospect as exhilarating rather than frightening, we might attain the psychological prerequisite for intellectual reform.

Similarly, when we stop seeing visual art as an enigmatic product of human intelligence, and understand it within the framework of biological communication and hominin evolution, we open an exciting possibility to better understand the role that it has played in our history, without it losing sight of its remarkable aesthetic and affective qualities.

To be sure, when we understand that much of our human 'uniqueness' is part of our hominin heritage and that those traits that 'make us human', like visual art, have been shaped by a long history of interaction between cooperation, cognition, communication, and culture, "light will be thrown on the origin of man and his history" (Darwin [1859]2006:306).

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SAMENVATTING

Kunst in de maak: De evolutionaire herkomst van beeldende kunst als een communicatiesignaal

Dit proefschrift beschrijft hoe onderzoekers uit verschillende disciplines al meer dan een eeuw trachten de biologische en psychologische grondslagen van beeldende kunst te doorgronden. De auteur stelt dat de verschillende perspectieven bij elkaar gebracht kunnen worden door beeldende kunst als een vorm van communicatie te beschouwen. Deze studie biedt tevens een aannemelijk scenario voor de oorsprong van beeldende kunst door het te definiëren als een materieel signaal dat, samen met sociale identiteit, waarschijnlijk een belangrijke rol heeft gespeeld in de context van menselijk coöperatief gedrag.

Het eerste hoofdstuk behandelt specifiek archeologische en evolutionaire standpunten en kijkt naar recente onderzoeksontwikkelingen op het terrein van de evolutie van het menselijke gedrag en de relevantie hiervan voor het verschijnsel kunst. Hieruit blijkt dat beeldende kunst binnen de archeologie vooral wordt uitgelegd als het bijproduct van de cognitieve vaardigheden van de mens, in bijzonder die van taal. Daarentegen bepleiten evolutionaire benaderingen dat het vervaardigen en gebruiken van beeldende kunst moet worden gezien als een adaptieve eigenschap, en dus evolutionair ontwikkeld is met een bepaalde functie. De auteur beargumenteert dat wanneer kunst als een communicatiesignaal wordt beschouwd, de afstand tussen deze twee standpunten kan worden overbrugd. Zoals alle signalen, is beeldende kunst afgestemd op de menselijke perceptie en cognitie, en kan het in verschillende contexten opereren. De uitleg van beeldende kunst als signaal verklaart zowel de relatie tussen beeldende kunst en cognitie, als de waargenomen diversiteit aan functies die beeldende kunst heeft aangenomen. Deze benadering stelt ons bovendien in staat om vragen te formuleren over de cognitieve en gedragsmatige effecten van beeldende kunst en hoe deze tot stand komen in fylogenie en ontogenie.

Het tweede hoofdstuk geeft een overzicht van de huidige stand van archeologische vondsten van beeldende kunst uit het Laat Pleistoceen (ca. 130.000 tot 10.000 jaar geleden). Het behandelt het gebruik van pigmenten, persoonlijke versieringen, graveringen, sculpturen en schilderingen. Er wordt beargumenteerd dat de opkomst van steeds complexere vormen van beeldende kunst gedurende het Laat Pleistoceen te maken heeft met een stijgende arbeidsinvestering in het maken van kunst en met veranderingen in de sociale structuur van de samenleving. Dergelijke veranderingen zijn bijvoorbeeld een toenemende groepsgrootte of de intensivering van interactie tussen groepen. De verklaring van arbeidsinvestering en veranderingen in sociale structuur wijkt

daarmee sterk af van de tot op heden gangbare archeologische verklaring dat de ontwikkeling van steeds complexere vormen van beeldende kunst het gevolg zou zijn van de groei in menselijke cognitieve vermogens.

In hoofdstukken 3, 4, en 5, geeft de auteur een overzicht en een kritische weging van drie invloedrijke evolutionaire modellen die de oorsprong van beeldende kunst trachten te verklaren. Hoofdstuk 3 behandelt het model van Geoffrey Miller dat beeldende kunst als een vorm van hofmakerij ziet welke geëvolueerd zou zijn via het principe van seksuele selectie. Hoofdstuk 4 gaat in op het model voorgesteld door Ellen Dissanayake, waarin kunst als een vorm van geritualiseerd gedrag wordt beschouwd met als doel om de sociale cohesie van een groep mensen te bevorderen. Uiteindelijk behandelt hoofdstuk 5 het werk van Steven Mithen en zijn voorstel dat beeldende kunst het resultaat is van menselijke cognitieve evolutie, oftewel het resultaat van de 'moderne geest'. De weging van de drie modellen komt onder meer tot stand door voorspellingen uit deze modellen te toetsen aan het archeologisch bewijsmateriaal dat in hoofdstuk 2 is gepresenteerd. De conclusie is dat, hoewel zij alle drie nauwkeurige beschrijvingen geven van bepaalde specifieke effecten van beeldende kunst, de modellen geen bevredigende verklaring bieden voor haar ontstaan en ontwikkeling door de tijd. Desondanks hebben alle drie op een of andere wijze beeldende kunst wel in verband gebracht met communicatiesignalen.

Gebaseerd op de theorie van stijl in materiële cultuur als een signaal, ontwikkeld door de antropoloogen Martin Wobst (1977) en Polly Wiessner (1983, 1984) in het bijzonder, stelt hoofdstuk 6 een scenario voor dat de opkomst van beeldende kunst verbindt met het ontstaan van wederkerige netwerken onder jager-verzamelaar groepen in het Laat Pleistoceen. Er wordt geponeerd dat beeldende kunst co-evolueert met archetypische menselijke samenwerkingsstrategieën en wijzen van sociale organisatie. Het argument is dat groepen mensen zich tijdens het Laat Pleistoceen organiseerden in bandsamenlevingen met netwerken van indirecte wederkerige samenwerking, waar culturele strategieën belangrijk zijn om aan de hand van sociale *markers* (zoals persoonlijke versiering) een individu te herkennen. Door informatie te verstrekken over de sociale identiteit vervulden deze vroege vormen van beeldende kunst een belangrijke rol bij het herinneren en beoordelen van individuele interacties in samenwerkingsverbanden. Het gebruik van beeldende kunst als sociale *marker* verschafte hiermee bepaalde verwachtingen ten aanzien van het gedrag van de ander (zonder deze noodzakelijkerwijs persoonlijk te kennen), en vergemakkelijkte zo een intensievere samenwerking tussen bondgenoten en zorgde voor een vermindering van conflict tussen potentiële tegenstanders. Vanuit het beperkte veld van persoonlijke versiering breidde beeldende kunst zich uiteindelijk uit naar andere media en omvatte steeds complexere technische processen, zoals het maken van sculpturen en schilderingen. Dit wijst erop dat beeldende kunst door de tijd heen belangrijker

werd voor groepen mensen, en de individuen binnen de groepen, waardoor zij steeds meer tijd, moeite en middelen in beeldende kunst staken.

Als culturele strategie, stelt de auteur dat beeldende kunst adaptief zou kunnen zijn geweest door het verminderen van het risico op agressie en het vergemakkelijken van uitwisseling van middelen in het netwerk. Evenals ander cultureel geëvolueerde eigenschappen, zoals het maken van gereedschap en koken, heeft beeldende kunst een belangrijke rol gehad op hoe menselijk gedrag en cognitie zich heeft vormgegeven. Dit alternatief model is veel meer in overeenstemming met het complex aan archeologische vondsten uit het Laat Pleistoceen dan andere modellen en kan beter verklaren waarom beeldende kunst beperkt is gebleven tot de moderne mens bij populaties van een bepaalde minimale grootte.

CURRICULUM VITAE

Larissa Mendoza Straffon was born in 1977 in Mexico City. In 1997 she started her studies in archaeology at the National School of Anthropology and History in Mexico. During her study, she carried out extensive anthropological and archaeological fieldwork in the Mexican states of Oaxaca, Hidalgo, Estado de México, Querétaro and Baja California Sur, and did an internship at the National Museums Organisation. In 2004 she graduated with honours for her thesis on the Archaic Great Mural rock art tradition of the Baja California Peninsula, obtaining a licentiate degree in archaeology. The same year she entered the Human Origins master at the Faculty of Archaeology of Leiden University in the Netherlands. She took on the Aurignacian art of Swabia, Germany, as her thesis topic and obtained her master's degree in 2005. In the summer of that year she participated in the archaeological excavations at the site of Hohle Fels, Germany. In 2007 she began her PhD research on the evolutionary origins of visual art at Leiden University Centre for the Arts in Society (LUCAS). From 2008-2011 she was a board member of the Dutch Postgraduate School for Art History. In 2013 she was visiting researcher at the Applied Evolutionary Epistemology Lab (AppEEL) at the Centre for Philosophy of Science in the University of Lisbon, Portugal. In 2007 she planned and coordinated the international workshop 'Complexity Perspectives on the Origins of Art, Creativity and Culture' at Leiden University. In 2013, at AppEEL, she co-organised two graduate schools on current issues in Evolutionary Theory, and the 'International Conference on Evolutionary Patterns' in Lisbon, Portugal. She has lectured three BA courses at Leiden University, has presented her research at various international conferences (ICOM, IFRAO, EAA, AAA, UISPP), and has authored and co-authored several academic publications. Currently she is editing a volume on cultural phylogenetics for the Springer series 'Interdisciplinary Evolution Research'.

ACKNOWLEDGEMENTS

I am grateful to my promoters Kitty Zijlmans and Wilfried van Damme for having accepted my research proposal into the the World Art Studies programme at the Leiden University Centre for the Arts in Society (LUCAS), and to my co-promoter Katharine MacDonald ,of the Faculty of Archaeology of Leiden University, whose insights and guidance were crucial to the completion of this manuscript.

I extend my appreciation to the managerial and secretarial body of LUCAS, Korrie Korevaart, Viola Stoop, Lenie Witkam, and in particular Lia ten Brink, for their kind help with all administrative issues during the course of my appointment as PhD researcher, and for the financial support towards the printing of this book.

My gratitude to Boudewijn Peters, of Leiden University, and Szabolcs Számadó, of the Center for Network Science at the Central European University, Hungary, for proofreading previous versions of some chapters.

I also thank everyone who generously gave me permission to include their images in this work. Especially: Tom Gauld for his cartoon *Hunter and Painter* for the cover. Prof. Christopher Henshilwood and Lisa Hulett, of the Evolutionary Studies Institute at the University of the Witwatersrand, for the image of the engraved ochre from Blombos Cave. Prof. Stanley Ambrose, of the University of Illinois, for the image of ostrich eggshell beads from Kenya. Dr. Kurt Wehrberger of the Ulmer Museum, for the image of the Hohlenstein-Stadel lion man. Dr. Stephanie Kölbl of the Blaubeuren Prehistory Museum and Dr. Sibylle Wolf of Tübingen University, for their help in acquiring images of the Hohle Fels Venus, the Hohle Fels lion man, and the Vogelherd beads. Dr. Marian Vanhaeren of the University of Bordeaux, for the image of the Blombos Cave seashell beads. Prof. Randall White of the Centre for the Study of Human Origins at New York University, for the images of Aurginacian beads. And finally, Prof. Jean Clottes, for the wonderful picture of the horse panel at Chauvet Cave.

Over the past years, the interdisciplinary nature of my research topic led me to pursue various interests and questions that would have remained unanswered had it not been for the goodwill of the professors that allowed me to sit in their courses and lectures, and exchange views with them and their brilliant students. Specifically, Raymond Corbey, Wil Roebroeks and Alexander Verpoorte of the Faculty of Archaeology of Leiden University, Liesbeth Sterk of the Faculty of Biology of Utrecht University, Arie Verhagen of the Leiden University Centre for Linguistics.

I am thankful to anyone who has been somehow involved in the realisation of this project. Above all, my colleagues of the art history department who at any point shared an office space or a lunch table with me, and were always quick

to lend me an ear, a shoulder, a friendly word of advice, and even a roof in Leiden whenever I needed it: Jenny Boulboullé, Marieke Hendriksen, David Louwrier, Marrigje Rikken, Sun Jing, Minou Schraven, Elsje van Kessel, Joris van Gastel, Ita Jansen, Maureen Warren, Erin Downey, Leonor Veiga, Amalia Kallergi, and especially Hieke Huistra, Elisa Goudriaan and Anna Grasskamp. Thanks, too, to Adam Jagich and Araceli Rojas, of the Faculty of Archaeology, and Max van Duijn and Barend Beekhuizen, of the Centre for Linguistics, for sharing their thoughts and experiences with me whenever we had the opportunity to meet.

My fellow rock art enthusiasts Ramón Viñas of the University of Tarragona, Roberto Martínez of UNAM, and Leslie Zubieta of the University of Western Australia, have been a constant source of inspiration, may we work together many more times in the future.

Finally, a loving thank you goes out to my dear friends Carlotta Tavormina, Priscilla Schoondermark, Vincent Verschoor, Paul Gibbels, Marlies de Bont, Joris Gravensteijn, Cruz Pacheco, Eduardo García, Tere García, Carlos Arriola and Azucena Cervantes, for their endless encouragement. To my 'Dutch family' Leo, Carla, Ferry and Dayenne Wijnhoven for their incessant support. To my parents Enrique Mendoza and Doris Straffon, and my sister Miriam for their unconditional love and backing. And last but not least, to my partner Martijn A. Wijnhoven for standing by me throughout this remarkable journey.