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

Mendoza Straffon, L.

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.

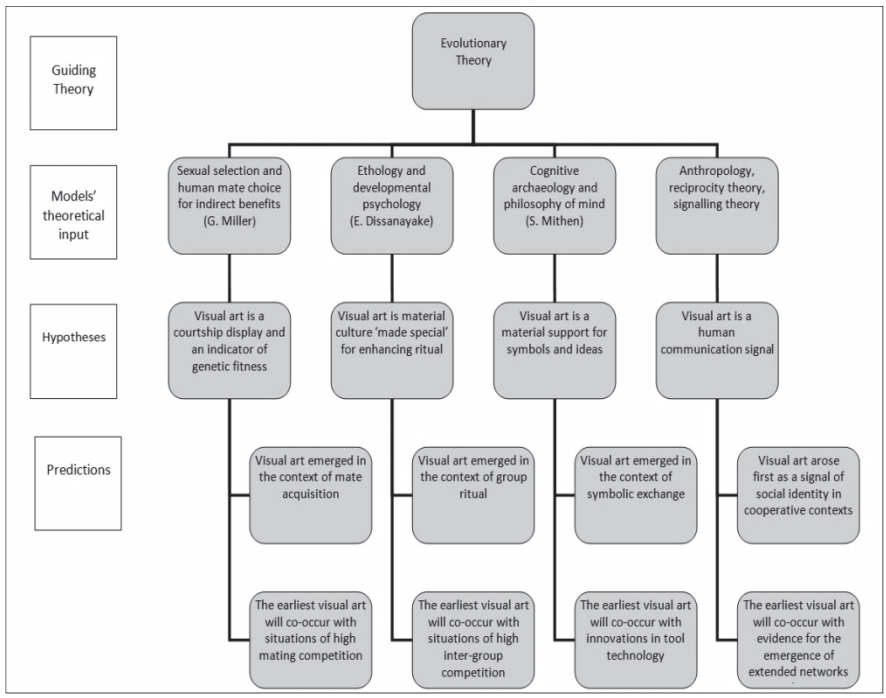

Figure 17. *Theoretical structure of the models analysed previously and the one sketched in this chapter.*

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).

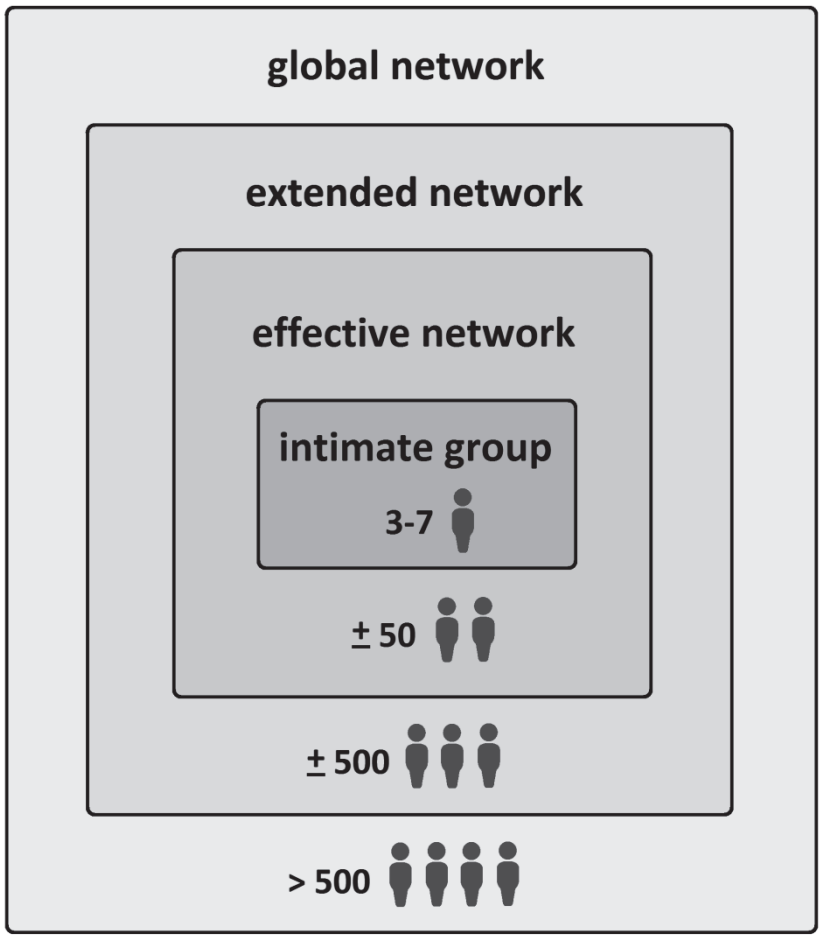

Figure 18. *Nested hierarchy of four social network levels, suggested by Gamble.*

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.