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From hominin to humanity:

Compassion from the earliest archaics to modern humans

Author revision, with additional illustrations

P. A. Spikins, H. E. Rutherford, A. P. Needham

Abstract

We are increasingly aware of the role of emotions and emotional construction in social relationships. However, despite their significance, there are few constructs or theoretical approaches to the evolution of emotions that can be related to the prehistoric archaeological record. Whilst we frequently discuss how archaic humans might have thought, how they felt might seem to be beyond the realm of academic inquiry. In this paper we aim to open up the debate into the construction of emotion in early prehistory and propose key stages in the emotional motivation to help others, the feeling of compassion, in human evolution. We highlight what appear to be particularly significant thresholds for human social relationships and the evolution of the human mind.

Keywords: Compassion, archaeology, prehistory, evolution of the mind, altruism

Mind and emotion

It is becoming increasingly apparent that emotions are central to human social relationships (Parkinson, Fischer and Manstead 2005, Nesse 2001, Evans 2001, Reddy 2001). Emotions structure decision making (Damasio 2000, Zeelenberg et al 2008) and link us in a web of shared understanding and concern (Baron-Cohen and Wheelright 2004). Indeed, the 'socio-moral' emotions such as compassion, love, remorse, empathy, and guilt have been seen as the key qualities making us 'human' (Nesse 2001, Evans 2001, Parkinson, Fischer and Manstead 2005).

Certainly the wealth, depth and interrelationships of human emotions mark us out distinctively from other species of higher primate. Yet archaeologists of early prehistory have been typically wary of discussing emotions and their role in archaic human societies. Emotions have been seen as nebulous and undefinable (Tarlow 2000) and so discussions of the development of emotions have remained largely detached from the archaeological evidence for how archaic humans behaved. Though there is evidence for archaic human behaviour from at least 2.3 million years ago we have been wary of making the link between behaviour, motivation and emotions, preferring to discuss clearly functional behaviour such as food procurement or butchery (Coward and Gamble 2008). Though occasional finds of archaic humans who appear to have been 'cared for' (Walker, Zimmerman and Leakey 1982, Walker and Shipman 1996, Cameron and Groves 2004, Lordkipanidze et al 2005) have sparked questions about compassion in the past, these remain outside key archaeological enquiries with a lack of theoretical context in which to place them. Perhaps because emotions are seen as intangible and uniquely personal, early humans remain very much 'hominins' in our discussions, obeying rational biological imperatives with little sense of any 'human' emotions or feeling for others and giving us little sense of how such feelings evolved.

As new ground is covered in understanding the development of more social areas of cognition such as 'the social brain' (Dunbar 2003; 2007, Dunbar and Schultz 2008) and in its application to the archaeological record (McNabb 2007, Gamble 2007, Coward and Gamble 2008), the way is primed for a discussion of the archaeological evidence for the evolution of key 'human' emotions. The link between emotion, motivation and behaviour is also increasing understood (Mikulincer and Shaver 2005a, Zeelenberg 2008) particularly through recent neuroimaging studies of modern humans today (McCabe *et al* 2001, Oschner et al 2004, Lemche et al 2006, Hee Kim and Hamann 2007). Moreover, the universality and biological basis of key emotions is increasingly clear.

We now know that key emotional reactions follow universal patterns (Ekman 1992, Damasio 2000, Parrott 2001, Evans 2001, Parkinson, Fischer and Manstead 2005) which draw on common neurological roots (Colombetti 2007, Dolan 2002, McCabe *et al* 2001, Oschner et al 2004, Hee Kim and Hamann 2007). Thus though there are cultural differences in the recognition and expression of emotions, and any one person's feeling of emotion will be distinct, it is increasingly clear that certain key emotions which structure human social relationships are found in all societies (Frank 1988, Nesse 2001, Damasio 2000: 50, Heinrich and Gil-White 2001, Evans 2001, Parkinson, Fischer and Manstead 2005, Wulff 2007). Parkinson, Fischer and Manstead (2005: 77) illustrate, for example, that shame is felt in subtly different ways within individualistic and collectivistic cultures. Shame in a collectivistic culture (such as Spain or China) is seen positively as an important emotion in restoring social harmony, whereas in individualistic cultures (America, Britain) shame is often associated with personal failure. However, the emotion serves a similar social function in each culture in limiting anti-social behaviour (Fiske 2002). Equally, pride is seen as a positive emotion in

American culture and a negative one in Japan (Reddy 2001: 8), and in some cultures, such as amongst the Inuit, anger is clearly repressed (Briggs 1970). Culturally specific emotions, such as the Japanese *amae* - a kind of sweet dependance on people close to you (Markus and Kitayama 1999: 237, Parkinson, Fischer and Manstead 2005: 35, Doi 1973, Morsbach and Tyler 1986), do exist, but these are nonetheless based on common roots. It is clear that key emotions developed in an evolutionary context and play broadly similar social roles in cultures across the world from modern western societies to ethnographically documented ones (Ekman and Friesen 1971, Ekman 1992, Parrott 2001: 176, Parkinson, Fischer and Manstead 2005: 59, Wulff 2007: 41, Briggs 1998).

Emotional construction and emotional reactions are as much part of the human mind as is linguistic or spatial abilities, and understanding the evolution of human emotions is as essential to comprehending the development of the human mind (Weisfeld and LaFreniere 2007, Eder, Hommel and Houwer 2007, Zeelenberg 2008).

Compassion

Given the wealth of human emotions, it might seem difficult to focus on any particular key emotional expression. However certain emotions, particularly the socio-moral emotions such as empathy, compassion, shame and remorse, appear to be particularly socially significant. Of all of these compassion is perhaps the most evocative of something we feel defines 'humanity' and thus perhaps the most appropriate focus for addressing behavioural evidence for the construction of emotions in the past. Indeed, were we to consider one feeling which we might ask to know if our earliest ancestors felt it would surely be compassion. Compassion is associated with love, commitment to others, willing self sacrifice and characteristics which we feel make us 'human' and separate us from other animals.

Understanding the evolution and role of compassion in past human species entails recognising that compassion is more than just a *feeling* which we recognise as personal but also in a wider analytical perspective it is a biological response, a 'motivation to act' whose roots lie in the hormonal and neuronal working of our mind. Indeed alongside its poetic connections compassion can be scientifically understood. Compassion involves both feeling an emotion appropriate to another's emotion, empathising, (Baron-Cohen and Wheelwright 2004) and being motivated to help (Gilbert 2002, 2005, 2009). When we compassionately help others through a genuine motivation rather than obligation or for a selfish gain whether this be caring for someone who is hurt or responding to an infant (Gilbert 2002, 2005, 2009, Depue and Morrone-Strupinsky 2005), looking after pets (Odendaal and Meintjes 2003, Nagasawa et al 2009, Miller et al 2009) or even punishing cheats (DeQuervain et al 2004) a flood of oxytocin is released into the brain (Oschner et al 2004, Carr et al 2003, Decety and Chaminade 2003, Baron-Cohen and Wheelright 2004, Lamm, Batson and Decety 2007, de Waal 2008, Davidson 2002, Tucker, Luu and Derryberry 2005). Compassion, the emotional motivation to be altruistic, is not just about higher morality but the biological evolution of a response which 'feels good'.

As a biological response compassion is not limited to humans. Spontaneous and specific altruistic helping, motivated by compassion rather than any instinctive behaviour, is recorded in dolphins, elephants and higher primates (Connor and Norris 1982, Caldwell and Caldwell 1996, Suzuki and Akiyama 2007, Trivers 1971 Lehmann and Keller 2006, Tomasello, Call and Hare 2003, Warneken 2007). Compassionate responses appear to be particularly important in higher primates where successful relationships are a key feature in evolutionary advantage both individually and as a group (Connor and Norris 1982, Caldwell and Caldwell 1996, Suzuki and Akiyama 2007,Trivers 1971 Lehmann and Keller 2006, Tomasello, Call and Hare 2003, Warneken 2007). Chimpanzees routinely 'hug' the loser of a

fight (deWaal 2008, DeWaal and Aureli 1996), figure 1, and orang-utans might move aside leaves to let another pass by more easily (deWaal 2008: 285). Acts of 'selfless courage' have also been recorded in chimpanzees, such as the case of an adult chimpanzee that died rescuing a drowning infant from the moat around a zoo enclosure (Goodall 1990: 213; deWaal 2008: 289).

Figure 1. A juvenile chimp puts an arm around a screaming adult male who has just been defeated in a fight. After De Waal 2008: figure 1. Photograph by Frans de Waal.

Though it might at first seem counter to the principles of the 'selfish gene', the evolutionary context in which compassionate motivations evolve is well understood. In certain particularly social animals the payoffs for collaboration which mutual reciprocal altruism generate are so great that an emotional motivation to help others is socially advantageous. Where there is sufficient capacity to understand others' minds so that 'cheats' on collaboration can be identified and punished, strong altruistic motivations can evolve which go well beyond kin and in situations where there can be no hope of payoff (Sachs et al 2004, Trivers 1971, Bowles 2006, Boyd, Bowles, and Richersen, 2003, Boyd and Richersen 1992, Aviles 1992, Gintis 2000, Gintis et al 2003, Hill 2002, Fehr and Fischbacher 2003, Fowler 2005, Lehmann and Keller 2006).

Compared with our own species, compassion in non-human species is typically fleeting - chimpanzees never make allowances for individuals who are slow or who cannot keep up with the group, nor do they 'think through' how to help others in the long term (Silk et al 2005, Jensen et al 2006). Human compassion seems to be qualitatively and quantitatively different from that in other species and though the existence of compassion cannot be taken and a symbol of 'humanity' its construction and expression are indeed unique. Collaboration is likely to have been particularly critical to early human success in open savanna environments where predators were common. Furthermore a particular factor stimulating the development of such broad ranging emotional investments in our own species appears to have been the benefits of 'co-breeding' as human development and maturation became increasingly delayed (Kaplan et al 2000, Hrdy 2009, Hublin 2009). Grandmothers, males,

siblings or others compassionately motivated to help care for dependant offspring would make an important contribution to their survival and wellbeing (O'Connell 1999, Panter-Brick 2002, Aiello and Key 2002). The selective benefits of a predisposition to 'care' for others are relatively clear.

As a result of widespread investments in the wellbeing of others, compassion in our own species is far more integral to how all of society works than in other species. Compassion is fundamental to human social life and Baron-Cohen and Wheelwright call it 'the glue that holds society together' (2004: 163). Indeed compassionate responses and reciprocal altruisim forms the basis of all close human social relationships (Buchan, Croson and Dawes 2002, Mikulincer and Shaver 2001, Goleman 2006, Boyd and Richersen 2002, Boyd, Bowles and Richersen 2003, Aviles 2002, Sachs et al 2004, Bowles 2006, Evans 2001, Nesse 2001, Baron-Cohen and Wheelright 2004, Parkinson, Fischer and Manstead 2005). Through empathy (feeling an emotion appropriate to another's emotion) and compassion (being motivated to help) we extend ourselves into others (DeWaal 2008). In 'love' we become 'handcuffed' by our emotional committment to others to act on others' behalves and consciously willing to sacrifice our selves by looking after them, taking risks for them or even in an extreme giving up our own lives (Frank 2001, Nesse 2001).

Unlike in other primates, compassionate motivations in humans also extend into the long term. Humans show a capacity to 'regulate' compassion, to bring compassionate motivations to help others into rational thought and plan ahead for the long term good of someone we care for (Gross and Thompson 2006). A reliable sign of compassionate motivations has been shown to be a willingness (and planning) to care long term for elderly relatives for example (Gillath, Shaver and Mikulincer 2005; Mikulincer and Shaver 2001; 2005a; Mikulincer et al 2001; 2003; 2005, Soeresen, Webster and Roggman 2002).

Human compassion is also remarkably diverse in comparison to other primates, we can also extend caring and commitment way beyond close relationships and kin and towards strangers (Mikulincer et al 2001, 2003, Buchan, Croson and Dawes 2002), and not only strangers but animals, particularly pets (Odendaal and Meintjes 2003, Nagasawa et al 2009, Miller et al 2009) and even abstract concepts (such as 'liberty' or 'justice') and objects (Wallendorf and Arnould 1988, Kamptner 1991, Belk 1996, Belk and Coon 1993, Miller 2008, Graham 2009). In a way that is totally unlike other animals we 'care for', make a commitment to and protect objects as diverse as photographs and gardens, and such objects can in turn provide 'comfort' (Miller 2008, Depue and Morrone-Strupinsky 2005, Graham 2009).

Though a biologically derived motivation to help others that we 'care' about might seem straightforward, the social expression of human compassion is nonetheless remarkably complex. Caring for the objects, animals or people to whom we have made a commitment can generate conflicts, and our capacity for self sacrifice presents a risk of being exploited. Close social ties based on genuine altruism are typically combined with wider social links based on 'tit for tat' relationships (Fiske 1991) and in some contexts social relationships are even competitive or defensive rather than caring of others (Gilbert 2005; 2009). The capacity for compassion, far from being found in all situations, is for example 'squashed' in those who have grown up in 'tough' environments (Gillath, Shaver and Mikulincer 2005; Mikulincer and Shaver 2005a; b, Mikulincer et al 2001; 2003; 2005, Gilbert 2002; 2005), potentially as an evolutionary mechanism to foster survival in such contexts where compassionate motivations might be exploited (Gilbert 2002). Thus certain individuals (up to 30% in modern western society, Goleman 2006) are predominantly self-focused in their motivations in close personal relationships even though most are predominantly other focused (Mikulincer and

Shaver 2005b). Those who are more 'self' focused than others are also noticeable in ethnographic contexts, such as orphans amongst the Inuit or MButi (Briggs 1970; 1992, Turnbull 1965). As well as opportunities for collaborators, those for people who are more competitive clearly also exist and certain genetic conditions which emphasise specific talents at the expense of connections to others, such as Asperger's Syndrome (Spikins 2009) or Schizophrenia (Nettle 2006) appear to have been selectively maintained in human populations due to their context specific advantages. Clearly a capacity for widespread compassion is sometimes overtaken by competitiveness and at times in human society it pays to be flexible and to protect oneself rather than to always act on behalf of others.

Compassion in the archaeological record.

How did such a key response develop through prehistory? The archaeological record provides us with only the most fragile of glimpses of the behaviour of archaic humans, yet within this there are several areas where the evolution of this particularly key emotion might be in evidence, of which the clearest is that of care for ill or infirm individuals, sometimes over long periods.

Evidence for long term care of others

For some time the concept of compassionate care of others in early species of human was largely a contentious one. Finds of early humans who survived disabilities or illnesses and appear to have been looked after by others prompted early discussions about compassion in archaic humans (Walker, Zimmerman and Leakey 1982, Walker and Shipman 1996, Cameron and Groves 2004, Lebel et al 2002). However such ideas were initially met by some negativity and an unwillingness to accord archaic humans with motivations which were seen as uniquely human. It was suggested that we might be implying our own 'moral rightness' on the past (Dettwyler 1991) or misrepresenting the level of disability which might truly demand care from others (DeGusta 2002), or failing to appreciate the potential calculated 'selfish' motivations for caring for other people (Tarlow 2000). However over recent years, as evidence has mounted for both altruism in other great apes (Warneken 2007, DeWaal 2008) and widescale evidence for 'care' of incapacitated archaic humans in the past (Lordkipanidze et al 2005, Shang and Trinkaus 2008, Garcia 2009) the question of whether archaic humans showed compassion to others has become much clearer (Hublin 2009). The question of the capacity for compassion becomes instead one of how that compassion 'works' cognitively, what stages there may have been in the evolution of compassion and how the emotion is played out in social relationships.

The evidence for 'care' of others in archaic humans shows a particularly interesting patterning. The most well known early example of long term support for an incapacitated individual comes from KNM-ER 1808, a female Homo ergaster dated to around 1.5 mya (Cameron and Groves 2004). Examinations of the skeletal remains of this individual have led to suggestions that she was suffering from hypervitaminosis A, a disease caused by excessive intake of vitamin A. Symptoms of hypervitaminosis A include a reduction in bone density and the development of coarse bone growths, both of which are present in KNM-ER 1808's skeletal pathology (Walker, Zimmerman and Leakey 1982, Walker and Shipman 1996, Cameron and Groves 2004). The pathology present would have taken weeks or even months to develop, accompanied by symptoms such as abdominal pain, nausea, headaches, dizziness, blurred vision, lethargy, loss of muscular coordination and impaired consciousness. Symptoms of this type would have greatly hindered this individual's capacity for independent survival, yet she survived long enough for the disease to be identifiable in

her skeletal pathology, something which only occurs in the advanced stages of hypervitaminosis (figure 2). A. Walker and Shipman suggest “someone else took care of her” (1996: 134), and Cameron and Groves note:

“There is no way she could have survived alone for long in the African savannah…someone must have been feeding her, protecting her from carnivores…The group dynamics of early Homo must have been based on some form of mutual support” (2004: 158).

Figure 2: An outer abnormal layer of bone growth on the femoral bone of ER1808 attested to the considerable time, possibly months, suffering the severe pain of hypervitaminosis

A capacity for compassionate support by providing food for several weeks in early hominins extends beyond the rather fleeting compassion in other higher primates, and is confirmed by similar evidence elsewhere.

An even earlier example of long term care comes from Dmanisi in Georgia, 1.77 million years ago (Lordkipanidze et al 2005), figure 3. One of the Dmanisi hominins had lost all but one tooth several years before death, with all the sockets except for the canine teeth having been re-absorbed. This individual could only have consumed soft plant or animal foods, necessitating support from others. Indeed, in reviewing all the documented lesions and non trivial pathologies in Lower and Middle Palaeolithic hominin specimens, a sample of more than twenty, Shang and Trinkaus (2008: 435) remark on at least some degree of survival from severe injuries in all cases.

Figure 3: ‘Toothless’ crania from Dmanisi, c 1.77 million years old

At a later date, the most in-depth evidence we have for the social behaviour of any archaic species, that from the Neanderthals, illustrates a particularly convincing case for widespread care for others. Shanidar 1, the ‘Old Man of Shanidar’, is perhaps one of the best known examples. This individual suffered multiple fractures across his body, with the right side being particularly badly affected; the right arm has been described as completely “withered”

(Klein 1999: 333), highlighting the severity of the injury. The individual also received a 'crushing' injury to his cranium, possibly causing blindness in his left eye due to the deformity of the skull (Solecki 1972), and some have even hypothesised that there may have been some brain damage as a result of this injury (Klein 1999). Studies of Shanidar 1's injuries have suggested that the majority occurred in adolescence (Trinkaus and Zimmerman 1982), yet were largely healed, with little sign of infection, by the time of his death, some 20-35 years later, at the relatively advanced Neanderthal age of between 35-50 years old (Trinkaus and Zimmerman 1982). This individual was not only looked after in the long term, but we might assume, given his great longevity in Neanderthal terms, by several different individuals if not as a shared obligation to 'care' from the whole group.

New evidence from Sima de los Huesos suggests that long term care such as that seen for Shanidar 1 was not limited to those individuals old enough to have already made a contribution to a society. Garcia et al. (2009) document evidence from Cranium 14, an individual mostly likely aged between 5 and 8 years old at death, who suffered from lambdoid single suture craniosynostosis (SSC), a premature closing of some or all of the sutures of the skull. This would have caused an increase in intracranial pressure in the Cranium 14 individual, which would have impacted upon the brain growth and cognitive ability of the individual, as well as their facial appearance. However, despite this, the individual survived for at least 5 years, prompting Garcia et al. to note that "her/his pathological condition was not an impediment to receive the same attention as any other Middle Pleistocene *Homo* child" (Garcia 2009*:* 6577), a contrast to behaviour sometimes seen in modern humans societies whereby infants with congenital deformities were abandoned rather than be cared for by their social groups, such as in the cemetery of the Medieval Hospital of St. James and St. Mary Magdalene in Chichester, which also acted as an almshouse from AD 1450 and which saw a high level of infants with craniosynostosis buried there, suggesting their abandonment by their families (Storm 2007). It seems that neither age nor the type of affliction, whether it be traumatic or congenital, recoverable or life-long, detracted from the care given by these archaic humans.

Many other Neanderthal individuals also show evidence for long term care, dating back as early as 190-160kbp (Lebel et al 2001). Indeed, research into the population distribution of evidence for care of the ill or wounded in Neanderthals supports the notion of widespread long term care (table 1). In research from a sample of 19 individuals, representing the majority of Neanderthal remains recovered to date, with some 23 different traumatic injuries, there was some level of healing to the injuries of 11 of these individuals, representing 60% of the total (Rutherford 2007). Partial healing was also present in 2 of the individuals, suggesting that the healing process had at least enough time to begin. It is also interesting to note the low rate of infection which seems to be present in the sample of Neanderthal trauma, the severity of many of the injuries and their long (approximate) healing times. There is only evidence of infection in 2 individuals from the sample of 19 (only 11%), and from these cases, only Shanidar 1's pattern of infection seems to indicate secondary infection due to trauma (Trinkaus and Zimmerman 1982) and this was largely healed at death. The second case, La Ferrassie 1, is not what would be expected if caused by a post-traumatic reaction; instead it has been suggested that the infection pattern present is more likely due to a systemic skeletal disorder (Fennell and Trinkaus 1997). That the low rate of infection occurs in parallel with the high incidence of healing seems to further support interpretations of care-giving. The approximate healing times for the injuries within the sample are also informative. While these are very much approximations, based upon modern medical advice, they still provide another avenue of evidence to suggest care-giving in Neanderthals; the fact that the minimum healing time for any injury in the sample is 4-6 weeks suggests quite a prolonged period when an individual would have needed care and

support. These injuries were therefore anything but short-term incidences; even after an individual trauma had healed, it would not be unreasonable to suggest, as in modern examples, that an individual would have reduced capabilities in many areas of life and would still require support for possibly much longer after this .

Early Upper Palaeolithic modern humans also illustrate evidence for cases of extensive care of injured or incapacitated individuals. Romito II, a child from the Late Upper Palaeolithic in Italy, for example showed severe disability of acromesomelic dysplasia and according to the excavators must have been cared for by the whole group until his death at around 17 years of age (Manchester 1987). Certain individuals including children with physical abnormalities demanding some 'care' appear to have even been accorded particular attention and elaborate grave goods, such as at Sunghir (a mid-Upper Palaeolithic child with bowed long bones) (Formicola 2007, Formicola and Buzhilova 2003), and Dolni Vestonice (a probable female with shortening of the limbs probably caused by chondrodysplasia calcificans punctata (CCP) complicated by trauma and early fractures of the upper limbs) (Alt *et al* 1997, Formicola 2007, Formicola et al 2001). There are also cases of newborns being buried suggesting care was extended to those who had not made an active contribution to the group (Einwogerer et al 2006).

The evidence for compassionate motivations in other areas of the archaeological record

Risk taking in collaborative hunting

Compassionately helping others is of course not limited to caring for those who are ill. Another reliable sign of compassionate motivations is a willingness to take risks or suffer pain on another's behalf (Mikulincer and Shaver 2005a, Mikulincer 2005). Evidence for such risk taking in archaic humans also supports the picture of a progressive expansion of an emotional investment in others integrated with a rational ability to plan ahead through early prehistory. Competing with predators for carcasses and at a later date hunting large mammals would have been very risky for soft bodied archaic humans (Hart 2005), yet highly successful as a strategy if all were prepared to take risks and to protect each other rather than individualistically avoiding danger (Spikins 2008). Larger body sizes and slower maturation rates at the time of Homo erectus (around 1.8 million bp) have been suggested to be the result of successful collaborative scavenging for meat and provisioning of pregnant females and young, forming a prime mover for widely shared 'care' of infants (Plummer 2004). Such collaborative, planned risk taking shows that archaic humans not only took risks on behalf of the group, but were able to trust others to do so equally.

By around 500,000 years ago the collaborative hunting of large animals at Boxgrove (Roberts and Parfitt 1998) shows an even greater element of conscious risk taking. Puncture wounds on a horse scapula at site GTP17 at this site have been interpreted to suggest the use of projectile weapons, and carcass butchery techniques illustrate very early access to carcasses i.e. that at this time, Homo heidelbergensis were either actively hunting large mammals or actively competing with large carnivores for carcasses. Whether actively hunting or competing with large carnivores any individual, sorely unsuited to defence from predators or from large mammals, might place themselves at considerable risk, and given evidence for weapons preparation prior to foraging, clearly planned to do so.

By the Middle Palaeolithic, Neanderthals clearly planned ahead as shown from evidence for deliberate 'drives' such as at La Cotte de St Brelade in Jersey (Scott 1980) or food 'caching'

(Schild 2006) and humans willingly took substantial risks in collaborative hunting, with almost all suffering serious injuries as a consequence (Berger and Trinkaus 1995).

Sharing of grief in mortuary behaviour.

Further evidence for an extended sense of group, rather than individual identity and concern with group wellbeing comes from mortuary behaviour. The deliberate placing of the bones of about thirty individuals into a pit at Sima de los Huesos, Atapuerca, Spain at around 400kbp (Carbonell and Mosqueara 2006) suggests grief, in its joint expression in shared ritual, was shared. Somewhat later, formal burials are recorded for Neanderthals (Riel Salvatore and Clark 2001, Petitt 2002), with the earliest at Tabun, in the Near East at 112-143kbp (Zilhão 2007). Whether or not Neanderthals could conceive of a spiritual being or afterlife as Dunbar suggests (Dunbar 2003; 2007), explicit burials shows both sharing of emotional states and their regulation through externalizing emotion in the material world. More than twenty Neanderthal burials are recorded, although evidence for more explicit symbolism in buried grave goods is more contentious (Pettitt 2002). Greenspan and Shanker (2004) suggest that such 'regulation' of grief through sharing of the emotion and externalising it in the material world shows an emphasis on symbolising and sharing emotional states and relates to the increasing role of shared socio-moral emotions in society. Shared ‘caring’ about the body at death may reflect similar motivations to those of caring for the living.

The comfort of 'things'

In much the same way that the body of someone diseased cannot reciprocate emotionally in the way that the living may do, yet nonetheless inspires a motivation to care and protect, other objects can, from relatively recently in evolutionary history inspire similar feelings. Widespread 'caring' for things that become immersed in emotional relationships with people only seems to develop remarkably late in evolutionary history. Personal ornaments are known amongst Neanderthals (Hublin et al 1996) but it is only with modern humans that such objects become widespread and fundamental to society (Mellars 1989; 1990, Klein 1999, McBrearty and Brooks 2000, Kuhn and Stiner 2007, White 1993; 2007; Mellars 2007). 'Caring' for objects (and in turn feeling 'cared for' and 'comforted' by objects) appears to be essential to modern human society. Though we know that 'gifts' form part of networks of obligation (Mauss 1990 (1922)) or display status (Jones 1997), amongst close relationships they also form networks of genuine selfless 'giving' to provide comfort for another (Wallendorf and Arnould 1988, Testart 1998, Kamptner 1991, Belk 1996, Belk and Coon 1993, Miller 2008, Graham 2009).

The archaeological evidence for personal ornaments seems particularly associated with modern humans. Thus we see early evidence of beads in the Near East in the form of two perforated marine shells at Skhul, dated to 100-135kbp (Vanhaeren et al. 2006, D’Errico and Vanhaeren 2007), and the selection of shells with natural perforations at Quafzeh, dated to 100kbp (McBrearty and Brooks 2000, D’Errico and Vanhaeren 2007) with beads later becoming widespread such as in the European aurignacian (D’Errico and Vanhaeren 2007, Zilhão 2007). In many cases necklaces or bracelets of marine shells would have been worn for considerable periods of time, very possibly for over a year (Henshilwood 2007: 127, figure 2). A particularly evocative reminder of a relationship with another is found in the form of a human molar from Aurignacian levels at Isturitz which has clearly been suspended and much worn (White 2007: 294).

Gamble (2007) and Coward and Gamble (2008) suggests that socially important objects, seen as 'part' of people (Strathern 1988, LiPuma 1998) allowed relationships to be

maintained over long distances. Indeed the transport of non functional marine shells and other exotic items up 1500 km (Feblot- Augustins 1993; 1997, Marwick 2003, Gamble 1982; 1998; 1999: 2003: 321) in Upper Palaeolithic Europe certainly illustrates that things 'mattered' to people in highly significant ways. Anthropological interpretations of such relationships of objects as part of the 'dividual', *conceptually* an extended part of the self, might usefully be combined with an understanding of the *emotional* extension of people through compassion. Certainly ethnographic studies support the important emotional role of 'precious' objects that form an emotional relationship with people 'as if' they were a person, tying in with studies of how objects such as photographs function psychologically today in 'standing for' someone who makes us feel comforted and secure (Mikulincer and Shaver 2005a,b, Mikulincer et al 2001; 2003; 2005, Depue and Morrone-Strupinsky 2005: 326). Bar-Yosef Mayer and Porat (2008) detail ethnographic studies showing that in widespread contexts personal ornaments help people feel more open and confident as they 'counteract or divert the effects of supernatural powers and...bring luck and strength' (after Morris and Preston-Whyte 1994: 55) and other studies also illustrate the importance of an attachment, and willingness to care for objects that 'stand for' people or important social memories in small scale societies.

'small wonder that the attainment of these most coveted shells, encrusted as they are with histories of people's successes, fills a person with emotional feeling for the shell itself' Weiner 1992, 144.

'Bambi Schieffelin tells of how the egalitarian Kaluli deeply treasure bits of cloth or tiny pieces of shell that once belonged to a deceased kin, carrying it with them wherever they go. The Trobrianders enlarge upon these feelings, ritually carrying a dead person's hair or fingernails that have been inserted into shell necklaces' Weiner 1992, 130.

Extending our capacity to 'care' for objects appears to also be related cognitively to extensions to other intangible areas such as to capacities to care about and make a committment to abstract concepts (such as 'freedom of speech', 'liberty' or 'justice'). Dunbar illustrates that prefrontal cortex size suggests that the theory of mind abilities (ToM) reached a capacity to conceive of an abstract concept, such as a god or spirits, at 200-100,000 years ago, tying in with evidence for 'caring' for commonly recognised symbolic objects. Indeed not only objects but any concept which 'means something' to a group of people can also be 'cared about' and investments made in its protection, or risks taken for its defence. Many have chosen to 'die for one's country' showing an emotional committment to sacrifice for concepts which goes way beyond self interest or simply complying with social norms. Such a widespread willingness to act against one's own self-interest for the apparent good of the 'group' can of course easily be exploited and Evans (2001) illustrates that committment to the wellbeing of others, 'love', is also the basis for long-standing feuds and vendettas where each is prepared to risk death to 'protect' their group.

From a simple motivation to provide food for an incapacitated individual in early humans, compassion became a reason for living, or for dying, and a structural fundamental to human social life.

A model for the development of human compassion

A brief review of the archaeological evidence for emotional investments in the wellbeing of others allows us to propose four key levels of a capacity for compassion (figure 4, figure 5).

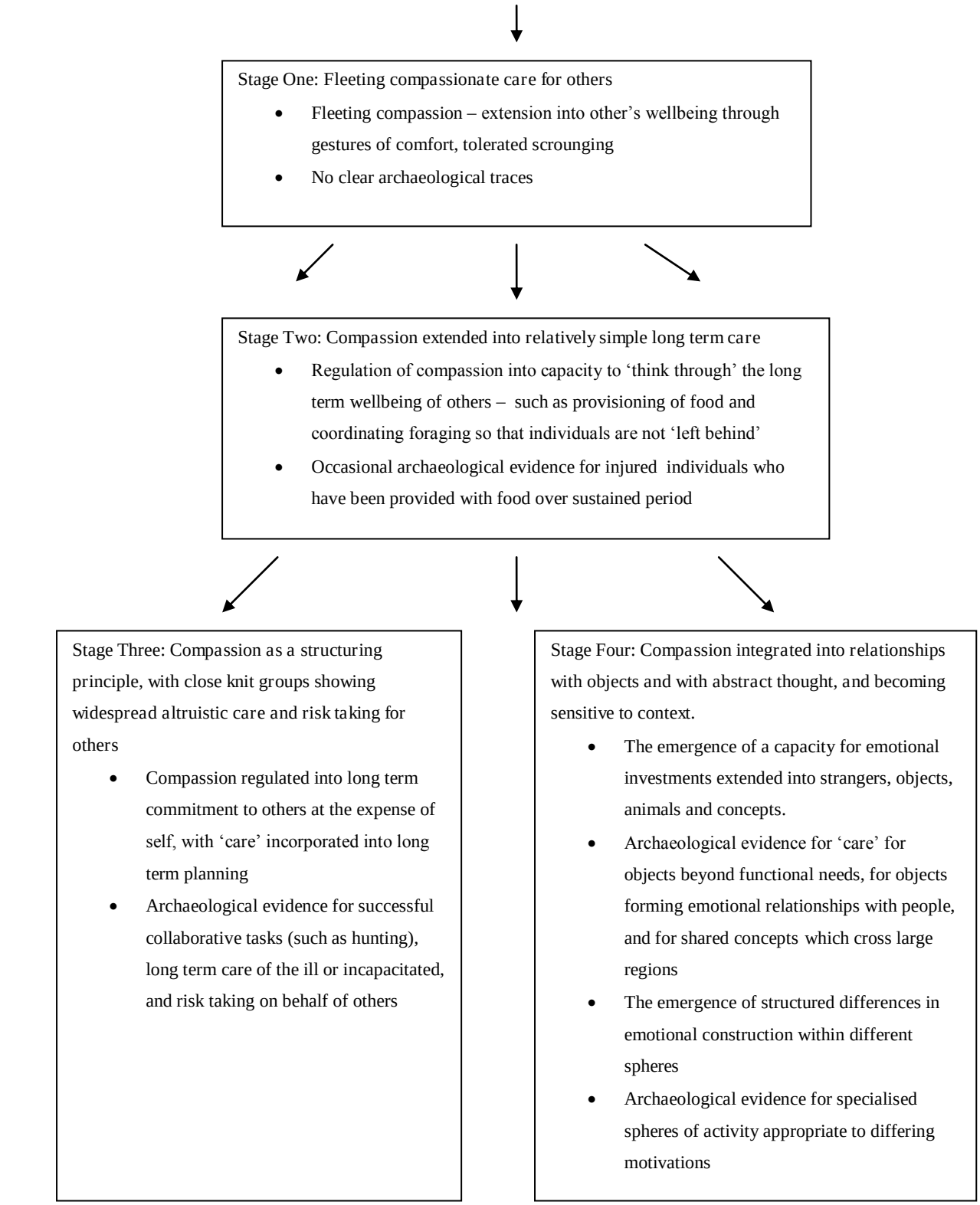
Level One: At approximately 6 - 1.8 million years ago we might expect to see compassion in archaic humans as a fleeting response to another's distress. In common with other higher primates the common ancestor between humans and chimpanzees (at about 6 million years ago) for example would have been likely to have been able to conceive of another's intentions, empathise with another's feelings and be motivated to help them (deWaal 2008). This 'helping' might have taken the form of an immediate gesture of comfort (eg 'hug') to one in distress, or a very limited 'thinking through' of an immediate problem such as moving obstacles in an individual's path. By the time of species such as *Homo habilis (2.3-1.6 mill years)* or *rudolfensis (1.9 mill years)* transport of carcasses is likely to have been a group activity (Rose 2001, Plummer 2004) as well as collaborative defence against predators (Hart 2005). Though it is difficult to judge we might assume that a propensity towards collaboration in food procurement and defence begins to be crucially important as hominins survive in relatively open savanna environments.

Level Two: Emerging from 1.8 million years compassion begins to be 'regulated' as an emotion which is integrated with rational thought. Within *Homo erectus (1.9-1.6 mill years),* and later *Homo heidelbergensis* in europe the acquisition of meaty carcasses and body size energetics suggests that meat was shared extensively, with pregnant females and those with young infants likely to have been provisioned with food (Plummer 2004). 'Helpers' with the care of offspring, whether these be males (Panter-Bruck 2002), siblings or grandmothers (O'Connell et al 1999) may have played an important role in evolutionary success (Aiello and Key 2002). Compassion thus gradually became extended widely into non-kin and in potentially extensive investments in caring for offspring and equally for ill individuals. Those who were incapacitated might be provisioned with food for at least several weeks if not longer. By around 400,000 bp with the emergence of mortuary treatment such compassion, and grief at the loss of someone cared for, emotions which bind us to others might be able to be symbolised in communication and recognisable as something akin to 'love'. One might speculate that other social emotions such as shame began to also structure archaic human social relationships within such collaborative contexts.

Level Three: (300,000-50,000 in Europe) By the time of the Neanderthals in Europe, the regulation of compassion extends into deep seated committments to the welfare of others. With a long period of adolescence and a dependance on collaborative hunting, Neanderthals society depended on deep seated emotional investments beyond the self. Theory of mind abilities allowing understanding of the shared beliefs of several individuals (Dunbar 2007) and long term planning capacities (Schild 2006) appear to have supported routine care of the injured or infirm over extended periods. Much of the sustained care such as of the Shanidar Neanderthal must have involved not a single individual but at least several over his lifespan if not the whole group, and in these cases suggests a shared emotional motivation to help, shared 'socio-moral' emotions which perhaps suggest that other such emotions, remorse, shame, empathy were also in evidence. Such emotional committment to others may have made abandonment of the disabled Neanderthal child at Atapuerca (Gracia 2009) 'unthinkable' for them, even though such children were abandoned in Medieval Europe. Indeed the healing rates in Neanderthals exceed evidence for care in historically recorded cemeteries (Rutherford 2007). Neanderthal language, judging by their sharing of the FOXP2 gene associated with language development, was at least complex enough to deal with communication of emotions (Mithen 2006, Trinkaus 2007). Though 'compassionate', Neanderthal society appears to have been very different from that of modern humans, with for example little contact between groups or with strangers as illustrated by their limited mobility (Féblot-Augustins 1993: 214). Neanderthals seem to have been no strangers to 'love' but it may not have been as we would know it.

Level Four: Within Modern humans (from 120,000 in Africa, 40,000 in Europe) the capacity for compassion extends into strangers, animals, objects and abstract concepts, and becomes flexible to context. These developments, shown as a 'branch' in the model, are perhaps best seen as a difference in the expression of compassion, rather than a progressive extension. Objects become ‘cared for’, particularly as symbols of supportive human relationships and in turn can provide comfort. Abstract concepts, illustrated by the emergence of symbolic art, can also be ‘cared about’ and protected or sacrificed for. Widespread connections across large areas, as shown by the movement of marine shells, show an ability to relate to strangers in an open and potentially ‘caring’ way and develop relationships based on trust in non exploitative motivations. However in the new hurly-burly of widespread social connections, the complex range of different social contexts may also have provided the contexts and pressures for different and less compassionate minds to emerge to take on different roles.

Figure 4. Stages in the development of human compassion



The explanation for the emergence of such changes may well lie in the formation of wider social networks in early modern humans. Capacities to store and manipulate more extensive social memories (Depue and Morrone-Strupinsky 2005) or to develop rule based means of communication and collaboration with other groups (Spikins 2009) may have prompted extended communication outside close kin and allowed much wider exchange networks (Marwick 2003) . Such networks may have have been the impetus for a the widening of compassion beyond close human relationships to include objects as means of providing security in uncertain social environments and at the same time a flexibility of compassionate responses to protect against exploitation.

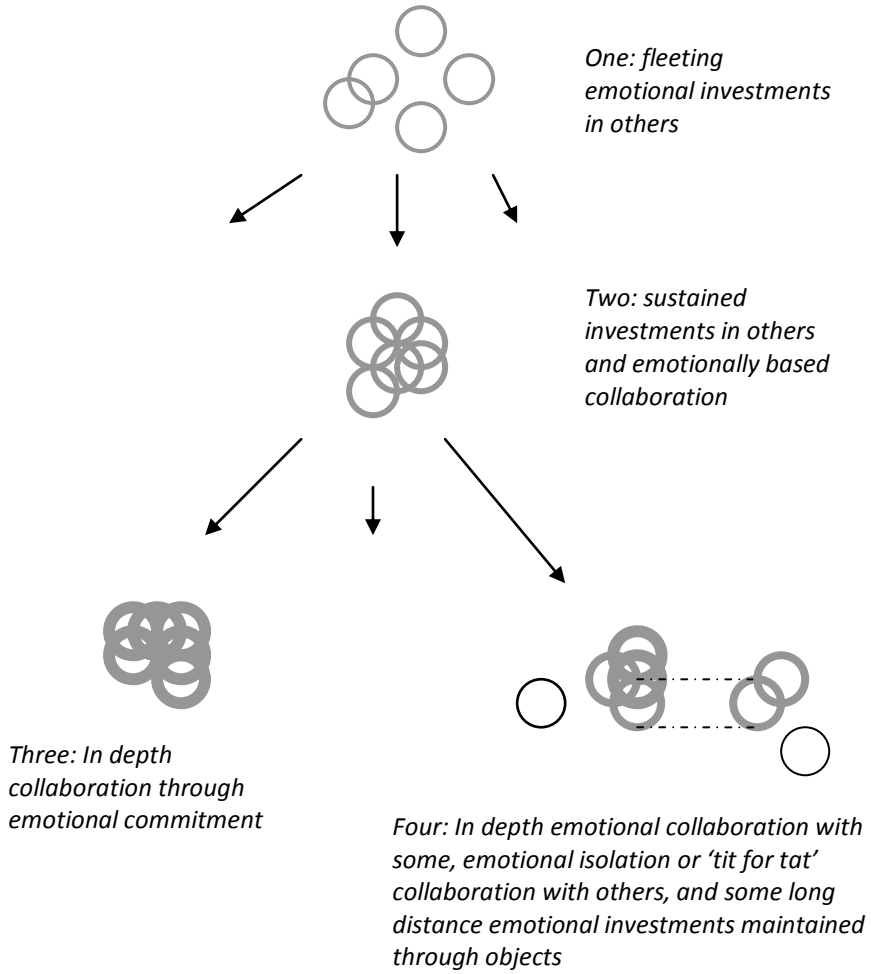


Figure 5: Stages in the development of emotional commitment and collaboration

Whilst is it hoped that a simple model might provide a basis for discussion, several issues still remain.

Further Issues

Compassion and other elements of 'mind'

Though a need to simplify forces us to focus on one element of cognition, it is perhaps overly simplistic to hope to take any one element of 'mind' in isolation. Whilst the archaeological record provides some clues as to the progressive role and extent of compassionate motivations towards others we know that compassion must also have developed in relation to other areas of cognition and within wider social relationships. The immediate motivation to help others, fuelled by an oxytocin response, may be straightforward, but caring for someone else in the long term, as we see in the archaeological record, is in truth a cognitively complex task. One must understand and predict their abilities and future behaviour and equally ensure that one's caring motivations are not exploited by 'cheats'. In this context the evolution of compassionate responses must inevitably have been related to developments in ToM, and mirror progressive developments in neocortex size (Dunbar 2003, 2007). Caring for someone long term equally demands the effective regulation of compassion to be part of rational thought and such integration of feeling and action would also have been influenced by the development of symbolism and the symbolic representation of feeling (Greenspan and Shanker 2004, Hobson 2004). Indeed disentangling the relationship between 'precious' objects as symbols and as things that are 'cared for' and stand in for human relationships is challenging. Most of all, the development of compassion must also be affected by elements of the social and cultural context, such as ecological influences on group size and a need to defend from predators (Dunbar 2003, 2007) and by developments other areas of social emotion (Greenspan and Shanker 2004). The evolution of emotional self-punishment for selfish acts, through shame, guilt and loss of self-esteem (Gintis 2003), like that of altruistic punishment of cheats (deQuervain et al 2004) relates intimately to the context allowing compassion to flourish. Indeed the evolution of the involuntary physical expression of such social emotions in crying and blushing (Evans 2001), not seen in any other primate, must be intimately related to the development of compassionate abilities to forgive and re-integrate any supposed trangressor. The development of compassion was both part of changes in other aspects of cognition and social relationships and in turn influenced such changes.

Whilst we might never fully appreciate the interpersonal expression of compassion in the past, in simple terms a brief review provides us with some building blocks for a speculative model of the fundamental elements in the development of human compassion. Such a model must inevitably be very simplified, and equally fail to describe the true complex branching of what must have been different expressions of compassion in different species of archaic human but nonetheless perhaps provide a basis for integrating discussions of the capacity for compassion within other debates within the evolution of the human 'mind'.

From homininity to humanity

The first steps in a prehistoric archaeology of compassion must neccessarily be tentative. New archaeological evidence for care of archaic humans and for altruism in great apes plus a greater understanding of how emotions 'work' cognitively has allowed us to begin to bring what were once intangible concepts of the 'feelings' of ancient humans into the area of scientific explanation. It becomes feasible to discuss the development of compassion, that apparently most 'human' of feelings, in the past and in the process we move from a purely scientific and rational construcion of archaic humans into one in which our earliest ancestors become far more familiar. Though we approach it scientifically, the development of

compassion in archaic humans tells us an important and also perhaps a moving story. We have traditionally paid a great deal of attention to how early humans thought about others, and how they understood other's beliefs or intentions, but it may well be time to pay rather more attention to whether or not they 'cared'.

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