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Spikins, Penny orcid.org/0000-0002-9174-5168, Hitchens, Gail and Needham, Andrew Paul (2017) *Strangers in a Strange Land?: Intimate sociality and emergent creativity in Middle Palaeolithic Europe*. In: Warren, Graeme and Finlayson, Bill, (eds.) *The diversity of Hunter-gatherer pasts*. Oxbow Books , pp. 1-17.

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Strangers in a Strange Land? Intimate sociality and emergent creativity in Middle Palaeolithic Europe

Penny Spikins, Gail Hitchens and Andy Needham

Introduction

Europe in the Middle Palaeolithic would have been an unfamiliar world. The landscapes which we reconstruct for this period seem almost alien - often shrouded in ice, occupied by extinct fauna, such as mammoths and woolly rhinoceros, and moreover by people seen by many as 'not quite human'. Unlike in later periods such as the Mesolithic (see Warren this volume) analogies between modern foragers and populations in the Middle Palaeolithic, *Neanderthals*, are rare. Such comparisons have typically been restricted to generalised ecological models, rarely extending to the social and cultural lives of these 'strangers in strange land' (Stutz 2012). Whilst in recent years a certain blurring of the boundaries between Neanderthals and modern humans has opened up the possibility of drawing on ethnographically documented societies to understand Neanderthal sociality such analogy is far from straightforward. Wholesale application of models from modern contexts onto this distant and undoubtedly different past risks compressing the very diversity we hope to understand. Even so, not only can modern foragers potentially provide much needed insight, but the distant lives lived by Neanderthals equally present us with a possibility of bringing something new to our understanding of hunter-gatherers.

Here we aim to rise to the challenge of including Neanderthals within the diversity of hunter-gatherer social existence, without imposing a modern foraging adaptation on to their way of life. We review some of the difficulties with the direct application of analogies from contemporary hunter-gatherers, and explore alternative approaches to help us to understand the nature of Neanderthal sociality.

Changing perspectives on Neanderthals

Neanderthal's robust physique and apparent position outside of a ladder of progression to modernity has historically consigned them to being seen as *different* and primitive. Despite a similar brain size to modern humans the shape of neanderthal crania for example led William King in 1864 to conclude '*considering that the Neanderthal skull is eminently simial, both in its general and particular characters, I feel myself constrained to believe that the thoughts and desires which once dwelt within it never soared beyond those of a brute*'. (King 1864): 96, cited in (Zilhão 2012): 35). Certain biases have been apparent in realms ranging from early technical drawings to descriptions (Van Reybrouck 2002), popular reconstructions (Moser 1992) and literature (Hackett & Dennell 2003). Neanderthals have in turn been interpreted as unable to think in complex or creative ways, incapable of burying the dead, using language or symbolism and as having limited abilities to think innovatively. Perhaps most significantly their supposed extinction led naturally to the concept that, despite their effective survival for far longer than modern humans as a species have been in existence, they *must* have been limited due to their failure to survive (Zilhão 2014).

Over recent years there has been a notable change of thought however, and with it a tendency to include Neanderthals within narratives of increasingly complex hunting and gathering societies. In part a recognition of the social complexity of Neanderthals has been

driven by new evidence, including a diverse range of treatments of the dead (Hovers et al. 2000; Pettitt 2013) as well as an expanding range of art and/or symbolic material cultures (Finlayson et al. 2012; Marquet & Lorblanchet 2003; Morin & Laroulandie 2012; Radovčić et al. 2015; Rodríguez-Vidal et al. 2014; Roebroeks et al. 2012; Romandini et al. 2014; Peresani et al. 2011; 2013; Pike et al. 2012; Zilhão 2012; Zilhão et al. 2010). Variability within Neanderthal cultures has also emerged, not only in changes through time, with the addition of novel production techniques and artefact forms after 60,000bp (Djindjian 2012; Zilhão 2014), but also in regional cultural distinctions (Ruebens 2013). However, the main driving factor influencing changing approaches was the publication of the complete Neanderthal genome (Green et al. 2010), demonstrating a contribution to modern genes. As our *ancestors*, Neanderthals have needed to become recognisably similar, rather than relegated to a side-branch.

Extending ethnographic analogies to an archaic past

Our new relationship with Neanderthals prompts us to extend the diversity of hunter-gatherers to include, rather than exclude, Neanderthal societies. However, this is not without its problems. Syntheses of Neanderthal capacities tend to argue for Neanderthal complexity through *similarity* to what is familiar to us, extending the ethnographic record of modern foragers to Neanderthals (e.g. (Burdukiewicz 2014; Hayden 2012; Zilhão 2014) and *conflating differences* as a means of most comfortably including Neanderthals within what we see as truly (and familiarly) 'human'. Emancipating Neanderthals from their inferior position can all too easily find us making them *just another example of what we already know*. Drawing on modern ethnographically documented societies, without simply replicating their existence to an ancient past, is a challenge.

Most obviously the archaeological evidence for lifestyles and behaviour is ever more impoverished in these distant time periods, particularly before the last glacial maximum. The loss of perishable items of material culture is ever more acute. Moreover unique glacial and pre last interglacial environments provide a further challenge, being unlike any occupied by contemporary hunter-gatherers. The Middle Palaeolithic adds yet a further complication: Neanderthals were biologically and physically distinct from modern humans, separated by at least 600,000 years of evolutionary change (Hublin 2009). Typical assumptions we make about the body might not apply given this evolutionary separation, with Neanderthals displaying notable anatomical differences to modern humans.

Most notably generalisations which hold for modern small scale foragers might not be applicable to distant periods of prehistory (Kelly 2013) The *modern foraging adaptation*, recognisable in contemporary hunting and gathering societies, seems to have appeared only recently on an evolutionary timescale. Signs of familiar social patterns, documented ethnographically, such as large scale social networks which provide a social buffer in times of resource stress, cemented by social interactions, exchanges of non-utilitarian gifts and regular aggregations are absent prior to 100,000bp and only begin to emerge sporadically and episodically after this time. For example, we find perforated and ochred shell beads in use at Taforalt in Morocco at 82,000bp (Bouzougar et al. 2007) and Blombos Cave in South Africa at 75,000bp (d'Errico et al. 2005), but these developments disappear subsequently. It is only after 44,000bp, with the typical San material culture found at Border Cave, that we see the material evidence which matches a recognisable and sustained

modern foraging adaptation as we know it today (d'Errico et al. 2012). The implication is that we can't take for granted what we feel to be familiar about the social structures of modern foragers when we deal with archaic populations or even those of much of the early Upper Palaeolithic. Even those commonalities with modern foragers which Kelly feels can confidently be extended into prehistory, ie. group sizes of around 18-30 individuals and that men predominantly hunt and women predominantly gather (Kelly 2013, p.274) are by no means certain in the Middle Palaeolithic.

It can be tempting to extend what we know of modern hunter-gatherer social structure into the Middle Palaeolithic in order to include Neanderthals within narratives of emerging complexity. Hayden for example presents Neanderthal societies as essentially modern foragers with sophisticated social groupings, personal and ethnic identities, collective rituals and large scale social connections (Hayden 2012). While a refreshing change from portrayals of Neanderthals as lacking social abilities, certain claims remain contentious. Hayden infers, for example, that Neanderthal group size was around 12-25 individuals, i.e. within the range of modern hunting and gathering groups, based on ethnographic generalisations from modern foragers backed up by a small selection of those archaeological sites where we see the greatest evidence of spatial structuring (Hayden 2012, p.8). He likewise infers the presence of ethnic groups of around 80-300 individuals with a central role for large scale aggregations, also based on the direct application of ethnographic models (Hayden 2012, p.12).

Welcome though interpretations of a complex social behaviour in Neanderthals are, direct inferences based on models from modern foragers fail to correlate well with other estimates or interpretations from other sources of evidence. Churchill, considering the ecological and archaeological evidence, argues for much smaller groups, typically in the order of 8-10 individuals (Churchill 2014), a position also supported by genetics (Rosas et al. 2006). In reviewing evidence from the Swabian Alb, (Conard et al. 2012) conclude that social groups would have consisted of a small number of close kin. Somewhat larger sites, such as Tor Faraj similar to those seen in modern foragers can be found (Henry et al. 2004) but are unusual. In modern contexts, exceptionally small site sizes might be explained as an adaptation to ecological circumstance through the exploitation of small distributed resources by specialist groups. However, good evidence for the importance of the collaborative exploitation of large game amongst Neanderthals, sometimes including game as large as mammoth, refutes this argument (Smith 2015; Sistiaga et al. 2014). Group size and mobility appear to have been tied to large game exploitation (Delagnes & Rendu 2011). Whilst there must have been considerable variability in patterns of mobility across the time and space of Neanderthal occupation, a predominant feature of small groups, probably made up of close kin, seems to have been typical.

Inferring the existence of modern forager like aggregation sites is perhaps even more problematic. As Hayden notes, amongst modern foragers even those living at the lowest population densities, such as in the Western desert of Australia, identify with a larger ethnic and mating group and go to great efforts to organise aggregations (Hayden 2012, p.10). This may not have been true of Neanderthals for whom there is little evidence of any sizeable aggregation. Hayden argues that Muraan, with its large quantities of bison bones, might have been an aggregation site that could have supported 200 people. Interpolations on the basis of the bone densities in a 25m² area, with approximately 137 individuals, have

certainly been used to infer at least 900 bison were killed there (Farizy 1994, p.157). However, the excavators themselves interpret Mauran as a palimpsest, accumulated over many hundreds or even thousands of years of small scale kills of one to three bison, hunted into or herded off a large cliff (Farizy 1994). As at La Cotte de St Brelade in Jersey, and at similar sites where large piles of accumulated bones of large game are recovered, discrete episodes of accumulation are often the most probable explanation for apparently large accumulations (Scott et al. 2015). A repeated use of significant sites within the landscape, often distinctive cliff sites, suggests a certain *tie to place* amongst Neanderthals (Burke 2006) without necessarily implying any aggregation of several groups.

Sites which are potentially *socially significant* exist in Middle Palaeolithic Europe, but lack the scale of population concentration familiar to modern aggregations. Molodova I (level IV) in the Ukraine for example, shows good evidence for the hunting of several mammoths, a dwelling structure, potential meat storage and symbolic activity in the form of deliberate grooves on an ochred mammoth scapula and inornate (Demay et al. 2012). Molodova I as well as other notable and potentially socially significant sites such as Tor Faraj and Abric Romaní may be socially significant, or even represent places where parts or all of small neighbouring groups joined together, but on a different scale from that seen in ethnographic contexts.

A distinctive Neanderthal sociality?

Archaeological evidence points to a pattern of social groups, social movement and social connections in Middle Palaeolithic Europe with a distinctiveness of its own, which we can risk losing if we expect social behaviour to comply with modern contexts. A certain *local focus* to Neanderthal settlement and social organisation seems inescapable. The great majority of flint artefacts found on Middle Palaeolithic sites in many regions are made of raw materials collected within 20 km or so of a site, and often within 5km (Féblot-Augustins 2009) for example. Within the Massif Central most raw material used for flint artefacts comes from within 5km of where it is discarded, with over 20 km being exceptional (Fernandes et al. 2008), with a similar pattern found in the Swabian Alb (Conard et al. 2012). Movements of raw materials over distances over 100km occur but are rare (Marwick 2003; Féblot-Augustins 2009), making it unclear if these represent personal procurement or links with other social groups (see (Féblot-Augustins 2009; Meignen et al. 2008). Greater extremes of long distance movements of a small percentage artefacts within assemblages, as with pieces travelling over 400km to Cap Grand in Southwest France, involve just a few well-used artefacts (Slimak & Giraud 2007). Though we might reasonably infer that such movements imply social contacts between groups (Sykes 2012), it is still possible to explain these raw material transfers as no more than personal transport (Kuhn 2012). Only in unique circumstances such as in Salento, Italy where local raw materials were almost unworkable are greater proportions of raw material from non-local sources found (Spinapolice 2012). Patterns of lithic raw material procurement suggest that long distance movements and external social connections were not common (Djindjian 2012) unlike the pattern we see in modern foragers of substantial material movements through fluid and dynamic fission and fusion over large regions.

What isotope data are available support the notion of restricted movements (Richards et al. 2008) and genetic evidence also argues for poorly connected groups (Sánchez-Quinto &

Lalueza-Fox 2015) with half sibling matings common (Prüfer et al. 2014). As (Kuhn 2012, p.78) comments '*The sheer difficulty of identifying consistent evidence for exchange of artefacts or raw materials in the Middle Palaeolithic of Eurasia suggests that strategies of social alliance formation were different from, or not as geographically ambitious, as they were among more recent foragers*'.

We would be wrong to paint a picture of Neanderthals as living in *isolated* groups, but certainly both the frequency and the scale of large scale social interactions seems to be constrained and the scale of social relationships and social life predominantly an intimately focused one. Social dynamics based on small groups often made up of close kin, infrequent social connection and a lack of large scale aggregations may be a common feature of archaic humans, and potentially a responsive to particular ecological contexts in later contexts (Djindjian 2012). Nonetheless Middle Palaeolithic Europe perhaps provides us with the best opportunities for understanding its implications.

The intimate scale of Neanderthal sociality in context

The behavioural ecology of Middle Palaeolithic communities provides an obvious *explanation* for the intimate scale of sociality. Neanderthal's robust body shape offered greater protection from cold, enabled a high level of physical endurance and even physical strength advantages. However, robusticity also comes at a cost. Neanderthals needed significant extra energy to power their robust physiques, and though estimates vary, their average estimated extra calorific requirement is of the order of 2000 calories a day more than an equivalent modern Inuit (Churchill 2014, p.326). Population densities will have necessarily been low given a greater 'energetic footprint' of each individual. Most significantly, travelling to maintain large scale connections would have been as much as 20-24% more energetically expensive (Froehle et al. 2013, p.318). Furthermore whilst Neanderthal distal limb morphology made them better suited to travelling over complex terrain (Higgins & Ruff 2011) within which evidence for the exploitation of ibex illustrates they may have been remarkably agile (de los Terreros et al. 2014), a distinct heel morphology also made them inefficient in certain gaits, potentially also affecting long distance travel (Raichlen et al. 2011).

Modern foragers depend on travelling great distances to support large scale networks. The Jo'huansi, for example, maintain their hxaro network by spending a third of their time travelling to visit distant friends (Wiessner 2002). In ecological terms, the costs of such travel for modern foragers is more than recouped through the benefits of a support network reducing risk in time of need. Such expenditure will have been far less energetically feasible, and perhaps thereofer often impossible, for Neanderthals however.

The *implications* of a distinctive local focus to social structures are harder to interpret, and it is here that the responses of modern ethnographically documented societies to opportunities and constraints can provide some insights.

Small group sizes, low population densities and infrequent large scale social contacts often been interpreted as evidence of a certain simplicity to Neanderthal society. Low population

density for example has been argued, on the basis of agent based models, to lead to a lack of innovation in Neanderthal societies, with low populations and a lack of contacts hampering the spread of ideas (Powell et al. 2009). Understanding the principles and constraints under which modern foragers act (Kelly 2013, p.273) can however help us to move away from seeing Neanderthals as *less social* (and less open to new ideas) than their modern counterparts, and towards a better understanding of how such societies might have functioned.

There are certainly distinctions which can be made between how ideas emerge and are spread between Middle and Upper Palaeolithic communities. The limited and varied evidence for Middle Palaeolithic personal ornamentation has been seen as simple and sporadic for example compared with that of Upper Palaeolithic societies entering Europe, characterised by their ubiquitous, identically produced and rapidly evolving types of artefacts, such as aurignacian split based bone points and shell beads (Pettitt 2014). However our knowledge of modern foragers argues that explanations for what has been seen as a lack of spread of new ideas may be a more complex and more cultural phenomenon than it appears. Cross cultural ethnographic comparisons illustrate for example that any observable relationship between population density and innovation is lacking (Collard et al. 2013). Rather it may be that, not population density per se, but an intimate sociality encouraged a certain focus on local culture and resistance to external ideas. What has been seen as inability to adopt new ideas might be better seen as a certain 'cultural resilience' (Fortier 2009).

If we move beyond a progressivist narrative we can begin to appreciate that *infrequent social contact* and a *markedly local focus to sociality* may lead to the emergence of ideas and meanings which are different but not necessarily simpler than in more connected societies. Infrequent large scale social connection brings with it an emergent creativity through freedom to develop external ideas, concepts and material culture negotiated within a local social context, inspired but not constrained by external views. The use of bottle glass from colonial encounters to make arrowheads in societies in Tierra del Fuego is one example (McEwan et al. 2014). Historical accounts illustrate that gifts of clothing were carefully torn apart and re-distributed as pieces, the concept of protection from the cold subverted into an affirmation of equality and sharing (Hazlewood 2000). Turnbull likewise records metal tubing subverted for use in sacred ritual performance amongst the Mbuti (Turnbull 1961). Such novel adaptations of a wider concept are creative innovations in themselves.

The cultural resilience seen in intimately focused societies extends to examples beyond modern foragers. In a historical context the island occupants of St Kilda, numbering less than 200 individuals until the 19th century, lived several days journey by boat from mainland Scotland and thus were exposed only infrequently to Christianity. As such they developed their own ritual practices, for example involving built stone circles (Macaulay 1764). Equally whilst Mellars ((Mellars 1999, p.360)) used so called Melanesian 'cargo cults' as an analogy for Chatelperronian artefacts in a derogatory sense to imply that Neanderthal copied modern human ornamentation without understanding, for (Zilhão 2012, p.6) this type of creative use of novel material goods reflects not a lack of understanding of their 'proper use' but a sophisticated social manipulation of concepts, sometimes lost in western notions of 'primitive' (Otto 2009). To negotiate and recreate external social and material concepts,

whether those of other Neanderthal groups or newcomers, within an intimately focused social setting is more 'creative' than any wholesale adoption of imposed ideas.

An understanding of the emergent creativity which *infrequent* exposure to outside influence generates allows us to newly reflect on the local and unique character of Neanderthal personal ornamentation (table 1). Within the context of what appears to have been a wider European practice of personal expression, observable through the widespread use of ochre, we see the emergence of unique local signatures of art. Many expressions of personal ornamentation are entirely unique, such as animal teeth or a marine shell with incisions (rather than perforations) for suspension, eagle talons hung as ornaments, or the use of feathers (figure 1). Within each context, meanings must have emerged creatively and been distinct. From this perspective the rigid imposition of an inflexible idea seen in the imposed similarity of Aurignacian shell beads, or split based bone points, across Europe by supposedly more complex moderns appears to be lacking in creative engagement. Early Upper Palaeolithic groups could as equally be viewed as *more simple*, with more frequent fission and fusion leading to less internal cohesion, reduced culturally resilience and subsequently a more marked wholesale adoption of external ideas.

Form	Site/Region	Date	Reference
Eight white tailed eagle talons, with modifications consistent with mounting as personal ornamentation	Krapina, Croatia.	c 130,000bp	(Radovčić et al. 2015)
Decorated (personal?) bone fragment found with La Ferrassie I burial	La Ferrassie, France.	60-75,000bp	(Zilhão 2012)
Ochred and perforated shell (<i>Pecten maximus</i>) (transported at least 60km)	Cueva Antón, Southern Spain.	c 50,000bp	(Zilhão et al. 2010)
Perforated shells (<i>Acanthocardia tuberculata</i> and <i>Glycymeris insubrica</i>).	Cueva de los Aviones, southern Spain.	c 50,000bp	(Zilhão et al. 2010)
Marine shell which has travelled over 500km (as personal item?).	Lezetxiki, northern Spain.	c 55-48,000bp	(Arrizabalaga 2009)
Ochred marine shell.	Fumane Cave,	48,000bp	(Peresani et al.

	northern Italy.		2013)
Use of bird feathers for personal decoration.	Fumane Cave, northern Italy.	c 44,000bp	(Peresani et al. 2011)
Red disc and hand print, potentially created by Neanderthals.	El Castillo Cave, northern Spain.	41 - 37,000bp	(Pike et al. 2012)
Incised (rather than perforated) tooth pendants.	Grotte du Renne, southern France.	c 45-40,000bp	(Zilhão 2012; Caron et al. 2011)
Perforated wolf canine,	La Grande Roche de la Plématrie, southern France.	c 45-40,000bp	(Zilhão 2012)
Spindle shaped bone pendant.	Bacho Kiro Cave, Bulgaria.	c 45-40,000bp	(Kozłowski & Ginter 1982; Zilhão 2012)

Table 1: Locally unique forms of personal ornamentation and personal expression in Neanderthals

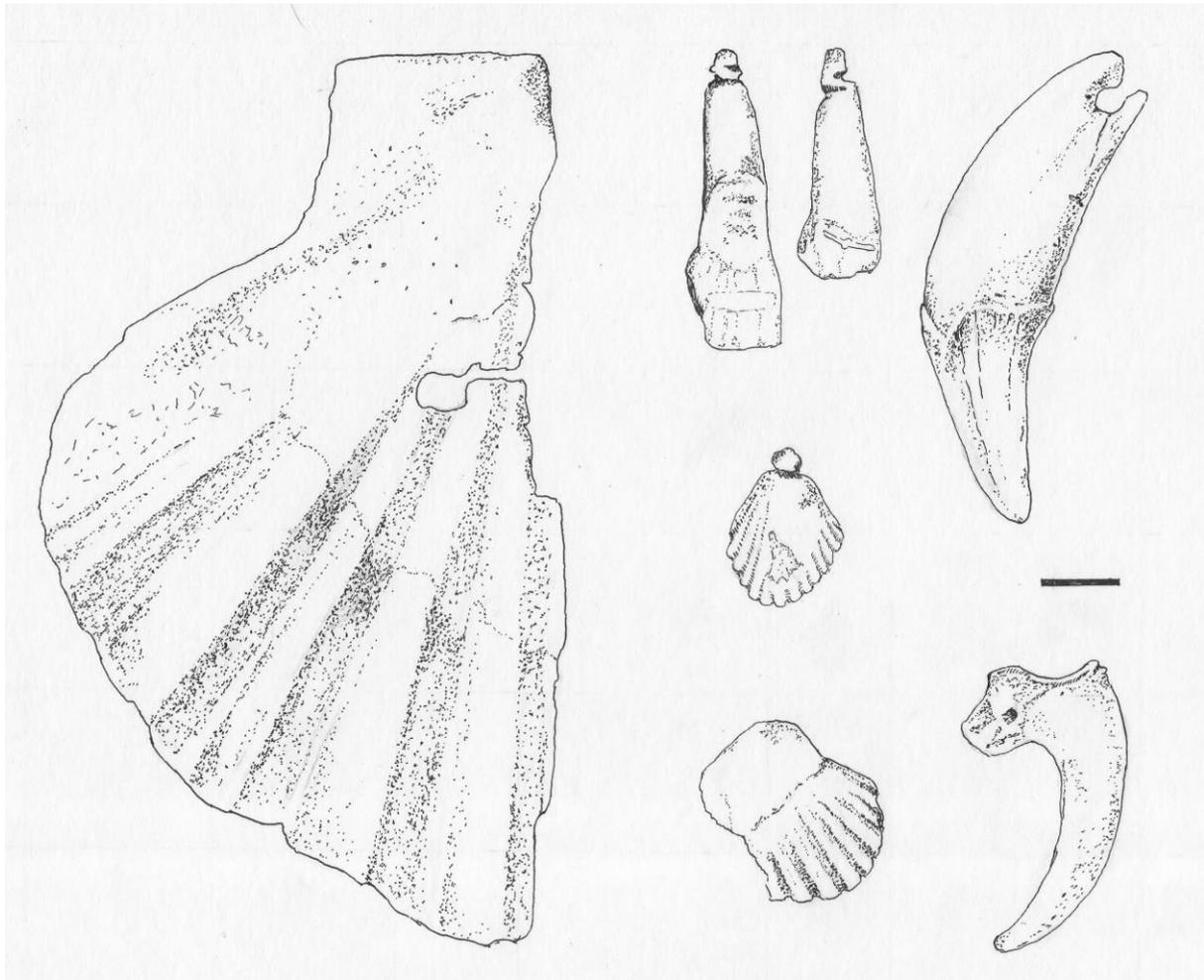


Figure 1: Examples of local creativity in Neanderthal personal expression. From left to right: Perforated and ochred pecten shell from Cueva Antón (*Pecten maximus*), incised teeth from Grotte du Renne, incised shell from Grotte du Renne, perforated wolf canine from La Grande Roche de la Plématrie, eagle claw from Grotta di Fumane, perforated shell from Cueva de los Aviones (*Acanthocardia tuberculata*) (re-drawn by P.S. after (Zilhão et al. 2010; Zilhão 2012; Radović et al. 2015))

Intimate sociality and Neanderthal childhood experience

An understanding of childhood experience amongst Neanderthals can provide insights into how such cultural resilience might have been constructed.

A distinctive intimate and local focus on sociality and social emotions would have had a subtle influence on the experience of being a child, in turn directing the flavour of adult Neanderthal sociality and culture (Spikins et al. 2014). Mutual support within a highly cohesive social system is certainly evidenced by high rates of care for the vulnerable (Spikins et al. 2010; Spikins 2015), including attention to infants and children (Spikins et al. 2014) amongst Neanderthals. In terms of emotional development the constancy of adult relationships with children, in contrast to the fission-fusion seen in modern foragers, may well have been a factor increasing infant security (Tottenham 2012), self control, and collaborative motivations (Mikulincer & Shaver 2010). It may be from this intimate basis for social life, allowing Neanderthals to develop collaborative and caring motivations (Gilbert

2015), that societies could develop their resilience to the adoption of external ideas or or ways of doing things.

An intimate focus and concern with the wellbeing of children is reflected in Neanderthal burial. Currently over 20 burials of children have been discovered, with many showing signs of great care being taken. For example, the burial of a 2 year old child at Dederiyeh Cave in Syria (Akazawa et al. 1999) was laid out on its back, with arms extended and legs flexed, with a triangular flint placed upon its chest and a stone slab beside its head (figure 2). Further, a 10 month old infant recovered from Amud Cave, Israel, was found with a complete maxilla of red deer (*Cervus elaphus*) lying on its pelvis (Hovers et al. 1995). A number of sites have also produced multiple child burials, most notably La Ferrassie, France. Here, in addition to two adults, five children were discovered. This included a newborn found within an oval depression with three flint scrapers (La Ferrassie 5), and a 3 year old child with three stone tools and a limestone block with cupules above the grave (La Ferrassie 6) (Capitan & Peyrony 1912; Delporte 1976). Within the context of an inwardly focused society, we have previously argued this evidence represents a social and potentially symbolic focus on the young (Spikins et al. 2014).



Figure 2. Dederiyeh 1, a two year old child found with a triangular flint on its chest and a stone slab next to its head (photograph courtesy of Takeru Akazawa)

Whilst our modern western attitudes tend to assume that children are taught and given instructions, ethnographic research illustrates the remarkable autonomy of children in hunter-gatherer societies, who instead learn from exposure and personal exploration (Terashima 2013; Hewlett 2013). Neanderthal children are likely to have learnt in the same

way through being exposed to new experiences. Within an intimate scale of social life secure relationships to constant carers and a familiar social environment will have fostered emotional development and learning. There is good evidence for learning through exploration as seen in the development of flint knapping skills, seen at sites such as Maastricht-Belvedere and Rhenen in analysis of novice knapping debris for example (Stapert 2007). As well as learning how to manage emotions and be part of the close knit group children were clearly being exposed to skills such as flint knapping, and given opportunities and support to learn.

Opportunities which come from an intimate scale to sociality can also bring constraints. Limitations to early exposure to novel landscapes can discourage distant exploration and encourage a firmer tie to local landscapes for example. For one thing, Neanderthal biology will have made the opportunities for children to travel *simply to explore* relatively costly, potentially limiting the scale at which exploration beyond the camp took place. Secondly the particular exposures to risk which children faced when exploring farther from camp may also play a role. Blurton-Jones et al. (1994), for example, illustrate the significance of relative exposure to risk in explaining why Hadza children forage frequently and successfully well beyond the camp, whilst !Kung children forage very little and do not venture far. The Hadza environment is much easier to navigate, as well as there being foraging opportunities very close to camp and far more shade available to avoid dehydration. In contrast for a !Kung adult to achieve the same as a 5-10 year old Hadza child, they must travel 5.5-6km in a landscape that is not only lacking in shade to avoid dehydration but also 'oddly featureless' (Blurton-Jones et al 1994, 197) and thus difficult to navigate in. This difference in environment has important implications, with Hadza children able to explore, but !Kung children more constrained to staying near to a camp. As well as biological constraints on mobility, and a cultural focus on the local, Neanderthal children may well have faced particular risks beyond those experienced by modern foragers or many Upper palaeolithic populations. Significant risks to individuals, the young in particular, were posed by predation in the Pleistocene for example (Camarós et al. 2015). Such predation risks might have been particularly significant for Neanderthal children for whom smaller group sizes implied a reduced number of peers who might travel together. Only in the Upper Palaeolithic might childhood patterns of landscape exploration have become much safer through larger group sizes, projectile technology, and later even the domestication of wolves (Shipman 2010; Morey 2010). The need to ensure that Neanderthal children felt and were safe from harm may have kept them relatively focused on landscapes close to camp, further re-inforcing an intimate tie to place (Burke 2006), and in turn a marked cultural resilience to imposed ideas.

Whilst any generalisation is bound to obscure significant variability within societies in Middle Palaeolithic Europe, we can use a knowledge of patterns in modern ethnographically documented societies to speculate that neither biology, ecology nor culture alone, but a mutually reinforcing relationship between these factors may have maintained a certain intimate and culturally resilient sociality to life as a Neanderthal.

Conclusions

Here we argue that the large scale social structure characteristic of modern foraging societies may not be applicable in its entirety to communities in Middle Palaeolithic Europe. Familiar features of a modern foraging adaptation such as extended networks of large scale social interactions, large scale exchanges of non-utilitarian items and regular aggregations of

a 'macroband' may not be there to be found, with a smaller scale, local sociality more typical. Sociality on an intimate scale is no less sophisticated however, and the particular creativity and resilience which emerges in such situations, and is reflected in and through childhood experience, may help explain the notable local creativity seen in Neanderthal personal ornamentation and artistic expression.

The landscapes and peoples of the European Middle Palaeolithic might seem alien, but these communities were not *strangers*, but societies and cultures responding to unusual constraints and opportunities in ways that nonetheless resonate with our understanding of adaptations in small scale societies. If we move beyond looking for modern foragers in the past to developing a more subtle understanding of how different experiences in modern ethnographically documented contexts influence sociality and culture we can open up new insights in Middle Palaeolithic communities, and from this greater insights into hunter-gatherer diversity.

References

- Akazawa, T. et al., 1999. New discovery of a Neanderthal child burial from the Dederiyeh Cave in Syria. *Paléorient*, pp.129–142.
- Arrizabalaga, A., 2009. The Middle to Upper Paleolithic Transition on the Basque Crossroads: Main Sites. Key Issues. *Mitteilungen der Gesellschaft für Urgeschichte*, 18, pp.39–70.
- Bouzougar, A. et al., 2007. 82,000-year-old shell beads from North Africa and implications for the origins of modern human behavior. *Proceedings of the National Academy of Sciences of the United States of America*, 104(24), pp.9964–9969.
- Burdukiewicz, J.M., 2014. The origin of symbolic behavior of Middle Palaeolithic humans: Recent controversies. *Quaternary international: the journal of the International Union for Quaternary Research*, 326–327, pp.398–405.
- Burke, A., 2006. Neanderthal settlement patterns in Crimea: A landscape approach. *Journal of Anthropological Archaeology*, 25(4), pp.510–523.
- Camarós, E. et al., 2015. Large carnivore attacks on hominins during the Pleistocene: a forensic approach with a Neanderthal example. *Archaeological and anthropological sciences*, pp.1–12.
- Capitan, L. & Peyrony, D., 1912. Trois nouveaux squelettes humains fossiles. *Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres*, 56(6), pp.449–454.
- Caron, F. et al., 2011. The reality of Neanderthal symbolic behavior at the Grotte du Renne, Arcy-sur-Cure, France. *PloS one*, 6(6), p.e21545.
- Churchill, S.E., 2014. *Thin on the ground: Neanderthal biology, archeology and ecology*, John Wiley & Sons.
- Collard, M., Buchanan, B. & O'Brien, M.J., 2013. Population size as an explanation for patterns in the paleolithic archaeological record. *Current anthropology*, 54(S8), pp.S388–S396.

- Conard, N.J., Bolus, M. & Münzel, S.C., 2012. Middle Paleolithic land use, spatial organization and settlement intensity in the Swabian Jura, southwestern Germany. *Quaternary international: the journal of the International Union for Quaternary Research*, 247, pp.236–245.
- Delagnes, A. & Rendu, W., 2011. Shifts in Neandertal mobility, technology and subsistence strategies in western France. *Journal of archaeological science*, 38(8), pp.1771–1783.
- Delporte, H., 1976. Les sépultures moustériennes de La Ferrassie. *Les Sépultures Néanderthaliennes*, pp.8–11.
- Demay, L., Péan, S. & Patou-Mathis, M., 2012. Mammoths used as food and building resources by Neanderthals: Zooarchaeological study applied to layer 4, Molodova I (Ukraine). *Quaternary international: the journal of the International Union for Quaternary Research*, 276–277, pp.212–226.
- Djindjian, F., 2012. Is the MP-EUP transition also an economic and social revolution? *Quaternary international: the journal of the International Union for Quaternary Research*, 259, pp.72–77.
- d’Errico, F. et al., 2012. Early evidence of San material culture represented by organic artifacts from Border Cave, South Africa. *Proceedings of the National Academy of Sciences of the United States of America*, 109(33), pp.13214–13219.
- d’Errico, F. et al., 2005. Nassarius kraussianus shell beads from Blombos Cave: evidence for symbolic behaviour in the Middle Stone Age. *Journal of human evolution*, 48(1), pp.3–24.
- Farizy, C., 1994. Spatial Patterning of Middle Paleolithic Sites. *Journal of Anthropological Archaeology*, 13(2), pp.153–160.
- Féblot-Augustins, J., 2009. Revisiting European Upper Paleolithic Raw Material Transfers: The Demise of the Cultural Ecological Paradigm? In *Lithic Materials and Paleolithic Societies*. Wiley-Blackwell, pp. 25–46.
- Fernandes, P., Raynal, J.-P. & Moncel, M.-H., 2008. Middle Palaeolithic raw material gathering territories and human mobility in the southern Massif Central, France: first results from a petro-archaeological study on flint. *Journal of archaeological science*, 35(8), pp.2357–2370.
- Finlayson, C. et al., 2012. Birds of a feather: Neanderthal exploitation of raptors and corvids. *PloS one*, 7(9), p.e45927.
- Fortier, J., 2009. *Kings of the forest: the cultural resilience of Himalayan hunter-gatherers*, University of Hawaii Press.
- Froehle, A.W., Yokley, T.R. & Churchill, S.E., 2013. Energetics and the origin of modern humans. *The origins of modern humans: biology reconsidered*, 2nd ed. Hoboken, NJ: John Wiley and Sons, Inc, pp.285–320.
- Gilbert, P., 2015. The Evolution and Social Dynamics of Compassion. *Social and personality psychology compass*, 9(6), pp.239–254.
- Green, R.E. et al., 2010. A draft sequence of the Neandertal genome. *Science*, 328(5979), pp.710–722.
- Hackett, A. & Dennell, R., 2003. Neanderthals as fiction in archaeological narrative.

- Antiquity*, 77(298), pp.816–827.
- Hayden, B., 2012. Neandertal Social Structure? *Oxford Journal of Archaeology*, 31(1), pp.1–26.
- Hazlewood, N., 2000. *Savage: the life and times of Jemmy Button*, Macmillan.
- Henry, D.O. et al., 2004. Human Behavioral Organization in the Middle Paleolithic: Were Neanderthals Different? *American anthropologist*, 106(1), pp.17–31.
- Hewlett, B., 2013. “Ekeloko” The Spirit to Create: Innovation and Social Learning Among Aka Adolescents of the Central African Rainforest. In *Dynamics of Learning in Neanderthals and Modern Humans Volume 1*. Replacement of Neanderthals by Modern Humans Series. Springer Japan, pp. 187–195.
- Higgins, R.W. & Ruff, C.B., 2011. The effects of distal limb segment shortening on locomotor efficiency in sloped terrain: implications for Neandertal locomotor behavior. *American journal of physical anthropology*, 146(3), pp.336–345.
- Hovers, E. et al., 1995. Hominid remains from Amud Cave in the context of the Levantine Middle Paleolithic. *Paléorient*, pp.47–61.
- Hovers, E., Kimbel, W.H. & Rak, Y., 2000. The Amud 7 skeleton—still a burial. Response to Gargett. *Journal of human evolution*, 39(2), pp.253–260.
- Hublin, J.J., 2009. The origin of Neandertals. *Proceedings of the National Academy of Sciences*, 106(38), pp.16022–16027.
- Jones, N.B., Hawkes, K. & Draper, P., 1994. Differences between Hadza and! Kung children’s work: original affluence or practical reason. *Key Issues in Hunter-Gatherer Research*, Berg, Oxford, pp.189–215.
- Kelly, R.L., 2013. *The lifeways of hunter-gatherers: The foraging spectrum*, Cambridge University Press.
- King, W., 1864. The reputed fossil man of the Neandertal. *Quarterly Journal of Science, Literature, and the Arts*, 1, pp.88–97.
- Kozłowski, J.K. & Ginter, B., 1982. *Excavation in the Bacho Kiro cave (Bulgaria): final report*, Państwowe Wydawnictwo Naukowe.
- Kuhn, S.L., 2012. Emergent Patterns of Creativity and Innovation in Early Technologies. In *Origins of Human Innovation and Creativity*. Developments in Quaternary Sciences. Elsevier, pp. 69–87.
- Macaulay, K., 1764. *The History of St. Kilda*, Becker.
- Marquet, J.-C. & Lorblanchet, M., 2003. A Neandertal face? The proto-figurine from La Roche-Cotard, Langeais (Indre-et-Loire, France). *Antiquity*, 77(298), pp.661–670.
- Marwick, B., 2003. Pleistocene Exchange Networks as Evidence for the Evolution of Language. *Cambridge Archaeological Journal*, 13(01), pp.67–81.
- McEwan, C., Borrero, L.A. & Prieto, A., 2014. *Patagonia: natural history, prehistory, and ethnography at the uttermost end of the earth*, Princeton University Press.
- Meignen, L., Delagnes, A. & Bourguignon, L., 2008. Patterns of lithic material procurement

and transformation during the Middle Paleolithic in Western Europe. *Lithic Materials and Paleolithic Societies*, p.sous–presse.

- Mellars, P., 1999. The Neanderthal Problem Continued. *Current anthropology*, 40(3), pp.341–364.
- Mikulincer, M. & Shaver, P.R., 2010. *Attachment in adulthood: Structure, dynamics, and change*, Guilford Press.
- Morey, D.F., 2010. The Roles of Dogs in Past Human Societies. In D. F. Morey, ed. *Dogs*. Cambridge: Cambridge University Press, pp. 86–111.
- Morin, E. & Laroulandie, V., 2012. Presumed symbolic use of diurnal raptors by Neanderthals. *PloS one*, 7(3), p.e32856.
- Moser, S., 1992. The visual language of archaeology: a case study of the Neanderthals. *Antiquity*, 66(253), pp.831–844.
- Otto, T., 2009. What Happened to Cargo Cults? Material Religions in Melanesia and the West. *Social Analysis*, 53(1), pp.82–102.
- Peresani, M. et al., 2013. An ochered fossil marine shell from the mousterian of fumane cave, Italy. *PloS one*, 8(7), p.e68572.
- Peresani, M. et al., 2011. Late Neandertals and the intentional removal of feathers as evidenced from bird bone taphonomy at Fumane Cave 44 ky B.P., Italy. *Proceedings of the National Academy of Sciences of the United States of America*, 108(10), pp.3888–3893.
- Pettitt, P., 2014. The European Upper Palaeolithic. In Cummings, V., Jordan, P., & Zvelebil, M., ed. *The Oxford Handbook of the Archaeology and Anthropology of Hunter-gatherers*. Oxford University Press.
- Pettitt, P., 2013. *The Palaeolithic origins of human burial*, London: Routledge.
- Pike, A.W.G. et al., 2012. U-series dating of Paleolithic art in 11 caves in Spain. *Science*, 336(6087), pp.1409–1413.
- Powell, A., Shennan, S. & Thomas, M.G., 2009. Late Pleistocene demography and the appearance of modern human behavior. *Science*, 324(5932), pp.1298–1301.
- Prüfer, K. et al., 2014. The complete genome sequence of a Neanderthal from the Altai Mountains. *Nature*, 505(7481), pp.43–49.
- Radovčić, D. et al., 2015. Evidence for neanderthal jewelry: modified white-tailed eagle claws at Krapina. *PloS one*, 10(3), p.e0119802.
- Raichlen, D.A., Armstrong, H. & Lieberman, D.E., 2011. Calcaneus length determines running economy: implications for endurance running performance in modern humans and Neandertals. *Journal of human evolution*, 60(3), pp.299–308.
- Richards, M. et al., 2008. Strontium isotope evidence of Neanderthal mobility at the site of Lakonis, Greece using laser-ablation PIMMS. *Journal of archaeological science*, 35(5), pp.1251–1256.
- Rodríguez-Vidal, J. et al., 2014. A rock engraving made by Neanderthals in Gibraltar. *Proceedings of the National Academy of Sciences of the United States of America*,

111(37), pp.13301–13306.

- Roebroeks, W. et al., 2012. Use of red ochre by early Neandertals. *Proceedings of the National Academy of Sciences of the United States of America*, 109(6), pp.1889–1894.
- Romandini, M. et al., 2014. Convergent evidence of eagle talons used by late Neanderthals in Europe: a further assessment on symbolism. *PloS one*, 9(7), p.e101278.
- Rosas, A. et al., 2006. Paleobiology and comparative morphology of a late Neandertal sample from El Sidron, Asturias, Spain. *Proceedings of the National Academy of Sciences of the United States of America*, 103(51), pp.19266–19271.
- Ruebens, K., 2013. Regional behaviour among late Neandertal groups in Western Europe: a comparative assessment of late Middle Palaeolithic bifacial tool variability. *Journal of human evolution*, 65(4), pp.341–362.
- Sánchez-Quinto, F. & Lalueza-Fox, C., 2015. Almost 20 years of Neandertal palaeogenetics: adaptation, admixture, diversity, demography and extinction. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences*, 370(1660), p.20130374.
- Scott, B. et al., 2015. A new view from La Cotte de St Brelade, Jersey. *Antiquity*, 88(339), pp.13–29.
- Shipman, P., 2010. The Animal Connection and Human Evolution. *Current anthropology*, 51(4), pp.519–538.
- Sistiaga, A. et al., 2014. The Neandertal meal: a new perspective using faecal biomarkers. *PloS one*, 9(6), p.e101045.
- Slimak, L. & Giraud, Y., 2007. Circulations sur plusieurs centaines de kilomètres durant le Paléolithique moyen. Contribution à la connaissance des sociétés néandertaliennes. *Comptes rendus. Palevol*, 6(5), pp.359–368.
- Smith, G.M., 2015. Neandertal megafaunal exploitation in Western Europe and its dietary implications: a contextual reassessment of La Cotte de St Brelade (Jersey). *Journal of human evolution*, 78, pp.181–201.
- Spikins, P., 2015. *How Compassion Made Us Human: The Evolutionary Origins of Tenderness, Trust and Morality*, Pen and Sword.
- Spikins, P. et al., 2014. The Cradle of Thought: Growth, Learning, Play and Attachment in Neandertal Children. *Oxford Journal of Archaeology*, 33(2), pp.111–134.
- Spikins, P., Rutherford, H. & Needham, A., 2010. From Homininity to Humanity: Compassion from the Earliest Archaics to Modern Humans. *Time and Mind*, 3(3), pp.303–325.
- Spinapolice, E.E., 2012. Raw material economy in Salento (Apulia, Italy): new perspectives on Neandertal mobility patterns. *Journal of archaeological science*, 39(3), pp.680–689.
- Stapert, D., 2007. Neandertal children and their flints. *PalArch's Journal of Archaeology of Northwest Europe*, 1(2), pp.16–39.
- Stutz, A.J., 2012. Culture and Politics, Behavior and Biology: Seeking Synthesis among Fragmentary Anthropological Perspectives on Hunter-Gatherers. *Reviews in Anthropology*, 41(1), pp.23–69.

- Sykes, R.M.W., 2012. Neanderthals 2.0? Evidence for expanded social networks, ethnic diversity and encultured landscapes in the Late Middle Palaeolithic Unravelling the Palaeolithic 2012 Conference Paper (available at http://www.researchgate.net/profile/Rebecca_Wragg_Sykes/publication/260157161_Neanderthals_2.0_Evidence_for_expanded_social_networks_ethnic_diversity_and_encultured_landscapes_in_the_Late_Middle_Palaeolithic/links/0046352fc9e5d8e777000000.pdf).
- Terashima, H., 2013. The Evolutionary Development of Learning and Teaching Strategies in Human Societies. In *Dynamics of Learning in Neanderthals and Modern Humans Volume 1*. Replacement of Neanderthals by Modern Humans Series. Springer Japan, pp. 141–150.
- de los Terreros, J.Y.S. et al., 2014. Specialised hunting of Iberian ibex during Neanderthal occupation at El Esquilieu Cave, northern Spain. *Antiquity*, 88(342), pp.1035–1049.
- Tottenham, N., 2012. Human amygdala development in the absence of species-expected caregiving. *Developmental psychobiology*, 54(6), pp.598–611.
- Turnbull, C.M., 1961. *The Forest People: A Study of the Pygmies of the Congo*.
- Van Reybrouck, D., 2002. Boule's error: on the social context of scientific knowledge. *Antiquity*, 76(291), pp.158–164.
- Wiessner, P., 2002. Taking the risk out of risky transactions: a forager's dilemma. *Risky Transactions: Trust, Kinship, and Ethnicity*. Berghan Books, Oxford, pp.21–43.
- Zilhão, J., 2012. Personal ornaments and symbolism among the Neanderthals. *Developments in Quaternary Science*, 16, pp.35–49.
- Zilhão, J. et al., 2010. Symbolic use of marine shells and mineral pigments by Iberian Neandertals. *Proceedings of the National Academy of Sciences of the United States of America*, 107(3), pp.1023–1028.
- Zilhão, J., 2014. The Neanderthals, Evolution, Palaeoecology and Extinction. In Cummings, Vicki and Jordan, Peter and Zvelebil, Marek, ed. *The Oxford Handbook of the Archaeology and Anthropology of Hunter-gatherers*. Oxford University Press, p. DOI: 10.1093/oxfordhb/9780199551224.013.054.