The modernity myth

Dieter JEHS

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Abstract

The dichotomy modern-archaic, and the concept of modernity in particular have been used in Palaeolithic archaeology for decades as a basic frame of reference for the description of Late Pleistocene hominin behavioural variability. While a number of researchers have pointed out that the modernity concept has outlived its usefulness (mostly on empirical grounds), its simplicity appears to be difficult to give up, as it keeps resurfacing even in the writings of those who have denounced the term. In this paper, we argue that (1) the modernity concept is not only plagued by problems of an empirical nature, but also by theoretical concerns, and (2) that this is caused by an urge to get to grips with what is inherently continuous variability by means of a discrete scheme of classification.

Keywords: modernity, modern humans, Neanderthals, behaviour, Middle to Upper Palaeolithic transition.

1. Introduction

About 45 years ago, Hsu (1964) advised to abandon simple dichotomies in anthropology such as the opposing concepts of *primitive* and *civilized*, in favour of more refined ways of classification. As he explained, «In the science of man, as in all sciences, terms or concepts are essentially means of classifying data or points of reference around which the data may be organized so as to achieve an empirically descriptive picture to enable one to grope for some theoretically based insights into the data. [...] The major criterion for the introduction or the continuance of a concept should be [...] that it has empirical validity [...] or theoretical utility» (Hsu, 1964: 174).

His analysis of a number of anthropological studies appearing over a period of 10 years prior to the publication of his paper indicated that the use of the term *primitive* carried unwarranted connotations of inferiority, thus being «politically incorrect». Probably more pertinent from a scientific point of view, he demonstrated that the concept lacked both empirical validity and theoretical utility, which led him to abandon it. Interestingly, Hsu kept on supporting the continued use of the dichotomy in the field of palaeoanthropology (1964: 174), which was not an unreasonable proposition given the knowledge available at that time. However, the dichotomy, now in the form of *primitive* vs. *modern* has been the object of criticism in the latter field as well (d'Errico, 2003: 199-200; Shea, 1998: S60; Stringer, 2002: 574-576; Davies & Underdown, 2006), albeit still without leading to a complete rejection (see e.g. the review article by Nowell, 2010). In fact, the modernity concept is currently either used in a metaphorical rather than a strictly scientific way (as such, the word is often typographically stressed, see e.g. Zilhão, 2007), or in a more specific and thus less debatable way (e.g. Soffer, 2009). Clearly, the dichotomy represents yet another example of typological thinking (see Weiss & Lambert, 2010) that proves to be

very persistent in the face of its inherent difficulties. To be sure, the dichotomy and the concept of *modern* in particular, has been very useful as a simple, yet effective means of uncovering and describing the morphological, behavioural, and cultural variability evident in the hominin palaeontological and archaeological records, i.e. as an analytical unit. This success, but also the opinion that we lack better alternatives has kept researchers clinging to the modernity frame of reference, in spite of their recognition of its limitations, and in spite of their replacing the term *modern* by (if anything, even more inadequate) surrogates such as *fully human* (Duff *et al.*, 1992: 213), *fully cultural* and *truly human* (Holliday, 2003: 640) or *fully symbolic sapiens behaviour* (Henshilwood & Marean, 2003: 644).

When focussing on Europe, the problematic nature of the modernity concept has become evident in the case of Neanderthal studies in general (see also Davies & Underdown, 2006), but even more so for those situated within the timeframe of the so-called Middle to the Upper Palaeolithic transition (MUPT) around 40 Ka BP. This spatio-temporal setting was long considered as marking an event known as the *Human Revolution* (see e.g. Mellars & Stringer, 1989), i.e. a sudden explosion of what was considered to represent modern behaviour. The search for a description of human[1] variability prior and during this event has been predominantly been channelled into a description of Neanderthal behaviour using the species best known to us as the norm: ourselves. As such, the characteristics that were perceived of as essential, as the package that makes us what we are, became entrenched in the concept of modernity (Mellars, 1991). Because of its elegant simplicity and because of the critical remarks it had to endure, the concept spawned quite a debate (Bar-Yosef, 1998; Chase & Dibble, 1987; d'Errico *et al.,* 1998; Duff *et al.,* 1992; Graves, 1991; Hayden, 1993; Knight *et al.,* 1995; Lindly & Clark, 1990; Mellars, 1991; Mellars & Stringer, 1989; Mithen, 1996; Renfrew, 1996; Roebroeks, 1988; Shennan, 2001; Wadley, 2001; Zilhão, 2007; Zilhão & d'Errico, 2000). Along the way, the existing concept was perceived as being too Eurocentric and was altered to encompass the transition of anatomically to behaviourally modern humans (Barham, 1998, 2002; Barham *et al.,* 2002; Brooks *et al.*, 1995; d'Errico *et al.,* 2001; Henshilwood *et al.,* 2001, 2002; McBrearty & Brooks, 2000; Yellen *et al.,* 1995, Zilhão, 2007). More recently, it has been deployed in an Asian context as well (James & Petraglia, 2005; Norton & Jin, 2009; Zilhão, 2007).

We will argue that modernity is indeed a problematic concept, hardly able to satisfy either of the requirements a scientific concept needs to possess according to Hsu (1964: 174), i.e. empirical validity and theoretical utility. To that end, we will briefly point out the essentially empirical arguments that have been raised against it. We will then try to add to the debate by looking at the theoretical aspects from a conceptually integrated (i.e. evolutionary) perspective. The latter will be kept very basic as this is, we believe, enough to confront the modernity metaphor and expose its shaky evolutionary logic. However, it will be clear that a more complex approach will be needed if we are to search a replacement for the modernity frame of reference within evolutionary theory. Such an approach will undoubtedly be more fuzzy than a simple dichotomy, but hopefully more useful in terms of our need for a frame of reference able to describe (*as well as* explain) late Pleistocene human variability.

2. *Morphology*

The concept of modernity has appeared in different but complementary research fields of Palaeolithic anthropology *sensu lato*, such as biological anthropology and (cognitive) archaeology. Perhaps somewhat artificially, the concept can be thought of a having a mor-

1 Used here as an adjective of *Homo*. As such, it relates to both Neanderthals and *H. s. sapiens*.

phological, a cognitive, a behavioural and a cultural facet. Of these, the first stands out to some degree, and not only because the latter three are hardly ever distinguished (as we shall see, they are indeed very hard to disentangle).

Although biological anthropologists contribute considerably to the modernity debate (e.g. Schmitt *et al.,* 2003), one of their most eye-catching research questions targets the taxonomic relationships between hominins, in our case Neanderthals and *H. s sapiens*. As such, it is our perception that the term *modern*, featuring in the common name for our species, is less loaded than in the other three domains of use: as a species, modern humans or *H. s sapiens* are discerned morphologically on the basis of unique or derived features. Though obviously subjective, calling these features *modern* is fairly unproblematic at first sight, as any other hominid (or species, for that matter) is distinguished by exactly the same criterion. This goes hand in hand with searching for characteristics shared with other species (i.e. *primitive* or *ancestral* characteristics), thus allowing for the construction of phylogenetic relationships. From an evolutionary viewpoint, some of these distinguishing attributes are considered to have been adaptive, i.e. at some point having led to greater reproductive success in the environment (the latter including both ecological and behavioural or social variables [Klein, 1999: 386-393; Pearson, 2000]) the organism inhabits, whereas others, without apparent adaptive value, are ascribed to processes such as genetic drift.

However, upon closer study a theoretical issue becomes evident, making the case for a continued use of the concept of modernity even in this context somewhat less convincing (*contra* Stringer, 2002: 576). According to the orthodox Neo-Darwinian view, evolution by means of natural selection is a dynamic, gradual, continuous, non-teleological, historical and fuzzy process, as derived phenotypic characters of new groups originate out of the extant genotypic variability within their ancestral population in response to environmental (sensu lato) conditions. As pointed out by others, matching this fact to a static and discontinuous concept such as *species* (which requires defining typical representatives) can be problematical (Henneberg, 2006; Stringer, 2002). In fact, what we see here is the difference between the outdated typological species concept, which in everyday thinking takes the form of «natural kinds», and the biological species concept, the latter being in line with the «populational nature of species and with their evolutionary potential» (Mayr, 2001: 180-186): when species are studied over geographical space, it is found that most of them consist of numerous local populations that differ either slightly or more drastically from each other. Such an assemblage of populations distributed in geographic space is a species taxon, as defined by the biological species concept (Mayr, 2001: 185).

Morphological and behavioural differences alone make it very hard to ascertain whether or not two populations belong to different biological species when their territories do not overlap (i.e. when they are allopatric), as this precludes applying the criterion of reproductive compatibility. The problem is obviously even more pertinent for palaeontological populations as the members that were (partially) preserved typically belong to populations that are separated in space *and* time. In this case, morphological differences, and these are indeed evident between the Neanderthals and *H. s sapiens* (e.g. Hublin, 1998; Stringer, 2002; Trinkaus, 2006), are used to establish whether or not they are of a larger magnitude than one would find in the case of sympatric (i.e. with overlapping territories) species (Mayr, 2001: 185). If, as the latter points out, this process must remain somewhat arbitrary when dealing with living species, it is certainly true in the case of extinct populations. This has led to an important, but as yet unsatisfactorily answered question: how should a modern human be demarcated and defined morphologically, assuming of course that this is possible (Athreya, 2006; Trinkaus, 2006: 614)?

It is the same question, which can be found in a general form (i.e. including cognition, behaviour and culture) throughout the modernity debate. It is basically about the rationale

and usefulness of designing and imposing a rigid and discontinuous concept to describe (diachronic) variability, when the latter is inherently continuous, or «intrinsically untidy» (Tattersall & Schwartz, 2008)[2]. In fact, the answer is quite straightforward: the intention is to describe, and get a grip on that variability as simply and parsimoniously as possible. The only problem is that there is a trade-off: the more basic the framework we impose on reality, the smaller the extent to which our model will accurately describe that reality. Depending on what we wish to investigate, this is troublesome to a greater or lesser degree. As such, being no biological anthropologists, and knowing that behaviour does not necessarily correlate with morphology (see Zilhão, 2007), we are rather apprehensive to actually object to the use of the term *modern* in the morphological domain besides from a conceptual point of view. Nevertheless, it remains noteworthy that in that field as well, the problem is felt and essentially the same as in the three others.

3. The Sapient Behaviour Paradox

With noted exceptions (e.g. Mithen, 1996; Wynn & Coolidge, 2004), cognition has often remained ill-defined and underdeveloped in palaeolithic anthropology and the modernity debate in particular. In most cases a certain, i.e. modern, level[3] of cognition, often understood as intelligence (and more in particular, the spare capacity consciously available to its owner, as opposed the unconscious computational power enlisted for processing sensorimotor information), is regarded as the prerequisite, the ability, or the potential to act in a modern way, without much further consideration.

Conceived of this way, the concept of cognitive modernity can be meaningfully applied only in a very limited way and on a general level, namely to extant modern humans. More in particular, all modern populations share the same general cognitive make-up (Brace, 1995), the *psychic unity of mankind* if you will (Tooby & Cosmides, 1992: 79). When taking the next step by attempting to trace back this aspect of modernity into our species' past, eventually up to the point where it arose, we encounter what Renfrew dubbed the *Sapient Behaviour Paradox*, which forces us to realise «[...] the impossibility, of observing potential or capacity or ability until it is revealed in performance/actuality/achievement» (Renfrew, 1996: 11)[4].

The temporal gap between the first expression and supposed achievement of modern ability or cognition, led Renfrew to question the utility and validity of the concept of potential/ability in archaeological contexts. In effect, the Sapient Behaviour Paradox shows that such a theoretical construct set up to describe past reality, is inadequate. We agree that deriving cognitive potential from archaeological data is indeed problematic, and definitely so when it is required to mark a rubicon in a context as complex as the MUPT, or the Neanderthal-modern human juxtaposition in general. This is why it is unfortunate that even the comparatively few, but nonetheless important exceptions that do seek to build a more comprehensive and sturdy model of hominin cognition (e.g. Wynn & Coolidge, 2004), often seem to align themselves automatically with the Revolution Model.

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2 In fact, the same is said to be true of the typological approach to lithic material culture (Clark, 2009).

3 Note the assumption of discontinuity implied in the word «level». Technically, a reconciliation of discontinuity with gradual variation across a continuum is actually possible, but requires the introduction of new concepts such as emergent behaviour, as applied to the Human Revolution by e.g. Fauconnier & Turner (2002).

4 For remarks along the same line, see also Mellars (1991: 70), Stiner (1993: 73), Féblot-Augustins (1997: 237-238), and Stringer (2002: 575).

4. Empirical validity

4.1. The Behavioural-Trait Approach

If cognition is in most cases intimately connected to behaviour and culture as an ability to make the latter possible, a diffuse intertwining is even more evident for behaviour and culture themselves (e.g. Bar-Yosef, 2002). Together, they are taken to make up material culture as well as those aspects of the organism that are morphological nor cognitive in nature. Obviously, the problem with modern cognition as indicated by the Sapient Behaviour Paradox could be accepted as some sort of epistemological limitation to our knowledge of the deep past by simply abandoning the search for potential in favour of that for actualisation, keeping in mind that the latter is necessarily a conservative approximation of ability. However, detecting a modern performance in the archaeological record requires us to know what to look for[5]. Two solutions to that problem have been proposed: using either symbolic reference as a proxy for modern behaviour (see e.g. Duff *et al.,* 1992), or the so-called Behavioural-Trait Approach (Wadley, 2001). The combination of both is common as well (e.g. Bar-Yosef, 2002), as the use of symbols can be regarded as one of the elements on the trait list. We will argue that both heuristics either lack the possibility of adequate empirical testing, or have a doubtful theoretical foundation. Moreover, as both have matured under the wings of the Revolution Model, they are not actually equipped to handle the evidence for what they necessarily must consider to be «early signs» of modernity, or what we like to call, «modernity singularities».

The former method, coined *Shopping-List Approach* by Wadley (2001: 207), basically consists of drawing up a list of supposedly modern features (of a behavioural or material nature), which are subsequently searched for in the archaeological record (Bar-Yosef, 2002: 364-369). Its flaws have been dealt with extensively by others (d'Errico, 2003; Henshilwood & Marean, 2003; Wadley, 2001), so we can refrain from going into detail here. In short, its main shortcomings are these: initial lists, which varied somewhat depending on the scholar, were distinctly Eurocentric in nature. They were grafted on the changes observed at the beginning of the UP (see Mellars, 1991: 63-64), which perhaps especially because of the marked outbreak of both portable and parietal «art», naturally lent itself to being viewed as the earliest occurrence of modernity. McBrearty & Brooks (2000) attempted to remedy this by compiling a list that purposefully incorporated the African record. Nevertheless, some features that seemed to be intuitively straightforward at first, turned out to be more difficult to operate than expected (e.g. standardisation of tools, see Marks *et al.,* 2001 and associated comments).

Secondly, it has become clear that the elements on the modernity list are not represented in the monolithic way as suggested by the Revolution Model: not only are some of them lacking from certain UP groups, they are even absent from several *extant* hunter-gatherer groups (e.g. blade debitage, Bar-Yosef & Kuhn, 1999: 323). Moreover, a lot of them are clearly attested in the archaeological record (long) before the onset of the UP (see also d'Errico & Stringer, 2011), e.g. blades and microblades (Bar-Yosef & Kuhn, 1999; Johnson & McBrearthy, 2010), bone tools (Brooks *et al.,* 1995; Yellen *et al.,* 1995, d'Errico & Henshilwood, 2007), hafting (Boëda *et al.,* 1998, 1999; Grünberg, 2002; Mazza *et al.,* 2006), the use of pigment (Hovers *et al.,* 2003), and non-representational markings (d'Errico *et al.,* 2001; Henshilwood *et al.,* 2002). As Soffer aptly described the problem, «These criteria are more than slippery because they are neither univer-

5 For some pertinent theoretical considerations regarding the question of how to actually deal with potential evidence for such actualisation, see Chase & Dibble (1992: 45-47).

sal nor eternal» (Soffer, 2009: 45).

When browsing through this subject matter (Bar-Yosef, 2002: 364-369; d'Errico, 2003; d'Errico *et al.*, 2003; Jehs, 2003, 2004; McBrearty & Brooks, 2000; Mellars, 1996: 366-391), one feels compelled to ask how many elements actually need to be present in order to infer modern behaviour: by demanding a specific package of characteristics to be present (like those emerging at the UP), the question of how to interpret the older modernity singularities becomes ever more relevant. Explaining them as singular expressions of a pre-existing ability for modernity would turn the *Cultural Revolution* into a «mere» evolution. If so, while we would never be able to put our finger on the actual formation of the required mental architecture (because of the *Sapient Behaviour Paradox*), the problem remains as to why it would have taken so long for the full package to coalesce, given the inherent connection between modernity and superiority. Marginalising this difficulty, and especially the problem of a Neanderthal modernity (cf. *infra*) by reserving the term Upper Palaeolithic/Later Stone Age (and therefore, modernity) for those new regimes that originated from the MP or MSA and went on to result in a lasting phenomenon (Bar-Yosef, 2002: 381-382), seems like an exercise in semantics, not an actual option.

These considerations of the Behavioural-Trait Approach announce the rather rhetorical question: can (new) material culture (Wadley, 2001: 207) or a certain kind of behavioural attribute, dietary specialisation for example (Stiner, 1993: 66-67), be used as a proxy for modernity at all ? Moreover, how do we choose the criteria for accepting any given trait, without falling victim to circular reasoning, as d'Errico appropriately asked (2003: 189-190) ? According to Tooby & Cosmides (1992: 64) as well, behavioural categories appear to be a notoriously bad guide to the universal features of a given species, and indeed, some behavioural distinctions between Neanderthals and modern humans have been found to take the form of differing frequencies of behavioural variants, rather than differing variants (Stiner, 1993: 64, 74, see also Zilhão, 2007). However, as the basis for the latter is to be found in genetically encoded cognitive mechanisms or information processors (Tooby & Cosmides, 1992: 64), it remains more than reasonable that at least some of those mechanisms are indeed species-typical (Mellars, 1996: 366-368). In the case at hand, the traits on the list have been taken to imply that Neanderthals displayed less foresight and planning depth than their modern counterparts, but whether this is the case, and if it were, whether it represents a mental constraint on the part of the Neanderthals, is far from resolved (Bar-Yosef, 1998: 154-155; Coolidge & Wynn, 2004; Hayden, 1993: 115-117; Mellars, 1991: 70-71; Roebroeks *et al.,* 1988; Schlanger, 1996; Wynn & Coolidge, 2004).

4.2. Symbolic reference

According to the orthodox take on symbolic reference in archaeology, this second proxy for modernity requires a referent or sign, for example an object, a gesture or an utterance, and that which is referred to (Duff *et al.,* 1992: 212). Basically, the relationship between both can exhibit three levels of abstraction, corresponding to three kinds of signs. The first one is the icon, which links by resemblance. The index represents the second level, at which the referee and the index directly relate to each other without the constraint of resemblance, e.g. by way of a temporal or causal link as in smoke and fire. The symbol, representing the third and highest level of abstraction, is clearly special, as its relationship to whatever it refers to is completely arbitrary (but obviously agreed upon). As symbolic reference can be securely tied into particular changes at the onset of the Upper Palaeolithic, it is also assumed to be pervasive in all extant human cultures, ostensibly making it a necessary and sufficient precondition for modernity (Chase & Dibble, 1987; Duff *et al.,* 1992; Lindly & Clark, 1990; Zilhão, 2007). Succinctly put, «[...] symbolism is considered important because of its necessarily arbitrary nature, allowing associa-

tion of meaning to take place apart from 'reality'. The ability to abstract is taken to be a uniquely human characteristic. To be able to identify evidence of symbolic behaviour is to be able to fix, in time and space, when and where we became fully human» (Duff *et al.,* 1992: 213).

As we saw earlier, Renfrew (1996) has already put the last part of this statement into perspective. As far as considering the ability to abstract to be uniquely human (read: modern) is concerned, it should be noted that symbol *use* does not seem to be restricted to our species. Great apes, and chimpanzees in particular are capable of using symbols (McGrew, 1991: 15, but see Pinker, 1994: 343-351, for a cautionary note on language), though creating symbols seems to be beyond their reach.

There is a more immediate difficulty, which is imbedded into the make-up of this approach. The distinguishing quality of a symbol is its arbitrary link with the entity it refers to. Consequently, symbol theory may prove highly productive in the hands of cultural anthropologists, as the meaning of a sign and its level(s) of abstraction can either be communicated to, or deduced by the researcher. Prehistorians, on the other hand, face the daunting task of figuring out by themselves, whether an icon or an index also has a symbolic component (see the discussions about the meaning of cave art, for example Mithen, 1990: 226-255), and in the case of a purely non-figurative feature, if they are dealing with a sign in the first place, rather than a doodle. Obviously, taphonomic and microscopic analyses are indispensable first steps (e.g. Gautier, 1986; d'Errico & Villa, 1997), but even after having established the intentional nature of an alteration, would it by definition be impossible to separate a symbol from a doodle. However, patterning of certain signs or designs limited in space and time may be expected to point to the existence of symbolic reference, because it would presuppose an information flow between multiple persons (Chase, 1991), which agrees well with the communicative function of symbols. This empirical guideline for uncovering symbolic reference happens to correspond with Wadley's (2001; see also Henshilwood & Marean, 2003; Zilhão, 2007) concept of modernity: the use of symbolic reference to organise behaviour (or differently put, the storage of symbolic information outside the human brain).

For several reasons however, discussed by Duff and co-workers (1992: 214) and including preservation and low population densities, this criterion may be impossible to meet for the time period under consideration, even if symbolic reference actually occurred in a patterned way in the deep past. These authors go on to argue in favour of isolated cases, because those allegedly are the only remnants of those once widespread patterns. These cases include the so-called symbolic artefacts (incised and perforated bone, worked fossils, minerals, wood, and stone) the practising of burial and ritual in general, art, style/imposed form, and language (see e.g. Bednarik, 1992,1995; Chase & Dibble, 1987; d'Errico, 2003; d'Errico *et al.,* 2003; Jehs, 2003; Mellars, 1996: 367-391 for summaries). Unfortunately there is no way of telling whether their claim has any general or even particular validity as it cannot be falsified. While we concur with their argument that one accepted case of symbolism pre-dating the UP would indeed disprove the theory that symbolic expression did not occur before the UP (Duff *et al.,* 1992: 214), having to deal with isolated cases only is what has prevented one from accepting a single example of symbolic reference in the first place. In other words, one accepted case of symbolism would consist of multiple individual expressions, restricted in space and time, which Duff and co-workers themselves admit is both unlikely and (at the time of their writing) unattested. Contrary to Hovers and co-workers (2003), a case of colour preference in pigments, although suggestive of a non-utilitarian function, does not constitute incontestable proof of symbolism. Worked lumps of pigment point to symbolic reference only indirectly (if they do so at all), inviting speculation and uncertainty about their actual function(s): ignoring possible utilitarian uses (such as a component of hafting material, e.g. Lombard, 2007), there is still a chance that

a mere aesthetic appreciation, for which ample evidence exists in the form of colourful minerals and fossils recovered from archaeological sites, acted as the sole generator for the observed pattern of colour selection or preference (Duff *et al.,* 1992: 224). A similar feel for aesthetically pleasing (abstract) imagery might account for the engraved ochres found in Blombos cave as well (Henshilwood *et al.,* 2002).

One class of artefacts that comes closest to escaping this line of reasoning, i.e. that may indeed be a sound indicator of symbolic reference in the Palaeolithic archaeological record, while at the same time dating back to pre-UP/pre-LSA times are beads, because of the numbers and patterns in which they have been found. Presumably, they functioned as elements of personal decoration, and, again presumably, in that capacity they signalled personal or group identity (Kuhn *et al.,* 2001; Henshilwood *et al.,* 2004; Soffer, 2009; Vanhaeren & d'Errico, 2006; Zilhão, 2007; Bouzouggar *et al.,* 2007; d'Errico *et al.,* 2009). At best, if all other indications for symbolic thought (e.g. MP burial[6]) before the Human Revolution are rejected, this leaves us, as was the case with the Behavioural-Trait Approach, with the existence of a *modernity singularity* pre-dating the Upper Palaeolithic.

In effect, assuming that the cognitive substrate was present the moment a certain modernity singularity appeared, *and* that this substrate remained present in the population, what we need to explain from the point of view of the modernity frame of reference, is why such singularities fluctuated in and out of existence. As noted by others, large enough population densities (Norton & Jin, 2009: 247; Shennan, 2001) may very well be such a trigger, but separating cause and effect when looking for associated changes in such tightly knit areas as food acquisition strategies, social organisation (see Wadley, 2001; Henshilwood & Marean, 2003; and the institutionalised intersubjectivity as described by Soffer, 2009), division of labour (Kuhn & Stiner, 2006) or mobility patterns is no straightforward task (see also Zilhão, 2007; Weiss & Dunsworth, 2011). In any case, one should ponder the value of a concept meant to differentiate one (sub-)species from another, when it can apparently only be used to tell apart performances that may depend on factors such as demography rather than cognitive potential alone.

5. Theoretical utility

5.1. Variability and evolution

In the previous sections, we gave a very succinct overview of the way the modernity concept has been used in palaeoanthropology by drawing attention to the most pertinent and general problematic features. Here, we take a step back, outside the confines of the modernity frame of reference, in search of another paradigm from which to scrutinise the latter's theoretical basis. We chose the theory of evolution to be that other point of view: it constitutes the very basis for the study of life and its staggering variability in particular, and moreover, it forms the basic frame of reference of (at least biological) palaeoanthropology.

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6 It is interesting to note that Fauconnier & Turner (2002: 204-206) consider burial to be a modern behavioural pattern, provided that the underlying reasoning would be guided by the concept of «living with the dead». As a similar explanation has been suggested several times by others (e.g. Chase & Dibble, 1987: 276), we consider Mellars' (1996: 381) statement to represent a common opinion: «At the very least we must assume that the act of deliberate burial implies the existence of some kind of strong social or emotional bonds within Neanderthal societies, which dictated that the remains of relatives or other close kin should be carefully protected and perhaps preserved in some way after death». This fits the requirement by Fauconnier & Turner perfectly, which would mean that the concept of modernity understood this way would be applicable to the pre-UP or pre-LSA time frame, and both to Neanderthals and (anatomically) modern humans.

As such, an evolutionary perspective may provide us with a universal and (far) more basic background compared to the quadruple set of morphology, cognition, behaviour, and culture we discerned earlier, in the form of the dual concepts of genotype and phenotype. While the genotype refers to the genetic make-up of an organism, its set of genes, the phenotype, defined as the «[...] manifested attributes of an organism, the joint product of its genes and their environment during ontogeny» (Dawkins, 1989: 299) encompasses and bundles the former four categories, however with the added implication that all four are intertwined and feeding back to each other, while interacting with the ecological and socio-cultural environment (see also Deacon, 1997; Gibson, 1996), as well as the genotype.

For our purposes, we wish to discern two kinds of phenotypic variability. The first, discussed in this section, stretches out over large time spans involving alterations of the genotype caused by evolutionary processes. Of these, natural selection is the most important given the fact that, in our simplified frame of reference, it is the only process that can induce adaptive (as opposed to neutral or maladaptive) change, which is critical to the study of *relevant* inter-specific variation (Chase & Dibble, 1990: 59). As evolution is basically the differential survival of alternative alleles (variants of a gene competing for their assigned place or locus at the chromosome), natural selection can only act indirectly on genes, i.e. by interacting with individual phenotypes. At that level and considered through time, evolution is nothing more than a continuous alteration of elements that are already there[7], without any foresight or predetermined goal, and not necessarily leading to increasing complexity or progress. In the apt words of Lewontin (2000: 88), «Evolution is not an unfolding but an historically contingent wandering pathway through the space of possibilities».

As we will argue, the modernity concept tends to violate this characterisation of evolution in a subtle way. No matter whether Neanderthals and modern humans represent two populations of a single species, or two different species, and no matter to what extent interbreeding between both occurred (see e.g. Green *et al.,* 2010), they may be considered as having walked diverging evolutionary paths since the moment both split off from their mother population. While this divergence need not be interpreted as absolute, one simply has to take a look at their respective morphology to recognise that each population adapted over time to its specific environmental (*sensu lato*) settings, and therefore, that genetic variability between both must have existed, and most likely surpassed that within the respective populations. So, even if it were possible to define a *modern phenotype* based on what is typical for us *H. s. sapiens* (to which we will come back later), that definition would logically be inseparably connected to *H. s. sapiens*, obviating the possibility (indeed, the need) of applying it to Neanderthals or any other animal with a distinct evolutionary trajectory, despite the inevitable existence of shared phenotypic features.

Still, in the context of the modernity debate, the question of Neanderthal modernity is both considered legitimate and common, as if an embryonic or partly developed state of modernity can be found in species or populations other than the one on which the concept was based, and as if modernity or the modern cognition underlying it, can be considered an independent norm which only modern humans (fully) attained. Arguing from an evolutionary point of view, we believe it is debatable to apply the comparative method in such a way that certain characteristic features of a population can be understood as scaled down versions of the (modern human) norm. They may, but that cannot be assumed *a priori*.

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7 These existing elements may have arisen through processes other than natural selection, such as mutation.

Traditionally archaeologists, and given the considerable time depth involved, those studying the Palaeolithic in particular, have tended to interpret variability in a diachronic way, as developing through time in a largely progressive and mostly discrete manner towards increasing complexity (Mithen, 1996; Rowley-Conwy, 2001: 44; see also d'Errico, 2003: 199). With some exceptions (see e.g. Smith & Szathmáry 1999; or Mayr, 2001: 234-239), progress or increasing complexity is not a product of natural selection (Rosslenbroich, 2006), as the latter leads only to adaptation[8] to specific environments that never remain constant when viewed over long enough periods. As far as evolutionary biology is concerned, if there is progress in evolution, it is never teleological (Mayr, 2001: 237), but rather «[...] a tendency of *lineage*s to improve cumulatively their adaptive fit to their particular way of life, by increasing the number of features which combine together in adaptive complexes» (Dawkins, 1997: 1016, as cited by Mayr, 2001: 237, *italics mine*).

However, and here the uneasy tension between behaviour and culture appears, this does not mean that the notion of increasing complexity cannot be defendable in cases of material culture. When comparing lithic technologies in human evolution, for example, it is clear that the chaîne-opératoire of an Oldowan stone tool is much simpler than that of prismatic blades. More relevant for our discussion is whether the same is true for prismatic blades and levallois-based artefacts (Schlanger, 1996), and particularly whether or how complexity at such a (material) level should subsequently be interpreted in terms of behavioural or cognitive complexity (see also Davies & Underdown, 2006). As an example of how tightly knit the notion of teleology/scalability and progress/complexity has become in Palaeolithic anthropology, it has been argued that Mode 3 technologies were more important to the origin of our species (and therefore modern ability and behaviour) than those of the subsequent Mode 4 (Upper Palaeolithic or Late Stone Age), which opens the door to modernity – initially a modern human prerogative - for other hominins such as the Neanderthals (Foley & Lahr, 1997).

A third consideration concerns the unique situation of the Neanderthals, our closest hominin relative, as they arguably stand the most change of having «attained» modern cognition. This intuitive and intriguing possibility has been amply suggested by using both empirical heuristics mentioned previously. Although the underlying reasoning of the Trait-List Approach has been deemed problematic, it has nonetheless been used to argue in favour of Neanderthal modernity (d'Errico, 2003; Hayden, 1993), or at least a «Neanderthal version» of it (Jehs, 2004; Hoffecker, 2006). Likewise, and as far as the so-called transitional technocomplexes such as the Chatelperronian in Europe were of Neanderthal making, evidence for symbolic reference prior to the UP has been found in the form of beads, comparable to, but different from similar attestations found among anatomically modern humans in Africa and the Levant (see Zilhão, 2007 for a summary).

The fact that behavioural characteristics between both species can overlap to such a degree, led Hoffecker (2006) to suggest that «[...] Neanderthals are the least suitable nonmodern hominins on which to base a comparative definition of modernity».

We could not disagree more: if modernity is really a definable concept that is supposed to set modern humans apart from other hominins, Neanderthals should on the contrary be ideally suited, exactly *because* of their close behavioural (and cultural) proximity: if

8 Adaptation can be described as a «property of an organism, whether a structure, a physiological trait, a behaviour, or any other attribute, the possession of which favors the individual in the struggle for existence [...] most such traits were acquired by natural selection or, if they arose by chance, their maintenance was favoured by selection» (Mayr, 2001: 165).

the definition works for Neanderthals, it will work for any other hominin. The fact that this approach cannot be made to work (anymore), is very significant. As again d'Errico (2003: 199-200) pointed out, having to acknowledge the possibility that another hominin displayed modern behaviour compromises the role of modernity as a marker for the modern human condition, which is especially striking when we consider the possibility that Neanderthal mental architecture may have been somewhat different than our own.

5.2. Variability and phenotypic flexibility

The second kind of phenotypic variation we would like to discern originates with phenotypic flexibility or reaction norm, i.e. «The amplitude of variation of the phenotype produced by a given genotype under different environmental conditions [...]» (Mayr, 2001: 98-99).

It allows organisms to tolerate (or swiftly adjust to) environments or situations that are either new, or quickly altering (e.g. seasonal temperature fluctuations, or more in general, stress) with a speed that cannot be matched by adaptation through natural selection. On a morphological level for example, athletes can (and purposely do) induce changes in their muscular and skeletal system by exposing their bodies to a special kind of (controlled) environment called training. Similarly, plasticity can produce a wide range of behaviours, including the adoption of new subsistence strategies in order to deal with a changing availability of food (Cronk, 1991). Our highly developed capacity to learn from others (social learning), as opposed to trial and error further enhances our ability to adapt (Kameda & Nakanishi, 2003). Such socially transmitted behavioural patterns, or culture (Alvard, 2003), extend our behavioural flexibility even more, far beyond that seen in other animals. Culture can moreover be viewed as an inheritance system on its own (Boyd & Richerson, 1985), adding to the already staggering diversity through feedback mechanisms between the genetic and the cultural level.

Modernity as a concept must necessarily subsume an enormous cultural and behavioural diversity, from the present day hunter-gatherers to the average western household (see also Chase & Dibble 1990: 59; Mellars, 1991: 70), as well as the variability displayed by the palaeolithic members of our species, who lived in environments without extant analogues (e.g. MIS 3, see Steward, 2005). While in theory, the ability to encompass these «endless forms» (Smith, 2011) constitutes the power of the modernity paradigm, it leaves us with a frame of reference unable to move beyond a very general descriptive level. Such a general level would most likely take the form of *ability*, in which case the term becomes rather meaningless when applied to extant humans (Tooby & Cosmides, 1992: 64) and prehistoric humans (Renfrew, 1996) alike.

Kahn (2001: 656-659) discusses the different meanings the term «modernity» has been infused with historically, as well as the way anthropologists envision it today. Typically, the concept covers only a small section of cultural variability (e.g. capitalism), while its application to different geographical realities even leads to the conception of *multiple modernities*. We therefore argue that the modernity frame of reference cannot be used to simultaneously describe (let alone explain) the origin of modern performance and any of the myriad subsequent manifestations with equal authority. As such, the assumption that modernity provides an empirically valid and theoretically firm conceptual framework for the description of our species, past and present, or in other words, that modernity is a determinable feature of our species, should best be abandoned.

6. Afterthoughts

While the simple evolutionary logic we applied may have sufficed to bring out some inconsistencies between the modernity concept and evolutionary theory, and to question the formers theoretical utility, it will be clear that this basic evolutionary point of view would not do any better than the modernity concept in dealing with cultural expressions and their diversity, even if an extended phenotypic point of view (Dawkins, 1999) would be adopted. While they apparently find it difficult to separate behaviour from culture (especially if the latter is understood in non-material terms), archaeologists have understood very well that culture cannot be explained in mere biological terms, and as such, reductionist approaches are unlikely to have any appeal to them, or to the human or social sciences in general. Moreover, while evolutionary theory is in principle non-teleological, and generally unconnected to complexity or progress, there is no way around the staggering diversity and complexity, and occasional increases thereof, in human culture.

However, this does not take away the fact that archaeologists' frames of reference must be compatible with evolutionary theory, so it may pay off to start from there. As mentioned before, this body of theory was built to describe and explain variability, and it does so without elevating aspects of one species to the level of norm against which other life-forms are gauged in some way or another. Moreover, we may have to step back from our intuitive urge to search for and identify rubicons – which appear to be plenty in archaeology – in favour of looking at adaptive phenomena, such as the modernity singularities discussed before. Only the study of the specific dynamics behind their occurrence in a specific spatial and temporal frame[9] (i.e. context specificity, see Clark, 2009: 34), can lead us to new insights; merely considering them as early «blips» of modernity cannot. In the case of two hominins with largely overlapping behaviours (one could envision them as frequency shifts within existing ranges of behavioural variation, see Stiner, 1993: 74; see also Chase, 1989), this could be a very productive strategy towards a more objective comparative method.

9 While recognising stochastic effects (i.e. historical contingency, see Clark, 2009: 34).

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Dieter JEHS
Universiteit Gent
Vakgroep Archeologie
Sint-Pietersnieuwstraat 35
BE – 9000 Gent
dieter.jehs@ugent.be