
Semiosis in the Pleistocene

Marc Kissel & Agustín Fuentes

A distinctive aspect of human behaviour is the ability to think symbolically. However, tracking the origin of this capability is controversial. From a Peircean perspective, to know if something truly is a symbol we need to know the cultural context in which it was created. Rather than initially asking if materials are symbols/symbolic, we offer that it is more salient to ask how they functioned as signs. Specifically we argue that using the Peircean distinction between qualisigns, sinsigns and legisigns provides support for this endeavour. The 'flickering' of early symbolic behaviour (the sporadic occurrences of objects with embedded social meanings in the Pleistocene archaeological record) can best be seen as sinsigns, whereas sites that show long-term presence of such materials are demonstrating the presence of legisigns: the codification of ideas. To illustrate this approach, we apply these ideas to three classes of artefacts, demonstrating how this system can address issues of relevance to palaeoanthropologists and archaeologists who often fetishize the symbolic as the one ability that makes us human.

Introduction

Symbolic thought is often argued to be a distinctively human trait (Deacon 1997), with the production of symbols seen as a marker of modern human origins (Chase & Dibble 1987). As the fossil record rarely preserves enough data to infer the cultural practices of early humans, the archaeological record is our main source of information for when and how hominins became fully human. In principle, we need to find evidence of symbolic behaviours in the archaeological record and extrapolate from these data the origins of symbolic behaviour. Yet this has proved far from easy. What makes something a symbol in an archaeological context is far from clear.

The main difficulty in assessing the use and role of symbols may be in the way the concept of a symbol has been applied to materials in the Pleistocene record. By its very nature, a symbol must be read and interpreted within a system of meaning. Yet the actual cultural system in which an artefact is situated is often unknown, and the same object can be interpreted in disparate ways even within similar cultures. Archaeologists and palaeoanthropologists have strug-

gled to find ways to identify symbols without knowing what they stand for (their meaning). This remains an issue of much relevance to archaeologists working on complex societies, where attempts to understand what particular objects mean have been highly influential. Yet for the Pleistocene, and in particular for the suite of artefacts suggested to be of symbolic relevance in human evolution, understanding what these objects meant to their creators is a seemingly hopeless objective.

Here we lay out our reasoning for centring questions not on what these objects meant to early humans, but on *how* they were able to mean something. Following Joyce (2007) and others (Hendon 2010; Keane 2003; Parmentier 1997; Preucel 2006; Preucel & Bauer 2001), we emphasize an approach using Peircean semiotics that allows us to track the evolution of meaning-making as opposed to symbol interpretation. In understanding how humans make meaning in the world, the ability to create objects embedded with meaning is a salient one. The ability to create objects that not only have meaning, but that are created with the intent to produce a specific meaning/response in the mind of another person, is a critical part of human behaviour.

We argue that a core weakness in the study of the origins of human symbolic expression is the frequent, often exclusive, reliance on the icon/index/symbol trichotomy developed by Charles Peirce. A sign is symbolic if the connection between the sign and the object it stands for is predicated on convention, rather than by similarity or contiguity (icon and index, respectively). However, discerning that a conventional ground (the abstraction of the quality of the meaning, the relationship between a sign and object) exists is difficult when the broader cultural system is unknown. For this reason, we suggest that this trichotomy cannot help us to understand when semiotic thought evolved to include symbolism, since it would require knowing *a priori* the specifics of the cultural system we wish to understand. This standard approach works once we know the cultural system, but it cannot help us to understand how the larger system came into being. In its place, we suggest utilizing Peirce's first trichotomy, which is centred on how a sign functions. Focusing attention on *how* signs were able to convey meaning, rather than on what specific meaning the signs are conveying, allows anthropologists a more subtle interpretation of the past. To demonstrate this, we first provide some background on the use of semiotics and on Peirce's pragmatics. We then apply this theory to three types of archaeological artefacts and conclude with suggestions for future research.

Background

Leslie White was among the first anthropologists to discuss symbolic thought as the principal difference between humans and other animals (White 1940). For White, the symbol is the basic unit of civilization, analogous to how the cell is the basic unit of life: 'A creature either uses symbols or he does not; there are no intermediate stages' (White 1940, 453). White's notion of an 'all-or-nothing' capacity for symbolic thought has been influential and he draws a distinction between a sign and a symbol. Under his system, a sign's meaning is intrinsic to the object itself; it can be perceived with the senses. For something to be a symbol it cannot be simply perceived by the senses.¹ Before the origins of language, White argues, we were not fully human: 'Only by means of speech can the baby enter and take part in the human affairs of mankind' (White 1940, 462).

For White, the transformation from non-human to human happens at the moment of language awareness. Likewise, modern palaeoanthropologists search for when and where hominins were transformed from non-symbolic to symbolic thinkers. Recently Rossano

(2010) asks when our species crossed the 'symbolic threshold'.²

While White has been very influential, Terry Deacon (1997), more than anyone else, is primarily responsible for popularizing the concept of humans evolving as a symbolic species and for bringing Peirce's work to the attention of palaeoanthropologists. Deacon argued that symbolic thought and language co-evolved and the ability to think symbolically is what allows for humans' unique linguistic capabilities. It is through his work that many palaeoanthropologists first became aware of Peircean semiotics.

Symbolic thought is suggested to be the basis for language, consciousness and shared intentionality, which exist in humans at levels beyond that which we see in non-human primates (Tomasello 2014). These characteristics, in turn, allow for cumulative cultural learning, which played a key role in the spread of culture and technology. Importantly, we can recognize these processes in the archaeological record. If the use of bead technology and the presence of engraved objects can be taken to indicate the origins of human symbolic thought, then by ~300–200,000 BP we can see the initial appearances (or flickering) of these behaviours (Kissel & Fuentes 2016; Marean 2015). The presence of shell beads and engraved ochre at Blombos Cave in South Africa by ~100,000 BP has been said to indicate that humans were not just creating symbolic artefacts, but using language (d'Errico *et al.* 2009). This is relevant, as the fossil and genetic evidence is equivocal on the origins of human language. If symbolic thought is a prerequisite for, or co-evolved with, language, then its archaeological indicators can, in theory, pinpoint the origins of these behaviours.

Yet, with all of the emphasis that symbolic thought has been given, what is meant by the term *symbolic* is far from clear. Malafouris (2008) suggests that archaeologists have been too quick to accept artefacts such as the Blombos beads as evidence of symbolic behaviour:

Although an emerging archaeological consensus seems to have accepted these artefacts as indexes of symbolic behaviour, I think that simply to prove the artificiality of a perforated shell, and maybe also its function as a personal ornament, does not necessarily make it a symbol—at least not in the arbitrary, representational sense that is often associated with them and which could substantiate a claim for the presence of fully developed symbolic language. (Malafouris 2008, 406)

Malafouris argues that the beads represent evidence of self-awareness, evidence similar to that revealed in mirror recognition tests with certain non-human organisms (such as chimpanzees, or dolphins)

(Gallup 1977). He suggests that beads provided ‘an extended reorganization in the cognitive system [which] makes possible the bringing forth of a new type of self-knowledge’ (Malafouris 2008, 408). The same problem can be seen with other markers of symbolic thought, as cogently argued by Wynn and Coolidge (2009), who suggest that much of what has been assumed to be evidence for symbolic thought/modern cognition does not stand up to strict standards derived from cognitive science.

What are palaeoanthropologists to do? We argue that a way out of this problem is to apply Peircean semiotics to the palaeoanthropological record. Umberto Eco defined semiosis as ‘the process by which empirical subjects communicate, communication processes being made possible by the organization of signification systems’ (Eco 1976, 316), a system of meaning making. Archaeologists have applied this framing of semiotic anthropology to understand more recent archaeological cultures (Hendon 2010; Joyce 2007; Lau 2010; Preucel 2006). While Peirce’s icon/index/symbol trichotomy is well known and has been applied to the archaeological record (Deacon 1997; Hodgson 2014; Rossano 2010), it lacks an effective explanatory impact for reasons articulated below. We intend to illustrate here the need to refocus the question away from whether something is a symbol, icon or index and ask how an item functions as a sign. Privileging the symbolic over other sign forms may cause evolutionary anthropologists to miss, or at least overlook, much of the semiosis (meaning-making processes) of the past.

The salient question a semiotics approach can assist in answering is how artefacts played a role in, and thus offer material evidence of, meaning-making processes of early humans. How signs functioned in the deep past can inform on not just their role in social evolution and niche construction, but also on the evolutionary processes of the more complex semiosis we see in more recent humanity. To move beyond the symbolic, we first must trace Peircean semiotics and its constituent parts. A semiotic palaeoanthropology can provide a clearer, less symbol-biased view of the archaeological record.

Semiotics

Much of what archaeologists think about the use of symbols is based on the work of Ferdinand de Saussure (1857–1913) and Charles Peirce (1839–1914). In order to understand what Peirce brings to the field of palaeoanthropology, we must first see how his interpretation and terminology differ from those of Saussure, whose framework significantly influenced an-

thropology via Structuralism. There has been a resurgence of the Peircean model in anthropology since the 1970s (Parmentier 1997; Singer 1978) and, in a limited sense, in archaeology as well (Preucel 2006; Preucel & Bauer 2001).

A key difference in the two approaches is that Saussure’s theory was developed to understand linguistic signs, while Peirce saw linguistic signs as part of a more general system. In other words, Saussure is primarily interested in meaningful sounds, while Peirce is more interested in representational signs. The second major difference is that Saussure’s system is dyadic, while Peirce’s is triadic. These two differences go a long way in determining how symbolic artefacts are identified. After a discussion of how both scholars conceived of signs, we explain how Peirce’s trichotomy of signs can help us to understand better how early humans were functioning in their social niche.

Saussure defined a sign as having two parts: the signifier and the signified. The signifier is an acoustic image and the signified is a concept. Importantly, Saussure argued that the relationship between these two was arbitrary. Problems emerge when scholars apply Saussure’s concept, meant for linguistic signs, to non-linguistic ones (de Waal 2013). Applying Saussurean semiotics, which is at the heart of Structuralism, to the archaeological record is complicated, as often the question under analysis is whether a hominin population was capable of language.

For Saussure, all signs are arbitrarily assigned, while for Peirce, two classes of sign-object relations are not arbitrary. This allows for semiosis to occur in non-human animals. One of the benefits of Peirce’s work is that it is less anthropocentric than Saussure (Kohn 2013): not all signs are language-driven, so signs are part of the non-human world. In other words, semiosis is part of the natural world. For scholars interested in evolution, Peirce’s system allows a more nuanced comparison between humans and the non-human animals, rather than assuming a strict dividing line such as White suggested and Saussure implied. Thus, it may be applied to differences within the hominin lineage.

One example of how the approaches differ comes from Singer (1978), who popularized Peircean semiotics in anthropology. He suggests that anthropology can turn to Peirce in that ‘a semiotic anthropology is a pragmatic anthropology. It contains a theory of how systems of signs are related to their meanings, as well as to the objects designated and to the experience and behaviour of the sign users’ (Singer 1978, 224, emphasis original). The benefit of a Peircean semiotic anthropology is that it allows researchers to analyse the

meaning of social context, rather than only attempting to reconstruct the abstract meaning of a material object (Mertz 2007). The sign process is a triadic relationship that includes the *understanding* of the link between the sign and the symbol. Thus, Peirce requires scholars to analyse social context while trying to understand the meaning of a sign (Singer 1978), focusing attention on the broader process of meaning. For example, in humans the feelings of connectedness engendered by ritual is an aspect that can be studied semiotically (Ball 2014). As all thought is mediated by signs, we can use the same toolkit to analyse both thinking and speaking with regard to ritual actions (Ball 2014). Discussing how a sign conveys meaning allows for an analysis that focuses on the various ways meanings can be conveyed, rather than focusing solely on language or its material homologues. This, in turn, allows for the recognition of semiosis as part of the broader animal world (Kohn 2013). Examining a particular artefact with a Peircean approach allows us to ask more general questions about the artefact than a Saussurian approach, as the Peircean system looks to understand semiosis beyond just the symbol or the word. In this vein, we can begin to ask how an archaeological culture functioned within its world of signs.

Peirce saw signs as composed of three related components:

A sign, or representamen, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That sign which it creates I call the interpretant of the first sign. The sign stands for something, its object. (Peirce 1958, para.228)

To avoid confusion, Peirce often talks about the *sign-vehicle* or the *representamen*, which refers to a specific aspect of the sign itself that is the signifying element. The representamen is what Saussure would call the signifier, while the object is what he would call the signified. What the interpretant *is* is hard to parse, but for our purposes we can think of it as the understanding between the sign and the object. Technically speaking, Peirce distinguishes between three interpretants: the immediate, the dynamic and the final: 'The [Dynamic] Interpretant is whatever interpretation any mind actually makes of a sign' (Peirce 1958); the 'Final Interpretant does not consist in the way in which any mind does act but in the way in which every mind would act' (Peirce 1958, para.315). By adding the 'every mind would act' phrase, Peirce seems to suggest that this is the way everyone would react to the sign, irrespective of their background. The immediate interpretant is the general impression one gets from a sign without fully reflecting on it (Savan 1988).

It is thus immediate since it does not require reflection on what is happening. The process of meaning, then, is a system of cascading interpretants, the basis of semiosis.

Examining Peirce's trichotomy (sign-object-interpretant) suggests that there are various ways the different aspects can interact with each other. We can examine the sign itself, how the sign is related to its object, and how the sign is related to its interpretant.

The most famous of these relationships, at least for archaeologists, is the one between a sign-vehicle (*representamen*) and its object, Peirce's second trichotomy. Peirce defines three different relationships. Iconic ones are signs where the concept being signified resembles the signifier. Indexical signs are where the sign is linked to its object in a causal manner. His third relationship, symbols, are only connected to the concept they signify because this connection is agreed upon by its users. Signification can only occur symbolically if the sign relies on conventions, laws or shared agreement and understanding to signify its object.

In addition to this core trichotomy, Peirce also adds another trichotomous level of analysis that may be particularly beneficial in thinking about human evolution. Identifying a sign's 'modes of being' (Jappy 2013, 49) is a key step in semiotic analysis often left out of archaeological interpretation.

The sign vehicle (*representamen*) is the part of the sign that is critical to our interpretation. Peirce (1998) defined three types of sign vehicles: qualisigns, sinsigns and legisigns (see Figure 1).³ Qualisigns, like icons, are derived from qualities. It is the tone of the sign, to use another Peircean term. Short (2007, 209) describes a qualisign as 'the colour embodied in a cloth sample; in itself, that colour is a mere possibility, its actually occurring in the sample being an addition to it; and what it represents is nothing other than itself'. To put it another way, a sign-vehicle that is a qualisign signifies something through the quality it has. What makes a qualisign confusing is that it does not signify anything except as it is embodied in an object or event. It is non-corporeal and cannot exist apart from something tangible. The qualisign is the 'blue' of a blue cloth, not the dye or the process of dyeing, but the sensation of blue imbued in the blue cloth.

The second type of sign-vehicle is the sinsign, which can contain several qualisigns (Peirce 1998). When a sign-vehicle uses what Peirce refers to as essential facts, this is a sinsign. For example, the weather vane that shows the direction the wind is blowing is using a sinsign. The meaning of a sinsign is restricted to the here-and-now (Jappy 2013) and reflects a critical component in the process of meaning in a sign.

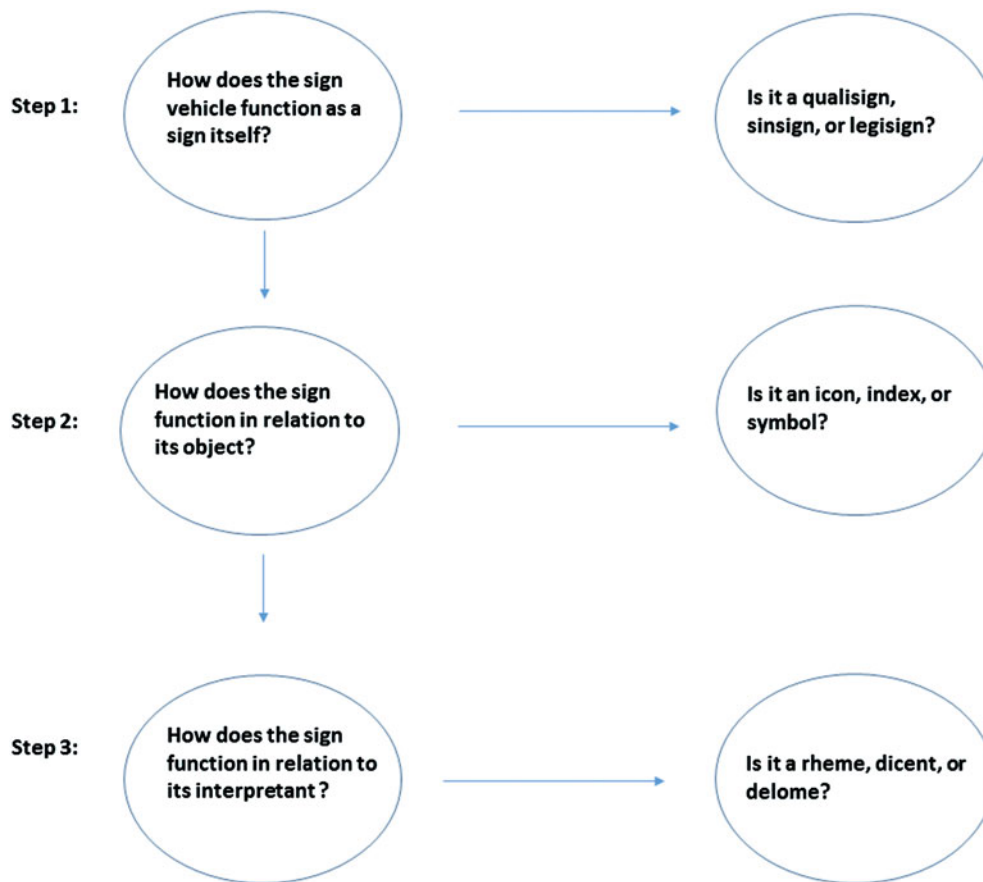


Figure 1. (Colour online) Steps in Peircean analysis.

Finally, a legisign is when the sign vehicle signifies based on convention. Legisigns define the characteristics, the shape or the sound, of their replicas. Replicas are an individual instance of a legisign, which makes them a special category of sinsigns where their significance is based on both being a replica of a legisign and on the features of its occurrence (Short 1982). Individual instances of a word are replicas of a legisign. We can think of the symbolic objects in the archaeological record, such as beads strung on a cord, handprints on a cave wall, or multiple pieces of etched ostrich eggshell, as replicas of a legisign.

How can looking at signs in relation to themselves (in Peircean terms, the triadic relations of comparison) be applied to archaeological reasoning? A qualisign is the initial thought process for a sign, just as the idea of ‘red’ may be the initial impetus to paint something, or seeing phosphenes gives an idea in the mind to depict something on a cave wall (Bednarik *et al.* 1990; Hodgson 2014). A sinsign would be the whole of the object created, like red markings on a wall. A legisign is the general practice of doing these

things, which exists within the culture—the process or habit of making red markings on walls across sites and possibly across time. We cannot actually ‘see’ the legisigns, as those are not tangible (each of the red marks on cave walls is a sinsign). But we can infer their existence, just as we can infer the existence of English by hearing people talk, yet never actually ‘see’ English.

It is difficult at first to understand the difference between a sinsign and a replica (evidence of legisign). A sinsign is a type of phenomenon that, in specific circumstances, can be used as a sign. However, a replica has to be interpreted. Parmentier (1994b) gives the example of a footprint and the utterance of a word. The footprint is possibly a replica and certainly a sinsign, but the word is necessarily a replica. Archaeologically, if we can distinguish between replicas and sinsigns, we can begin to ascertain the semiotic level, and gain insight into the process of meaning making; for example, the idea of ornamentation is passed down through cultural learning. We cannot excavate the resulting legisigns associated with ornamentation, but we can find their replicas amongst the archaeological

evidence, as we find beads at Blombos and engraved eggshell at Klipdrift. If someone has the idea of ‘red’ and expresses it by using ochre, they are creating a sinsign. When we study that artefact in the lab, are we then looking at it as a sinsign in the same way, seeing it as an expression of red? By finding repeated examples of the same artefact type, within and possibly between culture groups/archaeological assemblages, we can distinguish between sinsigns and replicas and then interpret the presence, or at least capacity for, legisigns.

While complex, Peirce’s system of thought is uniquely suited to the archaeological record, as it can be applied to any type of visual medium. The majority of archaeological theory has centred on applying his second, and by far most famous, trichotomy of icon/index/symbol. Yet this is problematic for reasons specified above. Recently, Iliopoulos (2016, 114) has also noted similar problems, arguing for the combination of pragmatic semiotic theory with material engagement theory the better to trace the evolution of sign use: ‘This preoccupation with arbitrariness is unproductive, because the arbitrary connection between a symbolic artefact and what it stands for is virtually undetectable in the prehistoric archaeological record’. He notes that the emphasis on symbols had led many to ignore icons and indexes. We would agree, and suggest further that work by Kohn (2013) and Ball (2014) indicates the importance of these sign types for both human and non-human semiosis.

We propose that the first step in a palaeoanthropological semiotic analysis is examining how the sign vehicle itself functions as a sign, before examining its potential symbolic connection. In the next section, we apply the qualisign/sinsign/legisign model to archaeological datasets to demonstrate how an engagement with Peircean semiosis allows for an enhanced discussion of palaeoanthropological data.

Applied to archaeology

In archaeology, both Saussurian and Peircean approaches have been taken, with mixed results (Preucel 2006). In terms of palaeoanthropological research, use of semiotics has been associated with Terry Deacon’s work (specifically Deacon 1997). Other scholars, such as Rossano (2010) and Hodgson (2014), have used Peirce’s icon–index–symbol trichotomy to assess the origins of symbolic thought as a distinct behaviour. As far as we know, however, the question of which subclass of sign these artefacts represent, and how subclass usage might inform our understanding of sign creation/use, has not been explored fully (for exceptions, see Hendon 2010; Lau 2010; Parmentier 1997).

Qualisigns need to be embedded. One benefit of thinking about artefacts as embedded qualisigns is that it allows archaeologists to discuss how artefacts can be similar in their qualities while still having a different materiality. For instance, we can think of the engravings on objects. Engravings have been found on ochre, bone, shell and teeth. The medium differs, but the qualisign, in this case the engraving, could be the same. Likewise, the common use of *Nassarius* shells to make beads could qualify as well (Bar-Yosef Mayer 2015).

As Keane notes, when a qualisign is embedded it is also bound up with other qualities of the same object, a process Keane refers to as ‘bundling’: ‘Redness cannot be manifest without some embodiment that inescapably binds it to some other qualities as well, which can become contingent but real factors in its social life’ (Keane 2003, 414). This bundling may reflect the sinsign. In the shell bead example, colour is bundled with other characters such as the shape of the shell.

The famous Cueva de las Manos rock art from Argentina dates to around 9000 years ago and has numerous depictions of hand prints. At the icon–index–sign trichotomy, we can note how the handprints may have functioned in the relation of the sign vehicle to an object. Iconically, there is the connection between the handprint and the hand itself. The sign and its object resemble each other enough that we can see the connection without noticing the difference. Indexically, the handprint stands for a single person, perhaps a known individual. Finally, there may be a symbolic aspect, as these prints could have a meaning known to the culture that produced it.

While perhaps a useful way to view the handprints, we need to be careful in applying these terms. As Richard Parmentier notes:

Attempts to place certain objects in the baskets of ‘icon,’ ‘index,’ and ‘symbol,’ similarly, miss the critical point that these Peircean terms are not types of signs but stages or moment in the hierarchical complexity of semiotic functioning; a symbol necessarily embodies an index to specify the object being signified, and an index necessarily embodies an icon to indicate what information is being signified about that object. (Parmentier 1994a, 389)

The relationship between a sign and object, the *ground*, is how we determine what the sign itself *means*. For a symbol, the ground is conventional, but for an icon and index the ground does not require cultural knowledge.⁴ Importantly, we do not know what the symbolic ground was in the past, so it is difficult to know how a symbol was interpreted. It is also important to remember that the terms icon, index and

symbol refer to *relationships between things, rather than to the thing itself*. When applying these terms, we are actively making connections and inferring relationships.

This proves problematic. For example, it is not enough to demonstrate that a particular suite of artefacts such as engraved objects have indexical meanings. We cannot disprove that a particular artefact is symbolic by showing that it is an index, as symbols, by their very nature, embed iconic and indexical meaning nested within them. This leaves us with the significant problem of figuring out how to demonstrate something is indeed a symbol.

If we assume *a priori* that humans are making symbols, then it may be possible to identify them in the archaeological record. However, for the earliest examples, 'are they symbols?' is often the question under consideration. The second trichotomy of Peircean semiotics can help us understand what is going on in the process of meaning making without having to assume the artefacts we are examining are necessarily symbols or that our goal is to expose their symbolic content. Modern cognition, and the ability to create and read symbolic signs, may have occurred in the distant past, but that is very difficult to demonstrate. Semiosis does not require a modern mind. Symbolic thought might be 'modern', but discerning this in the archaeological record is difficult, since we simply do not know the grounds. Using the qualisign/sinsign/legisign approach allows for the identification of a purposefully created system of signs without the assumptions of a symbolic referent. Yet it still suggests complex thought and an underlying process of meaning making. As a qualisign, there are embedded qualities such as shape, size and colour. As a sinsign, a singular handprint is a marker that someone was there, but no further meaning is assumed. It is an 'on-off' example.⁵ As a replica (evidence of legisign), it is a sign that is part of a system of meaning in which people leave handprints to signal something. Finally, the legisign itself is the overarching system in which the replicas are used and assumed to exist based on the number of replica instances. We cannot, without other cultural materials, reconstruct what these meanings are, but we can demonstrate that habitual and shared meaning-making was occurring. The presence of a conventional legisign indicates that the signs are made on purpose: it demonstrates active meaning-making.

Symbolic thought requires the capacity to use iconic and indexical signs as a template. One example of this complexity can be seen by the handprints reference above. We can view them as iconic and indexical without much of a ground, but we cannot know the

symbolic link without direct knowledge of the shared perspective of the handprint creators. It is wholly possible that different makers in different locales saw them as different symbols. Similarly, did Venus figurines have the same meaning throughout the Aurignacian and Magdalenian? We can infer the particulars of a specific 'ground' if we see extreme consistency in the image making and placement. As an example, we cannot 'see' the legisigns that make up a language, but can infer its existence through observation of auditory and visual replicas of that language.

In order to clarify these suggestions and processes of interpretation, we offer three examples of how the classification of signs can be applied to the archaeological record of the Pleistocene.

Ochre

Ochre refers to a class of mineral objects that contain iron oxide, including goethite (usually brown), limonite (yellow) and red haematite, and is a multi-functional material that served a variety of utilitarian and symbolic purposes across human history. Wadley and colleagues (2004) hypothesize it may have functioned to facilitate hafting, while Rifkin (2011) argues for its use as a tanning agent. Others suggest it had medicinal properties (Velo 1984) or was perhaps used for odour prevention (Tributsch 2016). Many have suggested it is used as a symbolic tool, perhaps suggesting a role in collective ritual (Hovers *et al.* 2003; Watts 2014). However, if it can be shown to have a functional use, some argue it is not symbolic (Tributsch 2016; Velo 1984). More than likely ochre had numerous functions, and at different sites it seems to have been utilized for different purposes, possibly multiple purposes simultaneously.

One attempt to demonstrate this has been via the colour of ochre and its potential link with a form of signalling. Power *et al.* (2013) suggest ochre use was cosmetic, supporting the earlier hypothesis of Power and Aiello (1997) that red ochre had ritual power and would have been used to signal fertility. If true, would this 'sham menstruation' be symbolic in the Peircean sense?⁶ Under the female cosmetic coalition hypothesis, redness is an index of blood but would eventually 'evolve' into a ritualized display. It is difficult to demonstrate that ochre use was only iconic or indexical as it would be hard to disprove the assertion that it has symbolic qualities. As symbolic objects, by their very nature, have iconic and indexical grounds, showing that there are iconic aspects to ochre does not disprove its symbolic significance. As we cannot disprove symbolic significance by demonstrating an object's indexical meaning, archaeologists are hard



Figure 2. Sites that have recorded use of ochre. (Data from Kissel & Fuentes in review.)

pressed to disprove the null hypothesis that an object has symbolic grounds. Because of this, we are sceptical of ever proving or disproving symbolic thought in a Peircean sense without detailed knowledge of the cultural practices.

Rather, by using a semiotic approach, we seek not necessarily to identify its function, but rather to trace if ochre gained meaning. By utilizing Peirce's first trichotomy we can ask if, and how, the ochre functioned as a sign. For Peirce, a sign is something that stands for something. Does the ochre stand for anything? And, if it does, can we trace this meaning through semiotics?

The Worldwide Instances of Symbolic Data Outlining Modernity (Kissel & Fuentes in review) allow us to ask when ochre first appears in the archaeological record (Fig. 2). The earliest site by far is Bizat Ruhama, where Ronan *et al.* (1998) report two pieces of yellow ochre from a site that dates to a minimum of 780,000 BP. Ochre then appears sporadically at sites from between 300–100,000 BP, though there is no geographic patterning to where these sites are located.

Watts suggests that after 200,000 BP 'habitual collective ritual may have been causally implicated in our speciation' (Watts 2014, 226).

The first step in a semiotic study is to ask about the sign itself rather than the sign-object relationship. We can imagine a human living at a site in southern Africa who has the idea, for whatever reason, of colour. The feeling she gets, the qualisign, cannot be embodied by itself (we can have the feeling of blue, which is a qualisign, but this cannot be expressed physically). If she had the 'idea' of yellow, red or blue and wanted to express it physically, she might find a way to embody it via a singular instance, a sinsign, perhaps by choosing a piece of red ochre found on the ground.⁷ The qualisign could then be embodied in different ways: rubbing the ochre on a wall, on her body, on a tool, rock, or other material item.

Another possible way of embodying the qualisign of red may be seen in the heating the ochre to make it red. Hovers *et al.* (2003) show that goethite, a yellow-brownish ochre, may have been intentionally heated at Qafzeh (100–90,000 BP) in order to turn it

red. They further note that red hues are common in the archaeological assemblage, though yellow goethite is ubiquitous throughout the exposures. The ochre nodules that were heated were subjected to controlled heating; had they been overheated they would have turned black (Godfrey-Smith & Ilani 2004). Its presence suggests that red was a desired quality for the humans at the site.

If this person wanted to mark something as red and used red ochre for this reason, she was using that ochre as an iconic sinsign. As soon as the person took the idea (the qualisign) and marked an artefact, she was making a sinsign. Later, when archaeologists study the artefact, semiotic properties lead them to think of red. In this way, we do not yet have to know if there is any other connotation, such as blood, to the redness (if the red was supposed to connote blood, rather than simply the colour red, this is an indexical sinsign, as the link to blood is due to the causal link between the two). Ochre, then, could have been an iconic sinsign or an indexical sinsign.

If the creation of this sinsign is reproduced by that person, and then by others, it has the potential to become a legisign. As legisigns are made to be used, if we can show that ochre legisigns existed, it would support the assertion of complex semiotics in the Middle Pleistocene. In support of this, we note that ochre recovered from palaeoanthropological contexts tends to be red (Hovers *et al.* 2003). The ubiquity of red ochre at human sites may indicate that humans were either deliberately selecting red ochre or, intriguingly, heating the nodules to produce a red colour. Redness seems to have been a desired trait, and its ubiquity suggests that there was meaning behind its use. This does not suggest that there was an inherent fitness value attached to the use of red ochre, or even a specific function, just that it had meaning as a sign to those people using it.

The earliest examples of ochre in the archaeological record are, at the basic semiotic level, sinsigns. We cannot excavate a legisign, since they are too 'general' and live in the mind (or, more properly, within the shared cultural system) rather than in the natural world. However, we may be able to find replicas. A replica's shape is determined by the legisign, which also determines how it is interpreted (but not necessarily what the interpretation is). When we interpret something as a being a replica of that legisign, we assume that it was made for that very reason. 'Other signs may be used to signify, as a piece of cloth may be used as a sample of its colour, but, normally, they do not exist in order to be so used, and their significance does not depend upon the fact that they are so used' (Short 1982, 292). In other words, the cre-

ation of legisigns is goal-directed. To be clear, the interpretation of signs is always teleological, but the creation of them is not, except in the case of conventional legisigns (Short 1982). In archaeological terms, if we were to find a situation in which ochre was being used to create a similar motif on a cave wall, that could suggest the presence of replicas, which implies that a legisign exists. For example, if, in creating the red mark, via ochre, on a piece of clothing or on her own skin, the individual was conveying a message, it may be a replica of a legisign. The main reason for producing this artefact is to cause in another individual's mind a particular type of thought or emotion. Creating a replica of a legisign happens on purpose. However, it is difficult to know this when all we have are isolated instances. As sites with ochre tend to have many pieces, this suggests that their use is not a one-time occurrence.

Sites such as Hollow Rock Shelter that report large quantities of ochre may allow us to identify replicas of legisigns. A single example of ochre use, such as the concentration of ochre found at Maastricht-Belvédère (Roebroeks *et al.* 2012), would, in this system, be a sinsign. At Hollow Rock Shelter, however, there are over 1000 pieces of ochre, with 8 per cent of them modified and two reported as having engravings (Dayet *et al.* 2013; Evans 1994). These individual instances are likely the result of a shared system of practice and thus reflect the existence of a legisign, with each singular occurrence being a replica.

Shell use

The interpretation of shell beads in the Pleistocene is contentious. Henshilwood and Dubreuil (2009; 2011) argue that the Blombos beads are proper symbols: 'In the archaeological literature beads are indisputably regarded as symbolic artefacts and indicative of "modern" behaviour' (Henshilwood & Dubreuil 2009, 50). They argue that beads can be proxies for 'modern syntactical language, which would have been essential for the sharing and transmission of the symbolic meaning of personal ornaments within and between groups and also over generations' (Henshilwood & Dubreuil 2011, 374–5). Discussing the Later Stone Age site of Enkapune Ya Muto, Ambrose (1998, 388–9) suggests that by 39,000 years ago ostrich eggshell beads were used in a type of *hxaro* gift exchange, and they functioned as a symbolic marker for a 'social security system that permitted behaviourally modern humans to survive in more risky environments'. There may be something in the fact that the beads of the Middle Stone Age are mostly made of marine shell. Ostrich

eggshell beads only show up in the Later Stone Age. Could we be seeing different types of embedded qualisigns?

Others agree with the symbolism distinction: 'Beyond signalling and possibly complementary to it, they might also represent a type of charm. The sum of their properties makes these shells important symbolic items' (Bar-Yosef Mayer 2015, 83); 'Beads represent a behaviour specific to humans whereby standardized items are displayed on the physical body to project symbolic meaning that can be interpreted by members of the same or other groups that share a common culture' (Vanhaeren *et al.* 2013, 500); 'Inferring symbolic meanings of non-utilitarian items such as beads is less ambiguous' (Ambrose 1998, 388).

Sceptics, however, have questioned the symbolic nature of beads. Wynn and Coolidge (2011) suggest beads functioned as tally devices. Malafouris (2008) argues that beads show the recognition of self/other distinction, but not suggestive of more complex thought. Coolidge and Wynn (2011) likewise suggest that, while beads show evidence of self-reflection, they do not demonstrate that there was a shared meaning behind the beads, which would indicate symbolic thought. To put this in Peircean terms, these scholars would see beads as indexical, but lacking a necessary ground between sign and object to make them symbolic.

The use of marine shells has been well documented (Bar-Yosef Mayer 2015). Bar-Yosef Mayer shows that the majority of beads from Middle Palaeolithic and Middle Stone Age sites come from the genus *Nassarius*. Many of the perforations are natural, with humans choosing shells that were already perforated, though some appear to have been artificially drilled. One reason for doubting the symbolic significance of beads has been the lack of continuity, as these and other objects tend to show up sporadically at sites across a wide geographic range (glimmering), rather than persisting, before 50,000 BP (Kissel & Fuentes 2016). This lack of persistence could suggest that symbolic thought was not yet possible, as it is often assumed that, once gained, humans would not have lost this capability (though see d'Errico & Backwell 2016, for recent evidence of continuity). While we cannot yet make a direct connection between the three main regions (Fig. 3) where beads first appear, it is possible, due to similarities in the production and choice of shell, that they shared a common system of meaning making and are thus suggestive of legisigns.

This does not mean that each population thought about shell beads in the same way. Indeed, we could claim that only the originator of the beads had a symbolic-mediated expression embedded in the or-

naments, and the other examples were copies made without being fully enmeshed in the culture. More likely, in our minds, is transmission of the ideas, perhaps in the form of stimulus diffusion as argued by Kroeber (1940). By using the first level of sign terminology, we can better articulate the processes of bead sign-making at 100,000 years ago.

We can first ask what qualisigns are embedded in these beads. Bar-Yosef Mayer (2015) notes that 166 *Nassarius* beads have been recorded from sites along both the South African and Mediterranean coasts. Specifically, she suggests that two species of *Nassarius* used resemble each other more than others and that they were used in similar ways. *N. gibbosulus* is found in Mediterranean and North African coasts, while *N. kraussianus* is found in South Africa. Besides having similar morphologies, they have similar perforations to them. However, both regions are rich in possible shells, making many ask why *Nassarius* were favoured. Stiner *et al.* (2013) argue that their small size, round surface and ability to be perforated without breaking made them prime choices. There may also be some colour preferences, but this is hard to prove, as the majority of shells in assemblages found on beaches are similar in colour to those found in archaeological contexts (Bar-Yosef Mayer 2015).

So, are there embedded qualisigns that we can track? A favoured species of shell may indicate that humans at these sites chose that species for logistical reasons. However, it is also possible that they favoured them for other, aesthetic reasons (Bar-Yosef Mayer *et al.* 2009; d'Errico *et al.* 2005; Vanhaeren *et al.* 2006).

Are shell beads used to send signals? Modern examples would suggest this is the case (Wilkie 2014), but it is of course difficult to assess this in the past. These meant something(s) to the people making them, though the exact nature of the premise is currently unknown. By wearing a bead, you are sending some signal to others; you are purposely creating a sign. The act of creating this sign indicates awareness and thus suggests it is a replica. Yet, as Malafouris (2008) and others suggest, we can propose scenarios in which there does not have to be a conventional link between the object and sign. If we can show that these beads are replicas, then they demonstrate that a legisign exists, which would imply that they were being created to produce a specific reaction (whether or not the actual reaction is the intended one is another story). While we cannot say for certain that it is symbolic, it would suggest that legisigns abound in the Pleistocene.

Evidence of this comes from the Still Bay layers at Blombos Cave, where archaeologists have identified a change in the way beads were strung together:



Figure 3. Sites that have recorded use of shell beads. (Data from Kissel & Fuentes in review.)

The results of our research demonstrate that *Nk* [*Nassarius kraussianus*] shells were used as beads at Blombos Cave for a time period encompassing at least one environmental shift. During this period, we have identified a change in the way beads were strung together, and this represents the earliest known change of a customised style, or norm, governing symbolically mediated behaviour. In this respect, the observed changes made by the Blombos Cave inhabitants parallel the many similar changes in symbolic norms observed among more recent and historically known human societies. (Vanhaeren *et al.* 2013, 515–16)

Based on their analysis of shell beads from Blombos, Vanhaeren *et al.* suggest that shell use was not a short-lived tradition but may have lasted hundreds or even thousands of years, leading to a 'long-lasting symbolic use of *Nk* shell beads by *H. sapiens* in southern Africa at this time' (Vanhaeren *et al.* 2013, 514). Vanhaeren and colleagues argue that we are seeing different social norms shared by members of a community, a change between an 'old type' and a 'new type' of stringing beads. Can we understand the rela-

tionship between a sign and object, what these beads meant symbolically? Not without a deep context for establishing the ground. We cannot ascertain their symbolic meaning. But they are replicas, signs made and shared across time in this culture group. Meaning was made material and shared. However, the patterning that exists indicates the presence of a legisign. It is a reflective product of the engagement with the behaviour of making shell beads that suggests a community of practice and ritual.

Engravings

Finally, we turn to engravings, which have been found on a number of different media, including bone, eggshell, ochre, shell and stone. The question of whether engravings are symbolic may be the most relevant one, as they seem the most similar to the traditional symbols we expect to see in the contemporary world. Many of the engraved lines are not randomly placed on an object, though this hypothesis still needs to be tested across a broader range of samples. There

are also significant archaeological issues involved, such as how many of these objects stand up to strict taphonomic scrutiny (Davidson 1990). Henshilwood and Dubreuil (2011) are interested less in the designs and rather focus on the underlying cause of symbolic expression. Importantly, they argue that the markings are true symbols. Yet, as we have suggested here, the issue may not be whether a Saussurean or Peircean definition of symbol is most applicable, but rather at which level of Peirce's trichotomies can we apply his ideas to the archaeological record. Are these engravings signs at all?

Does the creation of these lines indicate symbolic thought? At a cursory level, there is similar patterning seen throughout different sites, which may suggest shared legisigns, similar to if we found similar pottery styles within a region. Hodgson (2006; 2014) has argued for what he calls a 'neurovisual resonance theory', which argues that the similarities seen in engraving motifs on eggshell from Diepkloof (the oldest example dates to 119–99,000 BP, with most in Howiesons Poort layers) and ochre from Blombos (75–69,000 BP Still Bay assemblages) are not indicators of symbolic thought. For Hodgson, these engravings are not part of a larger cultural tradition, nor are they symbolic. He argues that early humans using ochre accidentally created patterns on the ochre nodules they were using. These patterns arose curiosity in them, due to neural resonance with phosphenes (visual tracks created when closing the eyes tightly). Hodgson argues that the way these accidentally created lines resonated with the existing visual system in turn engendered the creation of intentionally engraved objects. This feeling/arousal is thus a qualisign. It then becomes embodied in an iconic sinsign on the ochre or stone on which it is engraved. Individual instances of engraved objects, such as the Palmenhorst pebble from the Middle Stone Age of Namibia (Wendt 1975), are sinsigns. At sites with a large number of examples, such as the numerous engraved ostrich eggshells at Diepkloof (Texier *et al.* 2013), the artefacts can be seen as replicas of a shared legisign.

At a site such as Klipdrift, where over 95 engraved ostrich eggshell pieces are reported (Henshilwood *et al.* 2014), we can perhaps reconstruct the semiosis at the site. The engravings have not all been published, so at this time we cannot infer much. However, they appear to have very similar patterns (sinsigns or replicas) and the ubiquity of them at the site indicates that they are replicas; thus we can infer legisigns. Clearly, these markings had meaning. Whether they connoted ownership, such as potter's marks used to indicate to whom a vessel belonged when placed in a communal

kiln, or meant something entirely different, is hard, if not impossible, to say. Yet from a Peircean perspective we can reasonably conclude, from their patterns and their presence, a shared system of meaning making.

Engraved lines are found on multiple objects (ostrich eggshell, ochre, bone and stone). The hominins doing the engraving were embedding qualisigns in these materials. With more fine-grained data, we can trace qualisigns through different media. Perhaps these are examples of humans copying phosphenes in the world around them. Under this system, most of the early examples of engraving, those that show up sporadically across time and space, are sinsigns. They show earlier humans interacting with the natural world and creating artefacts, but not necessarily for the consumption of others. This may have had meaning for the individual, but we cannot tell if it was part of a larger overarching system of meaning making. However, at sites with many engravings (such as those with the eggshells), we can infer, if enough information is present, that a legisign existed. Thus, in these cases the individuals making these artefacts were involved in a larger system in which they hoped to produce some effect on their and their community members' minds. Table 1 provides a summary and example of our theoretical framework

Discussion

A problem with this entire endeavour is that many, if not most, of the meaning-making behaviours that were being performed before ~100,000 years ago were ephemeral and that our ability to recover archaeological data is always biased in both space and time. This makes it absolutely clear that much of the potential semiotic process during the critical time periods of 300–100,000 BP will be archaeologically invisible. The sporadic occurrences and glimmerings of these early signs may be imbued with exaggerated influence due to these biases. We acknowledge this, but argue that our proposal retains merit even if the actual evidence of legisign is scanty until the last 100,000 years. It is precisely the evolution of such capacities of meaning making that we seek to understand, so moving away from the determination of symbol *versus* non-symbol, even in disparate and depauperate data sets, can facilitate enhanced analyses.

We have attempted to show the benefits of embracing a sort of semiotic palaeoanthropology, one which utilizes a Peircean system to track the appearance of meaning making in the Pleistocene. While previous scholars have commented on the application of his icon–index–symbol distinction, applying that level of semiotic function is complicated by the lack of

Table 1. Summary of theoretical framework utilized in this paper.

Class	Qualisign	Sinsign	Legisign
Ochre	'colourness'	Maastricht-Belvédère (Roebroeks <i>et al.</i> 2012)	Ochre nodules at Hollow Rock Shelter (Evans 1994)
Bead	<i>Nassarius</i> use 'colourness'	Instances at various cave sites in North Africa (Bouzougar <i>et al.</i> 2007)	Changing shell bead motifs at Blombos (Vanhaeren <i>et al.</i> 2013)
Engraving	'phosphenes' 'patterns'	Engraved bone pieces such as at Sainte Anne (Raynal & Seguy 1986) or engraved shell at Trinil (Joordens <i>et al.</i> 2014)	Engraved ostrich eggshells at Diepkloof (Texier <i>et al.</i> 2013)

distinct cultural knowledge for early human cultures. A semiotic palaeoanthropology, however, aims to understand not *what* signs stood for, but *how* they stood for things. We wish to know how signs and their objects are related to the behaviour of their users. Furthermore, this is a step towards a more integrative anthropology (Fuentes 2015; 2016), as searching for embodied behaviours expressed in the archaeological record requires understanding the semiotic capacity of early humans.

Asking if early humans embedded qualisigns into artefacts is a first step in bridging the gap. Were they doing this intentionally? Why does ochre at archaeological sites tend to be red? Why are *Nassarius* shells the preferred species for making beads (Bar-Yosef Mayer 2015)?

Recently, archaeologists have used a semiotic approach to try to understand meaning making in the past (Hendon 2010; Lau 2010; Preucel 2006). These approaches tend to be for societies in which we know a lot more about the culture history. Hendon (2010) attempts an archaeological study of memory, using semiotics to understand the role that temples and other objects played in Mayan life. Under this system, Temple 22 at Copan is seen as a set of symbols, a 'mimetic image of a specific mountain that recalls important formative events and relations without which life as the Maya knew it would not exist' (Hendon 2010, 76). Yet for the Mayan world, this can be done by using contemporaneous texts, colonial-era sources and ethnographic work among modern descendants of the Maya.

This method is not without its limits and problems. One difficulty of semiotics, and the Peircean approach in general, is that the terminology is notoriously opaque. As one critic notes, Peirce's 'scattered writings employ a peculiarly personal and tortuous technical vocabulary which was not stable over time' (Leach 1985, 154). Because of this, scholars are forced to employ numerous complex phrasings that require non-experts to grapple with terms such as 'Rhematic Indexical Sinsign'. Fans and scholars of Peirce often

quibble over the exact meaning of his terms, and the fact that his classification system changed over his years of writing makes it difficult to pinpoint what he means.

Also, simply arguing for new terminology does not form an explanation. What we strive for here is to suggest rethinking the level of analysis, forcing scholars to de-emphasize the symbolic aspects of semiosis.

Can we trace replicas of legisigns? Sites with high preservation, such as Blombos Cave, can show embedded qualisigns within different artefact classes. The work on the Blombos shell beads discussed above suggests a changing system of how they were strung together. This could indicate a change in the overall legisign. What we argue is that this terminology does not require direct knowledge of the object of the sign vehicle. Sinsigns abound. Replicas appear when we can see the formation of a conventional approach to their creation. Notions such as colour and patterning are qualities that are of interest to most humans, and probably to other species as well. Early humans began to embody these concepts into individual objects, creating complex sinsigns of engraved bone, coloured shell beads and patterns on various media. In some places, the production of these artefacts became part of the larger cultural system, the legisign.

Shifting to *how* things meant rather than *what* they meant is useful, but it needs further elaboration to get around the objection that it still assumes that they meant *something*. As one reviewer of an earlier draft of this paper notes, would an Oldowan chopper count as a replica, once we find dozens of them at one site? In some sense, it would suggest that there was an overarching system that governed the creation of these artefacts. But the salient point is that it does not require the use of symbolic thought. However, replicas that embody qualisigns beyond efficiency may allow for the discovery of a more complex set of legisigns (and even stone tools may be important here: see Sterelny & Hiscock 2014).

While it has been the subject of much research, from a Peircean perspective the symbol is not the

most important, nor the highest order, of semiotic representation (Ball 2016). Instead, it is the legisign which provides a way to discuss signs without noting their symbolicity (or, for that matter, their iconicity, or indexicality): 'It is the fact there is pattern, and the pattern is a reflexive product of engagement with some kind of habit, and this is accomplished in communities of people together, this is really what the point is that Peirce was trying to make' (Ball 2016, 234).

The formation of legisigns allows for group ideas/concepts/ideals to be passed on to the next generation, but does not carry with it the overt attempt at ascribing specific meaning. Tracing legisigns in the Pleistocene allows not only for a more inclusive form of anthropology, but is the critical first step in semiotic analysis. Once we are able to discern their presence, perhaps further theorizing will allow scientists accurately to track symbols themselves. We see this evidence of shared intentionality as one of the aspects of human distinctiveness that emerged as our ancestors expanded their niche and increased their social networks (e.g. Tomasello 2014).

Notes

1. This is similar to Saussure's description of a sign.
2. There is something to be said for the prevalence of the working assumption that there will be a discrete boundary between hominin species and between early hominins and non-human primates
3. The interpretant can also be divided into three different types, the third trichotomy, where the emphasis is not what is being signified but rather how the sign affects the interpretant. The lowest category, the rheme, calls attention to something. A spontaneous cry, for example, calls our attention to the utterer. The second category, the dicisign, forces us to make an interpretation or opinion. Peirce provides the example of a weather vane as a dicisign or dicent, since we need to interpret it. A dicisign makes us note the *features the sign uses to signify its object*. The final category, the delome, is where the interpretant is assumed to be aware of a specific law or convention, and that s/he will apply that to come to the correct object (Short 1982).
4. It can require some knowledge, though. Interpreting a weathervane as showing the direction of the wind requires learning how to interpret it.
5. Jappy's example of the footprint in the sand that Robinson Crusoe found being a sinsign helps to make this point: it is not part of a large system of legisigns, though of course as a sinsign it was quite important to Crusoe himself!
6. Female birds interpret colourful plumage on a male bird as a signal of fitness. However, the male bird is not producing colourful feathers through its own will (as far as we know ...).
7. Technically, this would be an iconic sinsign, as there is a direct connection between the colour chip and the colour itself.

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Marc Kissel
Agustín Fuentes

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Author biographies

Marc Kissel completed his PhD at the University of Wisconsin-Madison and is currently a postdoctoral researcher in the department of anthropology at the University of Notre Dame, where he works on a project on the evolution of human symbolic thought. His research includes the study of modern human origins and the evolutionary arc of human warfare.

Agustín Fuentes completed a BA in Zoology and Anthropology and an MA and PhD in Anthropology at the University of California, Berkeley, and is currently a Professor of Anthropology at the University of Notre Dame. His current foci include cooperation and bonding in human evolution, ethnoprimateology and multispecies anthropology, evolutionary theory, and public perceptions of, and interdisciplinary approaches to, human nature(s).