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Approaching Archaeological Images with Cognitive Science*

> I am interested in circulating past iconography
> in the present in order to get to the future.
>
> Mariko Mori

Introduction

This quote of the Japanese artist Mariko Mori can be understood as an outright positive answer to a question of main interest in this volume: is archaeology able to contribute to the general field of visual studies? Going beyond the positive answer, her statement could be easily converted into the following hypothesis: looking at the vast and diverse corpus of ancient images can help modern scholars to derive knowledge that can be used to develop methods for visual studies (*Bildwissenschaften*). These methods can then be applied to all kinds of images regardless of their origin.

Within the field of archaeology, there has been a tedious discussion whether the study of material culture and the study of iconography, or visual studies in general, belong together, or whether they should be distinct from one another and follow separate scholarly traditions.[1] Archaeology in itself is an interdisciplinary field of research, since it tries to reconstruct the living environment of ancient people

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1   See for example Czichon 1999.

with all its different domains, including architecture, religion, politics, social life, food culture, art, craft and many more. It, therefore, has to combine knowledge as well as theories and methods from various disciplines, including visual and image studies. Thus, one could argue that the fields of archaeology and visual studies do not only overlap but are inseparably linked. This connection works also the other way around: thanks to the knowledge gained from the broad field of cognitive science (see below) it is possible to refer to a comprehensive repertoire of images from different cultures and periods, including even Paleo- and Neolithic art works. It is this factor that makes the field of archaeology a rich source for the development of image studies and visual studies. The present paper attempts to explore these considerations further by looking into cognitive science and by applying it to some case studies.

The benefits of the application of cognitive science in the study of archaeological images

Archaeology and image studies are both open to interdisciplinary approaches. That is why using methods developed in or adapted for image studies, like iconography and semiotics, are commonly used in archaeology. Against this backdrop, it is remarkable that neither image studies nor archaeology commonly utilize results stemming from cognitive science in the analysis of images, but – apart from a few often isolated studies[2] – largely neglect the theoretical approaches and methods of cognitive science. This is especially striking given that perception, processing and production of images are of course based on cognitive processes. Not only are images products of the human mind, they are also expressions of thought which are used to communicate with other minds. Another form of expression which humans use, the spoken and written language, has been studied in its capacity as product of the human mind since the 1980s in the field of cognitive linguistics. Recently, the application of cognitive linguistics has started to seep into the study of ancient languages.[3] In light of the parallels between language and images in their capacity as forms of human expression, the cognition of ancient images could or should play a bigger role in archaeology as well.

However, in the field of archaeology there is a general reluctance towards approaching the minds of ancient people, especially trying to reconstruct what they were thinking.[4] Archaeology is the science of material remains of the lives of ancient

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2   A selection: Huth 2003; Bol 2005; Wengrow 2013.
3   For example, Nyord 2009; Corbeill 2015; Köhler 2016; Gräßler 2017.
4   Johnson 2010, 90–91.

people whereas thoughts are of course immaterial and therefore not reconstructable. Archaeologists simply cannot ask the ancient people they are studying about their thoughts and consequently they will never know them. It is, therefore, reasonable to take another approach: instead of being interested in WHAT ancient people were thinking, we should rather take an interest in HOW they were thinking.[5] Thus, cognitive science presents an aid to the archaeological disciplines to analyse archaeological objects – especially images – as artefacts representative of cognitive processes, because we know that human cognition functioned in much the same way since the conclusion of the development of *Homo sapiens* as a species as it does today.

The invariability of human visual perception

According to Colin Renfrew, every human born after the human genotype was fixed and the beginning of the phase of human expansion in and beyond the African continent (Tectonic Phase, ca. 60,000 years ago) has the same body including the brain and sensory organs and cognitive abilities.[6] The diversity of human lives until the present day is a result of learning during ontogeny what has been established during phylogeny (e.g. language, social and technical capabilities, conventions, symbols) and building on that.[7] Thus, human development does not happen on a physiological level but a cultural level through learning and sharing of knowledge. The knowledge about cognitive abilities and functions in contemporary humans gained by cognitive science can therefore be projected onto past humans as well.

Perception is based on the one hand on human physiology, which is largely the same in every healthy human, and individual experience on the other hand, which is limited by our shared world. It is important to understand how perception works and which roles these two elements are playing. For in the study of archaeological images, modern researchers obviously lack almost any knowledge about individual experience connected to the images. Thus, the functioning of perception defines on which level modern researchers are able to use results from cognitive science in describing, analysing and interpreting archaeological images: that is, HOW images were constructed and HOW they store meaning, not WHAT their meaning is.

According to Robert L. Solso, visual perception of images is to be understood as a dual process of seeing (initiated by visual stimulation) and understanding

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5   Huth 2003, 8–9; Renfrew 1994, 6.

6   Aside from the natural distribution of properties like the IQ that can occur in a certain spectrum in humans today and in the past.

7   Renfrew 2008, 94–97; 100–101; 106–107; Renfrew 2007, XV.

(interpretation of visual stimuli).[8] Within the bounds of this theory, Solso established his interactive model of artistic perception,[9] which comprises successive stages of the process of visual perception.[10] In the first stage, light reaches the retina of the eye, neurochemical processes are initiated to transform light energy into neural impulses. These are transmitted to the brain via the optic nerve. Stage two comprises the processing of the forwarded signals in the primary visual cortex: analyzation and classification of primitives like lines, edges, and shapes and, building on that, the featural analysis of primitives (primitives are put together in bigger units, these fundamental forms make up the basic components of a scene).[11] Finally, in the third stage massive parallel processing is taking place in several parts of the cerebral cortex. Thus, signals are interpreted through association with previously stored knowledge about the world which is based on experiences. At this stage of semantic processing, the brain again commands the movements of the eyes to focus on other parts of the viewed scene to gather more visual stimuli and start the process of perception anew.

The stages are arranged inside the duality of visual perception according to Solso as follows: "seeing" is represented in the first two stages, the so-called bottom-up processing, which are fully dependent on the physical properties of light and the physiology of the human eye and brain. They function the same way in all healthy humans.[12] "Understanding" refers to the third stage which marks an individual process different for every human being. Here, acquired knowledge of the person viewing a scene and also his or her interests, both based on previous experiences, play a role, the so-called top-down processing.[13] However, even in this stage of top-down processing all humans are using the same structures of the brain which share the same neurochemical processes. This holds also true for the processes which form stored knowledge in long-term memory based on individual experiences.[14]

HOW visual perception works is comparable in all humans. Their interpretation of the viewed scene is different. Solso's model shows how human physiology and individual knowledge interplay in perception. Therein, humans are not understood as automatons but as individuals with their own experiences, ideas and agency who share the basic physiology of all members of the species *Homo sapiens*.

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8   Solso 1996, 4; Solso 2003, 78.

9   The model is based on the so-called INFOPRO model (information processing paradigm) which shares the same stages but lacks the interaction between them (Solso 1994, 5–6; Solso 2003, 79–81).

10 Solso 1996, 5–6; 44–45; Solso 2003, 79–81.

11 Solso 1996, 80.

12 Solso 1996, 101–102; Solso 2003, 2–3.

13 Solso 1996, 101–102; Solso 2003, 2–3.

14 Solso 2003, 22–23.

Hence, visual elements which are perceived during the first two stages, like form (figure-ground discrimination), colour and organisation of forms and objects in scenes,[15] can be instructive in the analyzation of archaeological images. Also, the basic properties of the living environment of all humans are the same. This comprises, for example, fundamental physical laws, dwelling on the surface of the earth (e.g. experience of gravity, light usually coming from above, viewing distance, etc.) and the biotic and abiotic features of our world like water, minerals, plants, animals and other humans. Humans form knowledge about things in the world based on their experiences and store it in long-term memory. Because all humans live on earth, they form knowledge which is similar to a certain extent.[16] Consequently, modern researchers are, to a certain extent, able to make qualified statements concerning the identity of objects, movement (direction, interaction) and also kinds of actions in archaeological images.

Images as communicative media

To establish the connection between cognitive science and archaeology more deeply, this paper focuses on images in their capacity as communicative media by calling on the assistance of basic communication models. Out of a great variety of communication models which partially are adapted to particular elements, stages or properties of communication processes this study uses the most basic and elementary model of communication developed by Claude Elwood Shannon. The model was originally created to illustrate technical signal transmission.[17] Shannon's colleague Warren Weaver, however, stressed the model's applicability to all kinds of communication processes, including communication with images.[18] In this way, Weaver initiated the use of Shannon's model of communication in the humanities where it is also known as the Shannon-Weaver model of communication.

According to the model, an information source creates the message and relays it to the transmitter, which converts the message into a signal and transmits this via a physical channel to the receiver. The receiver converts the signal back to the original message and passes it to its destination. The signal transmission can be disturbed by noise (**Fig. 1**). In communication between humans, the information source and transmitter are the same person, as is the receiver and destination.[19] In

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15   Solso 2003, 4–5.
16   Solso 1996, 116–122.
17   Shannon 1948.
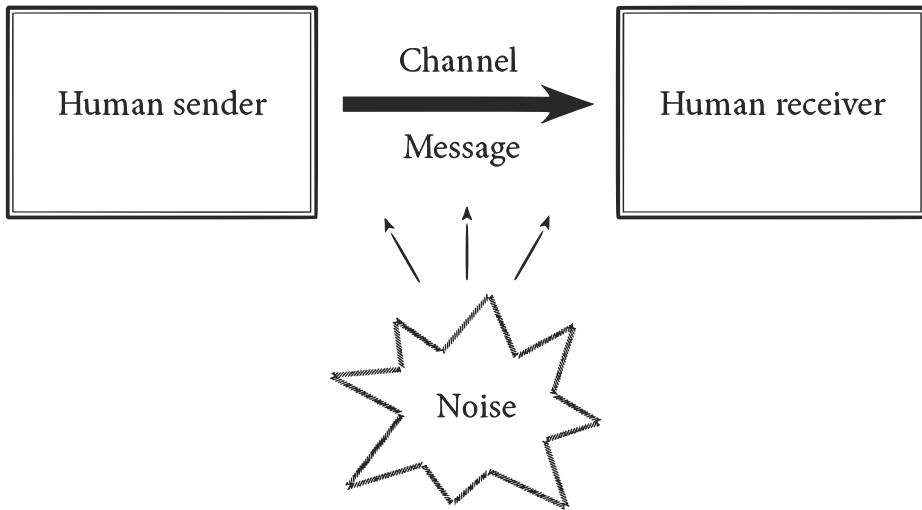18   Shannon – Weaver 1964, Preface.
19   Lenzen 2013, 319–320.

Fig. 1: A simple model of communication based on Shannon – Weaver 1964.

the case of communication with images, the image is the physical channel that bears the message. This model does not consider the context of a communication process. However, it is possible to extend the model in this way to adapt it to archaeological methods, which strongly focus on context. In the case of this study, the contexts of communication processes are not relevant and are therefore left out to keep the argumentation simple and coherent.

Usually, the sender wants a successful delivery of the content of the message; that is, he or she wants the receiver to understand. Therefore, the sender has to make the image effective, and needs a conception of what an image has to look like in order for a particular audience to understand. According to the 'Theory of Mind' human beings have the ability to make assumptions about the thoughts, beliefs and intentions of others, that is about mental states in general.[20] Also, the receiver needs to have a 'Theory of Mind' of the sender to form expectations about the contents of the message for facilitating comprehension. So, both participants have to put effort into making the communication process successful. In spoken communication, for instance, it is essential not only to speak loudly and clearly but to use a language and a set of grammar rules that is known by the receiver. As sender and receiver are never the same person, there is always a certain difference between them, which has to be overcome by different forms and intensities of efforts. Ideally, the sender and the receiver are members of the same group and living at the same time at the same

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20   Esken – Rakoczy 2013, 444.

place while sharing a cultural, social, and possibly political background and a similar range of exposure to other images. In this case, their mutual 'Theories of Mind' are most likely accurate. The fewer features sender and receiver have in common, the more probable and severe are errors in their mutual 'Theories of Mind'. Up to the present day the lowest common denominator between the sender and the receiver in a communication process using images is that they are both human and living on this planet.[21] This means, as was already established, that the brains and visual systems of all possible senders and receivers function in the same way and also, the basic properties of the living environment are the same.

In the case of archaeological images, it is possible for a contemporary researcher to take the role of receiver in the communication process, if he or she is aware of the commonalities he or she shares with the sender and also the differences between them. Against this background, cognitive science informs us about how the human mind and the visual system operate. Thus, cognitive science can give us the tools we need to make an effort to understand the messages transmitted via archaeological images as communication channels. However, in accordance with the difference between the contemporary researcher and the original sender, the contents of the message can only be understood within a certain limit. This means that we will be able to gain knowledge about the framework of the message, particularly what the sender did to make the image effective, but not complex contents like values and emotions. This correlates with the objective determined above: trying to find out HOW the ancient senders of images were thinking, not WHAT they were thinking.

How to make an image effective: The principle of counterintuitiveness

After having established that we, as contemporary researchers, are able to decode the messages behind ancient images on a certain level and within certain limitations, taking a look at some examples will help to further illustrate the matter. Since each and every culture yields its very own set of special or even unique motifs and artwork, it is difficult to make general assumptions. Furthermore, even the images of one society or culture might be very different, depending e.g. on the respective period or context. However, in order to demonstrate the benefits of cognitive science for archaeology/image studies, the inherent similarities shared by many images from different backgrounds should be stressed. This is why supernatural beings depicted

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21   Latest studies suggest that also *Homo neanderthalensis* created cave art (of the rather abstract kind) and used pigments in symbolic behaviour, see Hoffmann et al. 2018a and Hoffmann et al. 2018b.

by images of composite creatures will be instanced here. Not only are they known from virtually all times and cultures but they are also mostly long-lived.

The griffin for example, a mixture of lion and bird of prey, was already known in many early cultures and has been a popular motif ever since.[22] Thus, a great number of examples for depictions of griffins could be cited here, ranging from Ancient Egyptian art to the present day. There is a painting of a griffin in the tomb of Chety in Beni Hassan, for instance, dating to the 12th dynasty (c. 2125–1985 BC, **Fig. 2**).[23] Among many others, further examples from ancient times are Achaemenid (c. 550–330 BC) stone capitals from Persepolis which consist of two frontal halves of reclining griffins (**Fig. 3**)[24] or the colourful frescos of a griffin in the throne room of the Minoan palace of Knossos (17th–15th century BC).[25] For medieval (byzantine) times a stone relief depicting the ascension of Alexander the Great adorning the famous St. Mark's Basilica in Venice (11th century AD) can be instanced.[26] Although these depictions are quite varied with regard to their cultural background, period, stylistic characteristics and material, all of them show clearly the same kind of composite being. Today, the griffin is still a common motif that may be encountered almost on a daily basis, even though we often do not perceive it consciously. On various coats of arms and flags the griffin appears as heraldic animal (for example on the coats of arms of the Swedish city Malmö, the German province of Baden-Württemberg, the Crimean peninsula or the Polish voivodeship of Pomerania, to name only a few). Furthermore, it is part of different logos of companies and organisations and is even portrayed in modern pop culture, e.g. in the Harry Potter movies.[27]

Whereas the meaning of the motif may have – consciously or unconsciously – been changed several times, the significant properties of the image stayed more or less the same (with some variations due to stylistic or cultural reasons). Why does this image remain active over such a long period of time and without regard to geographical boundaries? As stated above, an image has to be effective to be understood. It seems that the image of the griffin is especially effective and therefore particularly memorable, thus suitable to transport certain ideas and messages. But what makes the griffin specifically memorable?

Griffins are hybrid, mythical creatures. They cannot directly be derived from the real world, that is, from visually perceivable objects or beings. At first sight, this does not seem compatible with the general premise for considering ourselves, the

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22 Flagge 1975.

23 Gerke 2014, 239.

24 Curtis – Tallis 2005, 51–52.

25 Raison 1969, Pl. 95.

26 Vio 2001, 164–167 (illustration: 164, upper left corner).

27 In the form of a so-called hippogriff, cf. *Harry Potter and the Prisoner of Azkaban*, Warner Bros. Pictures 2004.

Fig. 2: Depiction of a griffin in the tomb of Chety in Beni Hassan (after Flagge 1975, 137, Fig. 8).

Fig. 3: Stone capital in the form of two reclining griffins from Persepolis, unfinished (after Curtis – Tallis 2005, 52, Fig. 42).

present-day researchers, as receivers in communication processes in the case of archaeological images. It was demonstrated that all humans share the same basic properties of the living environment. Since composite beings cannot be directly perceived in the living environment this seems to be a problem. But when we think of the second part of the premise – that all humans share the same cognitive preconditions – this supposed contradiction would be resolved. Hybrid beings are products of human imagination, of our ability to take elements we know from former visual perception and to combine these elements in order to create something new. In other words: they are products created within the range of our cognitive abilities, drawing on our living environment.[28]

Such mental images can become manifest in the material world in the form of representations like paintings, carvings or sculptures despite not existing in real life. In this respect, they can certainly be classified as counterfactual. But how can an image of a composite being that no one has ever seen in the real world be effective? In the case of the griffin, it is striking that the discrepancies from what can be expected in the real world are mostly minor ones. Within the motif, a basic image known from the real world (i.e. a lion's body) is merged with components of only one other category (i.e. with the head and frequently also the wings of an eagle). These elements are all loyal to nature and it is still possible to identify the different features of the creatures. This is why there is only minimal confusion when looking at these unreal beings. The motif of the griffin can therefore be denoted as minimally counterintuitive.[29]

Minimally counterintuitive representations attract human attention since they are different compared to the real world as we know and expect it; they seem odd to us. To single out such oddities is, in fact, one of the most basic functions of the human visual system.[30] This mechanism helps us to differentiate features and recognize shapes (e.g. figure-ground discrimination in the second stage of Solso's model like recognizing the shape of a potential prey animal in front of some trees). The same principle applies to counterintuitive phenomena. Dan Sperber summarizes this as follows:

> The most evocative representations are those which, on the one hand, are closely related to the subject's other mental representations, and, on the other hand, can never be given a final interpretation. It is these relevant mysteries, as they could be described, which are culturally successful.[31]

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28   Wengrow 2013, 17.

29   For (minimal) counterintuitiveness see Boyer, 1994; Boyer 2001; Atran 2002, 83–113.

30   See, for example, Norman et al. 2011 (further literature is cited there).

31   Sperber 1985, 85.

What he describes is a clash between stored background knowledge (based on the visually perceivable world) and human imagination – which is again based on the same background knowledge. Therefore, counterintuitiveness comes into play at the third stage of perception according to Solso's model (top-down processing). It steers attention after a first interpretation and in this way refers to the interaction between the stages of visual perception.[32] It is this clash, this degree of oddity/minimal counterintuitiveness or – in Sperber's words – these "relevant mysteries" that make certain images, like supernatural beings, memorable. They stand out but are still connected to our knowledge gained by direct sense perception. Thus, minimally counterintuitive images/motifs are well suited to transport complex messages or collective concepts from the underlying cultural background.

Another important point is that the counterintuitiveness survives jointly with the image. The image of a griffin was perceived as minimally counterintuitive by the ancient viewer just in the same way as humans perceive it today. We know how lions and eagles look like, but no one has ever seen a griffin in the real world. Therefore, such an image will attract our attention since it is so close to what we are used to and yet, it is still different. It is exactly this kind of otherness which makes the image special to us and helps us to memorize it. Thus, the image itself remains active and efficient over the course of time and its minimal counterintuitiveness still evokes a certain fascination.

Additionally, it can be mentioned that the principle of minimal counterintuitiveness does not exclusively apply to images. Faith can serve as another example: there are counterfactual and minimally counterintuitive elements in every religion, like supernatural beings or miraculous stories (e.g. angels and Christ's resurrection for Christianity).[33] These elements often convey the key messages (like commandments, prohibitions and values) within the religion's framework "to solve existential problems, including death and deception".[34] It is noteworthy that these crucial elements are minimally counterintuitive to us regardless of our own beliefs. We perceive angels or other supernatural beings as minimally counterintuitive whether we believe in them or not.

David Wengrow argues that Boyer's idea of minimally counterintuitive supernatural beings cannot be applied to prehistoric images of composite beings because of their scarcity during these periods.[35] He understands the scarcity of these images as a contradiction to their postulated effectiveness. However, if one looks at them not from a historico-cultural perspective but from an image-centred perspective, it

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32   See above. Solso 1994, 5–6; 44–45; Solso 2003, 79–81.
33   Mithen (1998, 102–103) lists further examples.
34   Atran 2002, 113.
35   Wengrow 2011, 159; Wengrow 2013, 17–18.

becomes clear that these early representations of hybrid beings are still counterintuitive and therefore effective. It has to be stressed that the longevity of an image or the large number of exemplars are not a necessary precondition for the memorability and effectiveness of an image, they are rather possible but not necessary results. If the image itself has both familiar and counterintuitive elements it is well suited to transport a specific message. This holds true for the earliest art as well. But beside the minimal counterintuitiveness, the nature of the message itself as well as other factors jointly determine the eventual fate of a motif.

Some case studies

Above, the principle of minimal counterintuitiveness was explained with the griffin as an example. As the following brief case studies will illustrate, the principle can be detected in composite beings of all kinds and from early on. In fact, one of the earliest ever examples of figurative art, the so-called Löwenmensch figurine (Aurignacian, c. 35 000–40 000 years BP) from the Hohlenstein-Stadel cave in the Lonetal in southern Germany, can be mentioned in this context.[36] The well merged hybridization shows human traits, like an upright posture, as well as cave lion traits, like the head and extremities (**Fig. 4**).

Minimally counterintuitive beings can also be found in Ancient Egypt, in the much later Naqada IC and II periods (c. 3700 to 3300 BC). Highly stylized anthropomorphic clay figures with the lower body fashioned in a solid pointed block (or replaced by a vessel) and a small head formed like that of a bird have been found in some Upper Egyptian cemeteries (**Fig. 5**).[37] These figurines, known as 'bird-women/-ladies' and 'bird-men', feature the bird head as the only counterintuitive element which is therefore rather compressed and clearly focused. Human-animal-hybrids were also common motives in Ancient Near Eastern Art, for instance, the bull man, known since the beginning of the third millennium BC on cylinder seals.[38] An anthropomorphic body is merged with the horns, ears, tail and hooves of a bull (for example Terracotta plaque depicting a bull-man, Old Babylonian period, London, British Museum Inv. 103225).

As for the examples presented in this section, the minimal counterintuitiveness became apparent because of the significant and clearly visible mixture between two different categories, human and animal. However, there are also examples where

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36 See http://www.loewenmensch.de/ (24.03.2020).

37 Patch 2012, 112–115. For the role these figurines play within the development of the Ancient Egyptian body concepts see: Speck forthcoming.

38 Green 1993–1997, 249–250; Braun-Holzinger 1999, 160–165.

Fig. 4: The so-called Löwenmensch figurine, Museum of Ulm (after Kind et al. 2014, 134 fig. 4).

Fig. 5: A female figurine ('bird lady') from the cemetery of el-Maʿmariya (07.447.505 Brooklyn Museum, Creative Commons-BY [https://creativecommons.org/licenses/by/3.0/, https://www.brooklynmuseum.org/opencollection/objects/4225]).

Fig. 6: Seal impression; to the left: a bull-man wrestling a lion, to the right: Nude Hero with six curls wrestling a buffalo, Akkadian period (after Boehmer 1965, Pl. 16, 176).

the counterintuitiveness is expressed in a different way. Another figure from the Ancient Near East, known as the Nude Hero (c. 3000–500 BC),[39] can serve as a case study. The principle of minimal counterintuitiveness works in the same way when a figure is placed in an unusual environment, interacts with unexpected partners or engages in an extraordinary activity. The Nude Hero, for instance, is perfectly anthropomorphic in figure but, nevertheless, it is certain that he was not thought to represent an ordinary man (**Fig. 6**).[40] His extraordinary hairstyle with six big curls and his nudity as well as the fact that his face is depicted *en face* distinguishes him from concurrent human representations. Such subtler cases of minimal counterintuitiveness become evident only if one already knows about the conventions of the respective period and about the cultural background. If it is not known what was common, it is impossible to identify certain things as uncommon, special or unconventional. After many years of studying a certain culture in a certain period we may be able to determine what was and was not conventional in many cases. Nevertheless, some uncertainty will always remain. There is always the possibility that some cases are overlooked or misinterpreted due to a lack of understanding originating from a modern-day perspective.

To sum up, it can be stated that there are two different kinds of minimal counterintuitiveness. The first one is counterintuitive in itself since it contradicts the real

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39   Green 1993–1997, 248–249; Braun-Holzinger 1999, 160–165. A comprehensive study of this figure will be presented in Zartner forthcoming.

40   Mithen (1998, 102) stresses that human-like features in supernatural beings help to anchor them in the human mind. Thus, supernatural beings with human elements are especially effective.

world as potentially perceived by all humans. Examples for this kind of counterintuitiveness are the griffin or the so-called bird ladies. The second kind is strongly dependent on its context: while the image itself might not be counterfactual, there might be some peculiarities within a culture/period which make the image counterintuitive by being different from the respective standard. Those images are especially memorable in a certain community but lack the transboundary mobility and popularity which other minimally counterintuitive images, like the griffin, are in some cases able to achieve.

Conclusion

Images are the products of cognitive processes on many levels. Their construction is intimately linked to how humans conceptualize their surroundings, the things and persons they encounter, and themselves. Thus, the ideas about what should be expressed influence images as much as the concepts producers of these images have about the minds and the perceptual capacities of others. It is a fact that the design of *Homo sapiens*' visual system and brain did not change in the relatively short time of the species' existence. Therefore, in the even shorter time that humans have been producing images, the basic functioning of seeing, perceiving, processing and also conceptualizing images has been the same.

In light of this information, there is no reason to exclude any images from any general analysis. In fact, all images made by humans can be collated in one giant corpus that spans several tens of thousands of years and a vast number of cultural backgrounds. Archaeology – or better: the different archaeologies – is able to provide this giant corpus for image and visual culture studies, as the discipline is, of course, concerned with the recovery of ancient images through excavation and survey. On a different level, archaeology also provides the context of the images, which is necessary to organize the image corpus itself and, just as importantly, to determine the degree of commonality that modern researchers share with the original producers of the images.

The case studies which have been propounded here, of course, represent only one aspect of the intersection of image studies, archaeology and cognitive science, but they show how relevant this approach can be for all the three disciplines. Images of composite beings are a phenomenon that concern many research questions in archaeology, as their meaning is not easily decoded, they appear in many forms in most cultures and they are extremely mobile between cultures. The archaeological material proves that humans have a profound interest in creating and sharing images of composite beings – an interest that can be explained by cognitive science. Those

images are not limited to the archaeological material but also concern art history and contemporary image studies.

Even today we are exposed to composite beings, like the omnipresent griffin, which looks back on a several thousand-year long history. When we ask why images of composite beings are present in most cultures and obviously easily transcend the limits of time and culture, the answer is that the bearers of these images are all human. Minimally counterintuitive images are ideal for storing and transporting important ideas. They create the same kind of psychological tension in all humans and thus attract attention and are memorable. That is also why new ideas are attached to them time and again. A long-living image is obviously beneficial for its content. However, it has to be kept in mind that an image can also outlive its initial content and obtain new or altered meanings. Minimal counterintuitiveness is not the only factor in this process of distribution and transformation of images of composite beings. Other image properties and also the cultural, social and technological context are significant for the 'life path' of the image. Consequently, approaches stemming from cognitive science are the most effective in the analysis of archaeological images when used in combination with other methods from visual studies and archaeology.

Images of composite beings are one relevant example where archaeology, image studies and cognitive science are able to produce knowledge in cooperation. But there are many other image sources, research questions and fields of research that would also profit, especially from the availability of a vast corpus of images. For example: in the testing phase of the development of new methods, image studies can profit from a corpus that contains a high number of images of culturally and thematically heterogeneous nature. Thus, such tests will be more effective and false positive feedback can be prevented. In this manner, with its ability to draw connections to other disciplines, in this case cognitive science, archaeology can actually contribute to image studies in a highly relevant manner.

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