BOLETÍN DEL MUSEO CHILENO DE ARTE PRECOLOMBINO
Vol. 19, N° 1, 2014, pp. 9-22, Santiago de Chile
ISSN 0716-1530

CANONICAL FIGURES AND THE RECOGNITION OF ANIMALS IN LIFE AND ART

FIGURAS CANÓNICAS Y EL RECONOCIMIENTO DE ANIMALES EN LA VIDA Y EN EL ARTE

Livio Dobrez* & Patricia Dobrez**

Is there a particular perceptual modality, i.e., a way of seeing rock art figures (zoomorphs and anthropomorphs) which involves simple recognition and is distinguishable from the recognition of these same figures in other contexts? Such a modality would be prioritized by evolution and would depend on elements of a figure and/or of perception which make preliminary identification easy and rapid, for example, typical or dominant views, salient features, pars pro toto processes, visual "invariants" (Gibson 1979), "typical contours" (Deregowski 1984, 1995). This paper discusses some of the literature on the subject and offers its own perspective on what we term canonicals in life and in art.

Key words: rock art, figure recognition, representational modalities, canonical form, salience, typical contour

¿Hay alguna modalidad perceptual particular, por ejemplo, una manera de ver figuras de arte rupestre (zoomorfas y antropomorfas) que involucre un reconocimiento simple y que sea distinguible del reconocimiento de estas mismas figuras en otros contextos? Esta modalidad de percepción habría sido priorizada por la evolución y dependería de los elementos de una figura y/o de la percepción que facilitan una rápida identificación preliminar. Entre esos elementos destacan, por ejemplo, las apariencias típicas o predominantes, las características destacadas, los procesos en los que se percibe la parte por el todo (pars pro toto), factores visuales "invariantes" (Gibson 1979) y "contornos típicos" (Deregowski 1984, 1995). Este trabajo pone en discusión algunas de las publicaciones sobre el tema y ofrece su propia perspectiva lo que llamamos "cánones" en la vida y en el arte.

Palabras clave: *arte rupestre, reconocimiento de figuras, modalidades representacionales, forma canónica, características destacadas, contornos típicos*

INTRODUCTION

It can no longer be assumed that rock art studies are simply an archaeological or even an archaeological/anthropological discipline. To say this is by no means to diminish the major role archaeology and anthropology have played in the development of rock art studies, nor is it to suggest that this role will not continue. However, for some time we have had (modest) input from art historians and (increasingly) cognitive scientists, as well as limited but important input from perceptual psychologists. The authors of the present article focus entirely on the phenomenon of perception—the way we see both real and depicted objects—and, while taking note of archaeological and anthropological work, explore depictions with perspectives that combine hermeneutics, art history, perceptual psychology and neurophysiology. We know that rock art may be either recent (even more or less contemporary, as in some art in Australia), or very old. Such near-contemporaneity coupled with deep-time lineage makes it ideal for the formulation of universalist hypotheses—the investigation of aspects of depiction which may be linked to fundamental modes of perception and so be regarded as non-culture-specific. Cognitive approaches to the study of rock art have initiated this enterprise. Our contribution takes these into

* Livio Dobrez, College of Arts and Social Sciences, A. D. Hope Bldg., Australian National University, Canberra, Australian Capital Territory 0200, Australia, email: dobrezl@grapevine.com.au
** Patricia Dobrez, 9 Blair Street, Watson, Australian Capital Territory 2600, Australia, email: u4045668@anu.edu.au

Recibido: mayo de 2013. Aceptado: septiembre de 2013.

account while positioning itself in a new discursive space between Humanities, Social Sciences and Neuroscience.

At the aesthetics session convened by Heyd and Clegg at UISPP, 2006, Lisbon, Livio Dobrez introduced the idea of particular modalities of vision, i.e., ways of seeing objects in given situations that might have been so important in our evolutionary history as to have become hardwired (Dobrez 2008). He identified two of these, Narrative and Hieratic (later changed to Performative) and expanded their analysis in subsequent papers. The idea, supported by perceptual psychologists (with the exception of Gibson) was and is that we see things in art and life in much the same way, though of course we do not confuse a painted lion with a real one, as the painter Rousseau is said to have done. Livio Dobrez sought to define:

a) narrative depictions, like this one from the Kimberley, northwestern Australia (fig. 1), more rigorously than so-called "scenes" have previously been defined in rock art studies (Dobrez 2007, 2008, 2010, 2010-2011, 2011a, 2011b, 2012b)—and to define, again in perceptually rigorous terms,
b) a type of full-frontal figure that "looms" at the observer, like this one from Temple Mount Wash, Utah, USA (fig. 2)—and which he refers to as Performative (Dobrez 2007, 2008, 2010, 2010-11, 2011b, 2012a).

In all cases the aim was to link perception in life with the perception of pictures, and also to extend the application of visual modalities to all kinds of pictures, including of course rock art. More recently he has tried to identify likely neural substrates for these perceptual situations, not in order to "explain" everyday perception by an appeal to neurophysiology, but to complement a top-down phenomenological approach with a bottom-up neural one (Dobrez 2010-2011, 2012a; Dobrez & Dobrez 2013a and b).

In this paper we wish to focus on a third possible visual modality, i.e., another fundamental and, in evolutionary terms, critical perceptual situation: that of *recognition* of an object—in particular an animal. In the process we shall make some reference to the perception of other humans and to their depiction as stick figures. What we want to stress is that we recognize an object by its "canonical form." After that we want to analyse the idea of canonical form and link it to what we shall call canonicals, i.e., canonical figures in depiction.

Figure 1. Kimberley, Australia.
Figura 1. Kimberley, Australia.

Figure 2. Temple Mount Wash, Utah, USA.
Figura 2. Templo monte Wash, Utah, EE.UU.

RECOGNITION AND CANONICAL FORM

Seeing as

To begin with we make use of an expression coined by the philosopher Wittgenstein: *seeing as* (fig. 3). Strictly speaking, you do not see something and *then* recognize it as an X (a horse). Provided you can clearly see X, you will see it *as* X. In short, all seeing is seeing *as,* which means that all seeing involves recognition, an identification (not always successful or accurate, of course) of what you are seeing. It applies to real horses and to horses in pictures. In pictures, such recognition is a precondition for iconicity or iconic representation: using Peirce's definition, we refer to the horse in the picture as "iconic" because it *looks like* a real horse. The important thing here, however, is recognition, not a particular depictive style such as post-Renaissance perspectival "realism." We recognize the horse because it has a particular canonical form which makes recognition easy and fast—speed of recognition being of vital evolutionary importance. After all, you may be very hungry and in need of horsemeat; or again, it may be critical to see that it is not a horse at all but a large feline, itself very hungry.

Canonical views

So we define canonical form as whatever we see in a real or a depicted object, say a horse, that makes recognition easy and rapid—and canonicals those types of representations that are especially geared to such recognition. We shall go into this last in more detail but, before that, some comments about canonical form.

Figure 3. Marsoulas model, Parc de la Préhistoire, Tarascon-sur-Ariège, France.
Figura 3. Modelo Marsoulas, Parque de la Prehistoria, Tarascon-sur-Ariège, Francia.

It may be understood in terms of what the perceptual psychologist Gibson (1979) called *invariants*, i.e., those features—for a horse, say the cervico-dorsal line—which are stable across the variations ("transformations") that are generated by movement. For a dog in rock art, a significant visual marker may be a lifted tail (fig. 2). For a deer it may be horns, with specific horns indicating a specific type, e.g., reindeer, as in Alta, Norway (fig. 4). For an American feline, in this case from Varedão, Serra da Capivara, Brazil, it may be the rounded form of the head or the paws (fig. 5). For Brazilian capybara it may be a prominent, bulky head, coupled with a stocky body (fig. 6). For sheep, as for deer, it may primarily be the horns—and so on. These elements are salient and likely to be visible in any view of the animal. However, most are likely to be best recognized in profile views.

The human face is probably best recognized in two canonical views exploited by the old police mugshot: frontal and profile. More or less recent European art, as well as photography, have accustomed us to the ¾ view, for example in post-Renaissance portraits. Animal ¾ views, and views from front or back are also common enough in recent representation. However, as all rock art researchers know and with the exception of a few plan view depictions (for selected animals such as tortoises and lizards) and famous examples of e.g., eland in southern Africa, the majority of rock art shows animals in profile. Breuil coined the term *perspective tordue* for profiles complicated by e.g., frontal horns, but this is a peculiarly Eurocentric interpretation which assumes that all art follows the rules of mimetic likeness invented (or reinvented) by the Italians in the Renaissance and developed along so-called "realist" lines from the 17th to the 19th centuries—from which time mimetic realism is increasingly associated with the camera. We shall *not* assume that, over thousands of years, depiction was understood to be mimetic, and so we will *not* say that a profile bison with frontal horns (fig. 7) is perspectivally "twisted." Rather we will say, following Deregowski (1995), that it aims at easy recognition by showing two salient features, viz hump and horns, in tandem with the canonical view, which is profile. It

Figure 4. Alta, Norway.
Figura 4. Alta, Noruega.

is worth adding that at times, either in life or art or both, two different animals will have similar canonical forms. Thus, at least in a picture, it may not be easy, in a South African case, to distinguish a rhinoceros from a wart-hog or bush pig or, in South American rock art, to distinguish between diverse camelids. More tantalizing is the case of strictly *identical* canonical forms for the celebrated duck-rabbit (fig. 8); facing *left*, we have the salience of a duck's beak—facing *right*, that of a rabbit's ears.

Figure 5. Serra da Capivara, Brazil.
Figura 5. Serra da Capivara, Brasil.

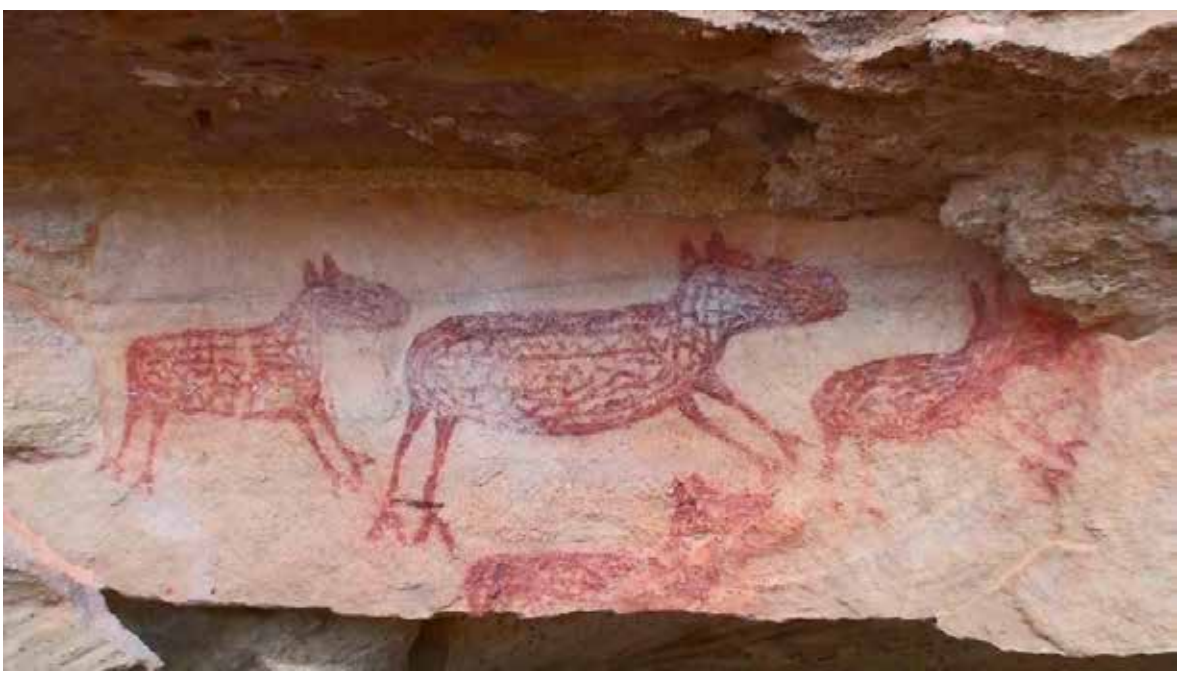

Figure 6. Serra da Capivara, Brazil.
Figura 6. Serra da Capivara, Brasil.

Visual shorthand

One way or another, however, if recognition is to be easy, a form of visual shorthand is called for. To identify an elephant in life or in art, it suffices to spot a heavy shape featuring a trunk. To identify a South American camelid, it suffices to spot that distinguishing cervico-dorsal, especially the right-angle between neck and

Figure 7. Newspaper Rock, Utah, USA.
Figura 7. Newspaper Rock, Utah, EE.UU.

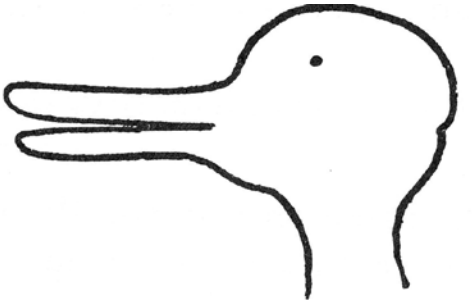

Figure 8. Duck-rabbit.
Figura 8. Pato-conejo.

Figure 9. Llama profile.
Figura 9. Perfil de llama.

Figure 10. Toro Muerto, Peru.
Figura 10. Toro Muerto, Perú.

back (fig. 9). In art this right-angle is highly diagnostic, as at Toro Muerto, Peru (fig. 10). On the other hand, in this example from Charcamata, Argentina (fig. 11), the essential elements are probably simply the small head, long neck and horizontal line of the back. The large bellies may indicate further detail: we recognize not merely the animal, but the animal as pregnant. In each case a salient feature, or features, will function in a part-for-whole way to identify the animal. It is what is known in ethology, and with original reference to the work of Tinbergen with gull chicks, as "fixed action pattern" or FAP (Tinbergen 1961). Just as the chick will peck at anything that has the salient feature of the parent's beak—in particular a red spot—so we recognize things as a whole by registering a single or several salient parts. With respect to art, this has been notably examined by Deregowski (1995), who sought to define salience—in his terminology, the "typicality" of a figure—mathematically by reference to Information Theory as elaborated by Attneave (1954). He coined the expression "typical contour" to describe canonical form—in many animal cases, the cervico-dorsal line. The thesis has its limitations. It applies only to outline depiction, but more than that, it fails to take into account the fact that a salient feature only makes visual sense *in relation to* the rest, or as an organizing principle, a highly visible *part* that snaps the *entire* configuration into focus for the observer (Arnheim 1974: 43-44). In line with his focus on contour, Deregowski regards

Figure 11. Charcamata, Argentina.
Figura 11. Charcamata, Argentina.

stick figures as a separate category. But it seems to us—and this is an argument supported by Halverson's (1995: 15) comments on Deregowski (1978)—that stick figures exhibit canonical form just as much as outline depictions. Marr and Nishihara's pipe-cleaner figures of animals are sketchy but perfectly recognizable as giraffe, rabbit, ostrich, sheep and feline. In rock art, stick figures are likely to be of humans—usually in profile (in a scene) or frontal. Frontally or in profile they exhibit the salience required for humans: a head, torso, arms and legs, with sometimes sexual characteristics added. Of these probably the torso, arms and legs are essential to establish canonical form.

Distortion vs. distinctiveness

By way of addendum to this discussion of salience we may note that Tinbergen's part-for-whole effect operated by the exaggeration of the salient feature, that red spot on the parent's beak (referred to as the "supernormal stimulus"). For some researchers this has pointed to the phenomenon of caricature or the cartoon. An experiment with photographs of real animals compared to images of European Palaeolithic ones by Cheyne et al. (2009) was intended to demonstrate that Franco-Cantabrian artists exaggerated features in their depiction. Others, not least Gombrich (1959, 1972) and Hochberg (1972), have accepted the general argument that art works by the principle of the cartoon. Ramachandran (2003) has termed it "peak shift." There may be something in this thesis. Elegant stags from Bhopal, India (fig. 12) have antlers quite out of proportion to their bodies. On the other hand, a stag from Brazil (fig. 13) puts the stress away from the—still diagnostic—antlers. Thus we would hesitate to argue that exaggeration is required for recognition in art. Our major concern, however, is that ideas of depictive exaggeration or distortion (see Deregowski 1984) are suspiciously dependent on concepts of a mimetic norm, that of the camera. We prefer to say that canonical form, undoubtedly reliant on salience, relates to the *distinctiveness* of the image, not its distortion. Canonical form is not equivalent to caricature, even if caricature may alert us to canonical form.

Figure 12. Bhopal, India.
Figura 12. Bhopal, India.

Figure 13. Serra da Capivara, Brazil.
Figura 13. Serra da Capivara, Brasil.

THE CANONICAL AS A SPECIFIC PERCEPTUAL MODALITY

Evolutionary imperatives

We now come to those types of representation which, we argue, are primarily geared to recognition and so constitute a particular perceptual modality: the category of canonicals. For a start we think canonical images differ from Livio Dobrez's Narrative images (featured as *doing something*, either singly or in a group). Likewise they differ from performatives, i.e., "looming" full-frontals, elsewhere defined as often large in size and having prominent eyes. These two categories constitute a great part of all depictions and especially a large part of rock art depiction. Both are important for evolutionary survival. We need to register an activity, even if it does *not* involve us: a "scene." (After all you never know when it may begin to involve you.) Likewise it is vital to register that a figure (in art, usually anthropomorphic) is "looming" towards you (Gibson, 1979: 175). However, it is also vital to *recognize* objects in your field of vision, i.e., to register canonicals. Of course this third category does *not* exclude the other two. Thus self-evidently when you observe a scene, for example a rhinoceros attack in Namibia (fig. 14), you read the emphatic large figure as a rhinoceros. A single animal doing something (running or leaping), like the Serra da Capivara does on the left of Figure 5, also constitutes a scene or narrative image—and it too is recognized by its given canonical form. We may say the same of the famous panel of black guanaco from Cueva de las Manos (fig. 15): we observe simultaneously that "something is happening", i.e., activity is depicted (a hunt)—and that what is hunted is guanaco. Something like this applies to performative images, which, however, are rarely zoomorphic: you recognize the looming frontal as a more or less human form (fig. 2). However, to read a narrative in life (and, consequently, in art) is more important than mere recognition. Likewise to read a figure in life (and, consequently, in art) as coming *towards* you, confronting you, is more important than recognition pure and

Figure 14. Noukloof Mountains, Namibia.
Figura 14. Montañas Noukloof, Namibia.

Figure 15. Cueva de las Manos, Argentina.
Figura 15. Cueva de las Manos, Argentina.

simple. It may, in life if not in art, be a matter of life and death. Thus in situations of potential danger, the fact of looming proximity will override recognition, even dispense with it altogether. Clearly here it suffices to register possible coming danger and to take immediate evasive action, since it makes no difference, let us say in poor light, whether the threat is from a large feline or an angry boar. So narrative and performative situations, and therefore, depictions, may be expected to be visually dominant over canonicals. While Livio Dobrez has argued that it is impossible to register a picture as a narrative scene and as a looming performative at the same time, i.e., these modalities *exclude* each other, they do not exclude canonical recognition. In real life you continue to see a rhinoceros attacking you as a rhinoceros, but this is not foregrounded! It is the action that counts. So both narratives and performatives are more active and visually primary than canonicals.

Defining canonicals

But how then do we define a canonical? That is to say: not simply an image or a figure recognizable *as* whatever it happens to be, i.e., not simply exhibiting a particular canonical form—but *only* geared to recognition, *only* calculated to exhibit a canonical form. In short, we are talking about a class of representations, chiefly but not solely animal, which prompt the observer to note one character and one only: that this is a picture of X (a horse, guanaco, etc.). There are situations of recognition in real life which do not involve the *further* perception of something "going on," a narrative in the visual field, or something apparently "advancing" towards the observer (a performative). By the same logic and on the evidence of the art, there is a representational category of canonicals. These are most likely to be depicted animals in profile—but *not* compositionally incorporated into a scene. If these depicted animals are not *doing* anything (even running or leaping, which must constitute a scene), then they constitute canonicals, depictions whose only visual effect is to exhibit the characteristics of a given animal—so as to enable easy recognition. The best example of such depictions is probably Franco-Cantabrian, notably the static animals of the Ariège (fig. 16). But, in addition to these, there are, again notably, eland in southern Africa, emus and kangaroos in Australia, bison in North America, moose in Norway. In South America we find notable examples of static camelids, like those from Charcamata above (fig. 11), or those in the "moon" panel at Cueva de las Manos (fig. 17).

As it happens, rock art from this area of Patagonia provides us with a particularly good example, and one worth elaborating here, of a convergence that may occur between a universalist approach like the one outlined above and archaeological/anthropological approaches whose main aim is to zero in, as taphonomy permits, on specifics of time and place. Gradin first arrived in the Rio Pinturas region in the sixties, with Barría as his original guide (see Gradin 2009), and, from the seventies onwards, in archaeological work eventually involving Aguerre, Aschero and others, suggested a chronology for the rock art. Of special relevance to non-Spanish-speakers, a detailed account of this is provided in Podestá et al. (2005); a scholarly summary in Onetto and Podestá (2011); and a brief but instructive summary intended for the tourist in Gradin et al. (2007). The chronology still stands, though it has been modified for the sake of greater nuance (Aschero 2012). Its basic division, based on dating as well as other evidence, is between three style groups: A, B and C. Group C covers the last 1000 years or so, but it is B and A, dated respectively at 7000+ BP and 9000+ BP, which are of interest here. Gradin wanted to distinguish the guanaco in dynamic motion as part of a hunting scene characteristic of style group A from the static, gravid guanaco of style group B. Of course our concern above was to describe possible perceptual and depictive universals, viz, in our terminology, on the one hand narrative and performative modalities and, on the other, a canonical modality. But it is significant that archaeological work in particular sites makes a parallel distinction from the standpoint of culture-specific, i.e., time/place-specific "styles." In this context the reader is also referred to Gradin and Aguerre (1994) and Aguerre (2003), as well as to material relating to the 1999 inclusion of Cueva de las Manos in the World Heritage list (Rolandi et al. 1998; Onetto 2006). It goes without saying that in engaging with a particular archaeological project

Figure 16. Niaux model, Parc de la Préhistoire, Tarascon-sur-Ariège, France.
Figura 16. Modelo Niaux, Parque de la Prehistoria, Tarascon-sur-Ariège, Francia.

Figure 17. Cueva de las Manos, Argentina.
Figura 17. Cueva de las Manos, Argentina.

we do not imply that canonicals as we define them bear a temporal relationship with other modalities, e.g., that canonicals postdate narratives in the way that Gradin's static style B figures postdate dynamic style A ones. In our scheme narratives, performatives and canonicals are depictive options available to any human group or individual at any time in history. What determines which modality, if any, dominates depiction at a given time is a matter for historical, i.e. cultural, circumstances. At any rate it is evident from the example of Gradin's stylistic sequence that perception-based and archaeology-based analysis may point up similar depictive elements from quite different and, in terms of evidence, unrelated methodological positions.

CONCLUSION

To return to the general point of our argument: depictions exist in which the figure is neither active as part of a scene (narrative) nor active in the sense of coming towards the observer (performative). Such figures in rock art may constitute a visual/depictive category primarily geared to the simple fact of recognition: that X is a horse or a bison, as at Niaux, or a guanaco, as at Cueva de las Manos and Charcamata (in the depictive format isolated by Gradin as group style B). But of course in real life the canonical view is likely to be provisional. What happens in life when—after the bison or kangaroo or eland or guanaco is recognized—the animal promptly *does* something, e.g., runs away from or attacks the observer? Or, likewise, when, observing the animal, the *observer* decides to act, either by fight or flight? At this point it is the activity, the event, which is foregrounded, *not* recognition—though recognition remains as a *basso continuo*. The key point is that in depiction, this perceptual instant of recognition may be *fixed*—in a static image. It is just such an image in rock art, whether of an animal (mostly) in profile, or of a frontal stick figure human (usually small), that we wish to term a canonical. The fact that recognition would seem a vital perceptual activity and the (doubtless corresponding) fact that images of this type are abundant worldwide, indicates the importance humans have placed on such perceptual activity and such images. We suggest, and elaborate on this suggestion in other papers referenced above, that this importance is mirrored in the hardwiring of the human visual system.

ACKNOWLEDGEMENTS We wish to thank María Mercedes Podestá for her assistance in connection with our 2012 visit to rock art sites in Argentina, and also for supplying publications not available to us in Australia.

REFERENCES

Aguerre, A. M. (Ed.), 2003. *Arqueología y Paleoambiente en la Patagonia santacruceña argentina*. Buenos Aires: Aguerre (self-published).

Arnheim, R., 1974. *Art and Visual Perception. A Psychology of the Creative Eye*. Berkeley and Los Angeles: University of California Press.

Aschero, C. A., 2012. Las escenas de caza en Cueva de las Manos: Una perspectiva regional (Santa Cruz, Argentina). In *Pleistocene Art of the World*, J. Clottes, Dir., pp. 140-141 (→AMS07: CD, pp. 807-823), Actes du Congrès IFRAO, Tarascon-sur-Ariège, septembre 2010. N° especial de *Préhistoire, Art et Sociétés, Bulletin de la Société Préhistorique Ariège*, LXV-LXVI, 2010-2011. Ariège, France.

Attneave, F., 1954. Some informational aspects of visual perception. *Psychological Review* 61 (3): 183-193.

Cheyne, J. A.; L. Meschino & D. Smilek, 2009. Caricature and contrast in the Upper Palaeolithic: Morphometric evidence from cave art. *Perception* 38 (1): 100-108.

Deregowski, J. B., 1984. *Distortion in Art: The Eye and the Mind*. London: Routledge & Kegan Paul.

—— 1995. Perception — Depiction — Perception, and Communication: A skeleton key to rock art and its significance. *Rock Art Research* 12 (1): 3-10. Melbourne: AURA.

Dobrez, L., 2007. The reception of visual representations. In *XXII Valcamonica Symposium: Rock Art in the Frame of the Cultural Heritage of Mankind*, E. Anati, Ed., pp. 115-121. Capo di Ponte, Italy: Edizioni del Centro Camuno.

—— 2008. Narrative and non-narrative figurative representation. In *Aesthetics and Rock Art III*, T. Heyd & J. Clegg, Eds., pp. 29-33. Oxford: Archaeopress.

—— 2010. "Good to Think" representational modalities. *FUMDHAM Mentos* IX (2): 283-294. Piaui: Publication of Fundação Museu do Homem Americano.

—— 2010-2011. What representations tell us about the way we see. *Purakala* 20-21: 23-41. Agra: Rock Art Society of India (RASI).

—— 2011a. Rock art, perception and the subject/object binary. *Rock Art Research* 28 (1): 71-83. Melbourne: AURA.

—— 2011b. Looking at our looking: A new approach to the definition of a rock art scene. *American Indian Rock Art* 37: 251-264. Glendale, Arizona: American Rock Art Research Association.

—— 2012a. American Ikon: how to choose an ARARA logo. *American Indian Rock Art* 38: 145-164. Glendale, Arizona: American Rock Art Research Association.

—— 2012b. Towards a more rigorous definition of terms: Are there scenes in European Palaeolithic art? In *Pleistocene Art of the World*, J. Clottes, Dir., pp. 316-317 (→SIG20: CD, pp. 1837-1851). Actes du Congrès IFRAO, Tarascon-sur-Ariège, septembre 2010. N° special de *Préhistoire, Art et Sociétés, Bulletin de la Société Préhistorique Ariège*, LXV-LXVI, 2010-2011. Ariège, France.

Dobrez, L. & P. Dobrez, 2013a. Canonical form and the identification of rock art figures. *American Indian Rock Art* 39: 115-129. Glendale, Arizona: American Rock Art Research Association.

—— 2013b. Rock art animals in profile: Visual recognition and the principles of canonical form. *Rock Art Research* 30 (1): 75-90. Melbourne: AURA.

Gibson, J. J., 1979. *The Ecological Approach to Visual Perception*. Boston, Massachusetts: Houghton Mifflin Company.

Gombrich, E. H., 1959. *Art and Illusion: A Study in the Psychology of Pictorial Representation*. London: Phaidon Press.

—— 1972. The Mask and the Face: The Perception of Physiognomic Likeness in Life and in Art. In *Art, Perception, and Reality*, E. H. Gombrich, J. Hochberg & M. Black, Eds., pp. 1-46. Baltimore, Maryland: The Johns Hopkins University Press.

Gradin, C. J., 2009. *Recuerdos del Río Pinturas*. Buenos Aires: Ed. de Autor.

Gradin, C. J. & A. M. Aguerre (Eds.), 1994. *Contribución a la Arqueología del Río Pinturas*. Concepción (Uruguay) and Entre Ríos (Argentina): Búsqueda de Ayllu.

Gradin, C. J.; A. M. Aguerre & M. C. Mattar, 2007. *Cueva de las Manos*. Perito Moreno, Santa Cruz, Argentina: Hotel Belgrano.

Halverson, J., 1995. Information and typicality. Reply to Deregowski. *Rock Art Research* 12 (1): 14-15. Melbourne: AURA.

Hochberg, J., 1972. The representation of things and people. In *Art, Perception, and Reality*, E. H. Gombrich, J. Hochberg & M. Black, Eds., pp. 47-94. Baltimore and London: The Johns Hopkins University Press.

Marr, D. & H. K. Nishihara, 1978. Representation and recognition of the spatial organization of three-dimensional shapes. *Proceedings of the Royal Society of London B* 200 (1140): 269-294.

Onetto, M., 2006. Experiencias de la gestión de un sitio del Patrimonio Mundial en Argentina: mitos y realidades. Cueva de las Manos, río Pinturas. In *Tramas en la Piedra: Producción y usos del arte rupestre*, D. Fiore & M. M. Podestá, Eds., pp. 263-278. Buenos Aires: World Archaeological Congress, Sociedad Argentina de Antropología & Asociación Amigos del Instituto Nacional de Antropología.

Onetto, M. & M. M. Podestá, 2011. Cueva de las Manos: An outstanding example of a rock art site in South America. *Adoranten*: 67-78. Tanumshede, Sweden: Scandinavian Society for Prehistoric Art.

Podestá, M. M.; R. S. Paunero & D. S. Rolandi, 2005. *El arte rupestre de Argentina indígena, 1ª parte: Patagonia*. Buenos Aires: Union Académique Internationale, Corpus Antiquitatum Americanensium, Argentina V, Academia Nacional de la Historia.

Ramachandran, V., 2003. *The Emerging Mind: The Reith Lectures*. London: Profile Books.

Rolandi, D. S.; M. M. Podestá & M. Onetto, 1998. *Proposal for the Inscription of Cultural and National Properties in the UNESCO World Heritage List*. Buenos Aires: Instituto Nacional de Antropología y Pensamiento Latinoamericano.

Tinbergen, N., 1961. *The Herring Gull's World: a study of the social behaviour of birds*. New York: Basic Books.