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The cognitive representation of nature in language

A taxonomy*

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The present article proposes a taxonomy of features to describe the grammar of natural landscapes with the parameters that can account for the preferences of speakers in the description of nature. The taxonomy is the theoretical foundation designed for the Corpus of Language and Nature (CLAN Corpus),¹ compiled worldwide, whose aim is to describe the cognitive and emotional preferences in the observation of nature by speakers of different languages. For this purpose, we have delineated the basic visual features deemed essential to read natural landscapes in order to create a network of cognitive variables in the perception of nature with its various components and features. These features of landscapes are complemented with a description of the cognitive variables that mould the individual's perception of nature and the emotions enacted after its contemplation.

Keywords: clan corpus, cognition, landscape, emotions, nature, taxonomy

1. Introduction

Possibly all human beings have had contact with nature and have also experienced impressions and emotions that have been awakened after the contemplation of a natural landscape. In general terms, it can be said that nature is not indifferent to humans, who derive from its perception feelings and emotions they like to share. However, when we want to describe the features of a landscape, its components, or what it means for us, we often resort to a simple enumeration of its elements: a river, a mountain, a tree, etc., with, perhaps, some additional specification of their qualities: Green, blue, deep, etc. These descriptions are often personal but they do not provide objective details of the structural elements that may trigger a cognitive response in our *weltanschauung*.

One of the recent fields of research in cognitive linguistics has been the description of emotions across cultures, especially in bilingual speakers. In this sense we agree with Wierzbicka (1993: 1) when she says that: “The “basic emotions” are believed to be part of the biological makeup of human species and to be therefore “hardwired””. Emotions, therefore, are central to humans and bilingualism grants enormous possibilities on the cultural description and comparison of languages. Looking at multilingualism from the point of view of emotions facilitates the study of the relationship between language, culture, and the self (Wierzbicka 2004), as for example in the use of the body in the expression of emotions (Enfield and Wierzbicka 2002). In this sense, Myhill (1997: 79) describes this novel approach as

...a model for the analysis of emotions in which each emotion word in each language is made up of a universal component and a language-specific component; the universal component is drawn from a set of universal human emotions which underlie all emotion words in all languages, and the language-specific component involves a language-particular thought pattern which is expressed as part of the meanings of a variety of different words in the language.

In fact, some of the results of this approach to bilingualism have been the description of emotions provoked by swearwords (Dewaele 2004), by politics (Ragajopalan 2004), by parent-child communication (Pavlenko 2004), by the notion of tolerance (Gladkova 2008).

The study of emotions has been developed, *inter alia*, by the theory of cultural scripts within ethnopragsmatics. This is based on the assumption of the existence of established semantic primes, i.e., simple and indefinable meanings that seem to emerge in all languages in such a way that concepts can be translated across languages without any semantic distortion (D’Andrade 2001).

In this sense, one of the most insightful approaches to the study of landscapes in language is the article by Bromhead (2011) with the comparison of ethnogeographical categories in English and Pitjantjatjara/Yankunytjatjara (an Australian aboriginal language). Following the Natural Semantic Metalanguage (NSM) methodology, the author engages in an interesting analysis of the characterisation in both languages of two geographic features: elevated and elongated hydrological patterns. The semantic primes identified for the study are ‘place’ and ‘kind’, which are then developed with explications *via* semantic molecules (Goddard 2007; Wierzbicka 1991). The author affiliates with the tradition developed from cognitive geography by Mark and Turk (2003), called ‘ethnophysiography’, whose premise is that culture plays an essential role in the description of physical entities, as in other classifications pertaining to ethnobiology (body parts) or kinship terms, etc.

Our model takes a different route, as we do not study the diversity or unity of the mental representation of natural elements in different languages (Dascal

2009). Our model tries to describe the emotional reaction to landscapes through language verbalization. For this purpose, we rely on the theory of landscape perception developed by ecology (Wiens and Moss 2005; Turner, M.G. et al. 2001), and on the assumed universal parameters of landscape perception and their role in the human adaptation to the environment (Espigares et al. 2008; Lucio et al. 1996; Romero-Trillo and Espigares 1996).

Our article proposes a model that accounts for the description of natural landscapes through language by taking into account two inextricably linked components: the formal geographic features, and the emotional and cognitive processes that these landscapes enact in the viewer's brain. In sum, we believe that the cognitive and emotional impact experienced with the observation of landscapes will depend on the formal features of the landscape, and *vice versa*.

2. The components of landscapes

2.1 Geographic vs. subjective landscapes

From a historical perspective, we can identify two branches in the study of landscapes: the geographic landscape and the subjective landscape. The geographic landscape has been traditionally studied in biology, ecology in particular, and geography, often in relation to the human intervention to create or modify new environments. In fact, to ratify this interdisciplinary approach it is worth mentioning that the term 'landscape ecology' was coined by a geographer, Carl Troll in 1930. Since then, there have been different approaches to the study of the organization of landscapes, although the idea of 'ecosystem', based on the theory of systems (Bertalanffy 1968), is nowadays the prevailing one.

The subjective landscape has always been present in the human cognitive structure, and one of the theoreticians who first related both approaches — the geographic and the subjective — and emphasized the essential role of perception was Alexander von Humboldt (1845:3) who, in the second volume of his work *Cosmos*, said (our emphasis):

We now pass from the domain of objects to that of sensations. The principal results of observation, in the form in which, stripped of all additions derived from the imagination, they belong to a pure description of nature [and] have been presented in the preceding volume. *We now have to consider the impression which the image received by the external senses produces on the feelings, and on the poetic and imaginative faculties of mankind.*

Our model is also aligned with this combinatory approach for which the scientific study of nature necessarily leads to the imaginative and poetic perception

of reality and, as a result, to the study of the impressions on the observer's mind. Therefore, in the same way as scientists can study the composition of soils, the acidity of waters or the precipitation of rain, and rely on measures and calibres to evaluate and describe these phenomena, we believe that linguistics needs to have a definite set of features that can also describe what we are seeing in a natural landscape with defined parameters and comparative scales. In this way, we will be able to 'read landscapes' and analyse the emotional and cognitive constructs that they create in our minds.

2.2 Global vs. visual landscapes

In the description of the components of landscapes we shall make two initial distinctions: global landscapes and visual landscapes. Global landscapes describe the visible (phenosystemic) and invisible (cryptosystemic) features that compose a specific landscape (González-Bernáldez 1981). The phenosystemic features are, for instance, the plants, the water, the animals, etc. and the cryptosystemic features are, amongst others, the soil composition, under-soil water resources, etc. The two types of features are in a mutually dependent relationship, although only the observers who are knowledgeable in ecology are able to see the mutual relationship between the cryptosystem and the phenosystem. This relationship between the visible and the invisible is similar to the perception of prosody for the average speaker of a language, and its acoustic dissection in its components (pitch, duration, fundamental frequency, etc.,) that are hidden to the neophyte.

Visual landscapes, on the other hand, interact with people's perceptions and expectations, with the clear dependence between physical (external) and psychological (internal) considerations. In other words, visual landscapes refer to the physical features that are perceived by humans, who always try to establish a relationship to integrate the two and identify a certain type of landscape with joy, sorrow, fear, etc. The stages of this integration according to Bell (2001:206), are the following:

- The physical aspects of the reception of visual stimuli
- The intuitive recognition of an aesthetic quality
- The ability of the mind to connect sensory information to other knowledge

However, the observer's expertise can also influence the cognitive representation of landscapes. Daniel (2001:268) distinguished between expert and perception-based approaches. The expert-based approach translates the biophysical features of the landscape into formal design parameters that are "assumed to be universal indicators of quality derived (implicitly) from classical models of human perception and aesthetic judgement". The perception-based approach, on the other hand, treats

biophysical features of landscapes as “stimuli that evoke aesthetically relevant psychological responses through relatively direct sensory-perceptual processes and/or through intervening cognitive constraints”. For instance, Kearney and Bradley (2011) described the interlocking effect of personal attitudes and forest management knowledge on the preference for certain forest scenes over the viewers’ group membership and other demographic variables such as sex, age or education. Researchers have also investigated the appearance of phobias or preferences for certain natural contexts, as in the appearance of danger before a certain type of landscape, especially with forests, as for instance Herzog and Kropscott (2004) who described the fear of informants when they walk across forests without pathways.

Some scholars have enlarged the variables that have been traditionally considered in the appraisal of nature and have included culture as a key for the evaluation of landscape preferences. For instance, Nassauer (1995) suggested that humans do not only manage and construct landscapes, as was proposed in traditional landscape studies, but they also see landscapes and, by so doing, they make decisions based on what they perceive “culture structures landscapes”, and “landscapes inculcate culture” (Nassauer 1995: 229). In other words, this new approach suggests that the cognitive perception of natural landscapes is at the same time the result and the origin of specific cultural values and, by extension, the cultural connotations imbued with landscapes do not necessarily agree with the understanding of the same landscapes from a purely ecological perspective. In fact, research has shown a universal preference for certain types of landscape elements in different cultures with a clear preference for natural landscapes over urban scenes (Kaplan 1987).

One of the most influential universalist hypothesis is the Prospect-Refuge theory (Appleton 1975). This theory proposes that the savannah-like landscape, with low shrubs and clumps of trees divided by open spaces, offers an attractive combination of prospect and refuge symbolism. The reason is because open spaces grant the opportunity to detect potential dangers, while the low shrubs and clusters of trees provide places to hide and escape. This theory would account for the universal preference for landscapes that favour survival in case of danger for humans, which is inscribed in our genetic memory.

An illustration of the Prospect-Refuge theory was suggested by Dutton (2003), who argued that the landscapes depicted in calendar art tend to have similar themes throughout the world and that these themes are the same ones predicted by the savannah preference hypothesis.

In the last decades some scholars have engaged in the study of landscape preferences from a cross-cultural approach. For example Sonnenfeld (1967) studied the preferences shown by native and non-native Eskimos in their choice of landscapes to settle down, or Shafer and Tooby (1973) who described the different preferences

of Scottish and American campers in their choice of campgrounds. Also, Zube and Pitt (1981) analysed the viewers' choice for scenic versus heritage landscapes, Yang and Kaplan (1990) compared the selection of Korean, Japanese, and Western gardens, and Herzog et al. (2000) who studied the preferences shown by American and Australian observers for six types of landscape categories in Australia (rivers, dry lake beds, floodplains, terraces, mallee plains, and cultural settings — i.e., habitation and planned agriculture). More recently, Falk and Balling (2010) have investigated the preference for savannah landscapes by Nigerian and American students following the premises proposed by Appleton (1975) mentioned above.

Although the role of culture has been regarded a source of investigation for landscape preferences with increasing interest, the role of language has had a marginal role in these studies. A notable exception is the seminal article by Hathaway (1976) who analysed the preferences expressed by English speakers whose origin was Italian-American, Afro-American, and Yugoslavian-American in the US. The study investigated whether the subjects' first language and 'family culture' would be influential in their choice for landscapes. The results showed that the subjects expressed their consistent different preferences when shown the same photographs, which proved that language and culture bore an important role, notwithstanding all the subjects had always lived and shared the same natural context.

Our taxonomy has been developed with the aim of describing natural landscapes in the collection of the Corpus of Language and Nature (CLAN). The CLAN project consists of the descriptions from speakers of all continents to evaluate their emotional and cognitive reactions to different types of landscapes within the cognitive paradigm of landscape perception (Zube et al. 1982:8). The corpus collects the data online via a web-based interface and compiles the video and audio commentaries on 24 photographs selected according to the features described in this article. The corpus design also considers objective parameters related to personal variables such as country of origin, mother tongue, sex, educational background etc. This allows researchers to correlate landscape descriptions with biographical variables, which will be used for the universal analysis of landscape preferences. The taxonomy uses the Natural Semantic Metalanguage (MSN) theoretical framework (cf. Bromhead 2011).

3. A taxonomy for natural landscape description

The features of landscape that we have identified for our study are the following: shape, line, texture, density, regularity, scale, and space. We now proceed to the enumeration of the features, accompanied by a sketch of their salient features, with authentic photographs that we consider prototypical for each of the categories.

3.1 Shape

The shape in landscapes delimits the volume of what is being observed. It can be two-dimensional, three-dimensional, geometric or complex.

- 1. Two-dimensional shape: When viewers see this place, they can observe some elements of a different kind there. They can think about all these elements like this: “these elements can be well observed and distinguished in horizontal and vertical terms”.
- 2. Three-dimensional shape: When viewers see this place, they can observe some elements of a different kind there. They can think about all these elements like this: “these elements can be well observed and distinguished according to irregular lines in terms of width, height and depth”.
- 3. Geometric shape: When viewers see this place, they can observe some elements of the same kind there. They can think about all these elements like this: “these elements can be well observed and distinguished according to regular lines in terms of width, height and depth”.
- 4. Complex shape: When viewers see this place, they can observe some elements of the same kind there. They can think of all these elements like this: “these elements cannot be observed or distinguished according to regular lines in terms of width, height and depth”.

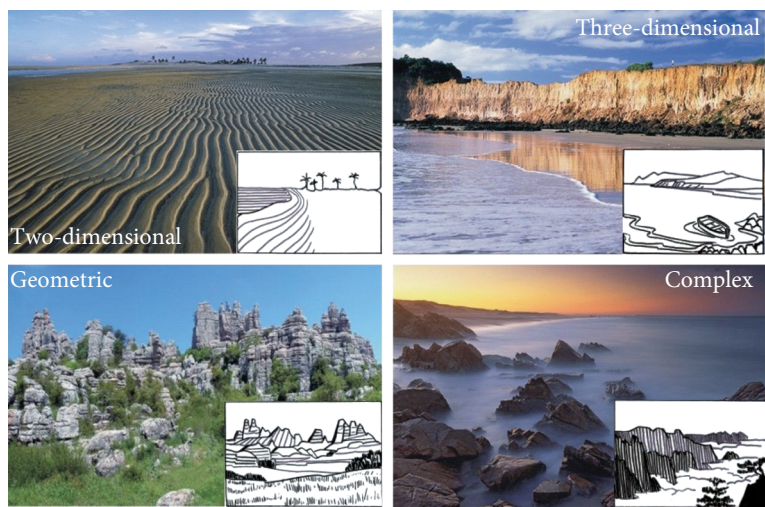


Figure 1. Shape

3.2 Line

Line refers to the border that limits the objects in the landscape. A line can be defined, blurred, striped, or silhouetted.

1. Defined line: When viewers see this place they can think like this: “the division of elements of different kinds in this place can be observed. The different kinds of elements can be identified as individual elements with their specific features”.
2. Blurred line: When viewers see this place they can think like this: “the division of elements of different kinds in this place is not clear. The different kinds of elements in this place cannot be identified as individual elements with their specific features”.
3. Striped line: When viewers see this place they can think like this: “the division of elements in striae of different kinds and width in this place can be observed. The different kinds of elements can be identified as individual elements with their specific features according to such striae”.
4. Silhouetted line: When viewers see this place they can think like this: “the division of elements of different kinds in this place can be observed. The different kinds of elements can be identified as individual elements with unequal detail because some elements stand out”.

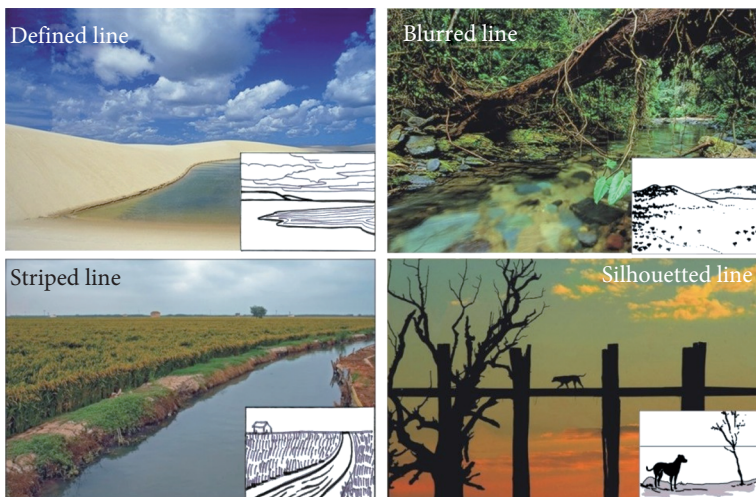


Figure 2. Line

3.3 Texture

Texture refers to the detail of the amount of information presented per visual unit. Texture can be fine, medium or thick.

1. Fine texture: When viewers see this place they can think like this: “the elements of the same kind in this place can be observed. They cannot be identified as individual elements nor their features can be perceived”.
2. Medium texture: When viewers see this place they can think like this: “the elements of the same kind in this place can be observed. They are difficult to be identified as individual elements, although some of their salient details can be perceived”.
3. Thick texture: When viewers see this place they can think like this: “the elements of the same kind in this place can be observed and they can be identified as individual elements through some of their features”.

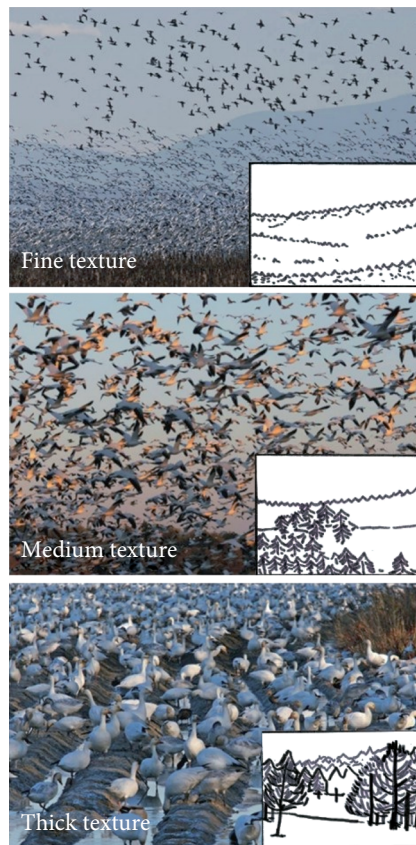


Figure 3. Texture

3.4 Density

Density is the quantity of elements presented per visual unit. Density can be low, medium or high.

1. Low density: When viewers see this place, they can observe some elements of the same kind there. They can think about all these elements like this: “This element is far from all the other elements of the same kind”.
2. Medium density: When viewers see this place, they can observe some elements of the same kind there. They can think about some of these elements like this: “This element is not very far from some other elements of the same kind, at the same time, it is not very close to any other elements of this kind”.
3. High density: When viewers see this place, they can observe many elements of the same kind there. They can think about all these elements like this: “This element is very close to many other elements of this kind”.

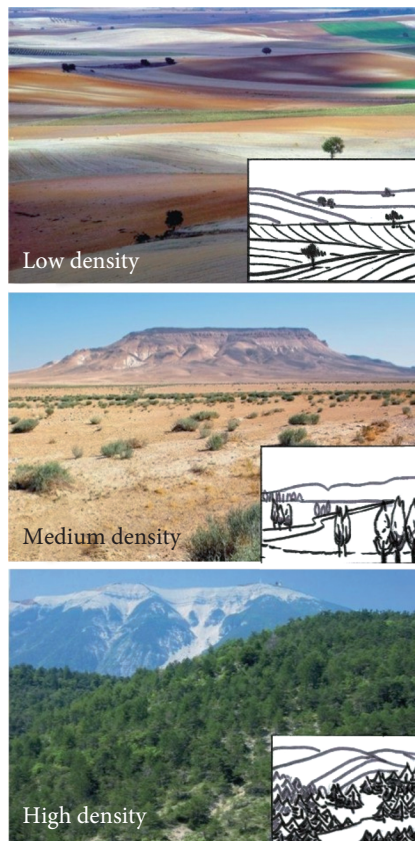


Figure 4. Density

3.5 Regularity

Regularity refers to the recurrent patterns of objects in the landscape. Regularity patterns can be random, aggregate, regular, or gradual.

1. Random pattern: When viewers see this place they can think like this about some of its parts: “There are many elements of the same kind in all parts of this place with no established order”.
2. Aggregate pattern: When viewers see this place they can think like this about some of its parts: “There are many elements of the same kind in this part of this place”. Viewers cannot think like this about all parts of this place.
3. Regular pattern: When viewers see this place, they can think like this about all of its parts: “There are many elements of the same kind in this part of this place, and these elements follow an established order”.
4. Gradual pattern: When viewers see this place, they can think like this about all of its parts: “There are many elements of the same kind in this part of this place, and these elements follow an established decreasing or increasing pattern in some parts of this place”.

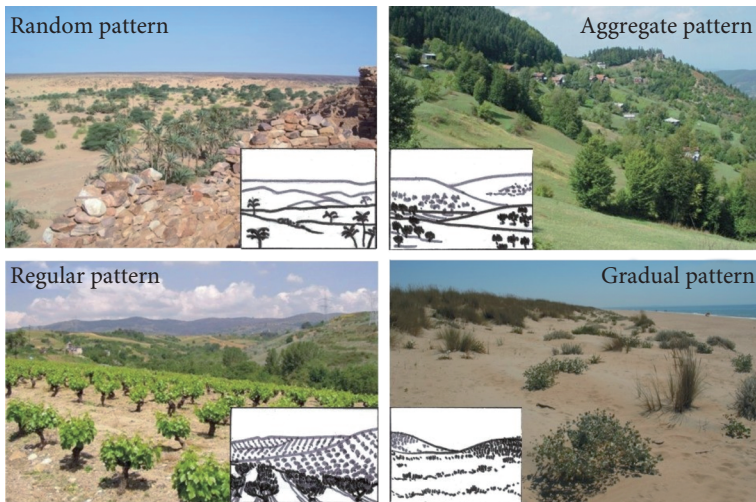


Figure 5. Regularity

3.6 Scale

Scale refers to the perception of the size of objects in the landscape. The scale can be measured in terms of distance, when the size of an object can be guessed in relation to the nearest one and its relative distance; and of proportion, when the size can be assumed in relation to the size of another object in the image.

1. Distance scale: When viewers see this place they can think like this about its parts: “there are some elements of the same kind in this part of this place. The elements look different because there is some regular distance between them”. As all the elements are of the same kind, the viewer can identify the size and composition of all of them.
2. Proportion scale: When viewers see this place they can think like this about its parts: “there are some elements of a different kind in this part of this place”. The viewer can infer the size of one kind of the elements. The viewer can infer the size of the other kind of elements in this place through comparison.



Figure 6. Scale

3.7 Space

Space is the feature that describes the layout of elements in the landscape in terms of their spatial prominence. Space can be panoramic, gorged, dominant, focalised, or luxuriant.

1. Panoramic space: When viewers see this place they can think like this about its parts: “there are some elements of a different kind in this part of this place. The elements have a similar salience because of the distance. Although the

- elements are of different kinds, it is difficult to identify the exact size and composition of all of them”.
2. Gorged space: When viewers see this place they can think like this about its parts: “there are some elements of a different kind in this part of this place. Some elements are more salient than others. The salient elements embed the non-salient elements”.
 3. Dominant figure: When viewers see this place they can think like this about its parts: “There are some elements of a different kind in this part of this place. One kind of elements is salient because of its size and position with respect to the others”.
 4. Focalised space: When viewers see this place they can think like this about its parts: “There are some elements of a different kind in this part of this place. The elements diminish proportionally. It is not possible to see the final limit of some of the elements in this place”.
 5. Luxuriant space: When viewers see this place they can think like this about its parts: “there are some elements of a different kind in this part of this place. All the elements are salient because they are very abundant in this place”.

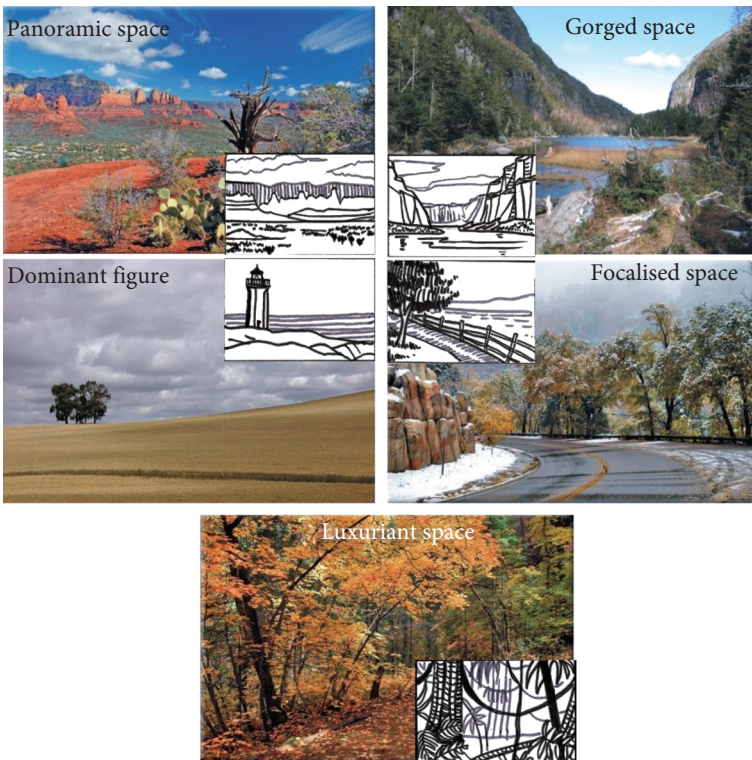


Figure 7. Space

4. The cognitive evaluation of natural landscapes: The observer's perspective

On the basis of the taxonomy of the features of landscapes presented above, linguistics can assess and describe the physical and cognitive parameters that influence the observer's perception of different natural contexts according to the following variables:

- The sensitive conditions inherent to the observer: the psychological variable.
- The cultural and educational background: sociolinguistic and sociocultural variable.
- The relationship between the observer and the landscape: the affective variable.

These three observer variables would influence the way an observer appraises a certain landscape. To evaluate this we can identify the following variables dealing with human intervention, as opposed to natural landscapes, in which the observer can evaluate qualitatively the preferences in terms of:

- Permanent features: those impossible to modify through human intervention. They have to do with the relief (from plateaus to high mountains) and the hydrology (from desert to forest) of the landscapes.
- Temporal features: those that are modifiable by human intervention or by seasonal factors; e.g., vegetation (from scarce to luxurious), fauna (from small to large animals), and others (basically buildings of different types, from factories to cottages in the mountains).
- Extra features: those that are added to the landscape in a contingent way. We differentiate between 'intrusions,' like vehicles or large animals, and 'other senses,' basically smells and noises (pleasant, like water streams, or unpleasant, like those from factories).
- Contrastive features of elements in a landscape, divided into natural (different types of natural elements) and artificial (like electric pylons in a field).

The intersection between the physical objective features of landscapes and the cognitive reading by the observer constitutes the substrate for the development of the emotional perception of nature. This perception is, obviously, patrimony of the individual but, at the same time, the result of a cultural and linguistic heritage.

5. Conclusions

The present article has presented the linguistic taxonomy of the cognitive representation of landscapes. Seven categories to describe the grammar of natural landscapes have been introduced, with the proviso that they co-occur in all the contexts and are functionally dependent. Each category includes a sketch and a prototypical landscape image that can be used as a model for further studies. This taxonomy has been complemented with the description of the variables that affect humans in their appraisal of landscapes. These variables range from the psychological construct to the socio-cultural background of the observers.

We are convinced that our taxonomy can be useful to establish principled terms of analysis and comparison between languages in the same way as other authors have done in relation to different aspects of culture and language; e.g., Wierzbicka (1985) on the relationship between languages, cultures and linguistic realizations; Béal (1994), for the comparison between French and Australian English; Ameka (1994) for the description of African languages in a multilingual society; Goddard (2000) for Malay; or Goddard and Wierzbicka (2004) on the description of cultural scripts, with special attention to West African languages, Chinese, Korean, Singapore English, and Colombian Spanish.

We believe that our taxonomy can help in the identification of the basic visual features that can describe the representation of landscapes and the personal preferences in the selection of natural contexts. Moreover, our approach can shed new light on the inextricable, although often forgotten, “visible proof of biology in culture and culture in biology” (Stafford 2007:4). In this sense, our tool can help to evaluate the cultural preferences of landscapes not only by observers from different cultures, but also by speakers who read or listen to objective or literary descriptions of natural settings in either their native or a foreign language.

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Note

1. <http://www.clancorpus.net>

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