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Categorising natural objects: some issues arising from recent work in cognitive anthropology and ethnobiological classification

Summary: Classification is not logically, developmentally or historically prior to conceptualisation, but rather consubstantial. Using examples of folk categories for plants and animals (including of humans), I show that classifications are always imminent, tentative and just sufficiently good to achieve their purpose. While there is evidence for some evolved regularities in the way classifying is cognized, it is always expressed culturally and contextually. This limits our ability to generalise about classifications as entities. As social phenomena, classifications are variable and dynamic, but under certain circumstances their shared elements can be stabilized and enforced. This happens through the conventions of language, where recognized authorities can enforce their will, and in the interests of effective communication within increasingly larger groups. Writing and pictures are powerful means of simplifying and sharing classifications, but they also transform them and introduce new properties.

1 Introduction

My original brief for the workshop on which this volume is based was to respond to some of the issues in the position statement circulated by Tanja Pommerening and Walter Bisang. This is a tall order as these issues have all been the subject of much reflection in cognitive anthropology and allied subjects for the last half century. I fully realize that in an attempt to say something that is of general relevance regarding the organisation of folk categories for plants and animals (including humans), I risk oversimplification in some specific areas. That said, I will focus here on just seven issues: classification as a situated process, the relationship between words and categories, hierarchies and taxonomy, cultural universals, domain specificity, the position of humans within folk classifications, and the impact of writing and depiction technologies. Nothing here is particularly original, and my main purpose is to provide an overview that may help connect papers in this volume coming from different disciplinary perspectives.

2 Classification as situated practice

The first thing to emphasize is that classifications as they are encountered in ordinary life are seldom fixed schemes to which we assign semantic content, but rather end-products of a process. Put differently, classifications emerge consubstantially with conceptualisation. There has been a problem in the past in attributing to them more stability than they deserve. Indeed, to speak of *classifications* is to run the risk of reifying schemes as permanent cultural artefacts or mentally stored old knowledge, when they are often more properly understood as the spontaneous and often transient consequence of underlying processes. The assumption to the contrary is what we might call 'the classificatory fallacy' (Ellen 2006: 27; 31). This is understandable when we think of the grand schemes that have arisen in the history of science (perhaps most obviously those of Linnaeus and Mendeleev), or when as students of ancient writing systems we are restricted to limited physical evidence (e.g. Goldwasser and Grinewald 2012). But when we look at classifications in the context of oral culture and social interaction, it becomes clear that they are generally imminent works in progress, just sufficiently good for their purpose, always tentative and plural. There is no one major scheme that all members of a particular cultural population share in its entirety, though there may be pressure to achieve as much commonality as possible. Consider an example, of cultural rather than natural objects. My father used to store screws in old tobacco tins that he aligned in shelves in his garden shed. Each tin had a label. These included the following:

- 'Posidrive screws'
- 'Medium flathead screws'
- 'Short dumpy flathead screws'
- 'Smallish flathead screws'
- 'Largish woodscrews'
- 'Long large flathead screws'
- 'Short fat round head screws'

On first inspection this list is baffling. It contains trademark names ('Posidrive' ™); what Lakoff (1973) calls hedges: vague terms that defy the determination of boundaries ('smallish', 'largish' ...), idiosyncratic allusive terms (such as 'dumpy'), and a mixture of morphonyms describing the physical properties of the fixing agent ('large', 'round', 'flathead' ...), as well as functional properties (what the screw is used for: e.g. 'woodscrew'). Systematic contrast is difficult to establish across the range of different types because the same attribute does not appear in all names. The best we can achieve is a partial polythetic set (Ellen 2006: 33 f.). Thus, although this series made perfect sense to my father and allowed him to always find what he was looking for, I would defy anyone to reconstruct the list of labels as – say – a taxonomic hierarchy, a challenge I have routinely proposed to students in my Kent cognitive anthropology classes. A taxonomy is impossible to establish because there are so many cross-cutting

features, not all of which are present in each case, and because boundaries between categories are generally fuzzy. The information my father supplies is neither exhaustive nor logical, only sufficiently detailed for him to achieve his practical purpose.

Of course, classifications have been the subject of interest in science for much of the twentieth century. As an object of anthropological scrutiny they came to prominence during the 1960s, exemplified in the British (constructionist) tradition by the writings of Mary Douglas, and in the American ethnosemantics (cognitive) tradition by the likes of Harold Conklin and Brent Berlin.[1] My own work has always tried to bridge this divide and develop a more embedded approach. In particular, I have used the analysis of people's categorisation of natural kinds as a means of understanding how classifying more generally works. In this view it is no longer necessary, when speaking of cognition, to choose between the *chicken position* (an approach which assumes a world with pre-given qualities) and the *egg position* (where reality is simply the reflection of internal laws of the system).

3 Words and categories

Most studies of classification begin with language. This is because most data acquired in natural fieldwork settings are generated through interviews and by hearing people talk about what they think, perceive and experience; because this is how most people themselves share classificatory knowledge; and because many classifications are stabilized in literate cultures and by researchers alike by committing them to written language. However, we have long known that words are not always a perfect indicator for the existence of categories: several words may label the same category, and the same word can be used for quite different ideas. What are often described as 'classifiers' by linguists in both spoken and written languages of various kinds (e.g. Grinevald 2000, Goldwasser and Grinewald 2012) – grammatical entities embedded in utterance or text – are often unreliable indicators of how people assign – say plants and animals – to groups. Moreover, some categories may be inferred without being labelled – they are covert but no less real (e.g. Berlin et al. 1974: 415).

It is nevertheless true that the nomenclature for labelling categories tells us something both about classificatory knowledge and about the attributes which people find important in distinguishing different entities, attributes and phenomena. Words provide evidence of more inclusive categorising strategies: for example, plant binomials often indicate two categories linked by a *kind* of relationship. Thus, for Nuaulu in eastern Indonesia, the term *sinsin msinae*, *re[ ]sinte* (a kind *Codieum*

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1 Background to these debates will be found in several of the essays included in Ellen 2006. Note also that I draw on some of the content of that book, as well as Ellen 2011, for the present chapter.

variegatum, a croton widely available in Europe as a houseplant), is a binomial. Local linguistic conventions have to be carefully observed, and it is important to note, for example, that *kasipi sinsinte* is not a kind of *sinsinte*, but rather a variety of cassava. In this context *sinsinte* becomes, instead, an adjectival qualifier. What is important is not that something has a fixed name, but that the association is registered through continual and repeated perceptual events, reinforced over the longer term and transmitted between individuals.

Early attempts to understand how categories within the cultural domain of natural kinds are established and used employed a distinctive feature model, in which category A was distinguished from category B by a number of key characteristics. For example, birds have wings, feathers, beaks and fly, in contrast to fish, which swim and have fins. This approach was largely based on lexicography and logic (e.g. Conklin 1962). However, it was early noted that the condition of contrast required for the model to work was not always evident. Thus, category A might be linked to category B by one common attribute, and category B linked to category C through a different common attribute, thus linking categories A and C even though they had nothing in common. Such a 'polythetic classification' (e.g. Ellen 1993: 128 f.) works on the same principle as my father's idiosyncratic labelling system for screws; while a similar critique of distinctive feature analysis coming from a different disciplinary angle is offered by Barsalou (1992).

As work on ethnobiological classification expanded it became obvious that the distinctive feature model was inadequate, and that a better way of modelling the cognition of basic and more inclusive categories might be in analogue terms, as cognitive prototypes. In this model – for example as exemplified in the work of Eleanor Rosch (e.g. 1977) – the brain has an image of, say, 'birdness' or 'treeness' to which incoming perceptual images are matched. The presence or absence of particular features is not an overriding consideration, only closeness of match. In this model an image could be a close match or a marginal match. Thus, in British English classification of birds a *sparrow* would configure closely the core prototype, but a *emu* would be marginal. Of course in practice, both the notion of contrasting features and cognitive prototypes are necessary to understand how classifications work in detail.

4 Hierarchies and taxonomies

Early anthropological work on cognitive domains modelled their subdivisions largely in terms of taxonomy (e.g. Tyler 1969), meaning a hierarchical model of contrast and class inclusion. This is partly because taxonomies had become so dominant in the literary and scientific tradition of the West, and particularly because of the powerful precedent of Linnaeus. The recursive relationship between the properties of classifications developed in the literate mode of science and our interpretation of *pre-literate*

or *non-literate* classifying behaviour has proved to be a major complicating factor in their analysis, an issue that I shall return to below. However, the work of Brent Berlin and his associates (e.g. Berlin et al. 1973, Berlin 1992) has put forward a strong claim for taxonomies as the general way in which at least ethnobiological classification works cross-culturally, hypothesising a series of ranks reflecting the Linnaean scheme: unique beginners, life-forms, intermediates, generics, specifics and varietals.

The principle of taxonomy is persuasive, as people undoubtedly classify living things into increasingly inclusive groups, and the idea of taxonomy provides a strong inductive framework for making systematic inferences about the properties of organisms. But this need not imply taxonomy in the formal or domain-specific sense. Systematic contrast and class inclusion are present across a number of domains. It is particularly striking in plants and animals because of their characteristic materiality or *thinginess*, and because they are the outcome of an evolutionary process reflected in patterned physical and behavioural resemblance. In the domain of living kinds these tendencies converge in a special way, not obviously because of the character of the mind which does the classifying, but because of regularities in the objective world so classified and to which the mind responds.

However, there is also evidence that taxonomic thinking is encouraged more in some cultural contexts than in others, such as in the performance of formal pedagogic operations in classroom contexts, that it is – at least in its strong version – a consequence of patterns of cognitive practice that emerge with writing (e.g. Goody 1977, Lancy and Strathern 1981). Because of the propensity of most researchers to rely heavily on taxonomic thinking embedded in their own protocols, it is easy to yield taxonomies in patterns of data collected from research subjects who may be simply being helpful within the constraints imposed by methodologies such as frame elicitation and sorting tests. Moreover, if we accept the centrality of prototypical thinking and polythesis in classifying activity, it is not at all surprising that it is often difficult to establish systematic and consistent hierarchical relationships between superordinate and subordinate categories.

5 Cultural universals

Claims for the universality of certain patterns of classification were easier to sustain in the past. Studies of intra-cultural variability (e.g. Romney et al. 1986) are now common and provide evidence for the role of social and situational factors, which challenge the validity of some key assumptions regarding the extent of sharing. Moreover, continuous exposure to even locally-distributed classificatory routines can result in a kind of fixing of culturally-derived habitual practices through neuroplasticity (Ellen 2008: 19–22). One universal, however, the existence of which few would

now deny, is that the classifications (and especially folk biological classifications) of all cultural groups display some concept of *basic* category, the segregates of which are then either aggregated or disaggregated (e.g. Rosch 1977, Atran 1990, Berlin 1992: 70–78). These may refer to natural kinds, people, social groups or other types of object or entity. But there is less agreement as to how consistent such a level of basic categorising is cross-culturally. When applied to natural kinds, it is the phylogenetic genus that generally gives us the basic level for plants, species only obtaining priority with Linnaeus.

More problematic, as we have seen, has been the notion of taxonomy. Brent Berlin has always argued in favour of its universality for ethnobiological schemes, but this only really works if we also assert the clear separation of general-purpose from special-purpose schemes; that is, those that are logical and *natural* from those that arise to meet particular cultural requirements – say medicinal plants or domesticated livestock. Indeed, the effective demonstration of the primacy of taxonomy depends on the extent to which categories are linked in a particular way, although we know that they are often flexibly connected in numerous different ways, ways that undermine implicit taxonomic levels and contrasts and the general-purpose/special-purpose distinction. It also depends upon the reliability with which we can elicit transitivity statements: i.e. if A is a kind of B, and B is a kind of C, then A must be a kind of C. Scott Atran (1998), who has followed Berlin in being a powerful advocate of the universality of the basic *natural* features of ethnobiological classification, suggests that his Itzaj Maya findings do not uphold the customary distinction between general-purpose and special-purpose classifications, which would violate their primary concern with 'ecological and morpho-behavioural relationships' in favour of abstract properties.

I believe that one of the problems central to the methodology that we use to generate much of our ethnobiological data is not knowing quite how independent the system of ranks that we discover is from the kinds of concepts with which we start. On the whole, it is my experience that data from long-term ethnographic research are more consistent with the notion of a holistic and dynamic conception of the relations between categories, one which allows for the generation of particular *classifications* depending on context. For example (Ellen 1998), some cultures clearly place palms within *trees* whereas others assign them to separate categories. The variable position of *palms* in comparative ethnobotanical schemes and the nebulousness of its position as a *life-form*, intermediate or *unaffiliated generic*, is an excellent example of the preeminence of local ecological and cultural considerations. On balance, the more dense our knowledge of a particular domain the more we deviate from general models, such that in a very real sense taxonomies only become possible by simplifying experiential complexity in ways which make knowledge less useful.

Having urged caution, there are certain discontinuities that are so much part of the lives of so many human populations, that they can be said to be universal. We can show this to be true for natural kinds as a phenomenal type, and also for *unique beginners*, such as plant or animal. Since hominids have evolved in environments which display a particular phylogenetic and phenomenal discontinuity, it is not surprising that they should demonstrate a capacity to utilise a notion of natural kind which assists the management of diversity. Similarly, living matter, *animacy* and *animality* are not simply an end-product of classification based on multiple cognitive discriminations, but relate to a fundamental ability of the human mind to distinguish an organic form that registers a particular kind of saliency matching objective phylogenetic features. And there can be little doubt about the neurobiological organisation which governs what Rosch (1977) calls 'cognitive economy': the propensity to store information in ways which make best use of the perceptual and cultural resources available and which provide templates with which to model *fuzzy* concepts.

6 Category formation and domain specificity

Many aspects of rule-governed category formation and classification work in the same way irrespective of cognitive or semantic domain, but there are also significant differences that we must note which suggest *domain specificity*, some of which have major theoretical and methodological implications. This is so even if we do not accept hardcore modularity of the kind which typologizes generic cognition into, for example, intuitive physics, natural intelligence, and social cognition. If we consider just four different semantic domains – colour, kinship, biota and the body – we can see that each involve different premises. Colours are not really *things* at all, but rather properties of things, measurable along the dimensions of hue, saturation and brightness; while kinship classes are part of social deixis (those aspects of language which vary with the occasion, time and location of utterance, and with the identity of speaker and hearer), and refer to the properties of the relations between things. Bodies are clearly bounded entities, but the way we divide them up into parts – through partonomy – involves some degree of arbitrary grouping despite a large degree of crosscultural conformity. Of the four domains, only natural kinds map directly on to real, discrete objects in an objective world. But even with biota, some gaps between purportedly discrete kinds and objects are bigger and more salient than others, in most environments, and therefore serve as more widespread (even universal) markers in classifying behaviour.

When we classify as humans, not only do we use codes established in one domain to make sense of another in ways which distort aspects of experience, we systematically repress or forget or ignore certain characteristics and associations of particular natural things, and exaggerate and foreground others. Any one species, entity, idea or percept presents too complex an aggregation of traits to take into account in routine practical memory storage and information handling. Sometimes this simplification results in more naturalistic classifications, sometimes it results in more symbolic ones, or a combination of the two. This is very clear when we look at graphic icons for natural species in different aesthetic and writing traditions. Thus in Britain a child is likely to see a picture of a *teddy-bear*, or a teddy bear toy, before it sees a real bear.

7 Humans as animals

One of intellectual legacies of dualism, as reflected in certain kinds of structuralism and the analysis of cosmologies, is the problem of where to place humans in classifications of the natural world. In developmental psychology this has translated as experimental work on the extent to which children in different cultures experience the similarities between people and animals in the narrow sense (Atran and Medin 2008: 130–132). On the whole, I think too much is made of this. All cultures simultaneously situate humans within both their ethnobiological classifications (emphasizing similarities) and emphasize the singularity of humans in contrast to other kinds of organism, most usually in theological and philosophical contexts. In the various diagrams of plant and animal classifications found in works of ethnobiology, humans are *the necessary other* and the main point of reference – absent from the picture but nevertheless informing its interpretation: a bit like the puzzle that Velázquez presents us with in his *Las Meninas* (fig. 1). We can only interpret these classifications because we know that they involve a series of steps in which other species are being compared with humans. In those ethnobiological classifications that I am aware of, anthropomorphism is a template by which to structure knowledge of the natural world: we make sense of other organisms by projecting on to them – as far as we can – human characteristics. In most folk classifications, while the default position is that humans are outside the frame, this evidence of constant comparison indicates that many peoples do understand that humans are a kind of animal – even where there is no word for the folk kingdom *animal*. Some of these issues are explored in my other contribution to this volume.

Fig. 1: *Las Meninas*, or *The Family of Felipe IV*, by Diego Rodríguez de Silva y Velázquez, Ca. 1656

In some local ecologies the presence of non-human primates of close phylogenetic proximity forces people to confront the intellectual issue more explicitly, as in cultures with elaborate beliefs about *orang hutan* or other large primates (e.g. Richards 1993). And where such evidence for transitional forms exists it is not unusual for local people to invent mythical forms that – as it were – close the gap. Consider, for example, the plethora of hybrid humanoid forms that have inhabited the Western imagination from the Nuremburg Chronicle (fig. 2) to modern popular science fiction. In Gregory Forth's (2008) book on *Images of the Wildman in Southeast Asia* he is even able to plausibly suggest that the concept of *Ebu gogo* on the Indonesian island of Flores is a folk memory of the non-sapient hominid *Homo floresiensis* that we now know existed there until some 10,000 years ago.

Fig. 2: Image from the Nuremberg Chronicle, first published in 1493

8 Writing, depiction and social control

In these remarks I have mainly been concerned with what we have discovered about the process of classifying in oral cultures, though I have already flagged-up the ways in which the interpretation of this process has been influenced by how we practice classification in the literary traditions of science. For as long as classifications were oral and shared they were constantly being reinforced by the cognitive limitations of the mind-brain and the body. In such situations storing knowledge as causal hypotheses (or models) was more efficient than making the right responses by induction alone, simply because humans relying on oral culture and low levels of division of labour do not have sufficient memory to make induction alone reliable. While oral language and graphic depiction seem to have common evolutionary roots (Mithen 1996), for most human populations over the last 10,000 years the reflection of classi-

fication in writing and art has been demographically of minor significance, becoming important mainly with the development of elite writing cultures, and latterly with innovations in the technology of writing that made it more accessible.

But what happens when we put classifications in writing or attempt to physically depict them? In fact, we find that physical depiction has permitted degrees of complexity in the arrangement of categories that individual minds could not cope with. Specialisation, the creation of visual images, and the written word allowed for the long-term storage and manipulation of classifications, in ways which were not limited by (even distributed) memory. The social distribution of knowledge and increasing specialisation led to specific classifications having semi-autonomous histories of their own, and to the generation of *emergent* categories within a completely cultural framework unconstrained by ecological experience and cognitive limitations. Writing reduces the scope for variation and plurality, increases sharing and can therefore become a powerful force for social control. Writing also makes knowledge more portable and permanent, reinforcing the dislocation that arises when knowledge rooted in a particular place and set of experiences (i.e. local or indigenous), and generated by people living in those places, is transferred to other places. Thus, *lion* could be imagined as a category and transmitted between generations in Medieval Europe even where lions had never existed; and people could agree on categories even where there was apparent disagreement over content of those categories, such as with the *basilisk* in medieval and early modern writings. Such transformations in the technology of knowledge management have had dramatic practical consequences in certain spheres of human activity, for example at the point where orally-transmitted medicinal plant knowledge interfaces with the great scholarly traditions (Leonti 2011). Thus, illustrated Tibetan medical texts (fig. 3) provided a powerful means of aggregating and arranging knowledge and passing it on in a summarised form to a new generation of practitioners over a wide area, but at the same time uprooted it from local contexts, simplified the detail and posed challenges for those interpreting its meaning outside the geographic situation of its creation. Similar issues occur in committing classificatory knowledge to scripts more generally (Goody 1968; 1977; 1986; Goody and Watt 1968).

Fig. 3: One of a set of 77 medical paintings copied in the time of the Thirteenth Dalai Lama in the 1920s for the training of physicians in Buryiatia. The originals are late seventeenth century, and accompany a medical text compiled by the then Regent of Tibet, Desi Sangye Gyatso (sde srid sangs rgyas rgya mtsho). See Parfionovitch and Meyer 1992.

What is more, the written mode can create *logical* totalizing synthetic classifications that bring together the mundane and the symbolic in ways that in oral culture are flexible and fuzzy (Ellen 2006: 56–58). The Tibetan texts to which I have just been referring are an excellent example of this, but a good contender for the most problematic in the Western tradition is the much-discussed *tree of Poryphry* (fig. 4). Such attempts to compress classificatory relationships into a single specialised domain of technical practice (in this case *philosophy*) have given rise to many of the logical problems that we see today reflected in the modern study of classification. And so – in a sense – we come full circle: from the ad hoc but highly pragmatic and successful attempt of my father to solve a limited technical problem in the storage and retrieval

of fixing devices, through the regularities of shared cultural schemes for organizing domain-specific knowledge through the oral mode, to the consequences of a technology of sharing (writing) that while undoubtedly increasing the evolutionary fitness of those that have access to it, has led to all manner of profound problems – including paradoxically – shaping the way we understand the classificatory process in non-literate contexts, including the position occupied by humans in classifications of the natural world.

Supreme genus:		SUBSTANCE	
Differentiae:	material		immaterial
Subordinate genera:		BODY	SPIRIT
Differentiae:	animate		inanimate
Subordinate genera:		LIVING	MINERAL
Differentiae:	sensitive		insensitive
Proximate genera:		ANIMAL	PLANT
Differentiae:	rational		irrational
Species:		HUMAN	BEAST
Individuals:	Socrates	Plato Aristole etc.	
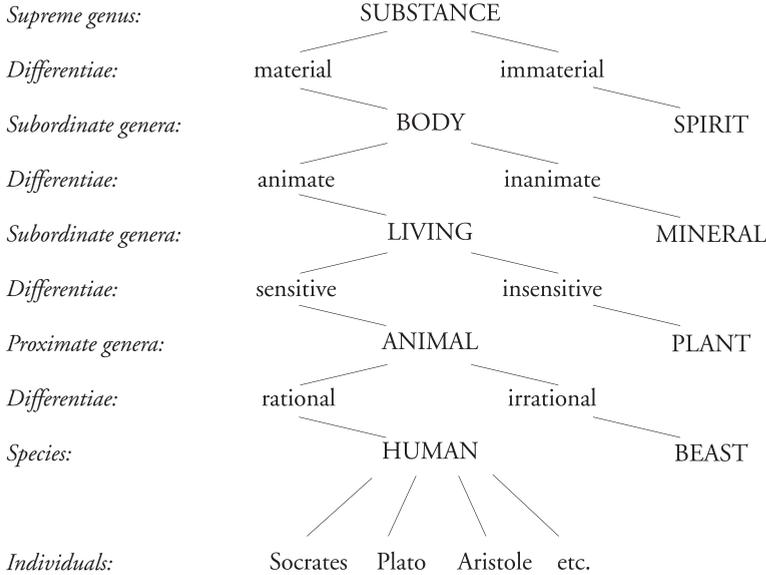
Fig. 4: The *Tree of Poryphry*, translated from a version by Peter of Spain (1239), after Sowa 1999

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Figures

Fig. 1: Original (Inv. No. P01174) in Museo Nacional de Prado, Madrid. 2015.

Fig. 2: Hartmann Schedel (2001) *Weltchronik: Kolorierte Gesamtausgabe von 1493: Einleitung und Kommentar von Stephan Füssel*. Cologne: Taschen.

Fig. 3: The present image (Item 40928) is from a private collection and reproduced courtesy of *Himalayan Art and the Shelley and Donald Rubin Foundation*.

Fig. 4: After Sowa 1999.

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