

with the kind of diagram produced during field elicitation that I have called a “kinship map” (Leaf 1971) and carrying through algebraic reconstructions demonstrating their underlying generative rules. I have published the kinship map for English previously, contrasting it with Punjabi and addressing the same issues of spatial representation that are relevant here (Leaf 2006; 2009, p. 92). Read (1984; Read & Behrans 1994) has demonstrated its mathematical logic, and Read and Fischer have constructed a computer analysis that can regenerate it and any other system that is available on the Internet with the Kinship Analysis Expert System (Read 2006).

The English terminology has three important features that Jones’s analysis obscures or misses entirely, and that OT apparently cannot encompass. First, positions can be extended vertically forever: Just keep adding the prefix “great.” The same number of prefixes mark the reciprocal terms. Jones recognizes generation, but not the idea of extensibility. Second, by contrast, in the horizontal direction “cousin” is a boundary. There is no relation beyond cousin. All terminologies must logically have boundaries in order to be closed, but Jones does not recognize the problem of finding them. And third, cousin in English is actually not specific to a single generation, so generation as a constraint does not dominate all others.

Every kinship terminology defines kinship in its own specific way based on its own conceptual contrasts. There are resemblances but no precise universals. The English idea of being related is strongly associated with the idea of common ancestry. To produce it, the terms consistently distinguish lineal versus collateral relation, sex, and generation in the direct descent line only. Outside the direct descent line, the terms distinguish only whether one is a sibling or sibling-spouse of a lineal or a descendant of such a sibling-spouse. The idea of an ancestor who is not a relative is a self-contradiction.

Seneca is indeed very different. Figure 1 is the kinship map for a female self (indicated by the gray circle). I have constructed it by asking the table of terms in Morgan’s *Ancient Society* for definitions beginning with the core positions around self, just as I would have asked a group of live informants. Despite two terms that appear to be variant pronunciations of a single name, the consistencies emerge clearly.

Here, the  $\beta_2$  and  $-2$  generations are boundary positions. The terms for the  $\beta_3$  and  $-3$  generation are the same, although Seneca recognize individuals who are their more distant ancestors. So the second feature is that an ancestor is not necessarily

a relation. The third conspicuous feature is that positions form groups based on a specific contrast between own matrilineal clan as against all other clans – not “matrikin.” Own brothers and sisters are grouped with mother’s sister’s children and contrasted with all other relations on one’s own generation. Children of  $ha-nih$  (father and father’s brother) who are also children of own mother are in own sibling group, children of other  $ha-nih$  are in the all others group. The same logic applies on the  $-1$  generation. Finally, the difference between the male and female terminologies is that in the male terminology own children are grouped with other children of males on one’s own generation, which Morgan does not explain but which seems to emphasize again the importance of the difference between descent through males and descent through females – as did Iroquois political organization. What the terms consistently distinguish are generation, clan, mother’s and father’s side, marital versus descent relation, sex of speaker, and sex of linking relative.

Seneca terminology embodies Seneca social conceptions just as English terminology embodies English social conceptions. Seeing how they do so brings us face to face with the cultural and social basis of thought itself. Empirically unnecessary speculation on the possibility of innate ideas is a distraction.

## Advancing our grasp of constrained variation in a crucial cognitive domain

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Abstract: Jones’s system of constraints promises interesting insights into the typology of kin term systems. Three problems arise: (1) the conflation of categories with algorithms that assign them threatens to weaken the typological predictions; (2) OT-type constraints have little psychological plausibility; (3) the conflation of kin-term systems and kinship systems may underplay the “utility function” character of real kinship in action.

The neglect of kinship in current anthropology and in the cognitive sciences is not far short of a scandal. Humans are the

categorizing species, and kinship systems categorize our own most significant others, so reflecting fundamental forms of social organization. In small-scale societies, kinship forms the backbone of the political and economic organization, and even in complex societies, it plays a significant role (Kuper 2009). Moreover, kinship is one of two primordial foundations for relational cognition – the other being, as Jones notes, spatial relations (kinship identifies a **person** by a relation to Ego; spatial relations identify a **place** relative to a landmark, where a place is rather more abstract than a person). Advanced relational reasoning is the big divide between us and the other primates: Even our cousins the chimps have a hard time doing relational thinking (Penn et al. 2008). It is likely that language and relational reasoning are mutually implicated, although which provides the foundation for the other is controversial (Loewenstein & Gentner 2005). Many small-scale societies have such complex kinship systems that they have exercised professional mathematicians, while still being mastered by kids.

So, Jones has done us a big favor by putting kinship back on the cognitive science agenda with an interesting new twist. It has long been obvious that despite exuberant variation in the kinship systems of the world, there seem to be a limited set of underlying types (see, e.g., the important work by Godelier et al. [1998], unfortunately not referenced by Jones). Jones gives us a very neat way to think about this pattern in the diversity, in terms of differentially ranked principles for grouping and distinguishing kin. Previous approaches, such as componential analysis and reduction rule analysis (see Tyler 1969 for a range of approaches), have each captured part of the phenomenon but somehow have failed to give us an exhaustive way to think about the typology of kinship systems. A componential analysis, for example, might characterize **cousin** as  $\beta$ collateral,  $\beta$ same generation, unmarked for sex, while **brother** might be  $\beta$ lineal,  $\beta$ same generation,  $\beta$ male (Romney & D’Andrade 1969), while a reduction rule analysis might tell us that a mother’s brother’s son is like a mother’s brother’s son, so counts as a kind of (less prototypical) cousin.

Jones’ system uses just eight “faithfulness constraints,” or instructions, to group or individuate kin of different kinds, which are further constrained by three “markedness constraints” giving us implicational scales of the kind “if you distinguish different kinds of cousins, you should distinguish different kinds of siblings.” What this actually amounts to is a way of formulating metaconstraints over componential analyses of different kinship systems. If you reorder his constraints, some distinctions will be made and others not – so you can’t have all your cake and eat it too. The markedness constraints will ensure that there is, for example, a greater lumping of distant kinsmen and greater splitting of close kinsmen. The whole system of Jonesian constraints then acts to constrain the possible componential analyses available to kinship systems. This looks as though it might be a major advance in the typology of kin term systems, although it will need testing on a representative sample of the exuberant variation (if there are 7,000 languages in the world, there are 7,000 kin term systems, even if many of these will prove isomorphic – note though that Tamil, for example, has a dozen or more distinct kin term systems adapted to the different castes: See Levinson 1977).

Now, this system doesn’t capture the notion of prototype kin and their extensions, so nicely captured in the reduction rule analysis of Lounsbury (1969), and argued for on psychological grounds by Malinowski. Here Jones plans an addition to the OT framework with a recursive application of the constraints. It is hard to see exactly what the implications for typology might be, but it must multiply the possibilities enormously, so undermining some of the attractions of the OT approach. It would seem better to keep separate the **categories** from the **algorithms** that assign referents to them, for the simple reason that we know that individuals use more than one manner of assigning kin to categories (Levinson 2006). This implies that the prototype structure of kin categories should form part of the primary category structure, not part of the assignment algorithm.

A major issue though is the psychological reality of all this. This is the Achilles’ heel of OT analyses, which are typically derived by detailed comparison across languages: They are thus constructed with all the metalinguistic hindsight of the (hypothetically) omniscient analyst. It is quite unwarranted (despite the normal claims of OT) to think that any one native speaker has this kind of meta-knowledge in his or her head. To learn a kin term system a child starts off by learning “names” for those around her, then grasps the relational character (other kids have “moms” too), then learns the extensions – and kin terms are one domain of language where explicit instruction and correction are common (see Hirschfeld 1989 for review). Thus an individual can learn to use the system without having an overview of how it works. Kinship systems are a wonderful example of culture as the second great invisible watchmaker – intricate systems without a designer. They are honed by cultural evolution, can be exceedingly complex like the Australian systems, and because they have to serve important social functions of regulating reproduction and social conduct, they are directly under selection by the social systems they must integrate with. Jones’ constraints, if they correctly capture the typology of extant kinship systems, may do so not because the categories are antecedently in our mind, but because these are the ones that societies need to work with.

Jones’ paper bristles with other interesting ideas. Particularly interesting, perhaps, is the idea that kinship systems have a digital character – unlike the analog (or gradient) nature of utility functions – because they are solutions to communicative coordination games. Here as elsewhere, Jones perhaps fails to draw a sharp enough line between kin term systems (linguistic in nature) and kinship systems (systems of reproduction, marriage, inheritance and authority). Note how the kin-selection metric (Hamilton’s rule) does not map neatly onto any known kin term system – a Seneca cousin, for example, is treated as equal to Ego’s sibling, even though the cousin shares 12.5% of his or her genes with Ego and the sibling 50%. In some ways the kin-term system will regulate the kinship system (e.g., in the kind of behavior appropriate to categories), but in other ways (e.g., inheritance) the two may part company. The kin-term system is part of the language and communication system, the kinship system is part of a social organization. Insofar as they are coincident, and kinship is digital, this is part of the magical power of language to construct the categories of our world (Levinson 2003).

## Exploring the conceptual and semantic structure of human kinship: An experimental investigation of Chinese kin terms

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**Abstract:** We designed an experiment to test the application of optimality theory (OT) in kinship terminology studies. Specifically, we examined the OT constraints within a set of behavioral data using Chinese kin terms. The results from this behavioral approach support and extend Jones’ linguistic approach by identifying underlying cognitive mechanisms that can explain and predict behavioral responses in kinship identification.

In the target article, Jones proposed that optimality theory (OT) is a universal principle for constructing human kinship