in its set of features affinal terms and altogether leaving out (perhaps due to deficiency in existing data records) the third form.

Other concerns include the following:

1. A claimed universality even though application is only demonstrated for two partial kin terminologies, English and Seneca. For instance, Faithfulness Constraint of Sex is based on a proposed Male-Female polarity. Can the devised system accommodate the many ethnographic cases of a "third sex" (Wikan 1978, among other studies)? However, the other polarity of bond-boundary has positive potential if developed further.

2. An asserted homology between kin terminologies (considered a linguistic domain) and other domains, such as spatial structure. A homologous conceptual structure enters analysis at a different level, and hence seems superfluous to the main goal of describing the differences among kinship terminologies.

3. The social and the mental dimensions are assumed to be at the same level of abstraction. Figure 1 in the target article mentions social organization and social cognition. We know that social organization exists at the level of society. But what is social cognition? Is it being claimed that cognition, too, exists at the level of society? Is it cognition of the social? Is cognition social? Or is it a Durkheimian-style, societally derived or determined cognition?

4. Ambiguity in the use of the notion of shape: "[shape] is about the structure, rather than content, of kin terms" (sect. 1). Is shape the same as form? Is form structure? If so, then conceptual structure as presented is at a low level of abstraction, quite distant from cognitive structure.

5. Producing an "account of *why* kin terminologies have the *shapes* they have" (sect. 1; emphasis added) becomes a partial description of the physical features of a particular set of data from Seneca and English kinship terminologies. A selective data pool is insufficient for conclusive generalizations and analysis of partial data does not automatically lead to understanding the whole. Nor should the whole be assumed.

6. The author generously borrows [Optimality theory (OT)] and [Utility theory (UT)] from other fields (linguistic, economics, etc.), and vocabulary such as *time, space, cognition, social organization, OT, UT, kin terms, shape, conceptual structure, semantic contrasts, constraints ranking, language, markedness theory, open-class, closed-class, faithfulness constraints, markedness scales*. These vocabulary borrowings are neither convincingly motivated nor coherently linked. They might serve interdisciplinarity, but do not serve science.

7. The stated goal that "constraint ranking defines the grammar of each language, establishing a *shared code* among speakers and listeners" (sect. 1.2; emphasis added) presumes, but does not take us onto, a road to cognition.

8. Jones claims that "In language after language, time is treated as a more abstract version of space" (sect. 1), which is substantiated by neither ethnography nor theory (see Hubert 1905). Having recently completed an ethnographically grounded monograph on the notion of time and space, I disagree (El Guindi 2008). Time and space are equally abstract notions variably manifested in different forms. Time has been theoretically dealt with in isolation from space by nonanthropologists and anthropologists alike, until the French tradition called L'Année Sociologique (later Annales Sociologiques), both school of thought and journal, linked the two. It was Henri Hubert who lifted both to the appropriate level of abstraction (see El Guindi 2008, pp. 32–35, for full discussion of this development). His ideas formed the foundation for my building a new theory of Islam (El Guindi 2008) based on the concept of rhythm as it penetrates time and space.

Human systems are complexly integrated. It is difficult to see how deploying OT by identifying a sequential list of features reordered to describe kin terms of two cultural systems will lead to understanding human cognition. To advance understanding kinship terminologies, we cannot lose sight of anthropology's holism. I argue that analysis of any sociocultural domain using an abstract conceptual structure with generative, processual properties embedded in cultural knowledge will lead more productively to a cognitive path (El Guindi 2006).

## Why do we need to coordinate when classifying kin?

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**Abstract:** We suggest that there are two coordination games when it comes to understanding kin terminology. Jones' article focuses on the linguistic coordination inherent in developing meaningful kin terminologies, alluding briefly to the benefits of these kin terminologies for coordination in other domains. We enhance Jones' discussion by tracing the links between the structure of kin terminologies and their functions.

Jones hypothesizes that the grammar faculty is an adaptation for playing coordination games (sect. 5.3, para. 6), allowing an individual to discover constraints, match his or her own constraint rankings with those of other speakers, and generate mutually intelligible classifications of kin. Jones does not fully develop an evolutionary account that explains why human propensities for coordination games should be applied to the domain of kinship, however. In other words: Why do we need to coordinate when it comes to classifying kin?

Evolutionary explanations of human kinship often begin with theories of kin selection (Hamilton 1964). As cultural anthropologists often remind us (Sahlins 1976), however, kin terminologies rarely classify kin in ways that correspond with genetic relatedness. As a result, many cultural anthropologists see kin selection – and evolutionary theory more broadly – as irrelevant to our understanding of human kinship (McKinnon 2005). Focusing on the role of coordination games in the structure and function of kin terminologies may provide a solution to the apparent disparity between the ways that kin terminologies define relatedness and the evolutionary advantages of nepotistic behavior.

Several researchers, including Jones himself (2000), have emphasized how kinship enables individuals to identify common interests and coordinate their actions accordingly (Chagnon 2000; Cronk & Gerkey 2007; Fox 1979; Irons 1981; Van den Berghe 1979). We suggest that there are actually two coordination games when it comes to understanding kin terminology. The first game determines whether two individuals can arrive at a mutually intelligible and agreed upon term for different kinds of kin. This is simply a specific instance of the broader coordination game presented by language in general (Hume 1740; Lewis 1969; Sugden 2004). The second game builds on the shared meaning of kin terms by combining them with cultural norms and values that inform how two individuals should act toward kin. Jones focuses primarily on the first coordination game and alludes only briefly to the second. Exploring the relationship between these two coordination games may provide a more comprehensive understanding of the structure and function of kin terminologies.

Efferson et al. (2008) demonstrated that individuals can spontaneously use symbolic markers to solve coordination problems. Although these markers were arbitrary at the start of the experiment, they acquired meaning and became reliable guides for solving the coordination problem when two conditions were met: (1) individuals differed from one another in an important but unobservable way, and (2) individuals were allowed to choose markers freely and flexibly (p. 1848). Efferson et al. note that the conditions enabling symbolic markers to serve as guides for solving coordination games should apply "whenever people have a shared interest in distinguishing among themselves in terms of their unobservable information" (p. 1848). Identifying kin and interacting with them often requires a significant amount of coordination, and kin terminologies may allow related individuals to distinguish among themselves in the way that Efferson et al. describe.

Although there is evidence suggesting that kin can to some extent recognize one another without kin terms or other symbolic markers (Lieberman et al. 2007), there are many important ways in which related individuals differ from one another that are difficult or impossible to observe. Genetic relatedness is one such trait, but, as Jones rightly emphasizes, there are others. In human social groups, where kinship is often inextricable from economic, political, religious, and reproductive affairs, an individual's sex, age, rank, descent group, and alliances may be as important as genetic relatedness, if not more so. This is because the kinds of coordination problems that humans need to solve involve complex calculations of costs and benefits in multiple currencies that eventually have consequences for reproductive success.

The next step is to investigate how kin terminologies help individuals solve coordination problems beyond the domain of classification. Alvard and Nolin's (2002) research on cooperative whale hunting in Lamalera, Indonesia, shows how kinship can help people solve coordination games. In Lamalera, descent groups coordinate whaling by providing the equipment, skill, and labor that lets individuals earn greater returns for their effort than solitary productive activities. Whaling crews are composed of related individuals, but Alvard (2003) has shown that descent group membership better predicts the composition of whaling crews than genetic relatedness. Unlike genetic relatedness, which varies from individual to individual in a whaling crew, descent group membership can be the same for all members. Interestingly, research by Nolin (2010; in press) shows that the subsequent distribution of whale meat in Lamalera follows genetic relatedness between households. Lamaleran whalers use descent groups defined by kin terminologies to solve the coordination game of whaling, and then they use the logic of kin selection to spread the spoils.

If humans possess an adaptation for solving coordination games, we should expect this adaptation also to apply in contexts that do not necessarily involve kin. Efferson et al.'s experiments with symbolic markers support this idea, and there is evidence from other approaches, as well. Cronk (2007) conducted experiments in Kenya with trust games that were framed with a reference to *osotua*, a need-based gift-giving relationship among Maasai. Maasai participants responded to the framed games in ways consistent with the central principles of osotua: They were attuned to signs of need, transferring more money when the other player appeared to need help.

Given that Maasai are familiar with the osotua concept, it may not be surprising that the osotua framing influenced how they played the game. However, when the experiment was conducted with Americans who were learning about osotua for the first time, the results were nearly identical (Cronk & Wasielewski 2008). This quick adoption of osotua norms and values may stem from a broader human susceptibility to being influenced by cultural norms that facilitate coordination. If solving coordination problems has been important throughout our evolutionary history, then we may have developed an alertness for and ability to quickly adopt such norms.

## Kinship terminology: polysemy or categorization?

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**Abstract:** The target article offers an analysis of the categorization of kin types and empirical evidence that cross-cultural universals may be amenable to OT explanation. Since the analysis concerns the structuring of conceptual categories rather than the use of words, it differs from previous OT analyses in lexical semantics in what is considered to be the input and output of optimization.

A hypothesis of the target article is that grammar – as conceived in Optimality Theory (Prince & Smolensky 2004) – is a general cognitive capacity underlying cognitive universals in a range of cognitive domains $\mathbb{D}$; the test case is $\mathbb{D}$ = kinship terminology. Because we find the target article unclear or ambiguous on a number of key points, and because OT's route to defining a $\mathbb{D}$-theory – call it $\mathbb{T}$ – is abstract and unfamiliar, we reformulate the hypothesis, through a concrete metaphor involving three machines.

To determine the name of Mother's Sister in Seneca, we begin with machine $\mathcal{C}$, which displays the genealogical tree of Figure 2 of the target article (omitting shading and labeling). We select the Mother's Sister node of the tree; the machine produces an indigo card $I$ containing a bit-string of $n$ 0s and 1s. Next, on the machine $\mathcal{G}$, we insert indigo card $I$ after setting a dial to "Seneca"; $\mathcal{G}$ produces an orange card $O$, also containing a string of $n$ bits. Finally, on machine $\mathcal{V}$ we insert orange card $O$ after setting a dial to "Seneca"; $\mathcal{V}$ responds with a word through its loudspeaker (*noyeh*).

$\mathcal{C}$ is conceptual structure, which is universal (= not language-particular): $\mathcal{C}$ has no dial. Theory $\mathbb{T}$ provides $\mathcal{C}$'s genealogical graph, the types of nodes, and so forth. $\mathcal{C}$ produces an indigo card $I$ in a universal alphabet. Each symbol on $I$ corresponds to the +(1) or –(0) value of a feature $f_k$ (e.g., ±female). $\mathbb{T}$ specifies the universal mapping from the tree on $\mathcal{C}$'s screen to the bit-string of feature values on card $I$ – defining the universal feature-set $\{f_k\}$.

$\mathcal{G}$ is an OT grammar, which receives indigo-card-input $I$ and produces orange-card-output $O$. The bit-string on $O$ depends on $\mathcal{G}$'s dial setting, a language $L$ = Seneca. The elements of $L$ are all the different orange cards' bit-strings that machine $\mathcal{G}$ can produce. All points of $\mathcal{C}$ that yield the same orange card can be thought of as constituting one of $L$'s $\mathbb{D}$-categories; for example, Mother's Sister and Mother are in the same Seneca kinship category.

$\mathcal{V}$ is the vocabulary; it receives $\mathcal{G}$'s output, the orange card $O$ representing a category, and, depending on the setting of its language dial, produces a distinct name for that bit-string/category. This name can then be used to refer any relation in that category; it is ambiguous in the same sense that a category name is ambiguous about which category member is being referred to.

$\mathbb{T}$ specifies the workings of $\mathcal{G}$. Conceptually (not computationally), each possible output bit-string is evaluated by a set of universal constraints provided by $\mathbb{T}$. Markedness constraint $M_k$ ("MINIMIZE[$+f_k$]") states that value + for feature $f_k$ is dispreferred or "marked". Faithfulness constraint $F_k$ ("DISTINGUISH-$f_k$") demands that $f_k$'s value on orange $O$ match $f_k$'s value on indigo $I$. Constraint conflicts are resolved by ranking: Possible output A is preferred to possible output B if the highest-ranked constraint that has a preference between them prefers A. If no bit-string A is preferred to B, then B is *optimal*; B is the grammar's output $O$. Crucially, ranking is language-particular – determined by the $\mathcal{G}$'s dial.

Thus the hypothesis is that a theory $\mathbb{T}$ of a domain $\mathbb{D}$ can provide all these specifications: Crucially, the universal constraints in the grammar $\mathcal{G}$ which, via OT computation, explain crosscultural patterns in the conceptual distinctions conveyed by different languages' $\mathbb{D}$-vocabularies.

At first sight, the outcome of optimization in kinship seems to result in polysemous terms (one word = several meanings) for different kin types. Previous OT work on polysemy has focused on the optimization of communication by means of polysemous terms (e.g., Fong 2005; Hogeweg 2009; Zeevat 2002; Zwarts 2004; 2008;). A word is assumed to correspond to a fixed set of semantic features. In production (which means word choice in this domain), the input is the meaning a speaker wants to express and the candidates are the bundles of features conflated by the lexicon of her language. Similarly, when a hearer interprets a word, the input is the bundle of features that are stored for this word and the candidates are any combination of semantic features. The optimal interpretation for a word will consist of all features in