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READ'S REPLY TO COMMENTS ON THE GENERATIVE LOGIC OF CROW-OMAHA TERMINOLOGIES: THE THONGA-RONGA KINSHIP TERMINOLOGY AS A CASE STUDY

DWIGHT READ

Introduction

The seven commentators, Thomas Trautmann, Peter Whiteley, Patrick McConvell, Patrick Heady, Franklin Tjon Sie Fat, Klaus Hamberger, and Maura Barbosa de Almeida, have provided wide-ranging and important observations that go beyond the specifics of my text and bring to the discussion important issues that relate to our understanding of the Crow-Omaha terminologies. Their comments alone provide a major contribution to the discourse on the Crow-Omaha terminologies. Accordingly, my response to their comments focuses on ways that the structural analysis I presented of the Thongan kinship terminology relates to this broader discussion.

I have divided my reply into seven parts: (1) Relationship of Abstract Algebras to Kinship Terminologies, (2) Other Methodologies: Thick Description, Equivalence Rules, Description and Extension, (3) Ethnographic Issues Relating to The Algebraic Representation, (4) Comments by Patrick McConvell, Patrick Heady, and Franklin Tjon Sie Fat, (5) The Formalism Issues Raised by Klaus Hamberger, (6) The Formalism Issues Raised by Maura Barbosa de Almeida, and (7) Conclusion -- Why Does *Ñwana* ('Son') o *Malume* ('Mother's Brother') = *Malume*?[i]

In Part 1 I address the questions raised by Thomas Trautmann and Peter Whiteley regarding how the representation of kinship terminologies as abstract algebras relates to issues in the study of kinship systems. I begin by discussing what is meant by an abstract algebra, with focus on the key point that kinship terminologies, in combination with the kin term product widely documented as a way culture bearers determine kinship relations directly from kin terms, *is* an abstract algebra. The questions being raised, then, relate not just to the formalism of abstract algebras, but address, more broadly, the relationship between the specificity of a detailed analysis of a kinship terminology and research issues relating to the nature of kinship systems in general.

In Part 2, I relate the analytical methods provided by the formalism of abstract algebras to other formalisms such as thick description, equivalence rules, and the extension hypothesis, and how these formalisms relate to description versus explanation. Good description is fundamental, but description is not explanation, though good description leads to explanatory arguments. The distinction I use is whether the methods are based on an imposed formalism that is not grounded in cultural concepts regarding kinship idea systems, or whether the formalism makes evident the logical implications of those cultural ideas.

In Part 3 I consider a number if ethnographic issues raised in the comments by Trautmann and Whiteley and by Klaus Hamberger. In this part of my reply, my discussion is largely one of clarifying how the algebraic analysis relates to ethnographic observations about kinship systems that go beyond the details of specific kinship terminologies.

In Part 4 I take up questions raised by Patrick McConvell, Patrick Heady and Franklin Tjon Sie Fat regarding the specifics of the algebraic analysis of the Thongan terminology that I present. McConvell is concerned with the connection between the seeming timelessness of an algebraic analysis and the diachronic study of kinship terminologies. Patrick Heady makes a number of useful comments regarding the generative logic of kinship terminologies, including the idea that some terminologies may be more open to variants than other terminologies due to whether the generative logic is highly deterministic or not. This is an aspect of the generative logic of kinship terminologies that needs further exploration. Heady, like Klaus Hamberger, considers that the Thongan terminology should be generated from neutral generating terms given the ;preponderance of neutral kin terms in the Thongan terminology. In reply, I note the need to go beyond suggestion and to determine if this is workable. I show that trying to use neutral generators leads to introducing *ad hoc* properties into the generative logic that are not culturally salient. Linking the formal analysis to culturally salient properties is, I suggest, a critical criterion that must be satisfied in order for a formal account to be explanatory and not just descriptive. Tjon Sie Fat is concerned in his comments with what appears to be a shortcoming on my part, namely that I do not actually present an algebraic analysis of the Thongan terminology. However, his concern stems from a misreading of my text. He goes on to suggest that it may be useful to consider how the Kin Term Space would vary under changes in parameter values, a procedure he has implemented with the concept of crossness for kinship terminologies, and in my response to him I demonstrate how the affinal space for the AKT would change and become substantially more complex if the affinal equation, *sibling* o *spouse* = *spouse* o *sibling*, were not part of the kinship terminology.

In Part 5 I discuss the formalism introduced by Maura Barbosa de Almeida aimed at exploring further the generative logic of the Thongan terminology. This leads him to the interesting suggestion that the use of *kokwana* as an alternative kin term for *malume* in reference to the maternal uncle may be due to whether the mother's brother is her 'older brother' or her 'younger brother', in keeping with the importance of age differences in Thongan kinship behavior. Unfortunately, Junod's ethnography is silent on this matter. Nonetheless, de Almeida's argument shows how a formal analysis can lead to questions about the ethnographic account that otherwise may not be (and in this case were not) addressed by the ethnographer. His formalism also leads to an informative discussion about the difference between kin term reciprocals (an anthropological concept with algebraic implications) and kin term inverses (a mathematical concept with anthropological implications), and how this relates to a fundamental difference between descriptive and classificatory terminologies based on the different way siblings are formally defined in these two kinds of terminologies.

In Part 6 I discuss the formalism introduced by Klaus Hamberger aimed at making more precise what I wrote regarding the generation of female kin terms in the Thongan terminology. Admittedly, my discussion of the generation of female terms is unclear and makes an incorrect assumption. Hamberger's formalism, though intended to bring clarity to my discussion regarding the generation of female kin terms in the Thongan terminology, actually serves the more important function of making evident the need for me to revise my discussion regarding how female terms are generated in the Thongan terminology, and how a structure of male terms and a structure of female terms, reduced to the single term female self, are joined together to make a single terminological structure. Accordingly, I have redone this part of my analysis of the Thongan terminology in my reply to Hamberger.

In Part 7, I bring the argument around full circle by returning to the question: Why does the Thongan terminology have the skewing represented through the genealogical equation, MBS = MB? For an answer, I turn to work by Fadwa El Guindi (1972, 1973) on mediating structures that, she argues, are the basis for culturally constructing a binary opposition between two categories. Following her argument, I show that a binary opposition between a +generation category (corresponding to ascending kin terms and with attribute value *respect*, and a -generation category (corresponding to descending kin terms with attribute value *familiar*, is constructed through *malume* serving as the mediating category between these two categories. *Malume* is a mediating category by virtue, I show, of having both the attribute value *respect* and the attribute value *familiar* associated with it due to the kin term product equation, *ñwana* ('son') o *malume* ('mother's brother') = *malume* ('mother's brother'). It follows that the skewing found in the Thongan terminology is not simply a variant form of Omaha kin term skewing but has an ontology differing fundamentally from that of other Omaha terminologies.

Part 1: Relationship of Abstract Algebras to Kinship Terminologies

Kinship Terminologies are Abstract Algebras

An abstract algebraic representation is primarily concerned with the structure formed through operations connecting the members of a set of elements, where it is the connections among the elements and not the content of the elements that is the subject of analysis. An abstract algebra consists of three components: (1) a set of symbols (in a mathematical/linguistic sense), such as the set of kin terms making up a kinship terminology, (2) one or more operations (sometimes referred to as products) that connect or link those symbols to one another, with an operation characterized by the number of elements that appear in its argument; e.g., the kin term product (denoted here by the binary product symbol "o") is a binary operation since it maps a pair of kin terms to a kin term, and (3) a set of structural equations the operation(s) must satisfy that determine the form, or shape, of the structure generated by the operations over the symbols. For example, for English speakers, inclusion of the structural equation *child* o *spouse* = *child* stipulates that if speaker (properly) refers to alter A as *spouse*, and alter A (properly) refers to alter B by *child*, then speaker (properly) refers to alter B by *child*; that is, when speaker refers to a person as *child*, that speaker's spouse refers to that person as *child* as well (cf. Lounsbury's [1965] Half-Sibling Equivalence Rule). This equation connects affinal with consanguineal kin terms.

The reader may well ask: Why bother with representing kinship terminologies using the formalism of abstract algebras? There are two main reason. First, the formalism fits naturally with kinship terminologies since a terminology *is* composed of a set of symbols (the kin terms), a binary product defined over those symbols (the kin term product that has been identified by numerous ethnographers as the way culture-bearers work out kin term relations between pairs of individuals), and the cultural kinship ideas of a group regarding its kinship terminology can be restated precisely using structural equations. Thus, the formalism of abstract algebras makes evident the sense in which a kinship terminology *is* a formal construct. Second, by restating cultural kinship ideas as structural equations, it facilitates working out the logic of kinship terminologies and determining the implications those ideas have for the structural relations among the kin terms of a kinship terminology.

To see how the implications of kinship ideas can be formally worked out, consider the *child*-*spouse* equation mentioned above. This equation only refers to *child* and *spouse*, but it implies that for any kin term K, if *child* o K = L and *spouse* o K is defined; that is, there is a kin term M such that M = *spouse* o K, then the kin term M is connected to the kin term L via *child* o M = L. This follows logically from the two equations L = *child* o K and *child* o *spouse* = *child* since, starting with the first of these two equations, L = *child* o K = (*child* o *spouse*) o K = *child* o (*spouse* o K) = *child* o M. For example, for English speakers, from the kin term product equation, *child* o *spouse* is *child*, it follows that since L = [*uncle*, *aunt*] = *child* o *grandfather* and M = *grandmother* = *spouse* o *grandfather*, then *child* o *grandmother* = *child* o *spouse* o *grandfather* = *child* o *grandfather* = [uncle, aunt] (where […, …] denotes the neutral covering term for the terms included between the square brackets). Similar arguments show that, in general, *child* o (*great*-…-*great*) *grandfather* is *child* o (*great*-…-*great*) *grandmother*. Thus, *child* o *spouse* is *child* logically implies the same triangular relationship holds when a marriage relation connects a pair of kin terms K and M; that is, *child* o K designates the same kin term as does child o M, hence this result will hold in any terminology that is logically consistent.

A common question one asks about an abstract algebra is: What is the smallest subset of the set of symbols such that the algebra may be generated by applying the algebra operations to the symbols in that subset, taking into account the implications of the structural equations for operations performed over the symbols in that subset? Trivially, the set of symbols for the algebra is, itself, a generating set for the algebra since an algebra is determined from the operations and structural equations applied to the symbols making up the algebra. What we want to know, though, is whether the algebra can be generated from a smaller subset than just the complete set of symbols. For example, the algebra consisting of the natural numbers, 1, 2, 3, … with the binary operation of addition, and the structural equations $a + b = b + a$ for all natural numbers a and b (the Commutative Law) and $a + (b + c) = (a + b) + c$ for all natural numbers a, b and c, (the Associative Law), can be generated from the single natural number 1 since 2 = 1 + 1, 3 = 2 + 1, and so on.

For kinship terminologies viewed as an abstract algebra with the kin term product and structural equations corresponding to the kinship ideas upon which the terminology is grounded, we ask the same question: What is the smallest subset of kin terms from which the kinship terminology may be generated using the kin term product and the structural equations for the kin term product? We refer to this smallest subset as a generating set for the kinship terminology. Typically, the generating kin terms are kin terms considered to be primary kin terms, meaning that the generating kin terms cannot be expressed as the kin term product of other kin terms. For example, the kin terms *parent*, *mother*, *father*, *child*, *son* and *daughter* in the English kinship terminology are primary kin terms, whereas the sibling terms, *brother* and *sister*, are not primary terms since they can be expressed by the kin term product equations, *son* o *parent* = *brother* and *daughter* o *parent* = *sister* (with it understood that mapping back to self is excluded for each equation) and so they would not be included in a set of generating terms for the English kinship terminology.

The important point is that a kinship terminology, as it stands *is* an abstract algebra. It is not made into an abstract algebra by introducing a formalism that is foreign to how kin terms and kin term operations are conceptualized by culture-bearers. The kin term product formally expresses the way culture-bearers compute kinship relations directly from kin terms, as has been noted by numerous ethnographers, and the structural equations express properties of kin terms that are part of the cultural understanding culture-bearers have of their kinship relations. The analysis of a kinship terminology, with regard to whether the terminology can be generated from a subset of primary kin terms for the terminology, determines, then, if there is an underlying, generative logic to a terminology. This is precisely the same question that Lounsbury (1964, 1965) addressed in his seminal articles, with the important exception that he used an imposed formalism rather than a formalism based on computations culture-bearers make with their kin terms. The goals of his formalism and the goals of the algebraic formalism are much the same, but the formalisms differ by the algebra formalism building from what has been ethnographically elicited about kinship terminologies rather than by imposing a formalism without a cultural foundation.

The structure of an abstract algebra can be expressed through graphs like the kin term maps for kinship terminologies (see text, Figure 1). These are known as Cayley graphs in honor of the mathematician, Arthur Cayley, who developed them as a way to display visually the structure of connections among the symbols entailed by the operations and structural equations of an abstract algebra. Cayley graphs are precisely what Trautmann and Whiteley note, namely "appealing both for their beauty and their rationality" (p. 1).

Generality is Introduced Through Comparison of Structures

The singularity of an algebraic account that concerns Trautmann and Whiteley is only partially correct. Because kinship terminologies may differ from one another with regard to the set of primary kin terms and the structural equations satisfied by the kin term product, we need to consider the structural differences entailed either by a difference in the set of primary kin terms and/or structural equations for a terminology. In this sense, an algebraic account of a kinship terminology is necessarily singular as it is, directly, only an account of the structure of that kinship terminology. It is through comparison of structures (e.g., by comparing kin term maps) that the

algebraic analysis goes beyond the singularity that concerns Trautmann and Whiteley. In what way does the structure of one terminology differ from the structure of another terminology? Does the difference derive from different primary kin terms? Does it arise through different structural equations?

Unlike comparisons made by assuming *a priori*, that certain genealogical equations will be used to categorize all terminologies, in the manner of the logical positivists (see Leaf and Read 2012), we need to determine, analytically and empirically, the structural level where we find structural similarity in kinship terminologies and the structural level at which we find structural differences, as well as the corpus of kinship terminologies among which we find similarities. Regarding the last point, an initial typology of kinship terminologies based on structural similarities and differences has been published in Read (2013a). Here, I will note only one, striking result that accounts for Lewis Henry Morgan's distinction between descriptive and classificatory terminologies, expressed by him through whether the terminology consistently makes a lineal/collateral distinction.

His characterization, it should be noted, leaves vague as to what exactly constitutes "consistently makes a lineal/collateral distinction," and does not address the underlying generative logic that gives rise to this difference. By viewing kinship terminologies as abstract algebras, I have been able to show that the descriptive/classificatory distinction hinges on whether: (1) the set of generating terms of a kinship terminology only includes ascending/descending kin terms; i.e., for American/English kinship terminology (AKT), the generating kin terms are a subset of the primary kin terms for the terminology that express ascending/descending kin term relations, namely, the ascending terms parent, father, and mother and the descending terms child, son, and daughter, or (2) whether the generating kin terms also include a subset of the sibling kin terms. This difference may also be expressed according to whether culture-bearers perceive of siblings as the child of parent other than self; that is, sibling is conceptualized in a descending sense (descriptive terminologies), or whether they perceive of siblings as sharing the same parents; that is, siblings are conceptualized in an ascending sense (classificatory terminologies).

The distinction as to whether siblings are conceptualized in a descending sense or in an ascending sense as a criterion distinguishing descriptive from classificatory terminologies has been independently corroborated in two cross-cultural, empirical studies of kinship terminologies. The first, by Stanley Witowski (1972), found that trying to reduce sibling to parent's child was "unworkable" (p. 171). The second, by German Dziebel (2007), finds that both definitions (1) and (2) of siblings are needed to accommodate differences among terminologies regarding sibling kin term relations. He empirically finds that siblings defined through common parents are linked with classificatory terminologies: "if alternatively Ego prefers to think that he shares ... common ascent with his siblings, 0 generation terminology will be Bifurcate Merging [i.e., classificatory]" (p. 233). Dziebel's conclusion, determined empirically from the comparison of kin terms and without consideration of the generative logic of terminologies, arrives at precisely the distinction found from working out the generative logic of descriptive versus classificatory terminologies.

In the same vein, the generative logic shows commonality among the classificatory terminologies in that classificatory terminologies, as a class, appear to be based on a core structure of male terms (centered on a male self term) and an isomorphic, core structure of female terms (centered on a female self term), but may differ regionally according to how these two core structures are conceptually connected to form a single structure of male and female kin terms. For the Polynesian terminologies, the connection is through the male self and the female self terms, and this leads to an ascending/descending distinction for sibling terms (usually referred to as an older/younger distinction, though the distinction is not simply one of relative age) occurring only for same sex siblings and not for opposite sex siblings (Bennardo and Read 2005, 2007). However, as exemplified by the Kariera terminology (see Leaf and Read 2012), the Australian terminologies connect the male kin term structure and the female kin term structure through the sibling terms in these structures, which leads to an ascending/descending distinction for both same sex and opposite sex siblings. In addition, and critically, the Kariera kin terms form a structure with four vertical lines of terms. For this structure to occur, the structural equation, *spouse* of self = 'cross-cousin', is necessarily an equation for the terminology. This structural requirement for logical consistency with four vertical lines of terms has been characterized in the literature as a prescriptive cross-cousin marriage rule, but the algebraic analysis suggests that what is involved is less a prescription about behavior and more a statement about kin term products that must be valid for a spouse term in order for the terminology to be logically consistent. Thus, it is not so much that marriages violating the marriage rule are prohibited, but rather that when they occur, kinship relations need to be redefined to bring the kin term relations between spouses into accord with the structural logic of the kinship terminology, as has been observed to happen with the Australian terminologies (see, for example, Denham 2013). In other words, the algebraic analysis feeds back, in this case, on our ethnographic understanding of Australian marriage rules.

The algebra analysis also shows that the Iroquois terminology differs from the Kariera terminology by structurally reversing the 'nephew' and 'niece' positions. This eliminates the four vertical lines of terms found in the Kariera terminology and removes the requirement that *spouse* o self = 'cross-cousin' is needed for logical completeness of the kinship terminology structure, hence a prescriptive 'cross-cousin' marriage rule is facultative for societies with Iroquois terminologies.

The algebraic analysis further shows that the Dravidian terminologies, exemplified by the kinship terminology of the Nanjilnattu Vellalar, a Tamil-speaking, agriculturalist caste in India located in the Kanyhakumari district of the state of Tamil Nadu in southern India (see Trautmann 1981), have a generative logic in which a structure of male terms and a structure of female terms is first formed and then this structure is linked to an isomorphic structure of affine terms to form the terminology (Read 2010). Here the prescriptive marriage rules arise through the way a structure of male terms and a structure of female terms are joined together; that is, for a very different reason than is the case for the Kariera terminology. The affinal terms are introduced through connecting together a structure of consanguineal terms based on self and an affinal structure based on *spouse* (see Read 2010 for details). This accounts for the way the Dravidian terminologies have been characterized by Dumont (1953).

The analysis presented here of the Thonga terminology extends these results by introducing an alternative way a structure of male terms and a structure of female terms can be connected, namely by forming the core male structure in the same manner that it occurs with the other classificatory terminologies, but then the female structure of kin terms is limited to female self and female terms are then generated through kin term products of female self, interpreted from the perspective of male self, with male terms, rather than through kin term products of generating female terms.

Classes Defined Through Genealogical Equations Hide Important Structural Differences

The algebraic approach also makes it evident that defining types of terminologies through a few genealogical equations can be misleading. What Morgan referred to as classificatory terminologies are now, following Murdock (1949), referred to as bifurcate merging terminologies and indexed by the genealogical equations, FB = F ≠ MB and MZ = M ≠ FZ. According to these equations, the Fanti terminology (see Kronenfeld 1980) is a bifurcate merging terminology yet missing in that terminology are other properties of bifurcate merging terminologies such as an ascending/descending distinction for sibling terms. In a framework that focuses on surface features like the above-mentioned genealogical equations, the missing ascending/descending distinction for sibling terms might be accounted for by proposing that in the past the Fanti terminology made an ascending/descending distinction for the sibling terms, but more recently this distinction has been neutralized. But how is a distinction neutralized? Do culture-bearers simply decide to no longer make a distinction that they previously made, as if neutralization has no logical implications? Logical implications have to be taken into consideration, as Kronenfeld (1980) recognized when he noted that adding skewing equations to the Fanti terminology does not simply change the referents of the kin terms that appear in the skewing equations but has logical implications for other kin terms as well. Kronenfeld points out that the Fanti terminology takes all of the logical implications of the skewing equations into account. The same is likely to be the case for the neutralization of an ascending/descending distinction for sibling terms. It is not just the sibling terms referenced in the equations that would be involved, but also the implications this neutralization has for other terms. Even more, we need to consider the generative logic that leads to the ascending/descending distinction in the first place, and to consider what changes in the generative logic of the terminology would be required for the ascending/descending distinction to be "neutralized", and what implications this would have for the structure of the terminology. As shown in Read (2007) and Leaf and Read (2012), the ascending/descending distinction for classificatory (bifurcate merging) terminologies can be the consequence of conceptualizing siblings in the ascending sense discussed above, hence removing an ascending/descending distinction for sibling terms is not simply a matter of erasing that distinction, but also requires considering structural changes implied by this distinction throughout the terminology.

Alternatively, it may be that the bifurcate merging equations arises in the Fanti terminology for different structural reasons than when sibling terms are also generating terms. The latter has been shown to be, in fact, the case for the Fanti terminology (Read nd). The Fanti terminology exemplifies one part of a three-part structural sequence of terminologies in which each terminology in the sequence includes a kin term product equation mapping collateral kin terms to lineal kin terms but does so at different generational levels. Examples of terminologies corresponding to

each step in the sequence are the Fanti terminology, the Shipibo terminology and the Punjabi terminology. They differ from each other by the generational level at which a collateral kin term is equated with a lineal kin term through a kin term product. The Fanti terminology has the +1 generation kin term product equation, 'son' o 'father' o 'father' = 'brother' o 'father' = 'father' (and similarly, 'daughter' o 'mother' o 'mother' = 'sister' o 'mother' = 'mother'). Call this Equation 1. The Shipibo terminology has the +2 generation equation 'son' o 'father' o 'father' o 'father' = 'brother' o 'grandfather' = 'grandfather' (and similarly, 'daughter' o 'mother' o 'mother' o 'mother' = 'sister' o 'grandmother' = 'grandmother'). Call this Equation 2. The Punjabi terminology has the +3 generation equation 'son' o 'father' o 'father' o 'father' o 'father'= 'brother' o 'great-grandfather' = 'great-grandfather' (and similarly, 'daughter' o 'mother' o 'mother' o 'mother' o 'mother' = 'sister' o 'great-grandmother' = 'great-grandmother'). Call this Equation 3. Each of the terminologies in this sequence is a descriptive terminology for which Equations 1, 2 and 3, respectively, have been added. The three equations are structurally similar, differing only in the generational level at which the kin term product is implemented, and each is a structural equation added to a descriptive terminology. However, Equation 1 is said to index bifurcate merging terminologies, thus requiring the classification of the Fanti terminology as a bifurcate merging terminology despite that fact that, absent this equation, it would be classified as a descriptive terminology. Further, despite this equation, the generative logic of the Fanti terminology is not that of classificatory terminologies (Read nd), hence focusing on surface level properties for determining similarity among terminologies leads, in this case, to an incorrect conclusion because structurally important differences were hidden by the focus on surface level similarities.

What all of this shows, I suggest, is the richness of the algebraic/generative logic approach for understanding kinship terminologies. While the algebraic approach begins with the representation of a single terminology, it then allows for identifying structural similarity through structural comparison so as to arrive at a more informed comparison among terminologies without incorrectly assuming that surface similarities imply overall similarity in terminologies. This avoids the problem that arises with Murdock's assumption that certain genealogical equations should be the basis for a classification of terminologies, namely the problem that this leads to including in the same category terminologies that clearly are not of the same kind, such as including the !Kung San terminology in the Eskimo category simply because of similarity in the genealogical referents of their terms that have the same genealogical referents as do the English aunt and uncle terms, even though otherwise there is no similarity between that terminology and other Eskimo terminologies such as the European kinship terminologies.

The Algebraic Account Embedded in its Historical and Geographical Contexts

Trautmann and Whiteley are concerned that the generative approach may be treating terminologies as if "they had no neighbors, suspended in history and geography, without a past" (p. 1). Were this the case, their concern would be appropriate. However, while the analysis of a single terminology can proceed without requiring consideration of its history or geography since the generative logic, *per se*, of the terminology is neither directly a consequence of history nor geography, some of the elements of that logic, such as the generating terms and the structural equations for the

terminology, may have a historical and a spatial context and consideration of that context can clarify why terminologies in the same region and/or time period have comparable structural properties. The extant Polynesian terminologies, for example, are the consequence of structural transformations from the terminology originally brought to the Oceanic Islands by their first colonists, and these transformations can be embedded into a historical and geographical account by relating these structural transformations to the historical and geographical pattern for the colonization of the Oceanic Islands (see Read 2013b). This account also shows that a historical-linguist account based solely on changes in the morphology of kin terms leads to a structurally unrealistic reconstruction, whereas a combined structural and historical-linguist account (see Read 2013b) leads to a historical/geographical account of the transformations in the Polynesian terminologies that is in accord with both data on changes in the morphology of kin terms and on structural changes in the Polynesian terminologies.

The Algebraic Account Makes Evident Structural Differences Hidden by Genealogical Equations

Trautmann and Whiteley are also concerned that the algebraic approach may magnify minor differences in terminologies, thereby giving undue weight to those minor differences (pp. 1-2). This would be problematic if that were the case. As has already been discussed, the algebraic approach makes it evident that similarities at the surface level can hide important and critical differences at a deeper, structural level. Consider the fact that both Australian groups like the Kariera and the Dravidian speaking groups have prescriptive marriage rules regarding the marriage of 'cross-cousins'. Should we just assume that this reflects commonality in behavior for the societies in Australia and in the Dravidian speaking regions of India, or should we take into account, as shown in Read (2010), that the same marriage rule arises for different structural reasons, and that these differences have important implications for the social systems in the two regions? The latter corroborates the arguments made by Dumont (1953) regarding differences between the Dravidian and the Australian terminologies. Obviously, no one advocates that we should ignore the fact that what appears to be similarity at a surface level may have different generative ontologies under the guise that in so doing we simplify our analyses. Their concern, I think, relates back to a more general concern that the algebraic formalism leads to a singular approach to the analysis of kinship terminologies and thereby ignores time and geography. However, as discussed above, this is not the case.

Part 2: Other Methodologies: Thick Description, Equivalence Rules, Description and Extension

Thick Description and Equivalence Rules

Trautmann and Whiteley bring up an important point regarding the role that cultural context plays in ethnographic descriptions of other societies (p. 2). Implicit in these ethnographic accounts is the notion that we do not understand behavior of others, and even our own behavior, if we simply provide accounts of behaviors taken out of context. The intent of an ethnographic account is not simply one of delineating the behaviors that others engage in, but to also make understandable the meaning that these behaviors have to the cultural actors and their audience by embedding those

behaviors into the context – phenomenal and ideational – in which they occur. The goal of an ethnographic account, then, is not simply to describe what one sees, hears, senses, smells or feels when engaging with the other, but to make the behaviors of culture-bearers – ourselves or others – more understandable by working out the cultural context that imbues behaviors with shared meanings influencing the form and content of those behaviors.

In the ordinary use of the terms *understanding* and *explanation*, understanding is sometimes equated with explanation, for to convey to others an understanding of what is happening we may need to provide our explanation for the behaviors that are being observed. A description of an American child's birthday party for an observer from a culture that does not ritualize the day a child was born would likely incorporate not only a description of the sequence of events taking place, such as parents bring their child to the party and then leave and only return to retrieve their child when the party ends, but also an explanation for the behaviors they observe by reference to the meaning a child's birthday party has to the participants in the context of American culture. In this sense, Trautmann and Whiteley properly observe that the concept of "thick description," borrowed, they note, by Clifford Geertz from the philosopher Gilbert Ryle, aims to bridge the description/explanation distinction that is prevalent in the experimental sciences (p. 2). Yet thick description is not the equivalent of explanation, and Ryle used the term "thick *description*," rather than "thick *explanation*," since he was concerned with how we understand the meaning of behaviors and not with explanation of the occurrence of those behaviors. Thick description may *lead* to explanation since "thick description … offers direct connection to cultural theory and scientific knowledge" (Stake 2010:49), but thick description, *per se*, is not explanation.

Ryle's introduction, then, of the expression "thick description" into philosophical discourse -- prior to its exaptation by Clifford Geertz to characterize his idea that the vocation of anthropology is interpretation and thick description is a way to make understandable to us, as observers, the behaviors of others, as culture-bearers -- was not aimed at explanation. It was aimed at meaning, with meaning to be provided by embedding the bare description of the facts of an action into its context, thereby helping convey the meaning of an action for the actor and for the actor's audience. In the same vein, a thick description, in Geertz's use of the term, is not the means for explanation in the scientific sense of making evident the processes giving rise to the patterning in what we observe, but a way to translate the meaning that that action has for a culture-bearer through a description meaningful to us as observers. In this sense, the formalism of rewrite rules is not thick but thin description since the context in which kinship behavior and discourse takes place has been stripped away, as Lounsbury (1964) points out, so that we can focus on the elements through which the genealogical meaning of kin terms is constructed culturally through extending the referent of a kin term from a core, or kernel, genealogical referent to more genealogically distant referents.
The method of equivalence rules is descriptive and not explanatory, then, not because of lack of cultural saliency, but since there are no constraints on the form of equivalence rules, hence it is possible to devise a set of equivalence rules, even for an artificial kinship terminology no matter how contrived, by simply defining for each term an equivalence rule that rewrites the kernel genealogical kin type for that term, and only for that kin term, by the kin types that are the referents of that kin term. What is important in Lounsbury's formalism is not the equivalence rules, *per se*,

but the discovery that a relatively small set of equivalence rules suffices and that the same equivalence rules may be shared across many terminologies. In brief, the importance of the equivalence rules lies in demonstrating that there must be an underlying logic to kinship terminologies, contrary to Leach's (1958) claim about the supposed illogicality of the genealogical referents of the Trobriand kin terms. The rules do this through description, not explanation.

The equivalence rules are not, themselves, a theory, for the method of devising equivalence rules cannot be falsified absent any constraint on what constitutes an equivalence rule. Further, the equivalence rule method leaves unanswered why the corpus of kin terms varies from one terminology to another. The method assumes the list of kin terms and the kernel genealogical referent for each of the kin terms as givens, hence differences between terminologies with regard to the kin terms making up a terminology are outside the realm of the methods of equivalence rule analysis despite the fact that accounting for differences in the corpus of kin terms making up a kinship terminology may be the most critical question we have about terminologies: Why the striking differences among the terminologies with regard to the kinship relations recognized linguistically through the kin terms making up the terminology? Rather than addressing this question, the equivalence rules are aimed at answering a different question: What is the logic by which the category of genealogical referents for kin terms is derived, or extended, from the kernel genealogical referent for each kin term? At the same time, as Scheffler and Lounsbury (1971) discuss, the equivalence rules, themselves, are not of interest absent demonstration that they are culturally grounded. Scheffler and Lounsbury did not succeed, though, in demonstrating that the equivalence rules are culturally grounded, and the single attempt to determine whether equivalence rules are culturally grounded led to the unequivocal conclusion that they are not culturally grounded (Kronenfeld 1980). As Kronenfeld discusses, the Fanti discuss easily the reasons for the kin term distinctions they make and the differences between the unskewed and the skewed version of their terminology, but their account makes use of the logic of kin term products upon which the algebraic representation is based and not the logic of equivalence rules.

Thick Description and Explanation

Trautmann and Whiteley end their comments by suggesting that the abstraction of "kinship algebra" leads away from thick description (p. 9). As discussed above, the goal of thick description is one of providing context, not explanation. Thick description may stimulate analysis aimed at explanation, but, *per se*, it is not explanation. Instead, as Lounsbury (1965) observed: "If recourse must be had to *kinship algebra* (as it will in what follows), it is only because the ramifications of the phenomenon are of sufficient overall complexity to require it, and because without it, the answers to these questions will continue to escape detection" (p. 147, emphasis added). The questions he is referring to are fundamental ones such as: "What is a kinship system?" and "What are the nature, the functions, the logic, and the social basis for a kinship terminology?" (p. 147).

It was through kinship algebra that Lounsbury was able to demonstrate that:

> Malinowski's data on the Trobriand kinship terms are tenable, logically coherent, and revealing just as they stand, i.e., genealogically specified and therefore premised on the

> familial relationships. The implications and the import of this fact should not be missed. This means that Malinowski's assumptions -- the ones that Leach found it necessary to reject -- are also tenable, at least for the Trobriand case (p. 147).

In other words, though the expression "thick description" was not part of anthropological discourse when Lounsbury wrote these words, he recognized not only that kinship algebra and thick description are complementary, but that kinship algebra is necessary for the validation of thick description by its ability to provide answers to the questions that thick descriptions addresses and raises but do not answer. It is not that formal analysis of kinship systems needs to be "complementary to and supportive of, the 'cultures of relatedness' approach" (p. 9) as Trautmann and Whiteley suggest, for that approach has abandoned the quest for answers to fundamental questions of the sort posed by Lounsbury and others relating to terminologies (see Carsten 2000) and has made the error of trying to treat accounts of the cultural instantiation of kinship relations as if instantiation of abstract terms is meaningful without reference to what is being instantiated. One cannot be culturally instantiated as a father or a mother without first having the concept of a father or a mother. To say that one becomes a kinsman through, say, commensality presumes we already know want it means to be a kinsman, and that we already have answers to the question: "What is a kinship system?" The 'cultures of relatedness' approach is not the driver, but the consumer, as implied by Lounsbury's observations, of what we learn through kinship algebra whose goal is to answer fundamental questions about kinship and kinship systems, in particular, and about culture and cultural systems, in general. The "cultures of relatedness' approach focuses on the *instantiation* of kinship relations expressed both through genealogy and through kinship terms (Parkin 1996), not on understanding how these relations have been culturally formulated as a coherent and logically consistent system that incorporates multiple cultural idea systems (Leaf and Read 2012), including the culture of relatedness approach with its focus on non-genealogical ways that kinship is culturally instantiated.

The Importance of Good Description

The above are the main reasons I conclude that the equivalence rules are descriptive and not explanatory, neither in the sense of rules derived from a theory of kinship terminologies nor in the sense of expressing native exegesis about the features of their kinship terminology. This, however, in no way denigrates the importance of the equivalence rules for increasing our understanding of kinship terminologies and making it evident that terminologies are not simply a compilation of kin terms, each independently determined, but rather have an underlying logic giving them coherence as a system of kinship ideas and concepts. There is no doubt, as Trautmann and Whiteley point out, that the equivalence rules have led to deeper understanding of kinship terminologies and have provided a more orderly account of the Crow-Omaha terminologies in place of conjecture and *ad hoc* assertions. However, understanding and (scientific) explanation are not identical, as can be seen from the distinctions made by Strevens 2013 among *understanding why*, which depends on already having a verified explanatory account, *understanding with*, which only depends on having an internally consistent explanatory account, and *understanding that*, namely recognizing that a certain state of affairs has been observed. It is "understanding that" that Trautmann and Whiteley use to characterize Lounsbury's formal account when they refer to "the better understanding …

that he supplied" (p. 3). To say that Lounsbury's formalism enabled observing a difference between "crossness" as it occurs in Dravidian terminologies in comparison to Iroquois terminologies does not say why the difference occurs, only that there is a difference; that is, their statement is in accord with Strevens distinction between "understanding why" and "understanding with" versus "understanding that" and provides understanding without (scientific) explanation.

Their discussion of "crossness" (p. 3) clarifies what is at issue here. Crossness does not refer to what has been elicited from culture-bearers as part of their emic concepts regarding kinship, but is an etic distinction introduced to help make evident that the logic of merging occurs in different ways in the classificatory terminologies for collateral and lineal genealogical relations distant from speaker than for the relationship of the father and mother genealogical relations in comparison to the cousin genealogical relations. Identifying the differences that occur in what they refer to as crossness has been analytically useful for further subdividing the classificatory terminologies beyond their shared commonality with regard to the merging equations FB = F and MZ = M, as they discuss in detail (p. 6), but we need to go from "understanding that" with regard to crossness to "understanding why;" that is from description to explanation. The latter comes about through the algebraic formalism since the algebraic account of the generative logic of a kinship terminology makes evident why the differences in terminologies that have only been descriptively distinguished using the etic concept of crossness should occur. The algebraic formalism is emically grounded, hence it does not impose an etic formalism, and for this reason can make the transition from a descriptive to an explanatory account. Unlike the non-falsifiability of an equivalence rules account, an algebraic account of the generative logic of a terminology generated from a set of primary kin terms can be falsified if there is a kinship terminology for which the terminology, as a whole, cannot be generated from a set of primary kin terms without appeal to imposed etic constructs, such as *ad hoc* structural equations (see Read's [2001] critique of the formalism advocated by Woolford [1984]). To date, no such terminology has been found.

Equivalence Rules and Explanation

Trautmann and Whiteley go on to observe that the formalism of equivalence rules led to the observation that kin terms in classificatory terminologies do not lend themselves to genealogical categories associated with kin terms that can be conjunctively defined. "[T]his", they assert, "is precisely what constitutes genuine anthropological explanation" (p. 3). Yet what is being explained is unclear. To make a property of a kinship terminology evident does not constitute explanation for why that property occurs, though it may lead us to ask why that property occurs in the first place. Similarly, their assertion that Lounsbury's formalism has "heuristic … capacity" (p. 3) incorrectly equates heuristic capacity with explanation. Kepler's description of planetary motion was rife with heuristic capacity and led to critical observations such as planetary motion sweeps out equal areas in equal times, but it is Newton's gravitational theory that is explanatory, not Kepler's description.

The concerns expressed by Trautmann and Whiteley appear to be triggered by their assumption that my reference to Lounsbury's formalism as being descriptive denigrates the value and usefulness of his formalism, and that I am reducing the insightful and critical importance of

Lounsbury's work to "mere description" (p. 3), as if description cannot be insightful and lead to important discoveries. Far from it. Kepler did not provide "mere description," but rather an empirical foundation critical for Newton's development of a gravitational theory of planetary motion. Equally, Lounsbury has not provided "mere description," but an empirical foundation making it evident that terminologies must have a generative logic underlying the regularities that his formalism has made evident, but what his formalism lacks is an adequate account of that generative logic.

We judge description by its effectiveness in representing what we experience; a good description of an object, event or an action is faithful to what we experience when we are engaged with that object, event or action. Explanation can provide a level of understanding beyond what we experience by making evident non-obvious properties of the object, event or action itself. Good description can make evident what we have not yet observed, and in so doing may challenge our current understanding of the world around us. When Lewis Henry Morgan first described the kinship terminology of the Iroquois, he was met with incredulity for his description showed that the meaning of their kin terms was completely outside the range of meaning for kin terms that users of the English kinship terminology took for granted. The power of good description is, then, just that—it can provide a challenge to what we take for granted, thereby forcing us to see things in a different manner. Good description, in this sense, and as Trautmann and Whiteley's comments indicate, may be the *impetus* for developing explanation, but description, *per se,* even thick description, is not explanation.

Extension Hypothesis

I am mostly in agreement with their comments (p. 3) about the extension hypothesis that motivates the formalism developed by Lounsbury. As they mention, the criticisms made of the equivalence rules fall wide of the mark. That some meanings can be an extension of other meanings is not problematic, as they observe, and the equivalence rules show how a wider genealogical category meaning of a kin term can be seen as an extension of a narrower genealogical category meaning of a kin term. Nonetheless, this leaves unanswered: Who is doing the extension? Is it part of the understanding that culture-bearers have of their kinship terms, or is this the understanding that the kinship theorist has of their kinship terms? As mentioned above, the former is not the case, at least for the Fanti, the only group where this question has been addressed and answered in detail. Trautmann and Whiteley seem to reach the same conclusion through their notion that the extension rules mainly have pedagogical for the kinship theorist as these are rules serving "to render unfamiliar terms into familiar ones, and in so doing to make the structure of the different logics apparent" (p. 4), where I assume that by "unfamiliar terms" and making "the structure of the different logics apparent" they are referring to the kinship theorist, not to the culture-bearer. I agree that David Schneider's critique of kinship studies, in general, and of the kinship formalism of Lounsbury and Scheffler, in particular, is "self-defeating" (p. 4), as it leads to the untenable conclusion that kinship does not exist, even though kinship is a critical aspect of people's lives in all societies. But rather than just noting that the Lounsbury formalism must, in some sense, be on the right track given the concordance between what that formalism has informed us about kinship terminology systems and what culture-bearers inform us about their terminological system, we

need to go beyond that formalism and to work out explicitly (see Read 2018) just what is the underlying logic that we only glimpse partially through the formalism of equivalence rules.

Metaphor and Kinship

Their discussion (pp. 5-6) of the role of metaphor in the work of Lounsbury (and of Scheffler and Lounsbury 1971) is interesting, but a side-topic since I do not discuss the use of metaphor in my discussion of the Thonga-Ronga kinship terminology. Formally, metaphor comes into play when the kin term product of a primary kin term with the kin term in question cannot be instantiated given the way the kin term is being used. Thus, for English speakers, the use of the kin term *uncle* to refer to a good friend of one's parent is metaphorical usage since kin term products such as *son* of *uncle* cannot be (properly) instantiated by the person who is the son of "my fathers' close male friend," where "fathers' close male friend" is the instantiation of the term *uncle*.

Part 3: Ethnographic Issues

Comparison of Terminologies

Whether comparison of terminologies should be made with the terminologies of other groups in the same region, or between groups that are geographically isolated, depends on the question being addressed by the researcher. I compared the Thonga-Ronga terminology with that of the Hokha Chin and of the Hadza for largely fortuitous reasons. At the time I was doing the analysis of the Thonga-Ronga terminology, Kris Lehman and I were working on a book aimed at providing a formal account of the generative logic of terminologies that has already been spelled out in a number of published papers. Since Kris's linguistic research involves the Hokha Chin, hence he is familiar with their terminology, we thought it might provide a useful case study for our projected book. To the surprise of both of us, we discovered that their terminology and that of the Thonga-Ronga are structurally almost identical. Neither his previous work on their terminology nor the work of Junod on the Thonga-Ronga suggested that there should be any correlation, let alone almost identity, between the terminologies of these two groups from opposite sides of the planet. This cannot be a case of diffusion and must be one of independent invention leading to the same terminology. That two groups should independently arrive at terminologies with the same generative logic indicates that the structures of these two terminologies is the consequence of the internal generative logic of kinship terminologies (see Leaf and Read 2012) and is not the consequence of factors external to that generative logic.

As it happened, and for unrelated reasons, I was also working out the generative logic of the Hadza terminology for a chapter in the to-be-published *Handbook on Cross-Cultural Research*, edited by Douglas White and others. In my chapter, I note that the generative logic, hence structural form, of kinship terminologies of hunter-gatherer societies can be strikingly different even when aspects of the social organization of the two hunter-gatherer societies relating to the procurement of food resources is quite similar. To my surprise, the generative logic of the Hadza terminology was based on the same structural logic consisting of a core structure of male marked terms and a core structure of female marked terms reduced to female self, though the terminology develops with a different

global structural logic due to differences in subsequent steps in the generative logic of the Hadza terminology in comparison to the Thonga-Ronga terminology.

I had no theoretical reason to compare the Thonga-Ronga terminology with the terminology of the Hokha Chin or the Hadza. The comparison arose from the fortuitous discovery of the near identity in the terminologies of the Thonga-Ronga and the Hokha Chin and the use of a core female structure reduced to the single term, female self, in the Thonga-Ronga, the Hokha Chin and the Hadza terminologies. However, the fact that the Thonga-Ronga terminology has a different structural logic than Omaha terminologies like the Fox terminology implies that the comparison of the Thongan terminology with the Hokha Chin, and even with the Hadza, terminology, which is not an Omaha terminology, is important for showing that the generative logic of the Thonga-Ronga terminology is not unique.

As Trautmann and Whiteley point out, comparison of the Thonga-Ronga terminology with neighboring groups has theoretical justification (p. 6). There are a number of interesting questions that a regional comparison can address, including comparison of the African context with a comparable region in North American that also has a mix of Crow-Omaha and other terminologies as they suggest. As Junod discusses, there are substantial differences among the terminologies of groups in the same region as the Thonga-Ronga, which raises questions about why there should be variation like this in terminologies within the same region. My goal in writing the article, though, was not a comparative one, but rather to extend the algebraic analysis already employed in making evident the generative logic of kinship terminologies to the Crow-Omaha terminologies. The choice of the Thonga-Ronga terminology stemmed from the debate between Junod and Radcliffe-Brown over the reasons for the importance given to the mother's brother among the Thonga-Ronga, a patrilineal society.

Differences Between the 1st and 2nd Editions of Junod's Ethnography of the Thonga

Trautmann and Whiteley correctly point out (p. 7) that the second edition of Junod's ethnography, published in 1927, adds brief comparisons of similarities and differences between the Thonga-Ronga and other Thonga and non-Thonga neighboring groups to the first edition. Junod also provided a more completely worked out table of kin terms for the Thonga-Ronga and neighboring groups in his 2nd edition. For a comparative study of terminologies in this region, the 2nd edition would be the ethnographic source book of choice, as Trautmann and Whiteley note. However, I was not making a comparative study, and with respect to the Thonga-Ronga terminology, there are virtually no differences between the two editions. For this reason, I am puzzled by their comment that "Junod (1927:232-236) offer[s] more expansive remarks on some key kin-terms for the Omaha question (especially *kokwana*, *ntukulu*, *malume*, and *mupsyana*) …" (p. 7), suggesting that the 2nd edition contains relevant information regarding these terms that is not in the 1st edition. However, the pages they reference are virtually identical to the corresponding pages in the first edition, except for an occasional comment about neighboring groups added to the second edition. The biggest difference occurs on p. 233 where a short paragraph in the first edition has been expanded into a longer paragraph in the second edition by providing an expanded discussion of the grandson-grandparent relation that is discussed only briefly in the 1st edition. Whereas the 1st

edition simply refers to "grandson by males, my true grandson" and "grandson by females" (1913: 229), the second edition refers more precisely to the grandson-paternal grandparent relation versus the grandson-maternal grandparent relation. Interestingly, both editions note that it is the relation through males and not the relation through females that is the *true* relation, which supports my argument that the terminology is based on a core structure of male terms with female terms determined through kin term products of female self with male terms. Thus, while both paternal and maternal grandparents are referents of *kokwana*, the "true" referents are the paternal grandparents. Here, "true" is not being used in a procreative sense, as Warren Shapiro assumes in his publications, but in the sense of identifying the referents corresponding to a directly generated kin term (e.g., the term for paternal grandparent derived from the kin term product 'father' o 'father'), as opposed to a kin term derived from a generated kin term (e.g., the term for maternal grandparent derived from the kin term product female self o 'paternal grandfather', discussed below).

Is *Kokwana* Diagnostic of Skewing?

Trautmann and Whiteley comment that "Read uses *kokwana* as the primary Thonga-Ronga term diagnostic of Omaha skewing, …" (p. 7) – a statement based, I assume, on my sentence that begins "For the Thonga terminology, the skewing is encapsulated in the kin term, *kokwana* ('grandparent', 'mother's brother') …" (p. 5). Given their interpretation of my sentence, they properly go on to discuss why the term *kokwana* is not diagnostic of skewing. However, my sentence continues: "…through this term being reflexive in both the vertical direction (for kin term products beyond 'grandparent') and in the horizontal direction (for kin term products beyond 'mother's brother'), …" which, while it reads as if I am saying this is the reason for the skewing, makes no sense as a reason for me to claim that *kokwana* is a marker for skewing since skewing does not refer to the reflexivity of kin terms. My sentence then adds the phrase: "… thus it provides a conceptual boundary for kin term products, ...", which is a valid statement about the term *kokwana*, but has nothing to do with skewing. Altogether, though, my sentence makes no sense as written. What I should have written is that both the property of skewing and being a boundary term are encapsulated in the kin term *kokwana* through, on the one hand, the fact that skewing is expressed via *kokwana* when it is used in place of *malume* (whose referents are mother's brother and mother's brother's son) and, on the other hand, by being a boundary term expressed through the reflexivity of *kokwana* in both the vertical direction for kin term products extending beyond 'grandparent' and in the horizontal direction for kin term products extending beyond 'brother' of 'mother'.

My hypothesis that the Thonga use the term *kokwana* to refer to 'brother' o 'mother' due to this being the only maternal, male kin term product in the terminology is questioned by Hamberger and de Almeida (discussed below). Hamberger notes that my saying *kokwana* is used to refer to 'brother' o 'mother' for this reason is a circular argument. Were that the only reason for saying why 'brother' o 'mother' is referred to by *kokwana*, he would be correct. Instead, since using *kokwana* to refer to 'brother' o 'mother' is not a logical consequence of the generative logic of the terminology, it must be the consequence of other considerations (see comments by de Almeida). What I was trying to suggest is that if 'brother' o 'mother' is to be subsumed under a kin term

already in the terminology, then it would have to be subsumed under *kokwana* as this is the only maternal male kin term (though it is not exclusively a maternal male term since its primary referent, according to Junod, is paternal grandparent). Of course, even with this clarification of what I wrote, I still have not established why the Thonga subsume 'brother' o 'mother' under a term already in the terminology in the first place. Unfortunately, Junod does not discuss the contexts in which *kokwana* is used for 'brother' o 'mother' and the context in which *malume* is used, hence it is difficult to identify what using *kokwana* for 'brother' o 'mother' signifies for the Thonga. As can be seen in Hamberger's re-drawn kin term map for the Thongan terminology, *kokwana* does play the role of a boundary term for the terminology, as I suggest.

Paternal *Kokwana* Versus Maternal *Kokwana*

Hamberger is uncertain about the validity of my (supposed) separation of *kokwana* into an unskewed, paternal (male) *kokwana* and a skewed, maternal (male) *kokwana* (p. 7). The differentiation between a paternal *kokwana* and a maternal *kokwana* follows directly from Junod's discussion of the kin term *kokwana*: "kokwana means first the paternal grandfather and all the ancestors on the father's side, side, and this is its proper essential meaning" (p. 226). He then goes on to say "The bakokwana are also all my mother's male relatives …" (p. 226), thus differentiating between the paternal and the maternal side for the kin term *kokwana* comes directly from Junod's ethnography. That the skewedness only applies to the maternal side derives from Junod's comment "If the mother's sister is a mother, the mother's brother is by no means a father. He is called malume or *kokwana* …" (p. 225, emphasis added).

Several of Hamberger's comments stem from assuming that *kokwana* is *the* kin term name for 'brother' o 'mother', whereas *kokwana* is an alternative to *malume*, the kin term through which the skewing of the Thongan terminology is expressed; that is, *kokwana* = 'brother' o 'mother' = 'son' o 'brother' o 'mother'. It is only through using *kokwana* as an alternative to *malume* that the genealogical equation MB = MBS is expanded to MF = MB = MBS and becomes part of the Thongan terminology.

Trautmann and Whiteley note (p. 7) that (1) I appear to downplay *malume* as a term for 'brother' o 'mother', (2) I do not include *malume* in Table 1 as a term for 'brother' o 'mother' and (3) Junod only lists *malume* under 'brother' o 'mother' for the Thonga-Ronga in his kinship table in the 2nd edition of his book. However, I include genealogical mother's brother and mother's brother's son as referents for the term *malume*, along with the term *kokwana*, in Table 1. In a footnote to Table 1, I state, and illustrate with a quote, that *malume* and *kokwana* are alternative terms for 'brother' o 'mother'. Although Junod's table in the 2nd edition only lists *malume* for genealogical mother's brother, Junod's elaboration on *malume* that is part of the 1st edition and shows that *kokwana* is also used to refer to 'brother' o 'mother' by the Thonga-Ronga, is kept unchanged in the 2nd edition. Thus, on pages 231-232 of the 2nd edition Junod comments: "the mother's brother … is called malume or kokwana … The Ronga dialect makes a distinction between kokwana, maternal grandfather, and malume, mother's brother, but the *malume is often called kokwana*" (emphasis added to malume and kokwana). Also, in the 2nd edition, Junod includes both *kokwana* and *malume*

as the kin terms for mother's brother among the Thonga-Djonga, and *kokwana* as the only kin term for mother's brother among the Chopi, as Trautmann and Whiteley note. This suggests that in some contexts mother's brother is distinguished by the term *malume*, but in other contexts *kokwana* is used, and yet in other contexts only *kokwana* is used. What these contexts might be are not discussed by Junod.

Neutral Versus Male Generating Terms

Hamberger suggests, on the basis of the smaller number of male terms in comparison to female terms, and the greater number of neutral terms in comparison to gendered terms that the generating terms are neutral terms and the few gendered terms are derived from the neutral terms (p. 6; see also Heady's similar comment). This is certainly a possibility, but as I discuss below, whether the generating terms are gendered or neutral is not determined by the number of gendered versus neutral terms, but by whether the terminology can be generated from neutral primary terms. As I show below, this does not work when the gendered terms are introduced using, for example, male and female gender markers. Perhaps there is an alternative way to introduce gender marking that accounts for the Thongan terminology with neutral generating terms and without being forced to introduce *ad hoc* procedures to introduced gendered kin terms, but that needs to be demonstrated and not just hypothesized. Also, Hamberger's count of male terms versus female terms ignores that fact that *kokwana* is not the name for the kin term product *makwabu* o *mamana* but is an alternative to the kin term name *malume* (see *malume* in the Table 1 and the footnotes to Table 1). As Trautmann and Whiteley point out (p. 7), Junod provides a more detailed kin term table in his 2nd edition and in this table Junod only lists *malume* as the kin term meaning 'brother' of 'mother'; however, Junod keeps the text that discusses the fact that *kokwana* is used in place of *malume*, so it seems that *malume* is the kin term name for 'brother' o 'mother', but *kokwana* may be used instead of *malume*, hence there are two male consanguineal kin terms and two female consanguineal kin terms in the terminology.

Gendered Self and Cross-Sex Sibling

Hamberger asks the critical question: "How do we therefore know that the Proto-Polynesian and Thonga cross-sex sibling terms actually correspond to 'cross-sex self', as Read consistently presupposes in his demonstrations but never demonstrates in the first place?" (p. 5). First, there cannot be a logical demonstration that female self is transformed into *makwabu* (which I incorrectly refer to as 'cross-sex sibling') or its equivalent since the Polynesian, the Australian, the Iroquois and the Dravidian terminologies use the same generating sets but only the Polynesian terminologies connect the structure of male terms and the structure of female terms though transforming cross-sex self into cross-sex sibling. Second, the validity of the correspondence between cross-sex self and cross-sex sibling is established by showing that the terminology can be generated from the culturally salient set of generating kin terms and the culturally salient structural equations for that terminology and this correspondence. Third, ethnographic evidence shows the close relationship between cross-sex sibling among the Polynesians; e.g., among the Gilbert Islanders "brothers and sisters are alter egos" (Lambert 1981:190), which is essentially what is meant by female self becoming 'sister' (ms) from the perspective of male self and male self becoming 'brother' (fs) from the perspective of female self.

Motherhood, Fatherhood and Kin Terms

If *mamana* ('mother') is not a generating term, then *mamana* has to be a computed kin term, namely *mamana* = *nsati* ('wife') o *tatana* ('father'). Hamberger is concerned that this contradicts ethnographic evidence indicating that fatherhood, not motherhood, relates to marriage, and that this requires assuming a non-primary maternal link is a culturally salient concept (p. 6). However, motherhood is not determined by whether *mamana* is, or is not, a primary kin term, but rather it is part of the concepts of a Family Space that, ontologically, is prior to the Kin Term Space. The start of motherhood is signaled by pregnancy and giving birth and continues by engaging in mothering behavior (though giving birth is not a necessary component of motherhood) and being a mother in the sense of motherhood does not require that the kin term *mamana* be a primary kin term. Likewise, that fatherhood relates to marriage does not entail that *mamana* must be a primary kin term, nor does the importance of the maternal link require that *mamana* must be a primary kin term.

That *manana* is not a primary kin term is implied by the fact that with the death of a man who has several wives, a *manana* may be transformed into a *nsati* ('wife'). The 1st through 3rd wives of the deceased man become the wives of his 'younger brothers', the 4th wife becomes the wife of his *ntukulu* ('sister's son'; see Table 1) and the 5th wife becomes the wife of one of the 'sons' of the deceased man and is thereby transformed from being mother into wife: "he gradually accustoms himself to consider her no longer as a mother (mamana) but as a wife (nsati)" (p. 200), suggesting that her status as mother is not through a primary kin term relation, but through the composition *manana* = *nsati* o *tatana* since her status as *manana* is erased upon the death of her husband, thus making possible what otherwise would be a forbidden marriage, namely marriage with a son or a step-son. Whereas marriage with a prohibited cross-cousin can occur only after holding the *dlaya shilongo* ritual (p. 244) so as to legally remove the cross-cousin kin term relation (see below), no such ritual is possible for a mother-son marriage (p. 241). Instead, the death of her husband suffices since his death erases the kin term product equation *manana* = *nsati* o *tatana* for his widowed wife. As Junod also reports, if another wife of the deceased husband does not want to marry one of his 'younger brothers' or his *ntulutu*, she may say "I am taking my young son as husband" (p. 200). Further, consistent with *manana* being a computed and not a primary term, being a barren wife does not necessarily lead to divorce. More commonly, her parents simply provide a young girl as another wife for the barren wife's husband who then can bear children in her stead (p. 188). These, and other examples, reinforce the notion that what is primary, in a kin term sense, for the Thonga is the status of a woman as *nsati*, not her status as *manana*. This can also be seen with the 1st wife (the "true" wife) and the fact that upon the death of her husband she must either marry the 'younger brother' who will become the headman or stay in the *kraal* else it will cease to be a social unit (p. 201). It is her status as wife and not as mother that is critical to the continuity of the *kraal* upon the death of her husband.

Thongan Family and Marriage

Trautmann and Whiteley provide a long quote (pp. 8-9) from Junod's 2nd edition as a way to link, from their perspective, Junod's account of the Thonga with Lévi-Strauss's notion of Crow-Omaha

kinship systems as having the consequence of dispersing marriage alliances, thereby opening up the highly regular form of symmetric exchange or asymmetric exchange marriage alliances associated with so-called elementary forms of kinship. Most of the quote discusses the pattern of cross-cousin marriage in neighboring groups, a pattern that differs markedly from the Thongan's prohibition on marriages with cross-cousins. They point out that Junod adds one intriguing comment about the Thonga-Ronga not in the 1st edition, namely that the son of a man's *malume* "belongs to the family from which we take wives" (Junod 1927:235). Read literally, Junod is saying that a man takes a 'cross-cousin' as a wife, and this is Trautmann and Whiteley's reading: "hidden within Junod's remarks, it appears the Ronga 'Omaha' element of *malume* especially includes *persistent matrilateral cross-cousin marriages* (indexing 'the family from which we take wives,' *notwithstanding a formal proscription*)" (p. 9, emphasis added). Junod's comment is curious, though, for he goes to great lengths to point out that not only is marriage with a 'cross-cousin' proscribed among the Thonga, unlike the situation in neighboring groups, but such a marriage can only take place after the *dilya shilongo* ceremony has taken place in order to "kill" the 'cross-cousin' relation: "the aim of the dilya shilongo is *lawfully* to kill one kind of relationship and to replace it by another, *because the two are not compatible*" (1913:246, emphasis added). Junod indicates that he knows of two cases like this, only one of which involved marriage with a maternal 'cross-cousin' – hardly evidence of "persistent matrilateral cross-cousin marriages." So, we need to ask: What does Junod mean by "family?"

The Term 'Family'

The term appears throughout his ethnography, with examples ranging from family in the sense Americans understand the term, to a Thonga village being considered a family (p. 216), and as a kinship grouping less inclusive than a clan. A family has a name, its *shibongo* (p. 224). *Shibongo* is also used to refer to a clan name (pp. 62, 334). As a kinship unit, marriage is endogamous at the tribal and clan level, but exogamous at the level of the family (p. 240). With regards to the family itself, Junod writes:

> "there is a very remarkable uniformity in the family conceptions all over the tribe, but also that the matter is even more difficult than I first thought. It is a tangle extraordinary difficult to unravel. I had believed that it was composed of two threads only, twisted together and knotted a hundred times: the *lobola* [bride price] and polygamy customs. But I saw that many other threads were entwined with these …" (p. 217).

Junod devotes a chapter titled "The Life of the Family and of the Village" to work out these threads.

Thus, I suggest, by the phrase "the family from which we take wives," Junod is referring to family in this sense of a named, exogamous kinship unit, and not literally the family (in the American sense) in which the son of the *malume* was born into. This is the sense in which Junod uses family when he discusses what are preferred marriages: "a wife ' from *the family* in which the father found the mother is recommended, and approved, as long as *she is not a too near relative*." (p. 248, emphasis added). In general, being a distant relative, viz. at least the 8th degree, makes marriage possible (p. 346). Thus, the phrase 'the family from which we take wives' is not Junod's way of implicitly indicating "persistent matrilateral cousin marriage" (p. 9), as Trautmann and Whiteley

suggest, but simply identifying the kinship unit within which a spouse is found, and that within this unit the choice of a spouse must be someone who is not a close relative, hence not a cross-cousin.

Part 4: Comments by Patrick McConvell, Patrick Heady, and Franklin Tjon Sie Fat

Comments by Patrick McConvell

Thongan Kinship Terminology as a Transformation from a Proto-Thongan Terminology
The generative logic I present for the Thonga terminology was worked out through a discovery process, rather than assuming the form of that logic. The discovery process begins with the facts of the terminology: What are the kin terms and how are they structured as a system, as shown through the way the kin terms are interconnected via the kin term product of primary Thongan kin terms with the kin terms of the kinship terminology?[ii] From the kin term map, it can be seen that there is asymmetry between the structure for the male kin terms and the structure for the female kin terms, whereas my previous experience with classificatory terminologies has shown symmetry between these two structures. This led to the radical idea of hypothesizing that the only female primary generating term is female self. With this choice of the generating set for the female terms, I found that it was possible to work out the generative logic of the whole terminology. In contrast, it quickly became apparent with the Fox terminology that, as argued by Lounsbury, it can be viewed as an Iroquois terminology to which structural equations have been added that introduce the so-called Omaha skewing. Consequently, the difference in the generative logics – one in the form of a transformation of a prior kinship terminology (the Fox terminology) and the other, as McConvell notes, a terminology whose form is not the transformation of a prior terminology, is an empirical observation, not an imposed conceptualization as he suggests (p. 1).

From a deep history perspective, there must be a predecessor terminology to the Thongan terminology presented by Junod, but the historic event of going from that predecessor terminology to the current Thongan terminology appears to be one of replacement rather than transformation. It is difficult to see how a terminology with a set of generating terms for the female kin terms would be transformed through intermediate terminologies into a generating set whose only element is female self. This is not to suggest that no transformations occurred subsequent to the introduction of the replacement terminology, as undoubtedly there have been transformations, but according to the argument I have presented here, the Omaha equations found in the Thongan terminology are not due to a transformation formed by the introduction of skewing equations into an existing kinship terminology, but are inherent to the terminology through its generative logic beginning with a set of generating male kin terms and female self as the sole generator for female kin terms.

McConvell correctly notes (p. 1) that I do not present a deep history of the Thongan terminology, which is not to say that a deep history is without interest, but simply that my research goal was one of working out the generative logic of a Thongan terminology and not working out the deep history of the Thongan kinship terminology. I did not employ the methods of linguistic

reconstruction as these are not directly applicable to my research goal of working out the generative logic of the Thonga terminology, given that it is said to be an Omaha terminology, and how this relates to theoretical debates regarding kinship terminologies. Without first knowing that generative logic, it is difficult to know what a deep history should be addressing, and the methods of historical linguistics, applied without taking into account the constraints on transformations introduced by the generative logic of a terminology can lead to an empirically invalid deep history going back to a proposed Proto- terminology by delineating transformations that supposedly have occurred historically subsequent to the appearance of the Proto- terminology, yet do not take into account the generative logic of terminologies, as I have shown has occurred with the Polynesian terminologies (Read 2013b).

*Patterning in the Aggregate Versus Patterning in Individual Ca*ses

In his comment, "Assuming it is possible to find such 'self' terms by a reliable method (about which I am unsure), there is an implication that this should yield a prediction of a Thonga-Ronga type of skewing and should be testable. Read does not try such a test on a wide sample of languages" (p. 1). McConvell is asking for an answer to a statistical question in a context where a statistical question is inappropriate. Statistics is appropriate when the goal is to determine patterning in data seen in the aggregate, but not on individual cases, such as the average height of males. Whether the Thonga terminology can be generated from a set of male generating terms and just a female self term is a question about patterning found on an individual case, namely the Thongan terminology. Either the Thongan terminology can be generated in this manner or it cannot. The claim that it can be generated in this manner is not tested statistically, but by demonstration. Note that I have not claimed that any terminology that has a set of male generating primary kin terms and just a female self as a generating term will always have the Thonga-Ronga from of skewing. Had I made this claim, it, too, would not be tested statistically since it is not a proposition about patterning in the aggregate, but a proposition about patterning on individual cases. As it happens, the proposition is false since the Hadza terminology has the same form of generating sets but does not have the Thonga-Ronga form of skewing.

As regards a method for finding male self and female self terms in a reliable manner, there is no difficulty, for all that is meant by, for example, "male self" is literally just that; i.e., "male self" is simply the concept that a male speaker can use to refer to himself as a person of the male gender. Whether, linguistically, there is a word in the language that means "male self" is not required, as there is no claim that the language in question has, for example, a kin term whose meaning is "male self," only that the concept of a man referring to himself as a male person or a woman referring to herself as a female person are not foreign concepts for the speakers of the language in question.

Kokwana *as a Boundary Term*

I agree with McConvell that the notion of *kokwana* as a boundary term (p. 2) needs to be fleshed out more. In the Hokha Chin terminology, though it is almost isomorphic to the Thonga terminology, it is with the grandparent terms that the two terminologies disagree. The Hokha Chin terminology has separate terms for 'grandfather' and 'grandmother' instead of the single neutral term *kokwana* found in the Thonga terminology. McConvell also makes the useful point (p. 2), in

reference to my observation that having a set of male generators and only a female self generator for female terms is consistent with a society that only recognizes patrilines, that while Omaha terminologies are associated with patrilineal societies, there is substantial variation in how this association plays out.

McConvell notes (p. 3) that in the Australian terminologies, where skewing appears to be an overlay on what otherwise would be a well-formulated kinship terminology (unlike the situation with the Thonga terminology), culture-bearers make reference to the unskewed versus the skewed version, depending on the context, much like the situation with the Fanti, as reported by Kronenfeld (2009). Thus, according to McConvell, overt recognition of skewing as an overlay appears to be relatively common. The different way the skewing arises in the Thonga terminology argues, though, against viewing the skewing in the Thonga terminology as being an overlay, but this is not an attempt to "naturalise" (p. 2) the skewing. Rather, I am simply noting the fact that skewing arises in the Thongan terminology through a different logic than is the case for the Fanti or the Australian terminologies, with one consequence being that the skewing is not an overlay. I suggest that an overlay is a 'cultural modification' precisely because, in terminologies like the Fox or the Fanti terminologies, it does not arise from the generative logic of the terminology, hence it does not arise for structural reasons arising from the logic of generating a terminology.

McConvell usefully notes that a shift to asymmetric male/female generating kin term sets likely relates to past social changes (p. 3). His suggestion that linguistic reconstructions may provide evidence for such social changes needs to be explored. Showing that skewing may arise through the generative logic of the terminology or, alternatively, through a cultural transformation, is not, as he indicates (p. 3), an endpoint, but a starting point for additional research.

Comments by Patrick Heady

There are only one or two points in Patrick Heady's thoughtful comments where some clarification may be helpful. Before discussing these points, I first need to explain my use of the expression "kin term product" rather than the more familiar expression "relative product."

Kin Term Product Versus Relative Product

The expression "relative product" is generally used for the product of genealogical relations computed using the logic of recursion and expressed through concatenation. Thus, the relative product of MMB and SD would be the genealogical relation MMBSD formed by concatenation of these two genealogical relations. The kin term product, however, differs from the relative product both by referring to kin terms, not genealogical relations, and by computing the product through the referential use of kin terms, not through concatenation. Thus, the kin term product of the English kin terms *daughter* and *father*, expressed by "*daughter* of *father*" or denoted symbolically by *daughter* o *father*, refers to the following computation: If speaker (properly) refers to alter 1 as *father*, and alter 1 (properly) refers to alter 2 as *daughter*, then what is the kin term, if any, that speaker (properly) uses to refer to alter 2? For English speakers, the answer would be *sister*, hence the kin term product, *daughter* of *father* is *sister*, or symbolically, *daughter* o *father* = *sister*.

Since the expression, relative product, already had a well-established use for the product of genealogical relations expressed through concatenation, I introduced (Read 1984) the expression, kin term product, to denote the process of taking the product of kin terms. Further, since genealogical products are written from left to right and read with the use of the possessive form; e.g., MMB is read as mother's mother's brother, and since, in English, the word mother is polysemic and can denote a relation in the Family Space, a genealogical relation or a kin term, writing kin term products from right-to-left, rather than from left-to-write, allows for using "of" rather than the possessive form so as to distinguish between the genealogical and the kin term meaning of a word like mother. Thus, *mother* of *daughter* is the kin term product of the kin terms *mother* and *daughter*, which would be self for a female speaker; that is, *mother* o *daughter* = self, whereas mother's daughter is the relative product of the genealogical relation mother with the genealogical relation daughter and would be the genealogical relation, sister; that is, MD = Z. Under my convention, Heady's use of "relative product" to denote a kin term product should be replaced by "kin term product."

Power of Good Description

Heady illustrates the power of good description through discerning a patterning that occurs in the aggregate using a cross-tabulation, for a sample of kinship terminologies, of the dimension 'form of the sibling terms' with the dimension 'kind of terminology'. His descriptive/statistical analysis corrects a problem with Murdock's analysis of the same data and shows that terminologies with absolute kin terms (e.g., English *brother* and *sister*) are associated with descriptive terminologies and terminologies that make relative distinctions among the sibling terms are associated with classificatory terminologies. This descriptive result immediately raises the question: Why this association between form of sibling terms and kind of terminology? Heady has already provided a partial answer to this question through his prediction that differences in the generative set of kin terms for a terminology should correlate (though not perfectly, as he discusses) with the kind of terminology, hence the association is due to the difference in the generative sets for the descriptive terminologies in comparison to the generating sets for the classificatory terminologies (see Read 2007; Leaf and Read 2012). More specifically, descriptive terminologies are generated with ascending/descending generators, but not with a sibling generator. In descriptive terminologies, 'sibling' = 'child' o 'parent', hence the generative logic does not introduce an ascending/descending dichotomy for the sibling terms, thus the association of descriptive terminologies with absolute sibling terms. However, the classificatory terminologies are generated with sibling terms as generators and this introduces an ascending/descending difference among sibling terms, though how this plays out with same sex and cross-sex sibling relations depends on how a structure of male terms is connected to a structure of female terms, as I've discussed above. Thus, it is not surprising that the grouping of kinds of sibling terms with types of terminologies has more than one cluster, as shown by Franklin Tjon Sie Fat using the data Heady has provided. By connecting description to theory prediction, Heady has engaged in the essence of what is meant by explanation.

Cultural Logic versus External Factors

Heady finds the distinction I make "between features of a terminology which are generated by its fundamental cultural logic and those which derive from external factors concerned with various aspects of social organization" (p. 4) perplexing since by the very fact of saying that a formal account must be culturally salient, it follows that social organization cannot be ignored since surely there is a feedback loop between social organization and the cultural ideas that comprise a cultural system such as a kinship terminology. My short response to Heady's concern is that what I mean by referring to aspects of the terminology that "derive from external factors" are aspects that are local and not global properties of the terminology, where by local properties I mean features arising from a factor whose logic only applies locally within the terminology structure and not globally to the kinship terminology structure as a whole. For example, the Tongan terminology has a term for 'ascending brother' of 'mother' and a term for 'descending brother' of 'mother' due, it appears to the logic of inheritance among the Tongans applied to mother's brother (Bennardo and Read 2007), but the logical implications of introducing the structural equation 'descending brother' of 'mother' are not applied to the whole terminology. Thus, we suggested that the 'ascending/descending' distinction for 'brother' of 'mother' in the Tongan terminology is due to an external factor that is only applied locally in the terminology, hence is a cultural modification of the kinship terminology structure. In contrast, the logic of the skewing equations in the Fanti terminology has been applied globally to their terminology by the Fanti (Kronenfeld 2009).

Heady's suggests that in some terminologies the nature of the generative logics is "'strictly determined'" (p. 4) and admits no variants, whereas in other terminologies the generative logic is less determinative and so variants are possible. This reformulates (in large part) what I mean when I say that the different ways to connect a structure of male terms to a structure of female terms can account for variability among the classificatory terminologies. When the two structures are linked through male self and the female self term is culturally interpreted as a cross-sex sibling term from the perspective of a male speaker, and the male self term is culturally interpreted as a cross-sex sibling term from the perspective of a female speaker (as is the case for the Polynesian terminologies), the terminology will have ascending/descending same sex sibling terms and an absolute cross-sex sibling term. (For some of the Polynesian terminologies, reformulation of the ascending/descending generating sibling terms is also involved [see Read 2013b for details].) When the two structures are connected through the sibling terms in the structure of male terms and in the structure of female terms (as is the case for the Australian terminologies), then there will be an ascending/descending distinction for both same sex and cross-sex sibling terms. Further, when the structure of male terms and the structure of female terms are linked together and then this consanguineal structure is connected to an isomorphic affinal structure (as is the case for the Dravidian terminologies) then there will be both ascending/descending same sex and cross-sex sibling terms and ascending/descending cross-cousin terms.

Heady suggests that the argument showing that the generation of the skewed Thonga terminology from an asymmetric pair of generating sets is faulty (pp. 5-6). His argument brings up the same issue raised by Hamberger, namely that in the terminology there is one male term and two female terms, with the remaining terms being neutral terms, so why should one assume that the generating

set for the male terms is of the form {male self, 'father', 'ascending male sibling'}? However, the relationship between the generating sets and the frequency of male terms in comparison to female terms in the terminology as a whole depends on how each step in the sequence for the generating of a kinship terminology plays out and how distinctions made at one level may be changed at a different level. The reason for considering that the generating set for the female terms is not the same as the generating set for the male terms stems from the fact that the core structure for classificatory terminologies has consistently been shown to be the structure shown in Figure 2, whether for male marked terms (including neutral terms, if need be) or for female terms (including neutral germs, if need be), but the structure for female terms comparable to Figure 2 but derived from Figure 1 would also include the kin term product *ñwana* ('child') o female self = *ntukulu* ('grandchild'), which is not a structural link that appears in Figure 2. Further, if one tries to use a generating set for the female terms isomorphic to the generating set for the male terms, the structure that is generated does not have the asymmetry between the kin term structure around the term *rarana* ('sister' of 'father') and around *kokwana*/*malume* ('brother' of 'mother') that can be seen in Figure 1. These asymmetries (in accordance with Heady's prediction that there should be correlation between the properties of the generating set -- in this case, asymmetry – and the form of the terminology) suggested that there should also be asymmetry between the generating set for the male terms and the generating set for the female terms. Thus, logically the generating set for the female terms could either be {female self}, {female self, 'mother'}, or {female self, 'ascending female sibling'}, but the latter two possibilities do not work as generating sets for the kin term map shown in Figure 1, which only leaves the generating set {female self}, and when this set is used as the generating set, the kinship terminology is generated in a coherent and consistent manner. (This topic is also taken up formally below.)

Heady suggests that one could use neutral generators to generate the substructure of neutral terms in Figure 1 (that is, change the sex of the generators shown in Figure 2 to neutral generators) and then "focus on explaining the generation of distinct male and female terms in the first ascending generation" (p. 6). However, as the saying goes, 'the devil is in the details'. The difficulty lies in how male and/or female generators would be generated from a core structure for which sex is not a feature of the kin terms in that core structure without the logic becoming circular or by making use of *ad hoc* additions to the generating logic that lack cultural saliency (shown formally below).

One terminology that begins with neutral generators and then introduces sex differences in the generated kinship terminology is the American/English terminology with generating set G = {self, *parent*, *child*, *spouse*} and appropriate structural equations (see Figure 4.1, Read 2013b). The terminology generated from this generating set yields a structure with only neutral terms, namely *parent*, *grandparent*, *child*, *grandchild*, [*uncle*, *aunt*], [*nephew*, *niece*], *spouse*, *parent-in-law*, *child-in-law*, *cousin*, and so on. Sex marking is introduced by adding male (M) and female (F) sex markers to the generating set, G, to form G* = {self, *parent*, *child*, *spouse*, M, F}, where each of M and F are right-identities for kin term products. That is, for any kin term K, K o M = K = K o F. The reverse order of these products, namely products of the form M o K or F o K, are recognized as kin terms in the AKT only if *spouse* o K is recognized as a kin term (that is, the kin term product is named) or *spouse* o K^r is recognized as a kin term (that is, the kin term product is named), where

K^r is the reciprocal term for the kin term K; e.g., since *spouse* o *parent* = *parent*, the kin term products F o *parent* and M o *parent* are recognized as kin terms, meaning that each of these products is given a name, namely *mother* and *father*, respectively, and the kin term products F o *child* and M o *child*, with *child* the reciprocal kin term for the kin term *parent*, are also recognized as being kin terms and given names, namely *daughter* and *son*, respectively. However, for the self-reciprocal kin term *cousin*, *spouse* o *cousin* is not recognized as a kin term relation and so neither M o *cousin* nor F o *cousin* are given names, hence these products do not determine kin terms in the AKT. (In languages such as French where all nouns must be marked by sex, a different logic is involved and, accordingly, French has the terms *cousin* and *cousine*.) This procedure, however, will not work for the Thonga terminology if the core structure is generated by neutral terms, for when the sex markers M and F are added to the generating set, most of the products with M and F will be sex-marked and so must then be rewritten as neutral terms since most of the terms in the Thongan terminology are neutral terms – to be discussed formally in more detail below.

What this example also shows is that validation of the generating set and the structural equations for a terminology depends on whether the generative logic expressed through generating terms and structural equations leads to a generated structure isomorphic to the kin term map without introducing *ad hoc* "corrections" to the generative logic in order to account for the structural properties of the terminology expressed in the kin term map. This is, in fact, a powerful constraint. My experience with working out the generative logic of terminologies is that wrong choices for generating terms and/or structural equations quickly become evident by discovering that the structural properties of the kin term map cannot be replicated by the current choice of generating elements and/or structural equations without either *ad hoc* additions to the generative logic or introducing features that are not culturally salient. (Examples like this will be discussed below.)

The Generative Sequence is a Universal Hypothesis

Heady correctly notes that the generative sequence going from ascending to descending to gendering of kin terms to affinal kin terms to structurally local properties of a terminology that I have worked out is universal only as a hypothesis (p. 6). If we consider the generative sequence to be a (part) theory for the structural generation of kinship terminologies, then like all theories, it must be falsifiable. The theory that I have developed regarding the generative logic of kinship terminologies can be falsified by a terminology whose structure, shown through a kin term map, cannot be replicated by a generative logic without *ad hoc* additions to that generative logic, or by adding features that are not culturally salient. No such terminology has been found to date. In contrast, the formalism of equivalence rules cannot be falsified, which is precisely why the formalism leads to descriptive, not explanatory, accounts.

Affinal Terms in the Thongan Kinship Terminology and Their Relationship to Skewing

I did not include affinal terms in my analysis, as Heady notes (p. 6), since I was focusing on the Crow-Omaha skewing property found in some kinship terminologies and, while skewing like this has direct implications for marriage systems, affinal terms do not seem to play a role in the

generative logic underlying the Crow-Omaha skewing of a kinship terminology. However, for a more complete understanding of the Thongan terminology and its relationship to the social organization and marriage systems of the Thonga, and how their kinship system relates to other, neighboring systems and to geographically isolated groups with comparable terminologies, the generative logic for the affinal terms also needs to be worked out.

Heady's comment that given the "question marks over the analyses of both sibling and affinal terms, it is not really possible to assess the claim that the elements of skewing in the Thonga terminology are determined by its underlying cultural logic" (p. 7) is not correct since, in fact, I have shown that the skewing in the Thonga terminology can be generated from its underlying generative logic. I think what Heady is getting at is that without working out the generative logic for the affinal terms, and without relating the terminology to the way marriage relates to skewing, we still only have a partial account of skewing in the Thongan terminology. To come back to Trautmann and Whiteley's similar comments for a moment, a formal account of skewing is necessary but not sufficient. We need, at least as a beginning point, a thick description of the way skewing plays out in Thongan society, but not as an isolated set of cultural facts. As Heady puts it: "we need to construct theories that explain in principle the ways in which terminological patterns and patterns of practice might map onto each other…" (p. 8). I return to this topic at the end of my reply to the Comments by considering why the Thongan terminology has the equation (male) *makwabu*('brother') o *manana* ('mother') = *malume* ('mother's brother') = *ñwana* ('son') o ([male] *makwabu* ('brother') o *manana* ['mother']), with its genealogical instantiation, MB = MBS.

Comments by Franklin Tjon Sie Fat

Kinship Algebra Maps Versus Kin Term Maps

Franklin Tjon Sie Fat suggests that my comparison of the structures for the Thonga and the Fox terminologies should be done at the level of kinship algebra maps instead of kin term maps (p. 2). The difference between comparing kin term maps and comparing kinship algebra maps, it should be noted, is like the difference between comparing one building to another through photographs (the kin term map) or through blue prints (the kinship algebra maps). The choice of comparison depends on what one is trying to show though the comparison. The visual perspective the kin term map provides for the structure of a kinship terminology makes it possible to compare easily visual differences in the structure, such as whether one structure is more symmetric than another, whether the structure can be mapped onto a two dimensional plane (e.g., the consanguineal kin terms of the AKT), or whether this requires a three dimensional space (e.g., the consanguineal and affinal terms of the AKT), whether the structure is in the form of a cylinder (the Iroquois terminology), or a torus (the Kariera terminology), and so on. Comparison of kinship algebra maps focuses, instead, on how a structure comes about, and what are the elements that give rise to the structural differences that can be seen in the kin term maps by considering how differences in generating sets and in structural equations affect differences in the structural form of the Kin Term Spaces determined by kinship terminologies.

Tjon Sie Fat goes on to say that "in the Thonga-Ronga analysis, no *kinship maps* are provided, with the *kin term* maps of Figures 1, 2, 3, 4 and 5 apparently derived from Junod's kin term/genealogical [= kin type] data in Table 1 by taking *kin term products* of the Thonga *primary terms*" (p. 2). I think Tjon Sie Fat misunderstood the progression of the argument. The argument starts with kin term maps (Figures 1 and 2), then shifts to algebraically generating a kinship terminology through kin term products of generating kin terms and structural equations that express Thongan emic kinship ideas, and lastly shows isomorphism between the generated structure and the structure displayed in the kin term map. I did not go into all of the details of the argument as these have been presented in previous publications, especially in Leaf and Read (2012). However, given Tjon Sie Fat's misunderstanding, I will briefly outline the argument here.

The argument begins with the ascending structure generated from the generating set A = {male self, *tatana*, *nhondjwa*} (e.g., by itself, *tatana* generates the sequence of kin term products *tatana*, *tatana* o *tatana*, *tatana* o (*tatana* o *tatana*), …, which structurally identify *tatana* as an ascending kin term rather than a sibling term[iii]) and incorporates the structural equations: (1) *tatana* o (*tatana* o *tatana*) = *tatana* o *tatana* (which bounds the sequence of products of *tatana* taken with itself), (2) *tatana* o *nhondjwa* = *tatana* (which expresses the idea that siblinghood has to do with common parents), and (3) *nhondjwa* o *nhondjwa* = *nhondjwa* (which distinguishes *nhondjwa* as a sibling term rather than an ascending term). Next, the descending kin terms are generated using the generating set D = {male self, *ñwana*, *ndjisana*} isomorphic to the ascending generating set A, along with the ascending structural equations written isomorphically as descending structural equations using the elements in set D. Critical here is the fact that the isomorphic, descending structural equation for the ascending structural equation *tatana* o *nhondjwa* = *tatana* is the structural equation *ñwana* o *ndjisana* = *ñwana*, which provides the logical basis for the merging property of classificatory terminologies. Also, at this stage in the argument, the structural equations *nhondjwa* o *ndjisana* = male self = *ndjisana* o *nhondjwa* are introduced that define *nhondjwa* and *ndjisana* to be reciprocal kin terms. Lastly, and given that the ascending and descending structures are isomorphic structures with reciprocal kin terms, it follows that *nhondjwa* o *tatana* = *tatana*, the ascending reciprocal equation for the descending structural equation, *ñwana* o *ndjisana* = *ñwana*, must be part of the ascending structure. Finally, when we replace *tatana* o *tatana* by the kin term *kokwana*, which is the name for this kin term product, and replace *ñwana* o *ñwana* by *ntukulu*, which is the name for this kin term product, we arrive at Figure 3 as the *generated* (i.e., algebraic) ascending and descending terminology. That this structure is, in fact, isomorphic to the comparable portion of the kin term map in Figures 1 and 2 appears to have led Tjon Sie Fat to consider Figure 3 to be a kin term map, rather than being the generated structure with its structural positions labeled using the kin terms from the isomorphic structural position in the kinship terminology.[iv] Similar comments apply to Figure 4 and 5. The remainder of Tjon Sie Fat's observations in this portion of his comments are predicated upon not recognizing that the argument shifts from a discussion of kin term maps through Figure 2 to kinship algebra maps in my subsequent discussion, hence these comments do not need a reply.

Primary Kin Terms

Tjon Sie Fat raises questions about what I mean by primary kin terms (p. 6). Primary kin terms are irreducible kin terms, such as *mother*, *father*, *son* and *daughter* in English. The kin terms corresponding to the relations in the Family Space are candidates for being primary terms, though whether sibling terms are primary terms depends on the cultural context. What is not self-evident is which primary terms should be used as generating terms. At first glance, one might expect *father* and *mother* to be primary kin terms that are also generating terms for the AKT, but if one tries to use the generating set {self, *mother*, *father*}, then each of *mother* o *mother*, *mother* o *father*, *father* o *mother* and *father* o *father* will be distinct terms, which then requires introducing structural equations such as *mother* o *mother* = *mother* o *father* and *father* o *father* = *father* o *mother* on an *ad hoc* basis. Difficulties like this when *father* and *mother* are used as generating terms leads to the realization that the generating term is *parent* and the terms *mother* and *father* are determined by bifurcating the neutral term *parent* into the male and female terms, *father* and *mother* through sex markers, as discussed above.

Contrary to Tjon Sie Fat's comments, the kin term product does not depend on first identifying primary kin terms since it applies to any pair of kin terms. The kin term product is a binary operation defined over the set of kin terms, not an operation that is defined only when one of the kin terms is a primary kin term. I focus on taking kin term products of primary kin terms with each of the kin terms as products like this are easily understood by culture-bearers, whereas kin term products such as *niece* of *great aunt* are probably not immediately obvious to English speakers. Kin term products like *niece* of *great aunt* can be determined from the kin term map based just on products of primary terms with each of the kin terms by tracing out, in the kin term map, the pathway from self to *niece*, but using *great aunt* as the starting point.

It is only when we ask about a generating set that the notion of primary terms necessarily arises, for by the nature of a smallest generating set for a kinship terminology (or for any abstract algebra, for that matter), any kin term included in a generating set for a kinship terminology that is not a primary kin term can be removed from that set since it can be reintroduced by generating it from the remaining generating elements in the generating set, hence the generating set was not as small as possible and so a generating set must consist of primary kin terms. A complete Cayley Table, it should be noted, has the product of each algebra element with every other algebra element, but much of the table (such as, for the AKT, a product like *nephew* of *great aunt*) would be a kin term product that most speakers of the AKT would not immediately recognize, whereas kin term products of the form *primary term* o *kin term* (such as *child* o *great aunt* = *cousin* would be a more familiar kin term product). Kin term products such as *nephew* of *great aunt* can be determined from the products of primary terms with each of the kin terms. I find it more useful for the kin term map to simply show the result of taking the kin term product of primary kin terms with each of the kin terms in the kinship terminology, rather than a map showing the kin term product of each kin term with every other kin term.

Kin Term Products

What Tjon Sie Fat refers to as triangular kinship is simply the kin term product I introduced in Read (1984) and have subsequently discussed in numerous publications. I present the formal definition of the kin term product in the text in Footnote 2. His three binary kinship relations: "1. between a speaker and an addressee, 2. between the speaker and a referent, and 3. between the addressee and the referent" (p. 3) is just a restatement of what I state in Footnote 2. In Footnote 2, I refer to the kin term relation between speaker A and person B (his speaker and addressee), between person B and person C (his addressee and referent) and between speaker A and person C (his speaker and referent). Thus, Tjon Sie Fat's comment that "triangular systems have not yet been subjected to a formal, algebraic analysis" (p. 3) is not correct since this has already been done in numerous publications, starting in 1984. In addition, what he refers to as triangular systems has been discussed informally by numerous ethnographers over the past several decades (see references in Read 2018). His statement "Read's analysis would be more convincing if it could be applied to compositional data obtained directly from informants" (p. 4) misses the point that triangular kinship relations are compositions obtained directly from informants and the triangular kinship is just another name for the kin term product I introduced in 1984.

Non-Associativity of Kin Term Products

Tjon Sie Fat correctly brings attention to the fact that some kin term products are not associative in some kinship terminologies, where by *associativity* is meant that, for kin terms K, L and M, K o (L o M) = (K o L) o M, so the order in which the kin term products are computed does not affect the result. A problem may arise with the generative logic of some of the classificatory terminologies when the product L o M can be reduced by a structural equation, say L o M = N, and then, at a later step when computing a product K o N with the kin term N, N is now rewritten as L o M. Thus, K o N is rewritten as K o (L o M), and if we now use associativity to write K o (L o M) = (K o L) o M, we can then compute the product K o L, say K o L = I, and lastly compute I o M. This may lead to a kin term other than what is computed when the kin term products are computed in the order given in the expression K o (L o M) = K o N; that is, we may find that K o N ≠ I o M. It is as if once the product L o M = N is computed at an earlier step, then the fact that N was computed from the product of two kin terms in an earlier step becomes 'hidden' and N is henceforth treated as if it were a primary kin term. This is an aspect of kinship terminologies that needs to be worked out more thoroughly. It is not a form of associativity that has been identified in the mathematical literature since the idea of generating an algebra through an ordered sequence of steps with products considered earlier in that sequence becoming inaccessible later in the sequence of steps is not a topic that has been considered in the mathematical literature.

Regional Comparisons

Tjon Sie Fat provides (p. 4) a useful discussion of the kinds of insights that can be obtained through regionally focused research. The reason for introducing this discussion stems, though, from his invalid assumption that I made a "decision to compare the Thonga-Ronga with 'widely disparate' terminologies" (p. 4) and that this decision is not justified. What I actually stated in the text is that I wanted to know whether the qualitative difference between the generative logic of the Thonga-

Rongan terminology and the Fox terminology used by Lounsbury to illustrate the application of the method of equivalence rules to an Omaha terminology is unique to the Thonga-Ronga terminology, or do other terminologies share a comparable generative logic with the Thonga-Ronga terminology? Were I to have considered other terminologies in the same region as the Thonga-Ronga, and even if there are other groups in the region with essentially the same terminology structure as that of the Thonga-Ronga terminology, we would still have to take Galton's Problem into consideration and determine whether other groups in the same region had the same terminology structure through diffusion or through independent invention. As is well-known, one of the solutions to Galton's problem is to compare groups sufficiently isolated so that diffusion cannot be the explanation for why similar structures are found in different groups. Thus, for the question I was addressing, a regional comparison was precisely what I should *not* do. That the Hokha Chin have virtually an identical terminology to that of the Thonga-Ronga, and the Hadza terminology is based on a generative logic comparable to that of the Thonga-Ronga, must be due to independent invention rather than diffusion, hence the Thonga-Ronga terminology is not a unique case and this allows for the conclusion that "there are fundamental structural differences among terminologies that, even if they share the skewing of comparable kin terms, are not simply variants on the same generative logic, but arise from qualitatively different logics" (my text, p. 5). I bring attention to what I see as the importance of this comment with my ending sentence: "For all of these modalities, we need to begin with the generative logic of the terminology and work out how that logic plays itself out with respect to the kinship system for which the terminology is a part" (my text, p. 31).

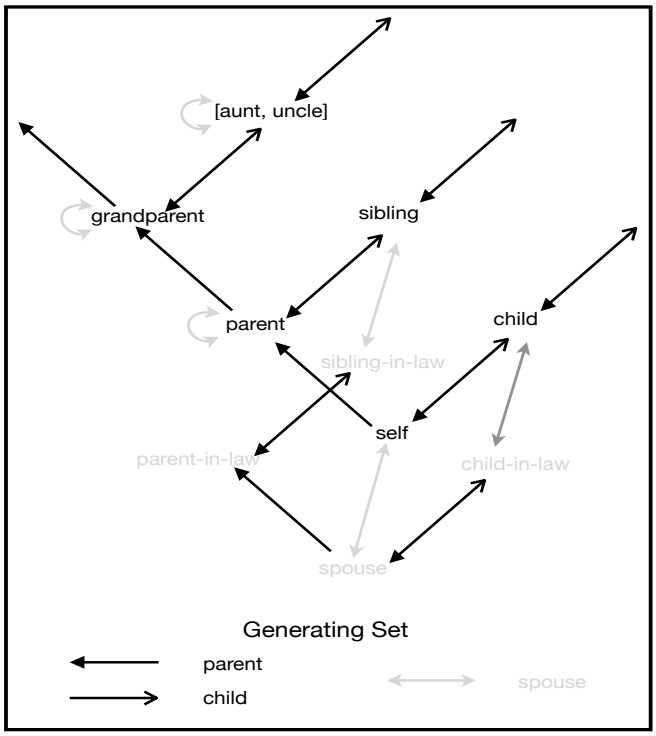

Figure 1: Algebraic structure of the AKT, based on parent, child and spouse generators.

Variations in the Structure of the Kin Term Space

Tjon Sie Fat is on the right track with his suggestion (p. 5) that variation in the structure of the Kin Term Space associated with a particular kinship terminology can be explored in a manner analogous to exploring a geometric space through changing parameter values. For the Kin Term Space, a change in one of its defining features – the generating set, the structural equations, or other kinship concepts that are part of the generative logic – would be analogous to a change in parameter values for a geometric space. For example, as shown in Read (1984), the structural equations *spouse* o *uncle* = *aunt* and *spouse* o *aunt* = *uncle* in the AKT are the logical consequence of the structural equation *spouse* o *sibling* = *sibling* o *spouse*. This equation is not logically necessary as it is not a consequence of the

generating set for the terminology and/or the structural equations used to determine the ascending structure, the descending structure or the sex marking of kin terms. So, we can ask: How would the structure of the Kin Term Space for the AKT change if this equation were deleted?

Figure 1 shows the algebraic structure for the AKT before introducing the distinction between male terms and female terms so as to keep the diagram simpler. The reflexivity of the *spouse* generator for the [*aunt*, *uncle*] term and the *spouse* connection from *sibling* to *sibling-in-law* and the *spouse* connection from *parent-in-law* to *sibling-in-law* are each a consequence of the structural equation, *spouse* o *sibling* = *sibling* o *spouse*. Now delete this equation and compute the algebra determined with this equation removed. The resulting algebra kin term map is shown in Figure 2, where the gray discs denote kin term products that are no longer reduced once the sibling equation has been removed, hence are candidates for being recognized culturally as kin terms. More precisely, the *spouse* kin term product with the [*aunt*, *uncle*] term is no longer reflexive and so two new positions are introduced (one above *aunt* and the other below *uncle*), and kin term products, using the generating terms, with the kin term products at these positions must now be included as well (i.e., *parent* and *child* arrows in Figure 2 point from, or to, kin term products that are not reducible without the sibling equation). The same is true for what was the *sibling-in-law* term. *Spouse* o *sibling* is now a kin term product distinct from the *child* o *parent-in-law* kin term product, so nodes for these kin term products are introduced and products of the generating terms with the kin term products introduced at these nodes will introduce yet other nodes that will be in the algebra without the *sibling* equation, and so on.

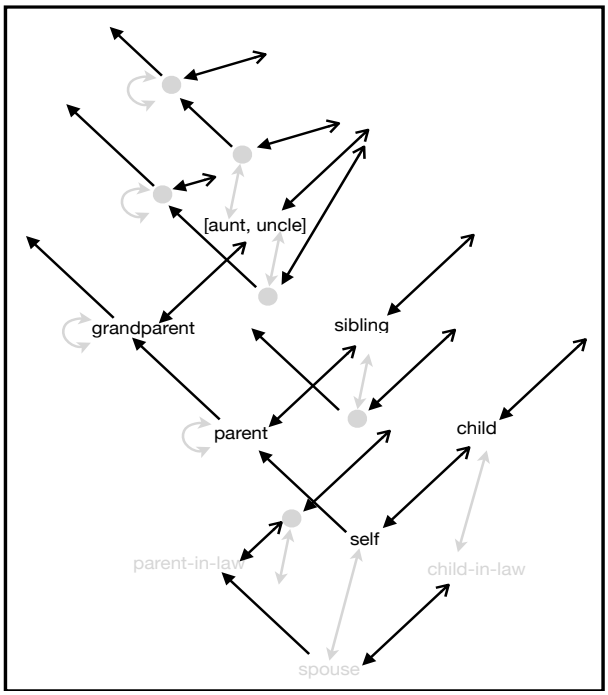

Figure 2: Algebraic structure of the AKT without the sibling in law equation *spouse* o *sibling* = *sibling* o *spouse*.

As can be seen by comparing Figure 2 to Figure 1, the *sibling* equation eliminates what otherwise would be numerous affinal kin term products that either are incorporated into the kinship terminology as kin terms, or else require cultural specification that these kin term products do not give rise to kin terms. The *sibling* equation, in combination with the specification that *parent* o *parent-in-law* is not recognized as a kin term, neatly simplifies the much more complex affinal subspace in Figure 2 to the simple affinal space we see in Figure 1. This result suggests that the occurrence of the *sibling* equation in the AKT may be due to changing what otherwise would be a complex affinal subspace for culture-bearers to conceptualize into a more easily comprehended subspace.

Finally, Tjon Sie Fat presents a four-dimensional hypercube representation of different ways crossness is said to occur for the 'parent'- 'cousin' and 'cousin'- 'children' kin term pairs and observes that in this representation there are exactly 24 steps between an Iroquois terminology and a Dravidian terminology (p. 5). It is not clear, though, what this shows. First, crossness is an etic and not an emic concept and it is not clear whether crossness has any meaning in a cultural sense. Second, it is even less clear that the four-dimensional representation has any meaning in a cultural sense. Lacking here is any notion of how a terminology is generated, hence we have no idea as to the structural changes that would be required for the "crossness" of an Iroquois terminology to be transformed into a different kind of crossness. Also, the assumption is being made that any step in the hypercube is comparable to any other step in the hypercube. The hypercube representation, though formally elegant, selects a property of kin terms (or pairs of kin terms in the case of crossness), then removes the property from its context as part of a kin term structure. Next, these are changed, one attribute value at a time, assuming this provides us with meaningful information about kinship terminologies. Consider, however, the difference between a terminology in which there is (to use attributes as they are reported in the literature) an older/younger distinction for same sex sibling but not for opposite sex sibling, and a terminology in which there is an older/younger distinction for both same sex sibling and cross-sex sibling. Using the method of changing attribute values one attribute at a time, the first terminology is but one step from the other terminology. However, from a structural viewpoint, the difference has to do with a qualitative change in the generative logic of the terminologies, namely a change in how a structure of male terms is connected to a structure of female terms in order to make a complete terminology of male terms and female terms (see Figure 5 in Read 2010). What is involved for there to be a qualitative change in the structural logic of a terminology is ignored by reducing change to a single step in the hypercube representation of crossness. In addition, crossness is not a culturally determined attribute of a terminology but a construct imposed on terminologies for analytical purposes. Though the etic concept of crossness has been analytically useful, it is also misleading as it leads the analysis of kinship terminologies away from a focus on the internal, generative logic of the terminology to properties that lack direct, cultural salience, and is not necessary (see, for example, the absence of reference to crossness in the formal, algebraic representation of a Dravidian terminology presented in Read 2010).

Part 5: The Formalism Issues Raised by Klaus Hamberger

Re-Drawing Kin Term Maps

Klaus Hamberger begins by introducing re-drawn versions of the kin term maps for the *Proto-Polynesian terminology and for the Thongan terminology. Hamberger has arranged the kin terms in his re-drawn maps to facilitate comparison of the structural arrangement of neutral terms in the terminology with that of the gendered kin terms, whereas I spatially arranged the kin terms to facilitate comparison of the structure of the male terms with the structure of the female terms. Yet another arrangement has been used by Murray Leaf (Leaf 2009; Leaf and Read 2012) to express the outcome of his process for eliciting the kin terms of a kinship terminology. Different spatial arrangements like this are possible, depending on what aspects of the kinship terminology structure is being emphasized. Hamberger also included the affinal terms that I did not include for the

reasons I mention in my reply to Patrick Heady's comments. Even taking these factors into account, though, there still are substantive differences between my kin term maps and his redrawn kin term maps. However, I will only discuss some of these differences for the Thongan kin term map (see Figure 4 in Read 2013b for the kin term map of the *Proto-Polynesian terminology).

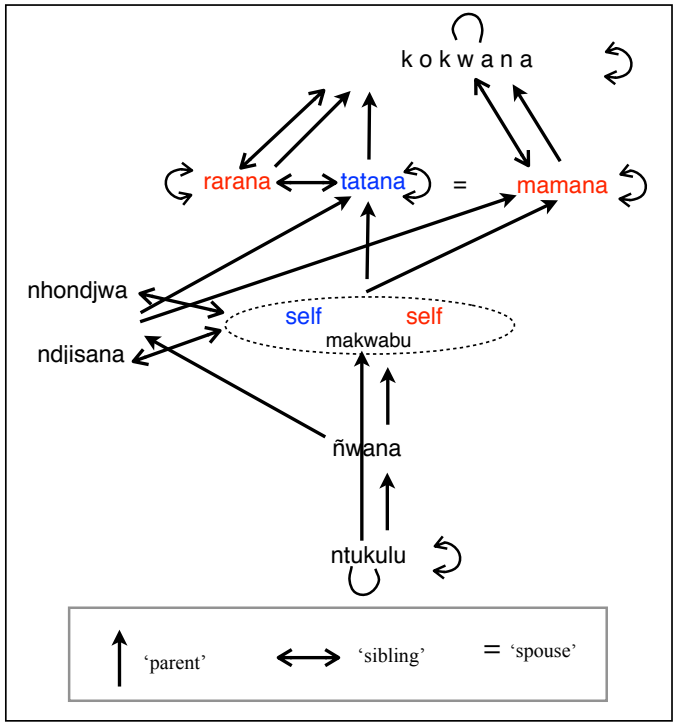

Figure 3: Kin term map for the Thongan terminology based on the re-drawn kin term map prepared by Klaus Hamberger but using the layout of kin terms and arrows for primary terms from Figure 1 in this issue's main article.

In order to simplify comparison of Hamberger's re-drawn kin term map for the Thongan terminology with the kin term map in my article, I have redrawn his kin term map using my spatial layout for the kin terms and the arrows I employ for showing the kin term products of primary terms with kin terms. Also, where he uses a line without arrow heads to denote a relation that is symmetric, I have indicated it with a line that has an arrow head at each end. Hamberger also introduces the convention that only an arrow for the kin term product with an ascending primary term needs to be displayed and not an arrow for its reciprocal descending kin term due to assuming (though this is not always valid, as I show below) that an arrow showing a kin term product for an ascending primary term will always be matched with an arrow in the opposite direction showing the kin term product with its reciprocal descending primary term.

A visual comparison of my kin term map with my redrawing of his kin term map (see Figure 3) shows that they are not identical. In my kin term map there is a *ñwana* ('child') arrow from (female) *makwabu* ('sibling') to *ntukulu* ('grandchild') and from *ndjisana*/*nhondjwa* ('ascending sibling'/ 'descending sibling') o *ñwana* ('child') due, as I demonstrate, to the generative logic of the terminology. According to his convention only a 'parent' arrow needs to be drawn from *ntukulu* to *makwabu* and from *ñwana* to *ndjisana*/*nhondjwa*. However, it cannot just be assumed that there must be 'parent' arrows going in the opposite direction for the 'child' arrows from *ntukulu* to *makwabu* and from *ñwana* to *ndjisana*/*nhondjwa*. This would require assuming that the kin term products, 'parent' o *ntukulu* and 'parent' o *ñwana*, are multi-valued: (1) 'parent' o *ntukulu* = *ñwana* and 'parent' o *ntukulu* = *makwabu* and (2) 'parent' o *ñwana* = *makwabu* and 'parent' o *ñwana* = *ndjisana*/*nhondjwa*, but Junod provides no ethnographic evidence supporting this assumption. Absent ethnographic evidence, the convention is imposed and may not be culturally salient.

Other differences[v] stem from features of the software program, Puck, Hamberger used to make kin term maps. For example, Hamberger comments that Puck neither allows for non-English kin term names nor gendered kin terms such as *mother* or *father*. Consequently, he reduced the set of primary, gendered kin terms to (his capitalization) PARENT, SIBLING and SPOUSE, with kin term products using CHILD left implicit as the inverse of an arrow showing the kin term product with PARENT, as discussed above. The neutral primary kin terms will only generate neutral kin terms, thus generating the kinship terminology from his primary terms would also require identifying a culturally salient procedure for introducing gendered versions of kin terms. The problem with so doing is discussed below. So how are gendered kin terms introduced into the Thongan terminology?

In the classificatory terminologies, male terms and female terms are introduced by beginning with a generating set of male terms (or of female terms), then generating a structure of ascending and descending kin terms, all gendered by the same gender as the primary terms in the generating set. Next, the kin terms gendered with the other sex are introduced by forming an isomorphic structure of ascending kin terms formed from generating kin terms gendered by the opposite sex as the generating terms for the initial structure of ascending and descending kin terms. Thus, the initial structure consists of, say, male kin terms and the other, isomorphic structure consists of female kin terms (or the reverse). However, when the generating set of female generating terms is reduced to just G = {female self}, no female kin terms are generated.

Instead of female kin terms being generated from female generating terms, as happens with other classificatory terminologies, I argued in the text that they are introduced through kin term products of female self with the male ascending and descending kin terms. Hamberger understands this to mean that I am introducing what he calls a gender-switching operator and introduces formalism to represent gender-switching: "Gender-switching thus can be represented as the kin term product of a gendered term with the gender-switch operator, either from the left (*to change the gender of speaker*) or from the right (*to change the gender of alter*)" (p. 4, emphasis added). Is this, in fact, what I am doing with the generation of female terms by taking kin term products of, for example, female self with male kin terms? I need to answer this question first before continuing with my reply to his comments.

Are Female Kin Terms Generated Through a Gender-Switching Operator?

Hamberger presents two equations to express the idea of gender-switching (p. 4). The two equations – here illustrated with the English kin terms *sibling*, *brother* and *sister* rather than with symbols, and writing kin term products from right-to-left[vi] -- are:

(1) *sibling* (man speaking) of female self = *sibling* (fs)
(2) (female self) of *brother* = *sister*.

In the first equation, speaker has changed from male on the left side of the equation to female on the right side of the equation, and in the second equation alter (the person speaker refers to as

brother) has changed from male on the left side of the equation to female on the right side of the equation since alter is referred to as *sister* on the right side of the equation. This agrees with Hamberger's understanding from my text as to what is done by a gender-switch operation. However, his assertion that gender-switching "can be represented as the *kin term product* of a gendered term with the gender-switch operator," where the gender-switch operator is said to be female self, needs to be examined carefully to see if kin term products can be used to represent the idea of gender switching.

The left side of Equation (1) states (a) that speaker refers to alter A as female self and (b) that alter A refers to alter B as sibling (man speaking). From (a), it follows that alter A is speaker and is female. From (b), it follows that alter A is male. Since alter A cannot be both male and female, the expression on the left side of Equation (1) is not a valid kin term product. The left side of Equation (2) states (a) that speaker refers to alter A as *brother* and (b) that alter A refers to alter B as female self. From (a), alter A is male. From (b), alter A is alter B and so alter A is female since alter B is female. Since alter A cannot be both male and female, the left side of Equation (2) is not a valid kin term product. Thus, these two equations do not represent gender-switching through kin term products using female self.

So, what is meant by a gender-switch operator? To answer this question, replace female self by a unary operator O that distinguishes between the argument located on the left side of O or on the right side of O; that is, the operator distinguishes between ( )O or O( ), where the argument for the operator is placed between the parentheses. Define the action of the operator, O, by rewriting Equations (1) and (2) as follows:

(1*) (K (ms))O = K (fs)
(2*) $O(K_{male}) = K_{female}$,

where K is a neutral kin term, K_{male} is the male gendered form of K, K_{female} is the female gendered form of K, K (ms) is K (male speaking), and K (fs) is K (female speaking). Thus, Equation (1*) has as its input K (ms) and has as its output K (fs) (hence there has been a change in the gender of speaker) and the second equation has as its input K_{male} and as its output K_{female} (hence there has been a change in the gender of alter). This matches the description of a gender-switching operator.

The difficulty, then, is not with the idea of a gender-switching operation, but with the attempt to translate this concept into kin term products equations with female self either to the right of *sibling* (male speaking) as shown in Equation (1), or to the left of *brother* as shown in Equation (2). While gender-switching can be defined as a unary operator, taking kin term products with female self is not the equivalent of a gender-switch operator and so a gender-switch operator does not represent the logic by which female kin terms are generated in the Thongan terminology. In addition, the way I described how female terms are generated in the Thongan terminology in the text is also faulty. As noted by Trautmann and Whiteley, I incorrectly stated that *makwabu* can be interpreted as 'sister' (ms) or 'brother' (fs), whereas Junod clearly indicates that that the English translation of *makwabu* is 'sibling' for both a male speaker and a female speaker (see Table 1). I then used

this incorrect interpretation to work out how female terms such as 'daughter', 'granddaughter' and 'grandmother' are generated through kin term products of the form *makwabu* o K = L, where K is a male, lineal term, *makwabu* o K is interpreted as 'sister' (ms) o K (given the above incorrect interpretation of *makwabu*), and L will then be a female term. For example, if K = *ñwana*, then *makwabu* o K = *makwabu* o *ñwana* = 'sister' (ms) o *ñwana* = 'daughter' – but there is no Thongan kin term with translation 'daughter' and so *ñwana* cannot be the covering term for *ñwana* and 'daughter' as I claimed.

Connecting Kin Term Structures: Male Terms and Female Terms

What may have led Hamberger to interpret taking kin term products with female self as being equivalent to a gender-switch operator is the procedure by which, during the generation of the Thongan terminology, a structure of male kin terms (centered on male self) and a separate structure of female kin terms (consisting of just the term female self) are connected. In my text, I discuss introducing female terms through kin term products of female self with male kin terms and this makes it appear that the kin term product (female self) o *tatana* switches *tatana* into a female kin term. If that were the case, it would be ambiguous, as Hamberger notes, as to whether *tatana* is changed into *rarana* or into *mamana* since both are +1 generation, female terms. However, this is not what is involved. Instead, the two structures, one consisting of male terms centered around male self and the other consisting of just the female term, female self, are joined into a single structure through the female self node, from the perspective of a male speaker, being culturally transformed into a kin term relation from the perspective of male self, and the male self node, for a female speaker, being culturally transformed into a kin term relation from the perspective of

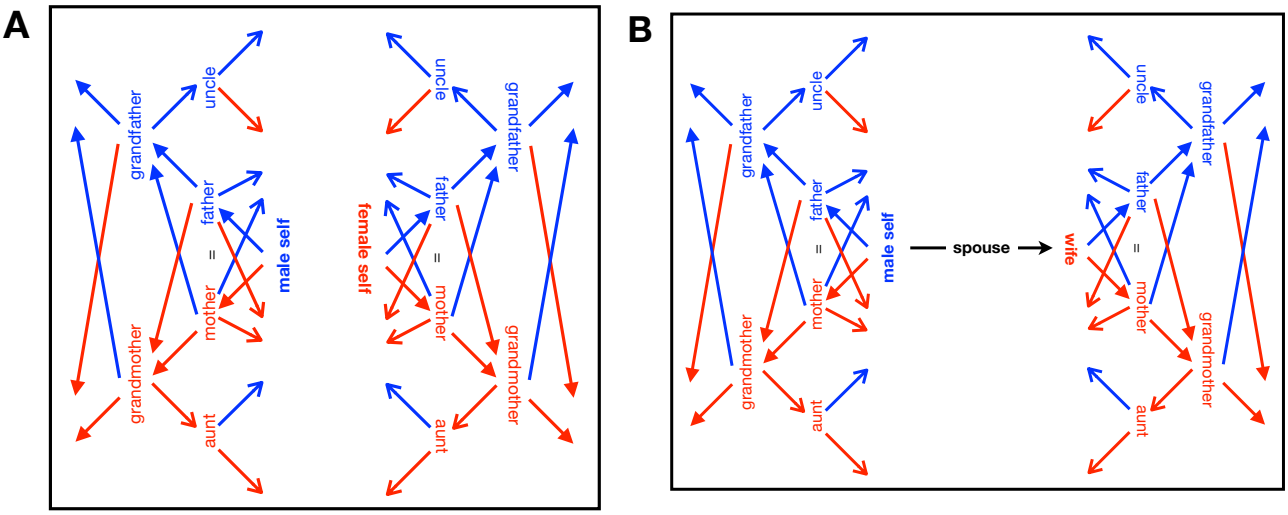

Figure 4: (A) (Left Side) Consanguineal terms of the AKT are centered on male self. (Right Side) Consanguineal terms of the AKT are centered on female self. (B) Female self has been replaced by the kin term *wife* and male self has been connected to *wife* by the kin term product equation *spouse* o male self = *wife*. Similar graph with male self replaced by *husband* and female self connected to husband by the kin term product equation *spouse* o female self = *husband* (not shown). For clarity, only nodes from the +1 and +2 generations are labelled.

female self. The cultural transformation of the female self node into a kin term from a male self perspective and the cultural transformation of the male self node into a kin term from a female self perspective are the key aspects of the procedure for joining the structure of male terms and the structure of female terms into a single structure. To illustrate what is involved when connecting two structures in this manner, consider the English and the Polynesian kinship terminologies. First, the English terminology.

AKT Terminology: Connecting Male Self and Female Self Through Marriage

Form two kin term structures by letting one structure be the consanguineal kin terms of the AKT centered on male self (see Figure 4A, Left Side) and by letting the second structure be the consanguineal kin terms centered on female self (see Figure 4A, Right Side). These two structures are structurally isomorphic, have the same kin terms for the nodes of the respective structures (except for the male self and the female self nodes), and are independent of each other in the sense that a male person instantiated as male self in the first structure does not constrain which female person can be instantiated as female self in the second structure. However, this independence is removed when marriage introduces the *spouse* relation as a way to connect the two structures into a single structure.

The two structures are connected to each other through the *spouse* relation by marriage transforming female self node into a *wife* node (that is, through marriage, female self becomes *wife* and is now connected to male self through the *spouse* relation; see Figure 4B), and transforming the male self node into a *husband* node (that is, through marriage, male self becomes *husband* and is now connected to female self through the *spouse* relation; figure not shown). Thus, marriage transforms female self into *wife* from the perspective of male self and male self into *husband* from the perspective of female self, and this may be expressed through the *spouse* relation via the kin term product equations, *spouse* o female self = *husband* and *spouse* o male self = *wife*. What were two independent structures have now become a single structure with two variants, one centered on male self with the kin term product equation *spouse* o male self = *wife* (see Figure 4B) and the other centered on female self with the kin term product equation *spouse* o female self = *husband* (Figure not shown). The consanguineal kin terms from the perspective of male self (see Figure 4A, 4B, Left Side) are now connected through the *spouse* relation (see Figure 4B) to what

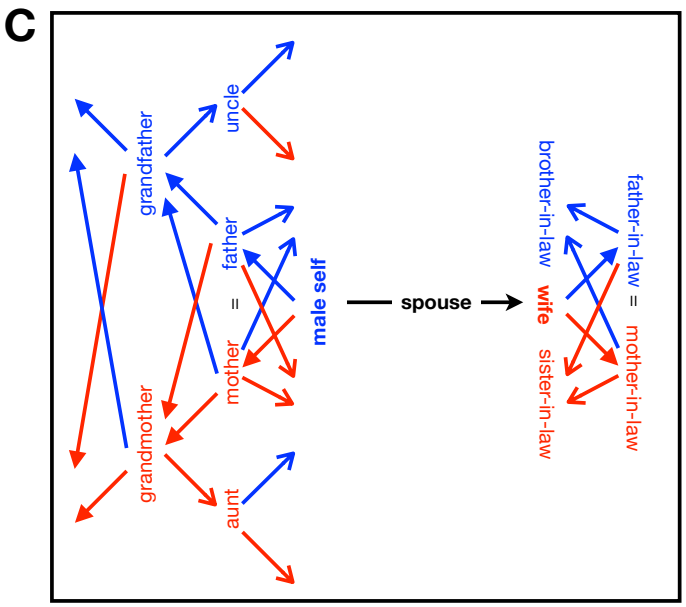

Figure 4: (C) Kin term products connecting *wife* to consanguineal kin terms and culturally recognized as kin terms have been given their affinal kin term names.

had been consanguineal relations from the perspective of female self (see Figure 4A, Right Side). A similar comment applies to the consanguineal kin terms from the perspective of female self.

Which of the consanguineal terms from the perspective of female self are culturally recognized as affinal kin terms with respect to male self are (culturally) named, and those that are not recognized as affinal kin terms with respect to male self are deleted (see Figure 4C, Right Side). The same procedure for the naming of affinal terms applies to the structure centered on female self. Since the resulting structures for male self and for female self are isomorphic and have the same kin terms, the distinction between the kin terminology structure defined with respect to male self and the kinship terminology structure defined with respect to female self can be (and is) dropped, with female self and male self replaced by self as a covering term for male self and female self, and the relevant kin term product equations become *wife* o self = *husband* and *husband* o self = *wife*, thus yielding the AKT centered on self.[vii]

Polynesian Terminologies: Connecting Male Self and Female Self Through Procreation and the Sibling Relation

An analogous procedure is carried out with the Polynesian terminologies, illustrated here with the Tongan terminology (see Figure 5A), but with the difference that the connection between the male terms and the female terms is derived through procreation marked by a life-crisis (birth) ritual that instantiates an offspring produced through procreation as occupying the child position in the Family Space (and from that position, is incorporated into the Genealogical Space through the logic of recursion, and is also incorporated into the Kin Term Space through the logic of kin term products). The female self node is culturally transformed into a kin term relation from the perspective of male self by being named (in the Tongan terminology) *tuofefine* ('sister' (ms)) (see

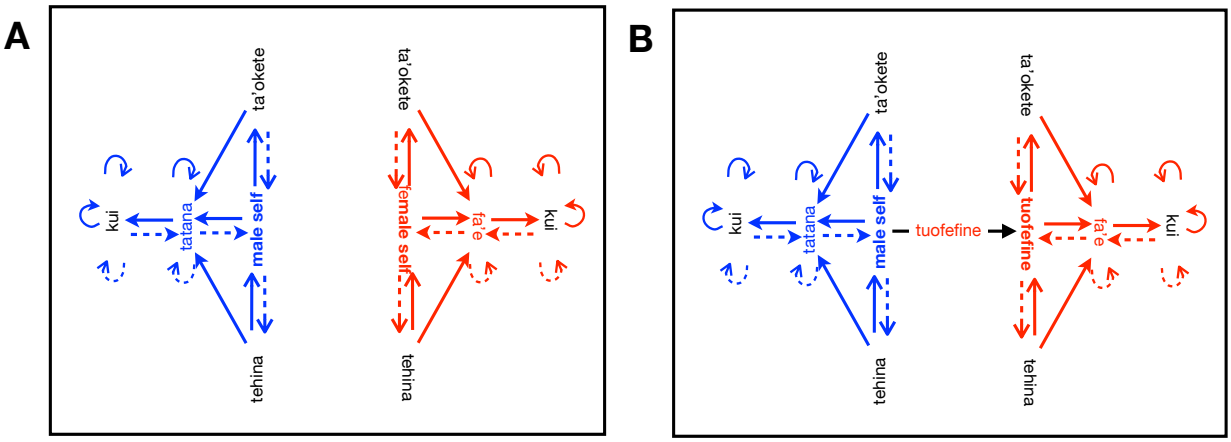

Figure 5: (A) (Left Side) Male kin terms centered on male self for the Tongan kinship terminology. (Right Side) Female kin terms centered on female self. (B) (Right Side) Female self has been replaced by *tuofefine* ('sister' (ms)) and male self has been connected to *tuofefine* by the kin term product equation *tuofefine* o male self = *tuofefine* (ms). For clarity, only the kin terms corresponding to the 0, +1 and +2 generations are shown.

Figure 5B). Similarly, the male self node is culturally transformed into a kin term relation through being named *tuonga'ane* ('brother' (fs)) (Figure similar to Figure 5B, but not shown). As with the AKT, the ascending/ descending kin terms for a female self (see Figure 5A, 5B, Right Side) are either recognized as kin terms from a male self perspective -- by being named or by being deleted -- and similarly for the ascending/descending kin terms for a male self from a female perspective (Figure not shown). For the Tongan terminology, the kin terms (female) *ta'okete* ('older same sex sibling') and (female) *tehina* ('younger same sex sibling') are not recognized as kin terms from a male self perspective (see Figure 5C, Right Side) and the kin terms (male) *ta'okete* and (male) *tehina* are not recognized as kin terms from a female self perspective (Figure not shown).

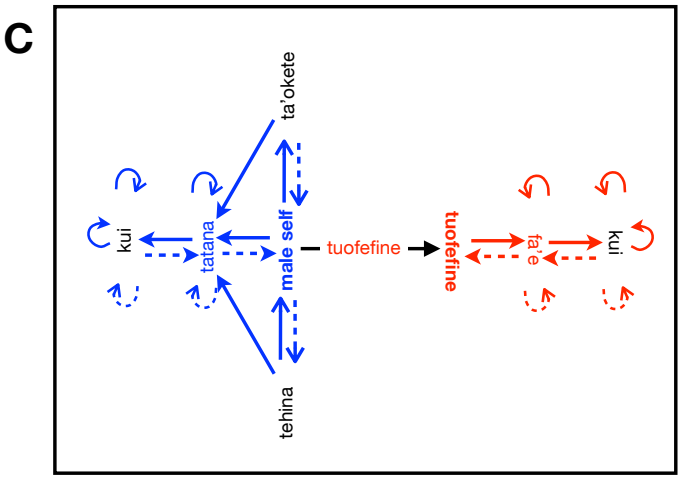

Figure 5: (C) Kin term products connecting *tuofefine* to female kin terms and culturally recognized as kin terms have been given their kin term names from the perspective of male self.

A natural question to now ask is whether the structure of male terms and the structure of female terms in the Thongan terminology can be joined together in either the manner of the AKT (that is through a generative logic that begins with neutral generating terms, as suggested by Heady, Hamberger and de Almeida) or in the manner of the Polynesian terminologies (that is, through a generative logic that is based on a set of male generating terms and a set of female generating terms)? The answer, as will now be shown, is "no", which leads to considering a different process by which female terms are introduced into the Thongan terminology.

Thongan Terminology: Cannot Connect Male Self and Female Self with Neutral Generating Terms

The preponderance of neutral terms that can be seen in Hamberger's kin term map for the Thongan terminology suggests, as Hamberger, Headley, and de Almeida comment, that the generating terms could be neutral. A set of neutral generating terms would generate a structure like Figure 3 in the text, except all of the kin terms would be neutral rather than being male terms. The male term/female term distinction could then be introduced in the manner discussed above for the AKT, namely by including a male gender marker M and a female gender marker F as generating elements in the generating set for the terminology. Male gendered and female gendered kin terms would then be introduced through bifurcation of each neutral term into a male term and a female term using the gender markers, with a neutral covering term for the male gendered term and the female gendered term. Since in all cases except *tantana*, *manana*, and *ranana*, only the covering kin term is kept as a kin term under this scenario and not the gendered forms of the kin terms, a rule would be required that deletes all gender marked kin terms except for the kin terms, *tantana*, *manana*,

and *ranana*. This rule would, however, be an *ad hoc* addition to the generating logic of the terminology since it is motivated only by the need to remove all of the generated gendered kin terms except for *tantana*, *manana*, and *ranana* and not by Junod's ethnography on the Thongan kinship system. In addition, the logic by which child of 'sister' (ms) is *ntukulu* would no longer be applicable and this would require another *ad hoc* addition to the generative logic of the terminology that also lacks cultural saliency. Thus, a formalism based on neutral generating terms can be rejected on the grounds that it would require introducing *ad hoc* procedures into the generative logic for the Thongan terminology.

Thongan Terminology: Cannot Connect Male Self and Female Self Through Male Generating Terms and Female Generating Terms in the Manner of the Polynesian Terminologies

For the Thongan terminology to have a set of male generating terms and a set of female generating terms consisting of just the term female self, the generated structure of male terms and the single female term for the generated structure of female terms can be connected in the manner discussed above for the Polynesian classificatory terminologies only if the generative logic of the Thongan terminology recognizes female self (ms) as a kin term relation and recognizes male self (fs) as a kin term relation. However, while the Polynesian terminologies have a kin term name for male self (fs) (i.e., *tuonga'ane* in the Tongan terminology) and for female self (ms) (i.e., *tuofefine* in the Tongan terminology), there is no pair of kin term names for these relations in the Thongan terminology. In addition, even if there were such kin term names in the Thongan terminology – call them 'brother' (fs) and 'sister' (ms) for the sake of argument – then corresponding to the male kin term *ñwana* ('son') there would be the female kin term determined by the kin term product 'sister' (ms) o *ñwana*, and corresponding to the male kin term *ntukulu* ('grandson') there would be the female kin term determined by the kin term product 'sister' (ms) o *ntukulu*. But neither of these two kin term products are named in the Thongan terminology, hence the kin term *ñwana* would have to be redefined as a neutral covering term for *ñwana* and 'sister' (ms) o *ñwana* in order for the terminology to have the neutral term *ñwana*. This requires introducing, however, an *ad hoc* procedure without ethnographic evidence, hence the structure of male terms and the structure of female terms are not connected in a manner comparable to the way these two structures are connected in the Polynesian classificatory terminologies.

A New Procedure for Introducing Female Terms

The fact that neither using gender markers nor using the procedure implemented for the Polynesian terminologies suffices to introduce female terms into the Thongan terminology implies that a different procedure is required. Two of Junod's ethnographic observations suggest what is needed. First, the kin term *makwabu* is 'sibling' in an absolute sense, regardless of the sex of speaker. This differs from the Polynesian terminologies where the comparable terms, *tuofefine* and *tuanga'ane*, are cross-sex sibling terms, hence specific to the gender of speaker. An alternative to male self and female self becoming cross-sex kin terms would be that *makwabu* is the cultural name for the sibling relation in the Family Space, which would make it an absolute sibling term, yet it would not be a generating term for the ascending or the descending kin terms. Instead, its status would be that of a primary term connecting the male term and the female term structures. Second, Junod

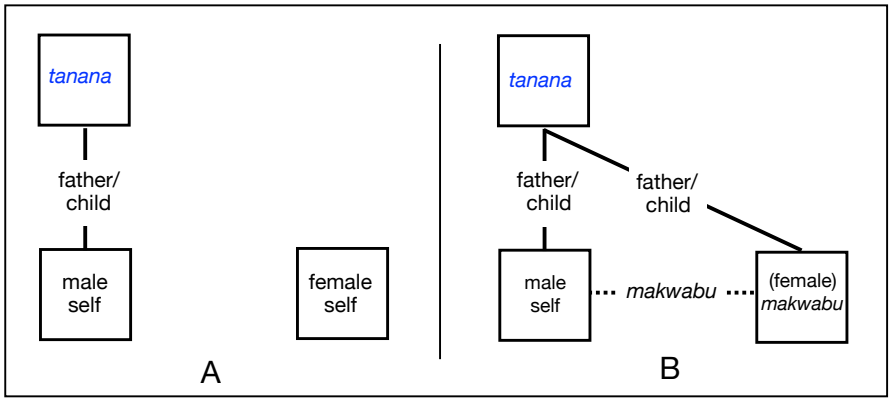

Figure 6: (A) Left side: Male self and *tanana* are the male generating terms for the terminology and are the content of the father and the child positions in the Family Space (shown by boxes) connected by the reciprocal father/child relation. Right side: The only female generating term is female self, the content of the position shown by an isolated box. (B) The two structures in (A) are connected by culturally introducing *makwabu* as the name for the sibling relation in the Family Space connecting the two child positions in (A). Thus, *makwabu* o male self = *makwabu* and, isomorphically, *makwabu* o female self = *makwabu*.

indicates that the kin term *ranana* ('father's sister') literally means female father" (p. 223). If this meaning derives from the logic of the Thongan terminology, then the term *ranana* must be generated in a manner that justifies using 'female father' as the name for this kin term.

These observations suggest that instead of joining the two structures through a cultural definition of female self as a kin term from the perspective of male self and vice-versa for male self (as occurs in the Polynesian terminologies with female self interpreted as 'sister' (ms), and male self interpreted as 'brother' (fs)), we need to consider how the structures can be joined from the perspective of the Family Space by working from the male child and the female child positions that are connected to each other through a sibling relation in the Family Space. Consider Figure 6A (left side) that shows the father position and the child position from the Family Space with content the male generating term *tanana* and male self, respectively and with these two positions connected by the father/child relation. Figure 6A (right side) shows a separate, single (hence isolated) position with content the female generating term, female self. Figure 6A corresponds to Figure 3 in the text.

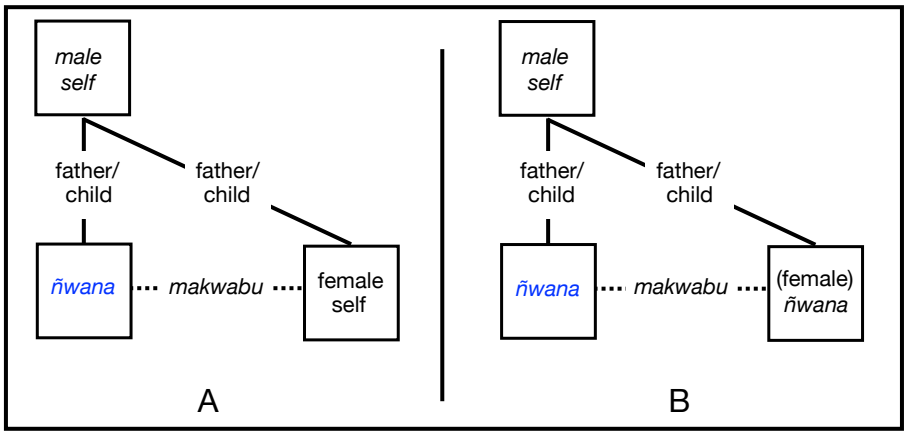

Figure 7: (A) Similar to Figure 6B, except that male self is now in the male parent position and *ñwana* is in the male child position. (B) *Makwabu* ('sibling') o *ñwana* ('son') = *ñwana* ('child') and, reciprocally, *makwabu* ('sibling') o female self = *ñwana* ('child').

Male self and female self will be terminologically linked by restricting female self, from the perspective of male self

(located at one of the child positions in the Family Space, see Figure 6A), to be the content of the other child position in the Family Space (see Figure 6A and 6B) and then culturally introducing *makwabu* as the name of the sibling relation connecting the two child positions in the Family Space. Thus, *makwabu* becomes the kin term corresponding to the sibling relation in the Family Space (see Figure 6B). In this way, *makwabu* will be the kin term used by male self for female self and reciprocally by female self for male self when male self and female self are located in the child positions in the Family Space. The male term structure and the female term structure are now connected by the kin term *makwabu*.

Kin term products with the kin term *makwabu* structurally map the lineal terms, *ñwana*, *ntukulu*, and *kokwana* to neutral forms of these terms as I discuss in my article: (1) *makwabu* ('sibling') o *ñwana* ('son') = *ñwana* ('child') and *makwabu* o female self = *ñwana* (see Figure 7A and 7B), (2) *makwabu* ('sibling') o *ntukulu* ('grandson') = *ntukulu* ('grandchild'), and (3) *makwabu* ('sibling') o *kokwana* ('grandfather') = *kokwana* ('grandparent).

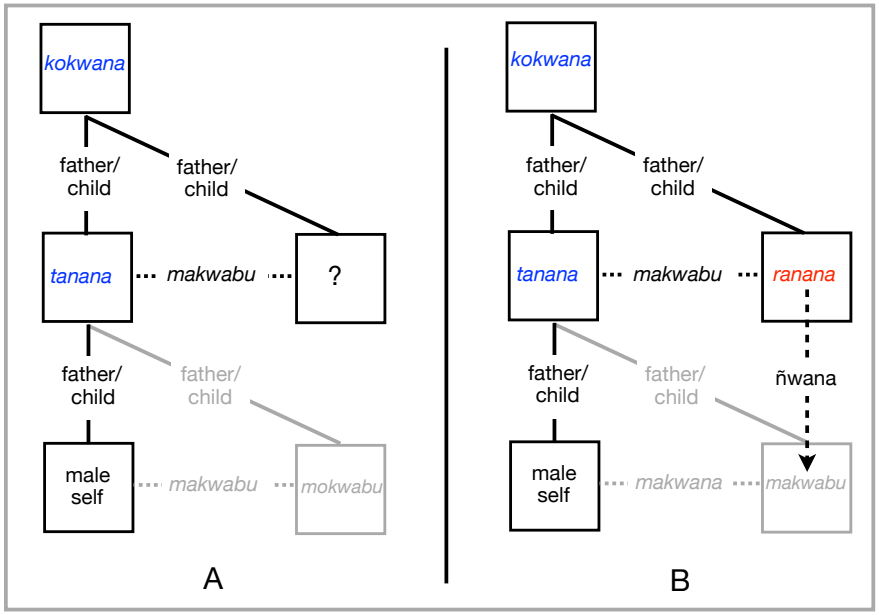

Figure 8: Graphs for determining the kin term product *makwabu* o *tanana*. (A) Lower graph in gray based on Figure 6B for male self located in child position with respect to *tanana* located in the father position in the Kin Term Space. The upper half of the graph is based on Figure 6B for *tanana* located in the child position with respect to *kokwana* located in the father position with respect to *tanana*. The "?" indicates the kin term to be determined for the kin term product *makwabu* o *tanana*. (B) The kin term product *makwabu* o *tanana* reduces to (female) *makwabu* o *tanana*, with this kin term product given the kin term name *ranana*, thus *makwabu* o *tanana* = ranana. (See text for details.) The vertical arrow showing the kin term product of *ranana* with the kin term *ñwana* ('child') has been included to show the structural analogy between *tanana* and *ranana* underlying the fact that the Thonga consider a female instantiated as *ranana* to be a "female father."

For the male term *tanana*, since *makwabu* is a neutral term, *makwabu* o *tanana* is either (male) *makwabu* ('brother') o *tanana* or (female) *makwabu* ('sister') o *tanana* (see Figure 8A, box with "?")). Since (male) *makwabu* o *tanana* = *tanana*, it follows that the only new relation introduced by the kin term product *makwabu* o *tanana* is (female) *makwabu* ('sister') o *tanana*, and the kin term product (female) *makwabu* o *tanana* becomes a kin term by being culturally named *ranana* (see Figure 8B).

In addition, as shown in the text, *ñwana* ('child') o *ranana* = *makwabu*, hence the arrow denoting a kin term product with *ñwana* goes from *ranana* to *makwabu* (see Figure 8B, right side). As can be seen in Figure 8B, *ranana* is structurally located in a manner analogous to that of *tanana*, consistent with *ranana* being considered to be like a "female father."

Part 6: The Formalism Introduced by Mauro W. Barbosa de Almeida

I appreciate Mauro de Almeida's goal of determining whether there is more than one way to represent the generative logic of the Thonga terminology, as this can increase our understanding of the logic of not only the Thongan terminology, but the Crow-Omaha terminologies in general. My comments will thus focus on clarification when the content of his comments suggests misreading of my text.

Female Self is Not a Dead End

Almeida reads my statement that female self is the only female generating term for the core structure of female terms to mean that "*female self* is not further composed with kinship terms such as '♀*mamana*♀' or '♀*tatana* ♂' … [thus,] the only possible composition is ♀*female self*♀*female self*♀ = ♀*female self*♀. The 'female self' is a dead end." This conclusion is misleading. The term, female self, may be composed with any female kin term, but in so doing, no new kin term is generated since female self is an identity element for products with female kin terms. To say that female self is the only female generating term for the core structure of female terms only means that there is no primary kin term that is a generating term for this core structure, hence the core structure of female kin terms only consists of female self. Outside of the core structure of ascending and descending kin terms there are primary affinal kin terms, namely *nsati* ('wife') and *nuna* ('husband') that add an affinal layer to the consanguineal layer of kin terms. Here, the unusual property is my assertion that *manana*, a core female terms, is generated by the kin term product of an affinal term with a consanguineal term: *nsati* o *tatana* = *manana*. So, Almeida's comment that female self is a "dead end" is only correct in the sense that no kin terms are generated from products of female self with itself, not that kin term products with female self are excluded.

Manana Is Not a Primary Kin Term

His comment brings to the surface the fact that a generating set, by its definition, must be composed of primary kin terms. That *manana* is not a primary term does not prevent the generation of a matriline of kin terms from *manana*, as Almeida observes, since kin term products may be computed with non-primary kin terms. The issue is not whether kin term products may be computed with female self, but is *manana* a *primary* kin term? For *manana* to be introduced through the kin term product *nsati* o *tanana* = *manana* implies that *manana* is *determined affinally,* rather than consanguineally. As de Almeida notes, the male terms are extended to female terms through both kin term products with female self and with *nsati* in the case of *manana* (p. 5). Relevant here is Hamberger's observation that motherhood and being a mother are not affinal concepts in African societies, along with my reply to Hamberger noting that the mother relation in

the Family Space does not depend on *manana* being a primary kin term. I would modify de Almeida's comment, then, to only state that even though *manana* is a compound term and so is not a generating term, it is still possible to form a matriline of kin terms from *manana* through kin term products of manana with itself, the kin term products of its reciprocal, *ñwana*, with itself, and from the kin term product of *manana* with *ñwana*.

De Almeida suggests that *manana* would not have a procreation meaning if it is not a primary kin term. This is not correct. *Manana* is the kin term name for the mother relation in the Family Space. Whether it is a primary term or generated from *nsati* reflects the relative importance of the *nsati* relation in comparison to the *manana* relation. To say that *manana* is generated through the kin term product *nsati* o *tatana* does not remove a procreation meaning from the kin term *manana*. Instead, it only indicates that the status of being a wife, not that of being a mother, is of primary importance in a marriage relation. This can be seen from the fact that being a barren wife does not, *ipso facto*, void the *lobola* contract. Instead, the girl's parents can simply provide another, younger wife to supplement the non-procreative wife, thus indicating that it is the spouse relation established through the *lobola* payment and the marriage ceremony that is primary to her husband, not her status as mother. As a mother, she can be replaced; as a wife, she cannot be replaced. Junod states that the *lobola* contract legitimizes a marriage, re-establishes the equilibrium lost by one family losing a daughter and the other family gaining a wife, assigns the daughter to her husband's family and makes its male members potential husbands for her through inheritance upon his death, and establishes the right of the husband (and his family) to claim her children as his children (absent the *lobola* payment, her children belong to her family) (pp. 261-263), all of which indicate that her status as mother derives from her status as wife. In addition, upon the death of a husband the widowed woman undergoes a transformation re-establishing her as a wife and erasing her status as a mother (p. 200).

Almeida brings up an important result, namely that generating the Thongan terminology from a core male structure by extending the male structure to female terms through products with female self and through the affinal term nsati, eliminates "crossness" and "affinity" as "explanatory constructs" (p. 5). However, it should be noted that, as I discuss above, crossness is an etic analytical construct imposed on terminologies, and to say that crossness in one terminology differs from crossness in another terminology is a descriptive, and not an explanatory account, absent identification of crossness as a culturally salient construct.

'Mother's Brother': *Kokwana* and *Malume*?

De Almeida shows that my argument for concluding that *ñwana* o *kokwana* = *kokwana* is circular – a conclusion also reached by Hamberger. I agree. As stated, my argument is circular since I do not provide independent evidence for asserting that *kokwana* is a boundary term, not only in the ascending direction, but also in the descending direction.

De Almeida next presents an interesting argument relating to the fact that 'mother's brother' is sometimes referred to by the kin term *malume*, with *malume* a kin term specific to this kinship

relation and other times is referred to by the term *kokwana* with its several layers of meaning and tying this to a contrast between affinal wife givers and consanguineal children producers. De Almeida begins with the two equations (here restated using my notation, and modified slightly to make clear that the two equations differ in the two ways that associativity involves the order of taking kin term products of three kin terms):

(1) male self o (*nsati* o *tatana*) = *makwabu* o (*nsati* o *tatana*) = [♂MB^+] = *kokwana*,

and

(2) (male self o *nsati*) o *tatana* = (male self o *nsati*) o *tatana* = [♂MB^-] = *malume*,

where the kin type in "[…]" indicates a genealogical kin type that de Almeida considers to instantiate the preceding kin term product.

I am unsure about the details of these two equations. I will only discuss these concerns briefly and then turn to his main point, namely that the difference between *kokwana* and *malume* when referring to 'mother's brother' hinges on whether this involves an older or a younger 'brother' with respect to 'mother'. With regard to Equation (1), it is not clear why: (a) male self changes to *makwabu* (though this may relate to my discussion regarding the way female self (ms) and male self (fs) are subsumed under the kin term *makwabu* when the structure of male terms and the structure of female terms are joined to form a single structure, but if so, male self should become *makwabu* in Equation [2] as well), (b) de Almeida assumes that the genealogical instantiation of Equation (1) involves the older 'brother' of 'mother', and (c) why the last product in the equation reduces to *kokwana* when computed in the order indicated by the parentheses. Similarly, it is not clear why genealogical instantiation of Equation (2) involves the younger 'brother' of 'mother', and why the last product in the equation reduces to *malume* when computed in the order indicated by the parentheses.

Though the details of the equations may be questionable, the main point that de Almeida is introducing does not depend on these two equations. He is opening up the possibility that the *kokwana*/*malume* pair of kin terms for mother's brother corresponds to a mother's older brother/mother's younger brother distinction, with an older/younger distinction, according to Junod, corresponding to a respectful/familiar behavior difference in Thongan social relations. A man's *kokwana* are his older kin with whom he has a respect relationship: "He [the *kokwana*] is respected for his age" (p. 227). Thus, according to this argument, *kokwana* would be used for mother's brother when a respect relation is being denoted, whereas *malume* would be used when a familiar relation is being denoted.

This could account for Junod's observation that the uterine nephew does not act towards his maternal uncle with respect (p. 227). However, Junod does not indicate that a man's *malume* is his mother's younger brother. He simply states: "The Ronga dialect makes a distinction between kokwana, maternal grandfather, and malume, mother's brother; but people often call the malume kokwana" (p. 227), and for the Thonga in the North: "the maternal grandfather and the maternal uncles, are called indiscriminately kokwana" (p. 226). Referring to *malume* as *kokwana* implies that the uterine nephew can be referred to as *ntukulu*, the reciprocal term for *kokwana*, and the pair of terms, *malume* and *ntukulu*, are used together by his informant Mboza; e.g., "'*Ntukulu* i hosi, a

nyenycla hikwapsu ku *malume'* — 'The uterine nephew is a chief! He takes any liberty he likes with his maternal uncle'" (p. 213, emphasis on ntukulu and malume added).

What is lacking, though, is any indication in Junod's ethnography that it is a relative age difference in the 'brother' that distinguishes whether a 'mother's brother' is referred to as *kokwana* or *malume*. Both the extensive use of *ntukulu* to refer to 'son' o *malume* /*kokwana* and the extensive use of *kokwana* in lieu of *malume* by the Northern Thonga (p. 226) suggest that age difference is either not a critical factor, or else this distinction only applies to the Thonga speaking the Ronga dialect. The use of *kokwana* instead of *malume* may, instead, simply be different ways to refer to the 'mother's brother' in contexts where respect or familiarity needs to be denoted. Regardless, that *kokwana* is often used in place of *malume* and the extensive use of *ntukulu* to refer to the uterine nephew rather than the term *malume* indicate that *kokwana* used in place of *malume* is not determined from the logic of the Thongan terminology, but depends, instead, on context. If so, then equally one cannot say that the use of kokwana for mother's brother stems from Lounsbury's Type III rule and the use of malume for mother's brother stems from Lounsbury's Type I rule since we would not know which rule is applicable except by context. Without independent determination of the context under which the Type I rule or the Type III rule applies, we end up with a circular argument. As de Almeida points out, this also implies that the Thonga terminology does not fit with Lounsbury's four Omaha types, which brings us back to the need to work out the underlying generative logic of the terminology rather than simply trying to subsume the Thonga terminology under one of the types identified by Lounsbury. In Part 7 of my reply, I take up the explanatory question: Is there a structural reason for why the Thongan terminology has the kin term product equation, *ñwana* ('son') o *malume* ('mother's brother') = *malume* that introduces skewing into the Thongan terminology?

Sibling and Self

De Almeida usefully brings out the fact that there is a fundamental difference between Morgan's descriptive and classificatory terminologies with regard to the concepts of *self* and *sibling*. His discussion uses the equations *self* ≠ *sibling* and *self* = *sibling* to characterize descriptive terminologies and classificatory terminologies, respectively. What, precisely, is meant by these two equations is not clear. I think what he is getting at is that in the classificatory terminologies self is included in the definition of siblings, whereas self is excluded from the definition of siblings in the descriptive terminologies. For the descriptive terminologies, siblings are the children of one's parents other than oneself. Call this Definition 1. For the classificatory terminologies, siblings are those who share the same parents. Call this Definition 2. Under Definition 1, speaker's siblings do not include speaker; under Definition 2, speaker's siblings include speaker. Another way to put it, under Definition 1, siblings are defined in a relative sense from the perspective of speaker – siblings are the children of speaker's parents other than speaker. Under Definition 2, siblings are defined in an absolute sense and speaker is included in those who are sibling to one another. Definition 1 can be taken as the meaning of de Almeida's equation, *self* ≠ *sibling* ; that is, his equation indicates that self is not included in the set of speaker's siblings. Definition 2 can be taken as the meaning of his equation *self* = *sibling*; that is, speaker is included in the set of those

who are sibling to one another. Definition 1 can also be seen as involving descent as the basis for defining the sibling relation, whereas Definition 2 invokes ascent as the basis for defining the sibling relation. This difference in perspective – whether siblings are perceived in the sense of descent or of ascent – provides the conceptual foundation for the difference in the generative logic of descriptive versus that of classificatory terminologies (Read 2007, 2011, 2015; Read, Fischer, and Chit Hlaing 2014; Leaf and Read 2012), yet the two definitions are biologically equivalent, hence from a biological perspective there is no difference between a descriptive and a classificatory terminology, yet the differences between these two kinds of terminologies are fundamental to understanding differences in human systems of social organization. Thus, attempts to subsume cultural phenomena within the biological domain and to biological explanatory frameworks are doomed to failure.

The term *self* is fundamental to kinship terminologies:

> The logical feature that is most distinctive of kinship idea-systems … is that systems of kinship ideas cannot be represented without an "I" or a self at the center. It is this precise position of self—no other—that an individual is recruited into from the fact of birth or an alternative point of recruitment such as adoption. The position of self logically entails the position of non-self, hence the possibility of identifying a relation of self to non-self. It is the duality of self and non-self that enables the perspective from which any given individual can construct a relation to another self. Conversely, in forming the relation of self to non-self one is also recognizing the possible relation of non-self to self – the foundation for the fundamental kinship notion of a relation and a reciprocal relation. In this sense, all kinship systems formally imply a speaking subject in the Kantian sense—as opposed to the object spoken of. Without this, reciprocity has no meaning and relationships cannot be formulated.
>
> As a fully articulated concept in all known kinship idea systems, this concept of self (speaker, or "my"—the person who has the relations defined) is the basis for a self-other contrast in which the other is constructed in logical opposition to the concept of self and not merely as the negation of self. (Leaf and Read 2012:98)

Accordingly, I use the term *self* in the sense of speaker referring to oneself, which leads to the conclusion that *self* is an identity element under kin term products. That is, if K is a kin term, then K o *self* = K = *self* o K, as I discuss in the text (see Endnote *iii*). If the reciprocal term, call it K^r, for a kin term K is an inverse for the kin term K under kin term products, then this means that K o K^r = self = K^r o K. This implies that under Definition 1, and using the AKT as an example, *sibling* = *child* o *parent* = *self* if reciprocal terms are inverses under kin term products. Thus, the consanguineal terms would all reduce to …, *child*^{2}, *child*, *self*, *parent*, *parent*^{2}, … and there would not be any sibling terms. For this reason, *child* is the reciprocal of *parent* but is not the inverse of *parent*. Under Definition 2, the reciprocal terms would be inverses, and so, as de Almeida discusses, *tatana* o *ñwana* = *makwabu* ('male self') = *ñwana* o *tatana* (where male self is an identity element for the kin terms tatana and *ñwana*), the kin terms generated by *tatana* and its reciprocal, *ñwana*, would just be *ñwana*^{2} = *ntukulu*, *ñwana*, *makwabu*, *tatana*, *tatana*^{2} = *kokwana* (since the terminology has the structural equations *tatana*^{3} = *tatana*^{2} and *ñwana*^{3} = *ñwana*^{2}). So

where do the sibling terms in the Thonga terminology come from? The answer is that the generating terms for the Thonga terminology also include the sibling terms *nhondjwa* ('older brother') and its reciprocal term, *ndjisana* ('younger brother'), and these are inverses since *nhondjwa* o *ndjisana* = *makwabu* = *ndjisana* o *nhondjwa*. Thus, a critical difference between the descriptive and the classificatory terminologies is that sibling is a compound kin term in the descriptive terminologies and sibling is a generating term in the classificatory terminologies. As de Almeida notes, Morgan's notion of descriptive terminologies being those that keep lineal and collateral relations distinct and classificatory terminologies being those that do not keep collateral and lineal relations distinct (which later became re-phrased as 'merging'), can be subsumed under whether reciprocal terms are inverses (classificatory terminologies) or not (descriptive terminologies), the latter can be subsumed under whether sibling terms are generating terms (classificatory terminologies) or compound terms (descriptive terminologies), and the latter can be subsumed under whether sibling terms are conceptualized from an ascent perspective (classificatory terminologies) or from a descent perspective (descriptive terminologies) (see Leaf and Read 2012 for details). Note that this sequence of ways to characterize descriptive and classificatory terminologies begins with genealogical properties, then shifts to formal criteria, and finally ends with terminological properties that can be, and have been, verified (see references in Read, Fischer and Chit Hlaing 2014).

Appendix by de Almeida

I limit my comments here to a few corrections needed in what otherwise is an informative, formal account of the core structure of male terms for the Thonga kinship terminology discussed less formally in my text (but see Leaf and Read 2012: Chapter 9 for a mathematical account of the Kariera kinship terminology).

On page 17, de Almeida states that the sequence of kinship terms generated by *tatana*, its inverse *ñwana* and the identity term male self would be:

♂*ntukulu*♂ < ♂*ñwana*♂ < ♂*nhondjwa* $^{+}$♂/♂*nidjisana*$^{-}$♂ <♂*tatana*♂ <♂*kokwana*♂

However, the sibling terms *nhondjwa* and *nidjisana* are not generated from the kin term *tatana* but are generating terms (along with *tatana* and *ñwana*) for the core structure of male terms. As I indicate above, the sequence of terms generated by *tatana* and *ñwana* is:

ntukulu < *ñwana* < *makwabu* < *tatana* < *kokwana*.

This is not a minor point, as it goes to the core of the difference between descriptive and classificatory terminologies. That the sibling terms *nhondjwa* and *nidjisana* are generating terms needs to be made explicit in a mathematical model of the male kin terms for the Thonga terminology. This means that kin term products of *tatana* and *ñwana* with *nhondjwa* and *nidjisana* must also be included in the mathematical model, as is the case in Figures 2 and 3 in my text. Critical here is assumption that the generation of a kinship terminology must take into account the

order by which different properties of kinship terminology are introduced, such as beginning the generation of the terminology with ascending kin terms and then forming an isomorphic copy of the ascending kin terms for the descending kin terms and introducing the structural equations that define reciprocity between ascending kin terms and descending kin terms. De Almeida properly draws attention to the fact that in the classificatory terminologies, one not only has reciprocity – which is modeled, for the male kin terms, by a kin term product equation of the form (ascending term) o (descending term) = male self, but inverses, meaning that (descending term) o (ascending term) = male self is also valid. Because the core structure for classificatory terminologies has inverses and not just reciprocity between ascending and descending kin terms, the core structure is a *group*; that is, an algebra with an (associative) binary product, an identity element, and an inverse for each element in the algebra. As noted above, the group structure for the male kin terms is only possible when sibling terms are generating terms, otherwise the terminology would devolve into a linear sequence of kin terms and there would be no collateral kin terms.

Beginning on page 19, de Almeida shifts from mathematical modeling of a kinship terminology such as the core structure of the male terms in the Thongan terminology to mathematical modeling of genealogical relations. He sketches out how properties of Dravidian terminologies can be expressed through genealogical equations, an approach that fits with a "rewrite" rule approach to viewing terminologies from a genealogical perspective. The difficulty I find with this approach is that one quickly loses sight of the cultural grounding of kinship terminologies through a formalism that is not culturally salient. Neither rewrite rules not crossness are culturally salient, hence while they may provide formal ways to express at least some aspects of ideas about kinship relations that are part of a kinship system, and while they make evident some aspects of the generative logic of kinship terminologies, missing is an account of that generative logic. Rewrite rules, for example assume the terms of the kinship terminology and the kernel kin type for each kin term is a given, and then provides a descriptive account of how the kernel kin types may be expanded to the full set of genealogical referents for each kin term. The rewrite rules cannot account for the differences between terminologies in the kin terms making up kinship terminologies; e.g., the rewrite rules do not account for the generative logic that leads to a descriptive versus a classificatory terminology. As de Almeida notes in his comments, the Lounsbury rewrite rules would require two different rules to be applied to account for the fact that *malume* and *kokwana* are both used as kin terms that refer to 'mother's brother', and the rules limit the notion of skewing to, for example, simply providing an expansion rule that says to rewrite MB so that MBS is included under the term *malume*, or a reduction rule that rewrites MBS as MB. What the rewrite rules have made evident, and what makes them analytically attractive, is that rules like this express not only the specific reductions (or expansions) of the kin types upon which the rule was based but can also be applied when these kin types are embedded into longer genealogical relations. The analytical success of the rules lies in making it evident that there is a logic to kinship terminologies, but they do not make evident what that logic is from a culturally salient perspective. That is worked out by determining the generative logic of a terminology in a culturally salient manner.

The problem with lack of cultural saliency for the rewrite rules was recognized by Scheffler and Lounsbury (see Scheffler and Lounsbury 1971), but never resolved for the simple reason that the

system of rewrite rules assumes that the primary data for kinship terms are their definition as genealogical categories, but that assumption is demonstrably false. This assumption is false since the genealogical categories can be predicted, in a non-circular manner, from the generative logic of a kinship terminology. The predictions are not circular since the generative logic is worked out without reference to the genealogical categories for kin terms. When we drop the genealogical assumption, and recognize that systems of kinship relations have a foundation based on a Family Space from which a Genealogical Space can be generated through the logic of recursion, and a Kin Term Space can be generated through the logic of kin term products, and these two spaces are interconnected through genealogical instantiation of the primary, generating kin terms, then the logic of the genealogical extensions that Lounsbury and Scheffler tried to work out through rewrite rules falls into place and can be given a rigorous, culturally salient foundation (see Read 2018 for details).

Instead of working from an invalid assumption, then, we need to make comparisons of kinship terminologies at the level of their generative logic, as developed here for the Thongan kinship terminology. By so doing, it became evident that the characterization of the Thongan terminology as an Omaha terminology like other Omaha terminologies is misleading – that we are dealing with whales and fish, as Trautmann and Whiteley put it – since the skewing arises through the generative logic of the terminology as a way to implement cultural ideas held by Thongan culture bearers regarding kinship and inheritance and not, as is the case for other Omaha terminologies, through the addition of skewing equations to a kinship terminology.

Part 7: Conclusion -- Why Does *Ñwana* ('Son') o *Malume* ('Mother's Brother') = *Malume*?

All of this still leaves unanswered why the Thongan terminology has the skewing introduced by the kin term product equation *ñwana* ('son') o *malume* ('mother's brother') = *malume*. To be discussed now is the evidence showing that this equation is central to the intermediary role a *malume* plays with regard to inheritance of goods (and wives) by the 'sons' of a deceased man. The role is not necessary, though, in that when a man dies his material goods will be inherited by his sons since the "sons of the deceased have the sole right to the property of their father" (p. 257). Nonetheless, as Junod discusses, the *malume*, in the form of the *ntukulu* – plays a required role in the inheritance by the 'son(s)' of a deceased male, despite the fact that the inheritance is not at issue:

> When the implements were distributed, they [the *ntukulu*] came and claimed their *tjhumba* (a technical expression, it seems, which means precisely this kind of claim lodged by a malume or a ntukulu). They were given the small assagay, the big one remaining for the son. In this way *ba nyihta pfindla, they give over the inheritance to the legal heirs*. (p. 257, emphasis in the original)

In other words, the inherited goods cannot be transmitted directly to the 'sons' – already known to be the legitimate heirs – but must first be transmitted from the deceased male to the *malume* and

then to the heirs. The *malume* acts, in effect, as an intermediary between the father and his 'sons'; that is, as an intermediary between the +generation (marked by *tatana* ['father']) and the -generation (marked by *ñwana* ['son']).

A similar pattern occurs with the inheritance of the wives of the deceased male. As already noted, the first three wives are transferred to the *ndjisana* ('younger brothers') of the deceased, the fourth wife is transferred to a uterine nephew, and a fifth wife is transmitted to the deceased man's *ñwana* ('son'). Of these three forms of transfer, inheritance of wives by the *ndjisana* follows directly from the *lobola* contract: "a woman bought [through *lobola*] belongs to the husband's family and must be inherited by his younger brothers" (p. 268). What is striking is the position of the *malume* between the 'younger brothers' and the 'sons' in the inheritance of wives. As with material goods, transmitting wives from the +generation to the -generation through inheritance does not occur without the *malume* as an intermediary. This is made explicit by Junod's informant, Viguet, who states that in the absence of 'younger brothers', the wives cannot be inherited by the 'sons', but must be inherited by the *ntukulu* (either the true 'son' of a 'son' or the 'son' of the 'sister' of the deceased) (p. 249). That the *malume* makes the transfer possible by acting as an intermediary between the +generation and the -generation is highlighted by the fact that the last step of the sequence, inheritance of wives by 'sons', cannot happen when the first step is not possible due to the deceased man not having any 'younger brothers' and so the inheritance sequence going from the +generation to the *malume* and then to the -generation cannot take place.

Further, the inheritance of a wife by a *malume* differs qualitatively from the inheritance of a wife by a 'younger brother' or by a 'son' since any children born subsequently to the *malume*'s inherited wife are not his children. Instead, all of her children belong to the family who paid her *lobola* and the *malume* is not a member of that family. However, a 'younger brother' or a 'son' is a family member and so the inherited wife adds to that family through any child she has with the 'younger brother' or the 'son'. Further, goods inherited by the *malume*, such as the small asagay, are special items the deceased man had solely for this purpose (p. 208), implying that the *malume* is not inheriting in the legal sense by which the 'sons' inherit the deceased man's material goods, but instead is carrying out a ritualized role that makes possible the transfer of goods from the +generation to the -generation through inheritance. Further, when a 'younger brother' dies, there is no ritualized inheritance in the opposite direction from a 'younger brother' to an 'older brother' and an 'older brother' can take the wife of a deceased 'younger brother' only if she cannot bear children or out of necessity when there is no one other than an 'older brother' to inherit the wife of the deceased 'younger brother' (p. 249). Altogether, then, what appears to be critical with the *malume* is not the inheritance that he receives – for this is symbolic, whether material goods or a wife – but the ritual role he plays as intermediary needed, as Junod discusses, for the inheritance to pass from the deceased man to his 'son'; that is, from the +generation to the -generation.

Junod attributes the claims made by the *ntukulu* on the goods of a deceased man – their maternal uncle – to a forgotten, past stage of matrlineality (p. 257), yet his description of how the *malume* (in the form of the *ntukulu*) make claim on the goods and the wives of a maternal uncle does not

suggest a remnant from a forgotten past, but rather appears to be ritualized behavior that the *malume* engage in, and must do, as part of the present:

> I have often been struck by the unconscious way in which they act on all these occasions! They give the impression of people who have been hypnotized and ordered to do something next day, when no longer in the mesmeric sleep. You see them accomplishing the act, constrained by a mysterious necessity and without knowing why. The hypnotising factor here is this powerful heredity … (p. 257).

Instead of attributing this behavior to a forgotten matrilineal past, consider instead the kinship categories involved in the ritualized actions of a *malume*. The *malume* is playing the role of an intermediary between (1) a category characterized by respect and corresponding to the +generation, with the latter the referent of the ascending kin terms, and (2) a category characterized by familiarity corresponding to the –generation, with the latter the referent of the descending kin terms, thereby conceptually placing these two categories in opposition to each other. The intermediary role of the *malume* is made possible by the *malume* incorporating both of the two sets of attributes for the two categories put into opposition. These sets of attributes are: (1) {+generation, respect} and (2) {-generation, familiar}. One set of attributes, {+generation, respect}, is associated with the *malume* kin term due to it being both an ascending kin term (since it is determined by the kin term product [male] *makwabu* o *manana* = *malume*) and denotes respect when *kokwana* is used as a substitute term for *malume*. *Malume* is also a descending kin term due to the skewing introduced by the kin term product, *ñwana* o *malume* = *malume*, and entails familiarity through the unconstrained behavior of the uterine nephew directed towards his maternal uncle. Thus, the *malume* kin term incorporates both the (+generation)/(-generation) contrast and the respect/familiar contrast, that enable the *malume* to be an intermediary between the +generation category and the -generation category.

This structural form of two categories in opposition with a third category combining the elements of the categories in opposition and acting as an intermediary, or mediating category, was identified from ethnographic observations made by Fadwa El Guindi (1972, 1973; see also references in El Guindi and Read 1979) as part of her fieldwork in the village of San Francisco Lachigol*ó* in the Oaxaca region of Mexico. El Guindi writes:

> Mediation is … the means by which two [conceptual] categories, otherwise unrelated, are related. The relation is provided by a mediating category and is created in several ways. Among these are defining/differentiating, in which the mediating category plays a semantic/logical role in the definition and maintenance of a structural opposition; transforming, in which it provides the conceptual locus for the change of one category into another; and linking, the linkage of one conceptual domain with another. (El Guindi and Read 1979:764)

El Guindi provides several examples of mediation structures and categories in opposition, including: (1) "cemetery" as a mediating category forming and linking the conceptual categories

"house" and "field" in opposition, (2) "*compadre*" forming a mediating category between the categories of "*caseros*" and "*consuegros*" in opposition, and (3) "marriage godmother" as a mediating category between "bride" and "groom" in opposition in the context of Zapotec weddings. Another mediation structure involving kinship relations is formed by an opposition between the mother category and the father category formed from the child category as the mediating category. The mother category and the father are linked through having a child in common and the opposition is expressed through marriage and the spouse relation (see Figure 1 in Read 2015 for details). As these examples show, the possible content for the mediation categories and categories in opposition is very broad.[viii] El Guindi observes that what is common structurally across these examples is the fact that the two categories in opposition are *closed* "in that they are well-defined, rigidly bounded, and inflexible," while the mediating category is *open* in that it "may combine opposite and contradictory characteristics" (El Guindi and Read 1979:765). Diagrammatically, her idea of a mediation structure has been modelled as shown in Figure 9, where the conceptual categories A and B are put into opposition with each other by a mediating category M that has the attributes associated with each of A and B as its attributes (El Guindi and Read 1979).

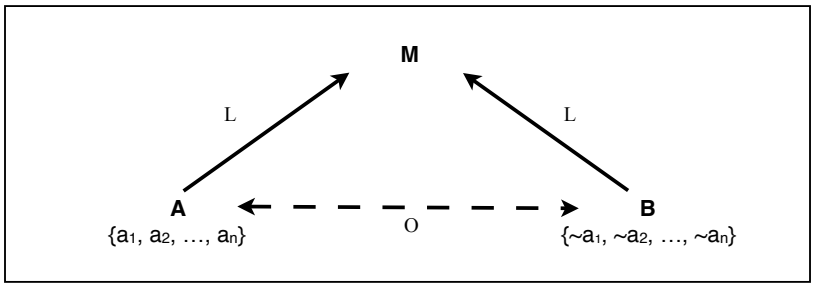

Figure 9: Mediation structure. Categories A and B are put in opposition by being linked to a third category M that has the attributes of both A and of B.

The mediation structure can be applied to the Thongan ethnographic data regarding the *malume* and the +generation and the –generation categories as follows. Let A be the +generation category (i.e., the category composed of the generations that are the referents of ascending kin terms) and characterized by the attribute, *respect*. Let B be the –generation category (i.e., the category composed of generations that are the referents of descending kin terms) and characterized by the attribute, *familiar*. Finally, let M be the *malume* category. I need to show that the A and B categories are closed; that is, they are well-defined, rigidly bounded and inflexible categories, and that the *malume* category is an open category characterized by both of the attributes *respect* and *familiar*. For the former, consider the ascending generating sibling term *nhondjwa* ('older brother') and the descending generating sibling term *ndjisana* ('younger brother'). Junod comments, with regard to these two terms, that the 'older brother' (+generation) must be treated with respect:

> The elder brother is treated with great respect … the position, of elder brother is not only a matter of age but, in the polygamic family, all the children of a first wife, or of the first house, are *tihosi* [chiefs] to the children of secondary or posterior wives or houses, though they may have been born after them. (pp. 223-224)

In contrast, the 'younger brother' (-generation) is treated with familiarity:

> Younger brothers and sisters of my wife are *balamo* or *tinamu* [those who come after; i.e., - generation], and this word implies as much ease and liberty in the relations as mukoñwana [wife's mother, wife's father, wife's elder brothers and sisters, or wife of a man's wife's brother] means respect and even fear. (p. 230)

Further, +generation and -generation are distinguished with regard to marriage:

> … there exists the strong feeling that it is altogether bad to marry a woman [+generation] and her daughter [-generation]. I fear my mother-in-law because I married her daughter. I fear my great mukoñwana because her daughters are my regular potential wives... (p. 234)
>
> an elder brother inherits his younger brother's wife only under quite exceptional circumstances. (p. 236)
>
> a woman bought [through *lobola*] belongs to the husband's family and must be inherited by his younger brothers (p. 268).

Respect is lifelong and inflexible:

> Let us hear Viguet [Junod's informant]: 'By the betrothal, as soon as you have been accepted, you enter into a new kind of respect [with regard to the wife's mother] and *you must remain in it till your death*.' (p. 230, emphasis added)

These, and other observations made by Junod, indicate that the +generation category and the –generation category are "well-defined, rigidly bounded, and inflexible."

The *malume* category matches being a mediating category. The *malume* category combines together the +generation and the -generation since (male) *makwabu* ['brother'] of *manana* ['mother', + generation] = *malume* and *malume* = *ñwana* ['son', - generation] of *malume*. The use of the term *kokwana*, as an alternative for *malume* connotes respect. As discussed in the text, the reciprocity between maternal uncle and uterine nephew implies that *ntuluku*, the male reciprocal term for *kokwana,* is another way to refer to *malume*, and the relationship of the uterine nephew to his maternal uncle is one of familiarity and not respect: "The malume, indeed, for his uterine nephew, is quite different from any other relative. No respect at all is necessary towards him!" (p. 227).

That the *malume* category mediates between the +generation category and the –generation category may be seen in inheritance. In inheritance, whether of goods or wives, movement from the deceased man (+generation, respect) to the 'son' (-generation, familiar) is made possible by the *malume* category combining together respect and familiarity. Thus, a *malume* can (symbolically) receive the inheritance since the *malume*, in the form of the maternal uncle, shares

+generation and respect with the deceased man. The uterine nephew may freely demand of the maternal uncle whatever the latter may have, so the inheritance received by the *malume* from the deceased also belongs to the uterine nephew and thus a *malume*, in the form of the uterine nephew, can deliver the inheritance to the 'son' since the uterine nephew and the 'son' share the attributes -generation and familiar. Thus, the *malume*, by virtue of the kin term product equation, *ñwana* o *malume* = *malume*, comprises the mediating category for the opposition between the +generation category with attribute *respect* and the –generation category with attribute *familiar*.

Finally, as discussed in the text, the concept of generation does not apply (except indirectly via male terms) to maternal kin terms since female self is the only generating term for the female terms. Consequently, the apparent genealogical contradiction in *malume* and *kokwana* both being kin terms used for the mother's brother, and *malume* and *ntukulu* both being terms used for the uterine nephew, with all of these terms equated through the kin term product, *ñwana* o *malume* = *malume*, disappears when it is recognized that genealogical generations are not part of the maternal terms. Instead, what is critical is the kin term product equation, *ñwana* o *malume* = *malume*, that implies *malume* is both a +generation and a -generation term and the association of *respect* with *malume* via the use of *kokwana* as an alternative kin term for referring to the maternal uncle, and the association of *familiar* with *malume* through the unconstrained behavior of the uterine nephew towards his maternal uncle. All of this makes *malume* into a mediating category conceptually linking the +generation category with the -generation category for the purposes of inheritance.

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[i] Kin terms are italicized. Male kin terms in blue font, female kin terms are in red font, and neutral kin terms are in black font. English translations of non-English kin terms are in single quotes and color coding is not used for English translations.

[ii] I excluded affinal terms since I was focusing on the first four of the following sequence of generative steps: (1) generating ascending kin terms, (2) generating descending kin terms (including reciprocity between ascending and descending kin terms), (3) forming a structure of male kin terms and a structure of female kin terms, (4) connecting the two structures in (3) into a single structure, and (5) introducing primary generating affinal terms (if any).

[iii] More precisely, suppose we did not know, from prior knowledge, that *tatana* is an ascending kin term and all we know is that it is a primary kin term. The products introduced using tatana determine that tatana is an ascending generating term. To begin with, the sequence of products using just *tatana* distinguishes *tatana* as either an ascending or a descending generating term and not a sibling term. Whether *tatana* is an ascending or a descending kin term is next determined structurally after the isomorphic generating set {male self, *ñwana*, *ndjisana*} is formed and we introduce either the structural equation *tatana* o *ñwana* = male self or *ñwana* o *tatana* = male self to define *tatana* and *ñwana* as reciprocal terms. The form of the equation defining reciprocity for male terms is (ascending term) o (descending term) = male self, so including the equation *tatana* o *ñwana* = male self then defines *tatana* to be an ascending kin term. Thus, the notion of ascending versus descending kin terms may be expressed precisely through the formalism of kin term products.

[iv] I have used the names of kin terms as the elements used to generate an algebraic structure. Strictly speaking, the algebraic structure is generated using arbitrary symbols, such as letters of the alphabet, with structural equations also expressed symbolically. Thus, when generating an algebra for the AKT, the ascending generating set could be A = {I, P}, where I is an identity element, and the isomorphic descending generating set could be D = {I, C}. The equation making P and C reciprocal elements would be P o C = I. After generating the algebra in this manner, the symbols used to generate the algebra are then mapped to the kin terms according to the structural properties of the algebra and the structural properties of the kin term map. For example, the algebra being generated for the AKT has the sequence of products P, P o P, P o P o P, … and the kin term map for the AKT has the sequence of kin term products *parent*, *parent* o *parent* = *grandparent*, *parent* o *parent* o *parent* = *parent* o *grandparent* = *great grandparent*, and so on. Thus, P is mapped to *parent*, P o P is mapped to *grandparent*, P o P o P is mapped to *great grandparent*, and so on. No assumption is made regarding which kin term corresponds to which node in the algebraic structure; rather, the mapping of kin terms to algebraic terms must be analytically determined. In the text, I have used the kin term names as generating elements for pedagogical reasons. The same idea still applies, though, namely that the algebraically generated structure, whether expressed symbolically or through kin terms, must be structurally isomorphic to the kin term map if the algebra formally represents the kin term map.

[v] Even after allowing for different conventions used to draw the two kin term maps, there are still structural differences in his kin term map in comparison to my kin term map: (1) inclusion of a 'parent' arrow from *ntukulu* to (female) *makwabu*; (2) inclusion of a 'parent' arrow from *ñwana* to *ndjisana* and to *nhondjwa*, (3) lack of a *nhondjwa* reflexive arrow from *nhondjwa* to itself, (4) lack of a *ndjisana* reflexive arrow from *ndjisana* to itself, (5) lack of a reflexive 'son' arrow from *kokwana* to itself, (6) his map presumes that both 'ascending sibling' and 'descending sibling' arrows go from *nhondjwa* and *ndjisana* to male self and female self, whereas only a 'descending sibling' arrow goes from *nhondjwa* to male self and female self and only an 'ascending sibling' arrow goes from *ndjisana* to male self and female self and (7) absence of a child arrow from *rarana* to male self and to female self. Some of these are a consequence of reducing the 'ascending sibling' and 'descending sibling' primary terms to just 'sibling'; e.g., (3) – (4) and (6). However, (1) and (2) relate to the fact that it need not be the case that a 'child' arrow in one direction must be matched by a 'parent' arrow in the other direction. The inclusion of the 'parent' arrows in (1) implies that 'parent' of *ntukulu* is either (female) *makwabu* or *ñwana*, but no justification is given as to why this kin term product would be multi-valued. Similarly, (2) implies that 'parent' o *ñwana* is either *ndjisana*/*nhondjwa* or *makwabu*, and again to justification is given as to why this kin term product would be multi-valued.

[vi] Hamberger wants to write kin term products from left-to-right, which leads to phrases such as "brother's sister," as a statement about kin terms. However, the phrase would be exactly the same if brother and sister are kin types, and the phrase also suggests that a kin term, which is an inanimate object, can own a kin term. Writing the kin term product as "*sister* of *brother*" for the kin term product, *sister* o *brother*, and "brother's sister" for the genealogical sister of genealogical brother (a relative product) helps keep clear that kin term products involve kin terms, not genealogical relations.

[vii] Read (1984) used the procedure outlined here to introduce the affinal structure through marriage. Subsequently, when writing the computer program KAES, Read found that the affinal structure could be generated directly by introducing an affinal generator, and that is the procedure implemented in KAES and is the procedure used for the AKT in publications subsequent to Read (1984), with the exception of the Dravidian terminologies where it became necessary to return to this procedure to account for the affinal terms in the Dravidian terminologies. This shift made it apparent that (as argued by Dumont 1953) there is an opposition between a consanguineal structure centered on self and an affinal structure centered on spouse, an opposition formed by connecting, through marriage, a terminology centered on male self to a terminology centered on female self (see Read 2010 for details).

[viii] Read (2011) discusses how the mediation structure defined by El Guindi also models the opposition between the negative whole numbers and the positive whole numbers with 0 as the mediating category, an opposition whose logic, including the crucial role of 0 in defining the opposition, was worked out by the Indian mathematician Brahmagupta (b. 598–d. 670) using the concepts of debt and fortune.