

Introduction: Spatial conceptualization in Mayan languages¹

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The relationship between language and spatial cognition has long been a focus for work that attempts to elucidate the connection between semantic representations and underlying conceptual structure.² Recently, the area has become one of intense activity, with a number of key articles, books, research projects, and international conferences.³ All this activity only makes manifest how little we actually know about the way in which languages of different stocks treat spatial distinctions, and specifically what kinds of semantic parameters are actually used in spatial description in different kinds of context across the languages of the world. In this special issue we turn to one particular language family, which is noted for displaying a certain exuberance in spatial distinctions. And what we find in this one language family challenges assumptions about what is universal in spatial language and conception.

1. Spatial traits in Mayan and the wider Mesoamerican linguistic area

Preoccupation with spatial parameters in semantics is an intriguing feature of the Mayan languages. The same preoccupation also appears in languages of different families in the Mesoamerican linguistic area. The notion of a linguistic area, as described by Emeneau (1956), seems to have exceptionally clear application to the languages of Mesoamerica (Campbell et al. 1986), where a number of linguistic features are shared across the dozen or so language families there represented. Among the most important of these features are those associated with what appears to be spatial meanings (de León and Levinson 1992), including the body-part systems, which display many semantic calques across linguistic stocks. Even when universal tendencies are properly taken into account, the Mesoamerican pattern seems distinctive (cf. Stolz and Stolz 1993). Research on such body-part systems has suggested that a preoccupation with the specificities of space and shape might be a general characteristic

of the area (cf. Friedrich 1969; Brugman 1984; MacLaury 1989; Levy 1992).

In any case, regardless of the wider linguistic area, the same spatial preoccupations have long been noted within the Mayan language family (see especially England 1978). Considerable attention has been given to a variety of form classes, which right across the languages of the family seem (at least at first sight) to be closely associated with spatial meanings: classifiers (Berlin 1968; Miram 1983; de León 1988; Lucy 1992), body-part nominals (de León 1992), relational nouns (noted in many grammatical descriptions, e.g. England 1983), positional roots (Martin 1977; Laughlin 1975), and motion verbs (Aissen 1987; Haviland 1991). Papers in this issue address each of these form classes, except the classifiers (which are in many cases derived from roots of other classes, including positionals).

This special issue takes this spatial theme a stage further, questioning some of the assumptions, providing evidence for others, but above all enriching the literature with relevant details from a number of Mayan languages, selected from the Tzeltalan and Yucatecan branches of the family.

2. Themes in this issue

How should we proceed to explore and document the apparent spatial exuberance of Mayan? The authors of the papers in this issue essentially concur that one should examine the notional content of specific form classes, but their methods differ considerably beyond that. One approach suspends judgment on specifically “spatial” conceptualization and concentrates instead on isolating form classes in particular languages using a wide spectrum of formal characteristics, only then turning to examine the resulting notional categories. Another approach details specific domains of seemingly “spatial” phenomena in a given language, trying to catalogue the formal devices that permit their expression. From the resulting collection of papers there emerges the first outlines of a general treatment of spatial distinctions in the Mayan family (at least as exemplified by the two branches of that family treated). Let us take these two complementary approaches in turn.

2.1. *The relation of form class to semantic class in Mayan roots*

The lexicon of Mayan languages is made up of relatively few roots, on the order of two or three thousand, from which the whole vocabulary is

projected by means of powerful derivational processes, to the order of say 30,000 stems with documentable uses.⁴ The tradition in Mayan lexicography, preserved in Mayanist terminology, is that some of the root classes in Mayan languages are specifically concerned with, or specialized to, spatial matters.

Take, for example, the so-called “positional roots.” As far as we know, every Mayan language exhibits a class of roots that can be identified as belonging to this class, at least on a historical basis. “Positional” roots are typically characterized by (a) being of no determinate stem class (i.e. not forming a stem without further derivation), (b) being associated with semantic distinctions that often involve shape, position with respect to some “ground,” disposition of parts with respect to a whole, overall configuration of parts making a Gestalt, and so on. The name “positional” derives from these associations (Kaufman 1963; Norman 1973; Martin 1977).

Now on close examination things are not so simple, as the paper by Haviland on Tzotzil roots in this volume makes clear. First, the morphological criteria for positional roots (specific stem-forming possibilities) may be failed by roots that seemingly meet the semantic criteria. Second, those roots that do pass the morphological tests display semantic contents more varied and complex than earlier discussions suggest, including, for example, the size of specific objects, qualities of substance, surface, or consistency, specific orientations and angles, etc. Haviland advances a finer-grained morphological analysis of root types that may restore a coherent association between form class and more detailed semantic class.

Although in the Yucatecan languages positionals appear to be a less numerous and important root class than in Tzeltalan languages, Lucy’s paper shows that they can also be identified in Yucatec and have the same associations with orientation, posture, shape, and position. Like Haviland, Lucy attempts to extract the full set of verb classes in the language, but in Yucatec the criterial verbal morphology interacts in a complex way with aspect and split-ergativity. Lucy reanalyzes the Yucatecan root classes and identifies two underlying kinds of intransitives, one with agent focus and one with patient focus (comparable to the distinction between unergative and unaccusative verbs in more familiar languages). Lucy’s approach seems to yield an elegant unified account of the complex Yucatec interaction between case marking, aspect, and root class. It is the patient-focus class of roots that one might on presumptive grounds call the “motion verbs” (cf. Haviland 1991), thus associating it with a spatial category. Lucy argues instead that the notional class is more abstract and corresponds to a semantic class referring to “state changes,” and so including verbs of awakening, ceasing, learning, etc.,

as well as putative verbs of “motion.” Indeed, he argues that this verb class (unlike the positionals) has no natural class of specifically spatial notions associated with it at all.

By contrast Aissen examines the class of 14 verbs in Tzotzil that can act as auxiliaries: these are all, with one exception, motion verbs, that is, when used as main verbs they denote paths, abstracted from, for example, manner (Haviland 1991). Aissen shows that auxiliary verbs constitute a genuine grammatical category of function words, which lack normal verbal argument structure. This accounts for their peculiar behavior under, for example, passivization. She then turns to some recent typological work,⁵ which suggests that there is a general grammaticalization pattern observable across all the Mayan languages, linking main “motion” verbs to auxiliaries and directionals. She accounts for such a pattern in terms of loss of argument structure and progressive lexical incorporation.

Comparison of the papers by Aissen and Lucy raises interesting questions about the correlation of form class and semantic class. There is one verb in Aissen’s auxiliary class that is clearly not, in its main verb usages, primarily a “motion verb”: *laj* means ‘finish’. Is the overall class really a subclass of “change of state” verbs as Lucy might suggest? Or is ‘finish’ to be assimilated to motion verbs, with an underlying notion of path, as suggested in much recent semantic work (see e.g. Jackendoff 1983)?

Although it may not always be profitable to seek coherent semantic classes behind every form class, some recent developments in linguistic theory suggest that learning a language must nevertheless involve just such a search (Pinker 1989). Otherwise, it seems impossible to explain how children, for the most part correctly, assimilate verbs to the syntactic classes that govern their morphosyntactic potentialities, in advance of direct evidence for the generalization and in the absence of correction of mistakes. The analyst may then profitably proceed in the reverse direction, using morphosyntactic classes as a clue to the underlying semantic classes (Levin 1993). Such a procedure may be essential when working on “exotic” languages that have not been well described, for which native-speaker linguists are not available, and about which a priori assumptions about the nature of potential semantic classes are suspect from the start. The papers by Haviland and Aissen show how this can be done using morphological and syntactic criteria respectively. Lucy’s paper, using both kinds of criteria, demonstrates how one then ends up with less familiar semantic categories, but ones more firmly based in the structure of the language itself.

2.2. *How Mayan languages carve "space" up*

It is inevitable, given the strength of linguistic research on the major European languages, that an initial approach to languages of other stocks is through categories that seem natural in familiar languages. Thus the prepositions and motion verbs of English or German or French suggest a search for the "spatial vocabulary," and for subordinate semantic fields specialized to motion or location, and within location to, for example, "topological" (cf. 'in', 'on', 'at') vs. "projective" (cf. 'behind', 'left of', etc.) spatial notions.

The papers in this issue suggest that Mayan languages do not "carve up" the relevant semantic fields in the same way. We have already mentioned Lucy's argument that the category we might on presumptive grounds call "motion verbs" really corresponds to a more abstract notional category, and he goes on to challenge more generally the search for a "spatial vocabulary." Brown's paper details just how fundamental the misfit is between the English-based expectation of a set of topological relators (like 'in' and 'on') and Tzeltal predicates that might be used to translate such notions. She argues that one looks in vain for correlates of English spatial prepositions; instead one finds in Tzeltal an elaborate specification of shape and configuration encoded in verbal roots, which serves to indicate, often indirectly, the spatial relationship between referent and relatum (or figure and ground).⁶ Tzeltal answers to 'where is it?' questions are not different in kind from answers to questions of the sort 'how does it look?'. And whereas in English specifications of containment or support are fractionated out into a spatial vocabulary, namely prepositions like 'in' or 'on', in Tzeltal these are either built into highly specific verbal roots as part of a complex meaning or are only indirectly implied by that meaning.

Haviland examines these kinds of verbal roots in the closely related language Tzotzil. Mayanists expect verbal roots of three categories: intransitive, transitive, and positional, on the basis of their ability to function as verbal stems with minimal derivation. Haviland shows that derivational criteria when strictly applied yield a seeming multitude of root types, many of which cross-cut the transitive, intransitive, and positional categories. Pursuing these subcategories, he explores their notional content. Positional roots by these criteria number at least 274, thus forming about a third of all verbal roots; they can be subdivided into minor form classes with associated notional content: for example, there is one class devoted to the description of shape, another to the position or disposition of the subject. The lexical preoccupation with

visual and spatial distinctions correlates with a cultural expectation for a spatially rich description.

Levinson analyzes another kind of lexical class in Tzeltal, which shows a similar “visual” preoccupation with precise shape specification, namely the “body-part terms,” which have special spatial uses. At first sight these seem familiar enough: notions like ‘face’, ‘back’, ‘sides’, etc., used to designate facets of objects, which can then be used in spatial description. And the grammaticalization literature suggests a universal tendency for these to evolve by metaphor into forms akin to English spatial prepositions (see Traugott and Heine 1991; and de León 1992 re Tzotzil). But the Tzeltal system falsely suggests such familiarity. There is a kind of semantic “bleaching,” but it is toward object-internal geometry, not projective spatial regions. In fact the system is a way of partitioning objects into their parts purely on the basis of shape, not by any metaphor based on orientation, and instead of generalizing to describe regions around objects the system is largely restricted to denoting object parts (and is thus only useful for describing the whereabouts of objects in contiguity). The way the system works makes an interesting contrast to other Mesoamerican systems, where orientation often appears to be basic and the derived concepts more “prepositional” in character (see e.g. MacLaury 1989).

In fact Tzeltal, and the sister language Tzotzil, have only one preposition, used for many functions beyond the spatial. Neither language makes available a system of deictic ‘front’, ‘back’, ‘left’, ‘right’ distinctions (Brown and Levinson 1992, 1993b; Levinson and Brown 1994). How then does one specify where things are? One important method is by the use of terms indicating fixed bearings, something like our cardinal directions. We know something about the importance of such “cardinal direction” terms in adult spatial description (Brown and Levinson 1993a; Haviland 1992), and their predominance appears to have a profound “Whorfian” effect on nonverbal spatial cognition (Brown and Levinson 1993b). But such an abstract non-egocentric system of spatial coordinates raises important questions about language acquisition: how does a child acquire such an abstract concept as, for example, “west,” not to mention the underlying dead-reckoning that will give it constant reference? The paper by de León contains some real surprises: Tzotzil children seem to have acquired the rudiments of the system by five years of age, although a true abstraction of cardinal directions may not appear until age nine. Many languages around the world utilize cardinal direction systems instead of front/back/left/right notions, yet this is probably the first study of the acquisition of such a system. It suggests one important conclusion for theories of the development of cognitive capacities: contrary to most

modern assumptions, cognitive development may be language-led and partially driven by language-specific properties.

Putting together the information about positionals, body parts and fixed-bearing systems that we have for the Tzeltalan languages suggests the following hypothesis for the Mayan languages generally. Any typology of spatial systems in language will need to distinguish between coordinate systems, or “frames of reference” as they are known in the psychological literature on spatial cognition. It appears (Levinson i.p.) there are three main families of such systems, which we may call the *intrinsic*, the *relative*, and the *absolute*, which can be partially identified with the more familiar distinctions intrinsic (or object-centered), deictic (or ego-centered), and geocentric (or environment-centered). The distinctions label coordinate systems that are derived, respectively, from the axes or facets of objects (intrinsic), the egocentric axes of the viewer (relative), and arbitrary fixed coordinates as in cardinal directions (absolute). The hypothesis with respect to Mayan suggested by the papers here is that relative coordinate systems (like our ‘front’, ‘back’, ‘left’, ‘right’) are absent or at least nonprominent, and that the heart of the spatial system is intrinsic, supplemented with absolute fixed bearings. This might help to explain the preoccupations with object shape and position, distinctions pertinent to intrinsic systems.⁷

No survey of spatial language would be complete without attention paid to deixis. There are good reasons for expecting universal patterns here, grounded in the nature of the speech situation, but there may be a typically Mayan slant here too. Danziger examines the deictic system of Mopan, a language closely related to Yucatec. She finds that the locative adverbs, demonstratives, presentatives, and so on form a coherent system, based on association between first, second, and third persons, with the second person form playing an important functional role, for example to introduce new nonvisible but copresent referents. The distinction between mode of apprehension is also crucial to the third person demonstratives, which have both “realis” and “irrealis” forms according to the mode of perception of the referent, visual or auditory. Danziger goes on to show that the association between mode of perception and spatial distinctions is more far-reaching than it first appears, predicting quite generally the forms used for new introduction of referents vs. anaphoric reference. This analysis makes sense of otherwise puzzling native exegesis and agrees with the conclusions of Hanks’s (1990) thorough study of the rather different Yucatec system. Future studies of deixis in other Mayan languages may show that this emphasis on modes of perceptual access, combined with spatial information, is an important general feature of the languages.

3. Conclusion

As mentioned at the outset, there is a great deal of current interest in spatial language, and its connection to underlying spatial cognition. Most of this work is based on familiar European languages. It is clear that we need much more information from other language families before current speculations can be firmly grounded. For example, a number of the papers here take issue with the idea, advanced by Landau and Jackendoff (1993), that an underlying neurophysiological distinction between a 'what' system (concerned with e.g. object shape and identity) and a 'where' system (concerned with object location) should have direct reflection in different linguistic subsystems, one dealing with object shape and identity (e.g. names for common objects) and another with spatial locations (e.g. prepositions expressing spatial relations abstract over shapes). Certainly at first sight Mayan languages are hard to reconcile with that claim: nouns tend to label the "stuff" from which objects are made, not shapes, and the shape specifications are located in relators like positional verbs and body parts. This linguistic separation of substance and form is thorough-going and seems to correlate with aspects of nonlinguistic cognition (Lucy 1992). A more careful specification of the hypothesis, and of the apparently refuting data, may yet lead to reconciliation, but the point is that any such speculations can only be tested when we have a great deal more of the relevant information from other language families. Perhaps this collection of essays will prompt such further endeavors.

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Notes

1. Some of the papers here collected derive from presentations to the conference "Space in Mayan languages," held at the Max Planck Institute for Psycholinguistics, Nijmegen, the Netherlands, February 1992.
2. See, in addition to the "localist" (e.g. Anderson 1971) and "cognitive linguistics" (e.g. Langacker 1987) movements, such work as Miller and Johnson-Laird 1976, Jackendoff 1983, Jarvella and Klein 1982, Weissenborn and Klein 1982, Herskovits 1986.
3. See e.g. Svorou 1994, Bloom et al. (i.p.), Dirven and Pütz (in prep.), Landau and Jackendoff 1993, Eilan et al. (1993). Conferences devoted to this theme were held in Nijmegen (November 1993), Tucson (March 1994), Duisburg (March 1994).
4. These figures are based on Laughlin's (1975) dictionary of Tzotzil, by far the most exhaustive and most careful compilation for any Mayan language.
5. Unpublished work by Roberto Zavala and Colette Craig, University of Oregon.

6. The authors use a variety of terminology to distinguish the object whose location is at stake (the figure, referent, theme, trajector) from the object with respect to which the location will be specified (the ground, relatum, landmark).
7. There are to be sure other factors involved. Given that nominals in Yucatecan or Tzeltalan often denote substances rather than objects, objects have to be individuated through shape specifications in classifiers or predicates (see Lucy 1992, and concluding paragraph to this essay).

References

- Aissen, Judith (1987). *Tzotzil Clause Structure*. Dordrecht: Reidel.
- Anderson, John M. (1971). *The Grammar of Case: Towards a Localist Theory*. Cambridge: Cambridge University Press.
- Berlin, Brent (1968). *Tzeltal Numeral Classifiers*. Berkeley: University of California Press.
- Bloom, Paul; Garrett, Merrill; Nadel, Lynn; and Peterson, Mary (i.p.). *Language and Space*. Cambridge, MA: MIT Press.
- Brown, Penelope (1991). *Spatial Conceptualization in Tzeltal*. Cognitive Anthropology Research Group Working Paper 6. Nijmegen: Max Planck Institute.
- ; and Levinson, Stephen C. (1992). Left and right in Tenejapa: investigating a linguistic and conceptual gap. *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung* 46, 590–611.
- ; and Levinson, Stephen C. (1993a). Uphill and downhill in Tzeltal. *Journal of Linguistic Anthropology* 3(1), 3–45.
- ; and Levinson, Stephen C. (1993b). *Linguistic and Non-Linguistic Coding of Spatial Arrays: Explorations in Mayan Cognition*. Cognitive Anthropology Research Group Working Paper 24. Nijmegen: Max Planck Institute.
- Brugman, Claudia (1984). The use of body-part terms as locatives in Chalcatongo Mixtec. *Survey of California and Other Indian Languages* 4, 235–290.
- Campbell, Lyn; Kaufman, Terrence; and Smith-Stark, Thomas (1986). MesoAmerica as a linguistic area. *Language* 62(3), 530–570.
- de León, Lourdes (1988). Noun and numeral classifiers in Mixtec and Tzotzil: a referential view. Unpublished Ph.D. dissertation, University of Sussex.
- (1992). Body-parts and location in Tzotzil: a case of grammaticalization. In *Spatial Description in Mesoamerican Languages*, Lourdes de León and Stephen C. Levinson (eds.). Special issue of *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung* 45(6), 570–589.
- ; and Levinson, Stephen C. (eds.) (1992). *Spatial Description in Mesoamerican Languages*. Special issue of *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung* 45(6).
- Dirven, René; and Pütz, Martin (eds.) (forthcoming). Language and space. In *Proceedings of the LAUD Conference on Language and Space, Duisburg, March 1994*.
- Eilan, Naomi; McCarthy, Rosaleen; and Brewer, Bill (1993). *Spatial Representation. Problems in Philosophy and Psychology*. Oxford: Blackwell.
- Emeneau, Murray (1956). India as a linguistic area. *Language* 32, 3–16.
- England, Nora (1978). Space as a Mam grammatical theme. In *Papers in Mayan Linguistics*, Nora England (ed.), 225–238. Columbia: University of Missouri Press.
- (1983). *A Grammar of Mam, a Mayan Language*. Austin: University of Texas Press.
- Friedrich, Paul (1969). On the meaning of the Tarascan suffixes of space. *Memoir* 23:

- Indiana University Publications in Anthropology and Linguistics. Supplement to *IJAL* 35(4).
- Hanks, William (1990). *Referential Practice: Language and Lived Space Among the Maya*. Chicago: University of Chicago Press.
- Haviland, John B. (1991). *The Grammaticalization of Motion (and Time) in Tzotzil*. Cognitive Anthropology Research Group Working Paper 2. Nijmegen: Max Planck Institute.
- (1992). *Projections, Transpositions, and Relativity*. Cognitive Anthropology Research Group Working Paper 3. Nijmegen: Max Planck Institute.
- Herskovits, A. (1986). *Languages and Spatial Cognition*. Cambridge: Cambridge University Press.
- Jackendoff, Ray (1983). *Semantics and Cognition*. Cambridge, MA: MIT Press.
- Jarvella, Robert J.; and Klein, Wolfgang (1982). *Speech, Place and Action: Studies in Deixis and Related Topics*. New York: Wiley.
- Kaufman, Terrence (1963). Tzeltal grammar. Unpublished Ph.D. dissertation, University of California, Berkeley.
- Landau, Barbara; and Jackendoff, Ray (1993). 'What' and 'where' in spatial language and spatial cognition. *Behavioral and Brain Sciences* 16, 217–265.
- Langacker, Ronald (1987). *Foundations of Cognitive Grammar*. Stanford: Stanford University Press.
- Laughlin, Robert M. (1975). *The Great Tzotzil Dictionary of San Lorenzo, Zinacantan*. Washington, D.C.: Smithsonian Institution.
- Levin, Beth (1993). *English Verb-Classes and Alternations: A Preliminary Investigation*. Chicago: University of Chicago Press.
- Levinson, Stephen C. (i.p.). Frames of reference and Molyneux's question. In *Language and Space*, P. Bloom et al. (eds.). Cambridge, MA: MIT Press.
- ; and Brown, Penelope (1994). Immanuel Kant among the Tenejapans. *Ethos* 22(1), 3–41.
- Levy, Paulette (1992). Body-part prefixes in Papantla Totonac. In *Spatial Description in Mesoamerican Languages*, Lourdes de León and Stephen C. Levinson (eds.). Special issue of *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung* 45(6), 530–542.
- Lucy, John (1992). *Grammatical Categories and Cognition*. Cambridge: Cambridge University Press.
- MacLaury, Robert (1989). Zapotec body-part locatives: prototypes and metaphoric extensions. *IJAL* 55(2), 119–154.
- Martin, Laura (1977). Positional roots in Kanjobal (Mam). Unpublished Ph.D. dissertation, University of Florida.
- Miller, George; and Johnson-Laird, Philip (1976). *Language and Perception*. Cambridge: Cambridge University Press.
- Miram, Maria (1983). Numeral classifiers in Yucatekischen Maya. Unpublished Ph.D. dissertation, University of Hamburg.
- Norman, William (1973). Positional and transitive verb roots in Quiche. Paper presented to the American Anthropological Association meetings, New Orleans.
- Pinker, Steven (1989). *Learnability and Cognition*. Cambridge, MA: MIT Press.
- Stolz, Christel; and Stolz, Thomas (1993). Universal and areal components of grammaticalization. Part I: Preliminary hypotheses. *Arbeitspapiere des Projektes "Prinzipien des Sprachwandels"* 19.
- Svorou, Soteria (1994). *The Grammar of Space*. Amsterdam: Benjamins.
- Traugott, Elizabeth; and Heine, Bernd (eds.) (1991). *Approaches to Grammaticalization*. Amsterdam: Benjamins.
- Weissenborn, Jürgen; and Klein, Wolfgang (eds.) (1982). *Here and There*. Amsterdam: Benjamins.