

# The INs and ONs of Tzeltal locative expressions: the semantics of static descriptions of location<sup>1</sup>

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## *Abstract*

*This paper explores how static topological spatial relations such as contiguity, contact, containment, and support are expressed in the Mayan language Tzeltal. Three distinct Tzeltal systems for describing spatial relationships — geographically anchored (place names, geographical coordinates), viewer-centered (deictic), and object-centered (body parts, relational nouns, and dispositional adjectives) — are presented, but the focus here is on the object-centered system of dispositional adjectives in static locative expressions. Tzeltal encodes shape/position/configuration gestalts in verb roots; predicates formed from these are an essential element in locative descriptions. Specificity of shape in the predicate allows spatial relations between figure and ground objects to be understood by implication. Tzeltal illustrates an alternative strategy to that of prepositional languages like English: rather than elaborating shape distinctions in the nouns and minimizing them in the locatives, Tzeltal encodes shape and configuration very precisely in verb roots, leaving many object nouns unspecified for shape. The Tzeltal case thus presents a direct challenge to cognitive science claims that, in both language and cognition, WHAT is kept distinct from WHERE.*

## **1. Introduction**

### *1.1. Object shape and spatial relations: some putative universals*

This paper discusses the nature of locative descriptions of static spatial relations in Tzeltal, taken very generally as answers to 'where' questions. That is, we shall be examining Tzeltal statements that predicate where some object (the figure) is located, in relation to some reference place or object (the ground), focusing specifically on the question of what is the role, if any, of the so-called topological primitives such as containment and support in such descriptions. Thus we shall be examining how Tzeltal

handles topological relations like those expressed in English as 'the man is in the doorway', 'the apple is in the bowl', 'the bowl is on the table', 'the picture is on the wall'.

The overall aim is to confront some of the claims for universals of spatial representation posed by cognitive scientists, on the one hand, and by students of language acquisition, on the other, with evidence from a language whose portrayal of spatial representations seems to be radically divergent from the received views.

Take for example the work of Jackendoff (1983, 1987; Landau and Jackendoff 1993), who makes a strong and persuasive claim that spatial language is closely aligned with spatial cognition and is analyzable in terms of the visual representation model of Marr and Biederman (Marr 1982; Biederman 1987). This at first sight is an attractive model for understanding the highly visual nature of a language like Tzeltal, and indeed, Levinson (1992b, this volume) develops an analogous analysis for the Tzeltal system of body-part locatives. However, Landau and Jackendoff (1993) go on to argue that there is in general a division of labor in language corresponding to one in cognition, such that, in both systems, 'what' gets separate treatment from 'where'. 'What' is encoded in the language of object identification, and here distinctions of shape and size, for example, are precisely implicated. The primitives they postulate are elaborated from those specified in the Marr and Biederman models for visual representations; these, they argue, enable humans to have some 10–15,000 names for objects with particular volumetric (3D) or surfacelike (2D) shapes. But 'where', by contrast, is encoded in the language of location, and distinctions of shape, size, etc., are largely irrelevant in this domain.

Landau and Jackendoff rely on linguistic analysis of English prepositions, and the work of Talmy (1978, 1983), Miller and Johnson-Laird (1976), and Herskovits (1986), to propose what components of spatial representations would need to be encoded in a nonlinguistic theory of spatial location. Here the primitives are taken to be "... mental elements corresponding to *places* and *paths*, where places are generally understood as *regions* often occupied by *landmarks* or *reference objects*" (Landau and Jackendoff 1993: 223). And in this 'where' system, the argument goes, there are only minimal constraints on the figural object (which is generally treated as simply a point), and not many more on the reference object; in short, only very simple shape specifications are possible in object descriptions within the 'where' system, going not much beyond 'thing here'. There is then a great disparity between the richness of object-shape expressions and the poverty of spatial-relation expressions. Landau

and Jackendoff conjecture that much of this disparity reflects a functional bifurcation of the system of spatial representation:

... One part of the system is devoted primarily to objects and their identification (mostly by shape); the other to locating objects in space relative to each other (and to the observer). The expressive power of the system of nouns that identify objects is linked to the shape identification submodule; the expressive power of the spatial preposition system is linked to the submodule governing the location of objects relative to each other (1993: 234).

Landau and Jackendoff link this bifurcation in the expressive power of language to a corresponding bifurcation in the functional and anatomical systems of the brain, citing brain studies that have demonstrated differential deficits accruing to tasks involving shape recognition as opposed to those of object localization and spatial relations. This suggests to them that the functional split between 'what' and 'where' is a universal feature of human cognition and language. In what follows, I shall argue that the Tzeltal linguistic systems for describing spatial relationships challenge this view in fundamental ways.

A second line of universalizing theory comes from those working in the field of the acquisition of language. Within the child language acquisition literature it seems generally taken for granted that notions of 'containment', 'support', and 'contiguity' are fundamental, apparently universal prelinguistic concepts, which the child acquires very early through exploration of his/her physical world, or which are innate. These concepts are then taken to be the basis for the child's first locative expressions — terms for IN and ON are mapped neatly onto this primary spatial distinction before more difficult concepts requiring the child to understand concepts of proximity, spatial relation to two reference objects, intrinsic named facets of objects, and finally, projective relations like those required for projective use of terms for 'front' and 'back' with nonfeatured objects, for example (see Piaget and Inhelder 1967; Johnson and Slobin 1979).

The basic assumption here is that a given language's words for notions like IN and ON are early learned locative expressions cross-linguistically, because notions of containment and support are early learned and conceptually primary cognitive distinctions. This isn't to say that every language will have a different word for each of these prelinguistic concepts — Spanish, after all, neutralizes most distinctions of containment and support, labelling both with the one preposition *en* — but the consensus is that there will in general be "isomorphism" between the properties of spatial language and those of perceptual space, which is taken to be prior (Clark 1973). Because of this isomorphism the child

learns relatively early to apply his or her language's expression(s) for these primitive topological concepts correctly.<sup>2</sup>

What happens, though, in a language where locations are not specified by a limited set of adpositions or locative cases, and where notions of containment and support are not neatly mapped onto specific linguistic forms, but, if they are expressed at all, are expressed indirectly and through overlapping or cross-cutting means?

The Mayan language Tzeltal provides an example of such a language: locative relations are not restricted to a prepositional phrase but are inextricably combined with predicates; you don't normally just say WHERE something is, you say HOW it is positioned or configured where it is, and this depends of course crucially on WHAT it is. This is in some respects analogous to German, whose speakers must use contrasting locative verbs: *Das Buch liegt auf dem Tisch* 'The book is lying on the table', *Die Tasse steht auf dem Tisch* 'The cup is standing on the table', *Das Bild hängt an der Wand* 'the picture is hanging on the wall'. However, Tzeltal takes such distinctions to an extreme: speakers can draw on a large proportion of the verbal lexicon to create a stative locative predicate that, combined with a prepositional phrase, expresses the answer to a simple question: Where is the X? These Tzeltal verb roots encode very precise semantic distinctions of size, shape, orientation, and position; when these roots are derived as stative adjectives (with a *-V1* or *-bil* suffix added to the root) they mean 'be located' in a precise disposition, said of something with some specific character. These predicates then accomplish much of the work done by prepositions in a language like English.

Underlying Tzeltal locative expressions there seems to be a radically different way of organizing spatial conception from the one postulated by cognitive scientists, wherein an egocentric, anthropomorphic perspective based on our bodies (front/back and left/right asymmetry, bipedalism) and the facts of gravity is presumed to provide a universal basis for spatial conception and description (Clark 1973; Miller and Johnson-Laird 1976; Bowden 1991; Lyons 1968). Nor does Tzeltal seem to pay attention to the supposed primariness of topological relations such as IN and ON. Tzeltal provides another model for spatial description — avoiding egocentric locative descriptions, and describing objects according to their disposition in space. The notions of containment and inclusion do not seem to be primitives; there is no single labelled concept along the lines of English 'in', as for example defined by Miller and Johnson-Laird (1976: 385: a referent x being "in" a relatum y if a part of x is INCLUDED IN a region of y). By the same token, the concept x is ON y (i.e. x is included in the immediate region of the surface of y, and y

supports x) is not neatly lexicalized. Some such notion is sometimes indirectly involved but not directly encoded in more than 200 dispositional predicate adjectives (encoding various forms of 'standing', 'sitting', 'lying' in different positions, of animate or inanimate objects). The categories underlying these dispositional adjectives are based on multiple interlocking distinctions of shape, form of attachment or support, canonical orientation and deviations from it, and body position, size, partitiveness, and quantity. Containment and support are contingent consequences of these sorts of facts.

This paper examines how spatial relations of containment and horizontal support are encoded in Tzeltal, in the light of the supposedly universal nature of these concepts. Since these, however, are not directly lexicalized but enter into lexical packages in a number of different ways, it is first necessary to provide an overview of the different Tzeltal systems for encoding spatial relations.

## 1.2. Data sources

Tzeltal is a Mayan language spoken by perhaps 120,000 Indians in southeastern Mexico, in a region just east of its closely related neighbor Tzotzil. The data on which this paper is based were collected in connection with an ongoing investigation of spatial language and cognition in collaboration with Stephen Levinson; work has so far been concentrated in the Tzeltal community of Tenejapa, in particular in the remote hamlet of Majosik', an hour or more's walk from the end of the road and on the border of the Tzeltal/Tzotzil divide. Here Tenejapans over the age of about 35 are still largely monolingual, but their children are now learning some Spanish in school.

The data on which this paper is based consist of the following strands (see Levinson 1992a for additional details):

- videotaped elicitation sessions, where informants provide descriptions of spatial relations in response to our manipulations of objects and their locations, or to other stimuli (a picture storybook, drawings depicting figure/ground topological relations, playdough shapes, etc.).
- videotaped interactive "space games" along the lines developed by Lourdes de León (1991a), where two native speakers play a game involving one, the "Director," describing a series of spatial arrays so that the other, the "Matcher," can correctly identify or reproduce the corresponding array.

Data from these focused elicitation sessions and prompted interactions are supplemented by two more natural sources of data on Tzeltal spatial



description: (i) anecdotal observations of native speakers' actual descriptions in particular contexts, and (ii) a corpus of naturally occurring Tzeltal verbal interaction, tape-recorded and in some cases videotaped, including everyday casual conversations, story-tellings, and activities where spatial relations are at issue.

Our primary aim in collecting and analyzing this material has been to understand the Tzeltal systems of spatial description in their own terms.<sup>3</sup> In this paper, I go on to try to compare some aspects of Tzeltal locative expressions with those in other languages, in particular, the Indo-European languages.

First, then, let us consider how Tzeltal speakers describe the location of objects, and then ask how their systems relate to the more familiar Indo-European prepositions.

## 2. IN and ON in the context of Tzeltal locative descriptions

### 2.1. Ways of describing locations in Tzeltal

*Locating a figure at a 'place.'* In Tzeltal there is only one "preposition," *ta*, which is omnifunctional: it introduces instrumental, purpose, manner, time, and place adverbials after the verb.<sup>4</sup> Examples include: *ta machit* 'with a machete', *ta s-kaj* 'for this reason', *ta muktin* 'secretly', *ta j-pisil-tik* 'all of us together', and *ta patil* 'later', as well as the place adverbials into which our locative expressions fall — both after verbs of motion, for expressing movement into or out of places, and after stative predicates, for expressing static locations. Thus *ta* is semantically general over notions like AT, IN, ON, TO, FROM, OVER, BELOW, etc., and *ta* PLACE can mean 'in/to/at/from PLACE' (e.g. *ta lum* = 'in/to/at/from town'), depending on the verb complex.

Locating things in reference to named places is achieved simply by the general-purpose preposition *ta* plus the place name.<sup>5</sup>

- (1) ay-0 ta Jobel  
 EXIST-3A PREP San Cristóbal  
 'He/she/it is in San Cristóbal.'
- (2) lijkem-0 tal ta Matzab  
 originate-STAT-3A DIR (come) PREP PLACE  
 'He/she comes from (the paraje of) Matzab.'

Sometimes the word for 'where', *banti*, precedes the prepositional phrase, suggesting in a literal sense 'the place where':

- (3) pero li' ay-0 ta j-sit-tik s-pisil-ik te  
 but here EXIST-3A PREP IE-eye-IPLI 3E-every-PL ART  
 a'tel-etik ya x-jil ta banti j-lumal-tik.  
 worker-PL ICP ASP-remain PREP where IE-community-IPLI  
 'But here in front of us are every one of the incumbent officials for our community' (i.e. 'at the place encompassing our entire community').

Indeed, an entire relative clause may specify a location:

- (4) ya a'-jok'-ik ochel te banti ya j-tzak-tik-ix  
 ICP 2E-dig-PL DIR (enter) ART where ICP IE-grab-IPLI-CMP  
 a te k-a'al-tik-e  
 DEIC ART IE-water-IPLI-CL  
 'You'll dig it in at the place where we've connected up our water (pipes).'

As these examples show, such locative expressions may also use the resources of the deictic system — especially deictic adverbs and demonstratives, and the presentative *in ta ba'ay* 'here it is' — to indicate the object's spatial relation to the speaker's location. This deictic strategy requires that the addressee share the speaker's visual scene and, like the unadorned *ta* PLACE strategy, linguistically conveys no information whatsoever about the nature of the figure or ground.<sup>6</sup>

*Locating a figure in relation to another object.* The foregoing examples illustrate how one can describe the location of something in relation to an abstract place, taken as a geographical location that is named or described: simply use *ta* plus the place name or its description. When, however, something other than a geographical place — for example, another object or person — provides the locative reference point, then Tzeltal offers several kinds of locative resources; some of these occur in the prepositional phrase introduced by *ta*, others in the predicate. The first of these — body parts and relational nouns — elaborate the *ta* phrase by providing in a sense alternative ways of naming a "place" in relation to which the figure can be located; the place is the location of some other object, or object part. The second has an altogether different function, being a predicate adjective that describes the configuration of the figure in relation to the ground and, in so doing, can specify precisely 'where' the figure is — for example, whether it is *kajal* 'mounted on top of' or *k'atal* 'positioned at right angles to' or *jok'ol* 'hanging down from' or *pak'al* 'glued to the surface of' or *tik'il* 'inserted inside of' or *bech'el* 'spirally wound around' a ground object with specific characteristics. In



Tzeltal, such predicates make an intrinsic contribution to the specification of where something is located.

Let's look briefly at the basic strategies for cooperatively replying to a question as to 'where' (*banti*) some entity is. All may be used for locations in the microspace directly in the interactants' immediate visual/tactile field as well as for more distant locations. They are not mutually exclusive, but each makes its own type of contribution to the task of specifying the location of a figure in relation to a ground.

One can use an *object-centered system*, a system that assigns a relation of immediate adjacency between the figure and some ground object. This is canonically done by a locative phrase of the form: *ta NP*, where *ta* is the unique Tzeltal preposition and NP refers to the ground object. Location can be narrowed down to a smaller search domain by using a possessed-NP construction indicating a specific part of the ground object, using the intrinsic *body parts* of the ground object to provide named "places" adjacent to which the figure is located. For example,

- (5) ta x-chikin mexa  
 PREP 3E-ear table  
 'at the ear/corner of the table'
- (6) ta y-it limete  
 PREP 3E-butt bottle  
 'at the butt of the bottle'

Any physical object may be assigned body parts, via a productive set of visually based heuristics that attribute axes on the basis of shape (see Levinson 1992b, this volume); hence shape is an essential element in the body-part locative system. However, for this system to be applicable, the designated part of the ground object must be actually in contact or immediately contiguous with the figure — the figure is 'at' a subpart of the ground ('at' its 'head', 'nose', 'belly', 'butt', etc.). There is no projection into a 3D void (beyond a leeway of an inch or two, depending on the relative size of the objects),<sup>7</sup> and no essential use of orientation (e.g. verticality). The figure is 'at' the specified body part, regardless of the body's orientation or position (thus in [6] the orientation of the bottle is irrelevant).<sup>8</sup>

Alternatively, a speaker may use one of a small set of *relational nouns*, which have more abstract spatial meanings. These label parts of surfaces or regions defined by the shape of objects, or in relation to axes given by the lay of the land or by the force of gravity; for example, *ta y-util*, 'inside of' an enclosed 2D or 3D space (lit. 'at its inside region'); *ta y-anil*, either 'underneath' a space defined by the object's shape or 'downhillwards' of the object; *ta s-ba*, 'on top of' or 'above' the top surface of

an object or 'at the uphill edge of' a planar surface; *ta y-olil*, 'at the middle of' a surface, region, or group of objects. For example,

- (7) ta y-util koral  
 PREP 3E-inside corral  
 'inside the corral'
- (8) ta y-olil mexa  
 PREP 3E-middle table  
 'at the middle of the table'

These, like the body parts, are possessed noun constructions, but they differ both morphologically (they aren't inalienably possessed nouns; see Levinson, this volume), and semantically (they aren't names of body parts).<sup>9</sup> They also differ in the spatial reckoning system they encode. The strict requirement of immediate adjacency characterizing the use of a body-part locative is relaxed for these relational nouns; rather, they indicate REGIONS or AXES within which or along which the figure is located.

For several of these relational nouns, this alternative system of reckoning spatial relations involves a system of *absolute angles*. One may compute the location of an object in relation to another by aligning it along an axis extrinsic to the objects themselves. The relational nouns *ajk'ol* 'uphill' and *alan* 'downhill', *s-ba* 'its top or uphill edge or surface' and *y-ejtal* 'its bottom or downhill edge/surface', and *y-anil* 'its underneath or downhillwards region' are all of this type. Unlike the body parts, they make essential use of absolute coordinates that specify fixed angles extrinsic to the objects being located, which never change regardless of the properties or locations of the figure or ground object. A number of these make use of the absolute coordinate provided by the overall slope of the land from 'uphill' (roughly south) to 'downhill' (north) to provide an axis along which the relative position of the figure in relation to some reference point (which may or may not be the speaker) is specified: it is 'uphill' or 'downhill' of the reference point.<sup>10</sup> For example,

- (9) tek'el-0 ta y-ajk'ol karo te winik-e.  
 standing-3A PREP 3E-uphill car ART man-CL  
 'The man is standing uphillwards of the car.'

A third, related strategy involves no relational (possessed) nouns, but simply uses a *geographical landmark* to project an axis from reference object to landmark, along which an object can be located ('it's toward [ta] Red Cliffs/the sunset/the big banana tree').<sup>11</sup>

All the above elaborations of the *ta* phrase can be used in descriptions

of either static location or motion into or out of a location.<sup>12</sup> All can also be combined with deictic demonstratives and adverbs that anchor the referent object in the speech situation.

There is a fourth possibility, however, which plays an important role in descriptions of static location; it is a stative predicate that adds to the locative phrase an element of "configuration" or "disposition" of the figure in relation to the ground. These *dispositional descriptions* are drawn from a large set of verbal roots that encode precise distinctions of shape, position, orientation, and configuration; well over 250 stative predicates are morphologically derived from these roots. Rather than simply saying an object 'is located AT a GROUND', Tzeltal speakers normally encode something additional about the visual properties of the figure, or of the figure/ground relation. For example,

- (10) metzel-0 ta tz'amal te' xawin  
lying.on.side-3A PREP bench cat(s)  
'The cats are lying on their sides on the bench.'
- (11) tek'el-0 ta ti'nail te winik-e  
standing-3A PREP doorway ART man-CL  
'The man is standing in the doorway.'
- (12) tz'apal-0 ta lum te'  
vertical.end.buried-3A PREP earth stick  
'The stick is vertically erect with its end stuck in and supported by the earth.'
- (13) waxal-0 ta ti'-k'ajk' p'in  
vertically.erect-3A PREP edge-fire pot  
'The pot is standing at the edge of the fire.'
- (14) xik'i'l-0 ta kukub machit  
leaning.vertically-3A PREP wallboard machete  
'The machete is leaning vertically against the wallboard.'

These examples illustrate how the spatial relation between figure and ground is "vivified" or given explicit semantic content by the dispositional adjective, which, in specifying how the figure object is configured, often suggests how it relates to the ground object that contains or supports it. Such predicate adjectives can occur with a *ta* phrase utilizing any of the systems of location (body part, relational noun, or geographical landmark) described above.<sup>13</sup> This is the routine conventional way to describe the location of things — when describing a scene in general, when distinguishing a particular referent from another, and also when it is precisely the location of something that is at issue, as when looking for

lost things, or sending someone to look for or fetch something. The following are some (naturally occurring) examples:

- (15) [in response to a query as to where a walking-stick is]  
la k-il xik'i'l-0 ta  
CMP 1E-see standing.at.slight.angle.from.vertical-3A PREP  
y-ok kajpej  
3E-base coffee.plant  
'I saw it standing leaning against a coffee tree.'
- (16) [in response to query as to where her father's coffeecup is]  
pachal-0 ta lum ta y-anil  
bowl.shaped.sitting-3A PREP ground PREP 3E-underneath  
s-xila  
3E-chair  
'It's standing on the ground under his chair.'
- (17) [describing how guerrillas cut down trees and left them lying across the main road]  
p'ek-ajtik laj te' ta karretera, k'atal-0  
low.lying-PL QUOT tree PREP road crossways.lying-3A  
ta karretera  
PREP road  
'They said trees were low-lying on the road, across the road.'
- (18) [describing a photograph]  
chepel-0 ta chojak' te ixim ta  
bulging.in.netbag-3A PREP netbag ART corn PREP  
tz'ante'-e  
roofbeam-CL  
'The corn is sitting in a netbag on the roofbeam.'

It is possible to express static locative relations in Tzeltal without using a dispositional adjective as predicate, for there is one general locative/existential morpheme *ay* that predicates pure existence and/or location without any of the extra semantic baggage carried along by dispositional predicates.<sup>14</sup> However, despite the general semantics of *ay*, its use in locative expressions is rather restricted, partly because of its dual function as existential and locative — it tends to be used to introduce the first mention of a referent in a context, to assert its existence, and to predicate the existence/location of immovable things and relations or the orientation of parts of objects. We shall therefore restrict our discussion here to the Tzeltal locative descriptions of the dispositional form, schematized as follows (with NP1 referring to the object whose location is being described [the figure], and NP2 to the ground to which it is related):<sup>15</sup>





in the construction cited in (19) above, for here their meanings also include a locative element, such that, for example, *waxal ta mexa* 'it's there), vertically standing on the table' is a natural answer to the question *banti ay te p'ine?* 'where's the coffee pot?'<sup>22</sup>

Now, in our data two things are abundantly clear: (1) the semantic features bundled together in the meanings of positionals are not restricted to the special class of positional roots (defined by their morphological properties), nor even to positional and bivalent (positional/transitive) roots, but extend to many straightforwardly transitive roots as well; and (2) speakers, when making spatial descriptions, use many semantically "positional" adjectives that in fact are derived with a *-V<sub>1</sub>l* suffix from TRANSITIVE ROOTS:

- (20) tik'il-0 ta tzulja' matz'  
put.in-3A PREP tortilla.gourd, the corndough  
'The corndough is in the tortilla-gourd.'  
< tik', T root, 'to put in, to gather together'
- (21) pak'al-0 ta lum te s-ti' limete  
pasted.to.surface-3A PREP earth, ART 3E-lid bottle  
'The bottle lid is stuck in/on the earth.'  
< pak', T root, 'to paste or plaster to surface'
- (22) kiilil-0 ta lum laso  
pulled.down-3A PREP ground rope  
'The rope is hanging straight down and touching the ground.'  
< kil, T root, 'to pull rope-like object'

Further, in comparable circumstances (answering 'where' questions, locating objects), speakers often use another locution, and indeed vary between it and the one just described — rather than using a *-V<sub>1</sub>l* adjective, a stative form of the verb, a "perfect passive participle" (Kaufman 1971) with the suffix *-bil* is employed.

- (23) k'ambil laso ta mexa  
long-coiled rope PREP table  
'The rope is lying long-coiled on the table.'  
< k'am, T root, 'to place in long coils'
- (24) tz'otbil ta ch'ajan tak'in jun  
twisted.together PREP cord metal paper  
'The paper is twisted (together) with a spiral wire' (i.e. it has a spiral binding).  
< tz'ot, T root, 'to twist it'

The *-V<sub>1</sub>l* and *-bil* forms are equally appropriate for static descriptions of a physical arrangement of objects or their location; in (23) and (24)

above, *k'amal* and *tz'otol* could replace *k'ambil* and *tz'otbil*. Similarly, *wolol*, *nolol*, *k'olol*, and *k'olbil* all mean 'spherical' and all were used interchangeably by informants to describe a round ball of masa on a table.<sup>23</sup> However, the *-bil* forms are not really in free variation with the *-V<sub>1</sub>l* forms, because use of the *-bil* form implies a prior action, with the focus more on HOW THE OBJECT CAME TO BE IN THAT POSITION (i.e. the gloss in [23] should actually be something like 'rope in a state resulting from having been put into a long-coiled position on the table'), whereas the *-V<sub>1</sub>l* form emphasizes its static appearance or state. Certainly the salience of the action involved in getting objects into positions is an important conditioner of the form chosen to describe the position.<sup>24</sup>

Therefore, for defining the class of stative predicates that characterize the "disposition" of objects — their position, shape, orientation, configuration in space — and that are the heart of Tzeltal descriptions of object configurations that can (among other things) locate objects, we group together into a general superclass of "dispositionals" the adjectives derived from three putative sources:

- i. those derived with *-V<sub>1</sub>l* suffixes from positional roots;
- ii. those derived with *-V<sub>1</sub>l* or *-bil* suffixes from "bivalent" (T/P) roots; and
- iii. those derived with *-V<sub>1</sub>l* or *-bil* suffixes from transitive roots (or indeed, from transitive stems that have been derived from P roots with an *-an* suffix and infixed *-j-*).

Whether there are any discernable subgroupings within the meta-class of dispositionals, on the basis of their morphologically defined root classes, remains to be separately explored. For current purposes, we treat them as a single functional class.<sup>25</sup>

### 3. IN/ON description tasks

What then is the correspondence between these locative notions we have been considering, encoded in the different Tzeltal systems — body parts, relational nouns, and dispositional adjectives — and the notions of containment and support central to the semantics of Indo-European prepositions for IN and ON? Some notional sense of IN can be conveyed in Tzeltal (along with much other detail) by certain items from the set of relational nouns, in the object-centered system, and of ON by the object-centered body-part system. But IN and ON relations may be most precisely conveyed by one of many dispositional descriptions, deriving from roots specialized for particular types of insertion, containment, or

position.<sup>26</sup> We shall look now at the results of some tasks designed to explore this correspondence.

Intrigued that the supposedly very basic, early acquired, putatively universal set of locative distinctions IN/ON is not clearly lexicalized in a pair (or small set) of Tzeltal expressions but is complexly conveyed through the nature of the dispositional relationship expressed, I probed further for how Tzeltal speakers express spatial relations of containment and support. I asked informants to describe the locative relations depicted in a set of stimuli developed by Melissa Bowerman in her cross-linguistic studies of IN and ON spatial relations — simple line drawings of a figure distinguishable against a ground (for example, a ribbon tied around a candle, a dog lying in a doghouse, a picture hanging on a wall).<sup>27</sup> These drawings, used as elicitation tools in conjunction with actually acting out some figure/ground juxtapositions with real objects, provided a cross-linguistically informed set of stimuli designed to probe the semantic categories underlying the use of one locative expression as opposed to another, as well as the verbs for inserting and extracting objects from various states of containment, inclusion, or support. Establishing what sorts of figure/ground relations tend to receive the same locative description and which ones are differentiated provides a basis for identifying the perceptual criteria for distinguishing the kinds of locative relations that in a particular language are taken to be sufficiently different to require a different label.

Bowerman's explorations with these sorts of stimuli (Bowerman 1993, i.p., etc.) had led her to identify the kinds of semantic distinctions underlying the different prepositions in English, Spanish, and Dutch, for example; she has gone on to explore analogous distinctions in Finnish, Italian, Korean, and other languages, establishing the different ways of partitioning topological relations. The European languages in her sample make semantic splits in slightly different places: where English uses only 'on', Dutch for example distinguishes with three prepositional notions of 'enclement', resisting gravity by specific forms of 'attachment', and 'natural contact/support'; Finnish groups together 'interior containment' and 'close attachment to exterior surface' (e.g. handle on pan), in contrast with 'loose contact'. Korean, however, shows a more radical departure: cross-cutting all 'in/on' relations is a dimension of 'tightness of fit', so that 'in' and 'on' are naturalized for relations of close contiguity (a cassette in a case and a lid on a container are both tightly fitting and take the same description) (Bowerman 1991; Bowerman and Pederson 1992).

This same picture-describing task applied in Tzeltal led to minute differentiation, as speakers described a large proportion of the

figure/ground relations depicted in the stimuli drawings with a different predicate adjective. A close look at what features are shared in common in those figure/ground arrays given the same description, and what distinguishes those given different descriptions, will help us get a handle on the precise contribution of the dispositional predicate to locative descriptions in Tzeltal.

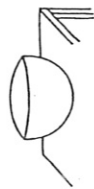
### 3.1. Use types: basis for differentiation in locative descriptions

For the purposes of cross-linguistic comparison, one can distinguish a number of categories of surface-contact relations or "use types" (Bowerman and Pederson 1992; Herskovits 1986) that one might provisionally expect to receive the same kind of locative description in any given language. These are kinds of situations that for purposes of locative description a given language groups together — for example situations of horizontal support from underneath, of containment, of hanging, of sticky surface contact. For the moment let us consider some of these separately and ask how they are expressed in Tzeltal; we shall look at various use types for IN, ON, AROUND, and different FORMS OF ATTACHMENT, indicating how such notions may be conveyed by dispositionals, or by elements of the body-part and relational-noun systems, or both, and giving examples from our picture elicitation to illustrate the scope of each of these. As we shall see, however, in Tzeltal these categories are not always kept distinct.

*ON types: encoding of 'vertically above + horizontal support'.* Notions of containment and support are subtly intertwined in Tzeltal locative expressions. Essentially, the detailed specification of shape allows one to infer the spatial relation. Take, for example, the set of 'horizontal support' relations depicted in Figure 1: the spatial relationship of 'sitting canonically on' a table will be expressed differently for each figure object pictured; each one is describable as 'sitting on' the table with the dispositional adjective cited underneath it.

While most of the dispositionals (as in the above examples) are semantically highly specific, there is one relatively general one, which conveys a spatial relation involving superpositioning but not necessarily support (although horizontal support in many contexts is implicated): *kajal* 'mounted on, above'. This can be used where a more specific adjective would also apply; the effect is to be more semantically vague about the position/disposition of the object, although location is still specified:

TA = IN, ON, AT, TO, FROM, TOWARD, ...  
= some spatial/temporal/instrumental/manner relation



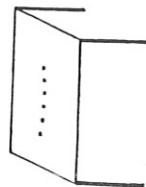
**PACHAL** TA table, bowl  
'be-located', of wide-mouthed  
container canonically 'sitting'



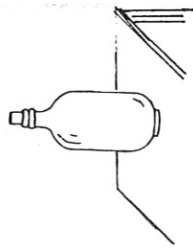
**PAKAL** TA table, dough  
'be-located', of blob with  
distinguishably flat surface lying  
'face'-down



**CHEPEL** TA table, netbag  
'be-located', of a full (bulging) bag  
supported underneath



**CHOLOL** TA table, beans  
'be-located', of multiple objects  
arranged in a row



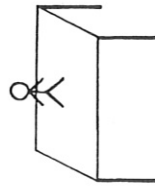
**WAXAL** TA table, bottle  
'be-located', of tall oblong-shaped  
container or solid object canonically  
'standing'



**LECHEL** TA table, frying pan  
'be-located', of wide flat object lying  
flat



**MOCHOL** TA table, cat  
'be-located', of animate object lying  
curved on its side



**TEK'EL** TA table, toy man  
'be-located', of a vertically standing  
(on hind legs) animate creature or a  
long/thin object

- (25) kajal-0 ta tzulja' waj  
located.above-3A PREP gourd.container tortilla  
'The tortillas are superadjacent to the gourd.'

(25) can be used even when a more precise delimitation of the configuration is linguistically available — for example if one could say that the tortillas are *latal* (if they are stacked) or *pakal* (if they are folded). *kajal* displays its more general meaning in the fact that, unlike most dispositional, it can freely occur in combination with other dispositional adjectives, and with directionals, in what appear to be adverbial uses:

- (26) kajal-0 waxal ta tz'ante' ala limete  
mounted.on-3A standing PREP beam DIM bottle  
'The bottle is standing on the beam (above us).'

- (27) kajal-0 jelawel ta s-jol te' te kable  
mounted.on-3A DIR (crossing) PREP 3E-head stick ART cable  
'The (electric) cable is on top of the stick, in a crossing direction'  
(i.e. describing a situation where the cable is slung across the patio from house to house and held up in the middle by a stick, over the top of which it passes and on which it therefore rests).

- (28) k'atal kajal-0 ta tz'ante' (te ch'ajan tak'in)  
acrossways mounted.on-3A PREP beam  
'(The chicken wire is) across and on top of the beams' (i.e. a roll of it is lying across the two beams and resting on them).<sup>28</sup>

Furthermore, unlike any other dispositional in our data, *ta kajal* can be used in an NP construction to indicate a general direction uphillwards (equivalent to *ta ajk'ol*; see Brown and Levinson 1993):

- (29) tey ay-0 s-na ta kajal  
there EXIST-3A 3E-house PREP on.top.of  
'There's his house uphill.'<sup>29</sup>

In addition to this relatively semantically general dispositional that conveys a notion of ON/ABOVE (in its specialized way), and the myriad of semantically specific ones that simply elaborate the disposition of the figure and leave its location as superpositioned on the ground object to be indicated (if desired) in the *ta* phrase, or conversationally implicated, there is also one term from the relational noun system with a meaning that corresponds most closely to ON: *ta s-ba*, 'at its-top-side'. This, as mentioned above, can describe the location of a figure that is vertically above and resting on the top surface (*-ba*) of the ground object; support from underneath is not, however, part of the meaning of *-ba*, as it can also apply to a figure poised in the air above the ground object: for

Figure 1. Some ways of encoding ON relationships in Tzeltal: figure is positioned above and supported by horizontal surface



Table 2. Ways of conveying ON relationships with a phrase

Tzeltal form	Spatial relationship conveyed	Eliciting F/G configuration	Examples from data
i. Relational nouns: <i>ta (s)-ba'</i>	'at its top surface'; superpositioned to top surface of G; neutral as to contact (ON vs. ABOVE)	any F on horizontal top surface OR any F at uphill edge of rectangular expanse	cup on saucer, book on shelf, boat on water, telephone on desk, pencil and paper on table, tablecloth on table, boat on sea, hose coiled on top of stump, man on roof bird above house, bottle held above man's head, receiver (hung up) on telephone, leaves on/above tree branch, pencil on paper on table, cup on saucer on table, book on shelf
ii. Body parts extended to inanimate grounds	relationship of immediate adjacency to a body part of G, regardless of orientation of body; neutral as to contact	any F adjacent to any G with body	<i>ta-s-fo'l</i> 'at its head' <i>ta-s-pat</i> 'at its back' <i>ta-s-ni'</i> 'at its nose' <i>ta-s-ti'</i> 'at its mouth' <i>ta-s-ch'iyi'</i> 'at its belly' <i>ta-s-ch'ikim</i> 'at its ear/ corner' <i>ta-s-ti'</i> 'at its butt' <i>ta-s-ti'</i> 'at its mouth' or edge <i>ta-s-ch'iyi'</i> 'at its belly' <i>ta-s-akam</i> 'at its foot/ leg/wheel'
<i>ta-s-k'ab</i> 'at its hand/ arm/branch' <i>ta-s-ok</i> 'at its base' <i>ta-s-ef</i> 'at its mouth/ teeth' <i>ta-s-ne</i> 'at its tail'			<i>ta-s-ti'</i> 'at its mouth/edge': crack in cup, cloth on table, leaf on top of standing bottle, boy next to fire <i>ta-s-ch'iyi'</i> 'at its belly': picture on wall, ribbon around candle, tree on mountainside, arrow through apple <i>ta-s-akam</i> 'at its feet': ball under chair <i>ta-s-k'ab</i> 'at its arm/hand': leaf on branch of tree <i>ta-s-ok</i> 'at its lower-extremities' hose around bottom of stump <i>ta-s-ti'</i> 'at its butt' apple at base of bottle <i>ta-s-ef</i> 'at its mouth': mud on knife blade

a. Some body parts and relational nouns are becoming grammaticalized, and one reflex of this is that their possessive prefix or -*VL* suffix is optional when they are followed by their possessor noun. Among these are (*s-ba*, (*s-pat*, and (*s-ti'*, which allow their possessive *s-* to be dropped, and *y-wi(iti)* and *y-an(iti)*, which allow their suffix *-iti* to be dropped (see de León 1992c for this phenomenon in Tzeltal).

Table 3. Ways of conveying ON relationships with a dispositional adjective

Dispositional	Spatial relationship conveyed	Restrictions on F or G	Examples from data
<i>kajal</i> 'mounted on'	superpositioned to G; neutral as to contact	no restrictions on F; G is a roughly horizontal surface	man on horse, telephone/pen on desk, boat on top of water, hose coiled on top of stump, hat on head, book on shelf, picture 'standing' on table, bowl on table, cup on saucer, coiled-up hose on stump, stick on pile of yarn, cloud over mountain
Body positions, orientations and shapes of F:	body positioned AT G; depending on shape of G, can convey IN or ON	F has a body with body parts arranged in a certain position or shape	toy man standing on table, cat sitting on mat, dog lying face-down next to doghouse, bird perched on branch, man standing on roof, boy lying on bed, shoes standing on floor, man standing on ladder, book lying flat on shelf, leaf floating on water
<i>tek'el</i> 'standing', <i>nakal</i> 'sitting', <i>jukul</i> 'crouching', <i>jawal</i> 'face-up spreadeagled', <i>luchul</i> 'perched on', <i>chokol</i> 'standing main-axis horizontal', <i>meizel</i> 'lying-curved-on-side', <i>pachal</i> 'roughly semi-hemispherical vertically sitting', <i>waxal</i> 'roughly cylindrical vertically sitting', <i>xokol</i> 'long-thin coiled'			objects of certain shape (e.g. round, oblong, container-shaped) on surface; e.g. cup and saucer on table, bottle on table, hose coiled on stump
Orientations: <i>xik'it</i> , <i>k'at'al</i> , <i>ta'al</i> , <i>se'el</i> , <i>tz'eel</i> , <i>pek'el</i> , <i>but'ul</i> , etc.	F in a certain orientation vis a vis the vertical (vertically upright, horizontal, angled at a certain angle, etc.) OR vis a vis the uphill/downhill axis	F is long/thin, or sheetlike, or container-shaped (hollow) Specific to the dispositional: e.g. <i>xik'it</i> firewood against house and picture 'standing' on table, <i>k'at'al</i> sticks on ground, <i>chokol</i> lines on paper, <i>p'ekel</i> knife on table, <i>nijul</i> hat on head, <i>but'ul</i> basket of corn tipped over	<i>xik'it</i> firewood against house and picture 'standing' on table, <i>k'at'al</i> sticks on ground, <i>chokol</i> lines on paper, <i>p'ekel</i> knife on table, <i>nijul</i> hat on head, <i>but'ul</i> basket of corn tipped over
Configurations: <i>chokol</i> , <i>joyol</i> , <i>latz'al</i> , <i>lapal</i> , <i>xojol</i> , <i>limil</i> , etc.	F is arranged in a certain spatial configuration	Specific to the dispositional: e.g. F is a mass item (multiple count items, or granular, liquid), or a flexible sheetlike object)	<i>chokol</i> beans in a row, <i>busul</i> corn in a pile, <i>panal</i> water in a puddle, <i>k'iyil</i> clothes spread out in sun, <i>lapal</i> needle through skirt, <i>xojol</i> glove on hand, <i>chokol</i> candles on cake, <i>limil</i> cloth on table, <i>latz'al</i> logs on toy train or one sticklebrick on another

example, the hook for hanging food over the cooking fire is described as being *ta s-ba k'ajk'*, 'at its (the fire's) top side'. It can also apply to the uphillward edge of a level or sloping piece of ground.<sup>30</sup>

Tables 2 and 3 summarize the different ways of conveying ON/ABOVE relations that emerged from the picture-description task applied in Tzeltal; they indicate the specific spatial relations each form encodes, restrictions each imposes on the figure or ground object, and examples of the eliciting configurations in my data. The thing to emphasize here is that none of these forms corresponds very closely to a pure ON concept. The forms cited in Table 3 focus on the disposition of the figure vis à vis the ground; the nature of support and contact is not always explicitly encoded. Many dispositional describing body positions also encode support from underneath (different forms of 'sitting', 'standing', 'lying', 'crouching', 'perching'). Many others encode specific kinds of nonhorizontal support or attachment ('hanging', 'pierced through', 'inserted-in-at-one-end', 'stacked between'). Others are neutral with respect to support, describing a figure/ground configuration with no reference to its support (for example *cholol*, 'positioned in a row').

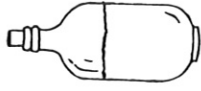
*IN* types: *encoding 'containment'*. There are many different ways of conveying a spatial relation of containment in Tzeltal. Figure 2 illustrates some of these. Some involve relational nouns like *y-util* 'its inside'; others involve Tzeltal dispositional terms that at first glance do seem to directly encode pure 'containment' relations, but of specialized sorts of containment. For example *tik'il* 'inserted in' derives from a transitive verb root meaning 'to insert'; this is widely used to describe containment relations such as tortillas in a narrow-mouthed gourd (which have to be carefully inserted through the small opening); an animal in a corral (normally inserted through a small gateway); clothing or other items in a closed suitcase; corn dough sitting in the bowl-shaped top part of a hand grinder; a letter inside an envelope; and many others. Thus *tik'il* does seem to be a general-purpose word for containment relations, but specialized for enclosing bands or surfaces with a small (relative to breadth of the container as a whole) opening, and definite human (or at least purposeful) agency in inserting the figure. Furthermore, if a more specific dispositional applies (e.g. if the figure is attached to the container, or oriented in a noncanonical way in it), that will preempt the use of this general one.

Two other candidates for expressing containment have very specific restrictions on the kinds of objects they can apply to:

*xijil*, T/P root, 'inserted in' (of multiple long-thin-things carefully placed into a delimited region, e.g. firewood into fire, pencils into cup);



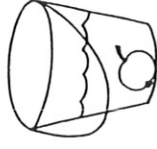
...TA Y-UTIL house, man  
'AT its-inside'



WAXAL TA bottle, water  
'be-located', of taller-than-wide  
rectangular or cylindrical object  
vertically 'standing'



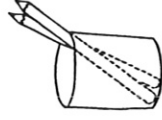
PACHAL TA bowl, apple  
'be-located', of bowl-shaped container  
canonically 'sitting'



T'UMUL TA water, apple  
'be-located' immersed in liquid in a  
container



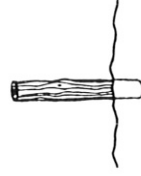
TIK'IL TA corral, bull  
'be-located' by having been inserted  
into a container with a narrow opening



XIJIL TA cup, pencils  
'be-located', of long/thin object, by  
having been inserted carefully into  
bounded ground



XOJOL TA pot, coffeebag  
'be-located' by having been inserted  
singly into closely fitting container



TZ'APAL TA ground, stick  
'be-located' by having been inserted at  
end into supporting medium

Figure 2. Some ways of encoding *IN* relationships in Tzeltal: figure is positioned (at least partly) within bounded region of *G*



Table 4. Ways of conveying relationships of containment

Tzeltal form	Spatial relationship conveyed	Eliciting F/G configuration	Examples from data
1. IN with TA phrase: Relational nouns <i>ta y-wil</i>	'at its inside': within the region defined by the boundaries of G object; enclosed within G's volume or circumference	no restrictions on F; G is 3D enclosed volume or 2D bounded surface	cup in/on saucer, apple in bowl, flowers in vase, dog/person in house, rabbit in hutch, fish in bowl of water, paper in desk drawer, man in boat, boat in/on sea, box in bag, hole in towel, apple in ring, sleeping bag in bag person/object in between two (sets of) others, e.g. paper on table with pen on top of it or person/object in middle of bounded entity; boat in/on water, picture on stamp, ribbon around candle, hole in towel, crack in cup, arrow through apple, clothespeg on line
2. IN with predicate: 1. IN with past participle of <i>och</i> 'to enter': <i>ochem</i>	F has entered into G's inside region (or, sometimes, G has entered into F's)	no restrictions on F; G has internal bounded region	apple in bowl, paper clip in film box, finger in ring or ring on finger, beans in horse's tail, foot in shoe or shoe on foot, frog's leg in bottle, speech in tape recorder, boat in/on sea, box in handbag, arrow through apple, crack in cup
ii. IN with directional: <i>ochel</i>	the direction of motion of F having been inserted was in-	no restrictions on F; G has inside region	frog in bottle, papers on stake
iii. IN with causative: <i>y-oizes</i>	F has been caused to enter G's inside region	no restriction on F; G has inside region	arrow through apple, paper on stake, ring on finger
3. IN with dispositional: Insertion verbs: <i>tik'il</i>	F has been inserted in G	no restriction on F; G is 3D bounded space with narrow opening	apple in bowl, tortillas in narrow-mouthed gourd, bull in field, dog in doghouse, paperclip in cardboard tube, fish in bowl, box in handbag firewood in fire, pencil in cup
<i>xijil</i>	F inserted in G	F is long/thin single item; has been carefully/deliberately inserted	hand in glove, popbeads into each other, bag of coffee in pot, gourd bowl in hanging container
<i>tz'apal</i>	F inserted-in G	long-thin item inserted at one end firmly into support	post in ground, stick in shoe, plug in socket, key in lock, candle in holder, earrings on pierced ears
<i>lat'at</i>	F stacked	flat items arranged in vertical stack	tortillas in pile, ribbon in notebook
<i>lapal</i>	F inserted-through G	long-thin-sharp thing inserted through flexible G	safety pin in cloth, needle through mat, ribbon in book, pocketknife blade in knife
<i>t'wul</i>	F dunked in G	G is liquid in container	apple in water in bucket, feet of flowers in water in vase
Container predicates <i>chepel, pachal, waxal</i> , etc. etc.	F is in container canonically sitting and supported underneath	no restrictions on F; G is container of the appropriate type	any F in netbag ( <i>chepel</i> ), in bowl or plate ( <i>pachal</i> ), in bucket or tall basket ( <i>waxal</i> ), etc.

*xojol*, T/P root, 'inserted/in/on' (of configurations where a single item is completely enveloped by a container or wrapper).

Indeed, creating a  $-V_1$  adjective from any one of a large set of insertion-verb roots can be a way of expressing static IN relations specialized as per the verb root. For example, *iz'apal* means '(long/thin thing) stuck in and supported at one end', while *lapal* means 'inserted through (of long/thin object inserted through ground object such that most of its length is covered by the ground)'. Others derive from verb roots for ways of filling containers: for example *but'* (a T/P root meaning 'to fill container full, hands not leaving ground') yields the adjective *but'ul*, meaning 'standing-full' (of a container).

In addition to many dispositional, several terms from the relational-noun system can in certain contexts convey containment, in two- or three-dimensional regions:

*ta y-anil* (in one of its senses): 'in the 3D region defined by the shape of an object as within the space underneath it'; e.g. underneath an overturned bowl (in another sense *ta y-anil* invokes the 'uphill/downhill' axis, and refers to the region 'downhillwards' from a reference point);

*ta y-util* 'at its inside' (of enclosed bounded 3D or 2D space);  
*ta y-olil* 'at its middle' or 'between' (e.g. within and at the middle of a bounded two- or three-dimensional space, or at the middle of a two-dimensional space, as for example defined by the axis between two objects).

Table 4 summarizes these possibilities for conveying notions of containment and inclusion and gives some examples of the stimuli that received these descriptions in elicitation tasks.

**AROUND types.** Distinct from 3D containment but also involving a spatial relationship of one object surrounding another, either in two dimensions (as an encircling band) or in 3D (as an enveloping material), we may talk of forms of AROUND. These are encoded in a variety of Tzeltal dispositional. Different kinds of encirclement, focusing on the outside part of an inside/outside figure/ground relationship, are differentiated in Tzeltal by different degrees of tightness, elasticity, etc. Examples of these use types are presented in Table 5.

**FORM OF ATTACHMENT types.** In many Tzeltal descriptions of where a figure is, what is encoded by the dispositional is not the spatial relationship per se but the form of attachment of the figure to the ground, for example with dispositional encoding notions such as 'hanging on', 'stuck on', 'tied onto', 'pierced through'. This indeed seems to preempt description in terms of a more general spatial relation like ON or IN. In

Dispositionals	Spatial relationships conveyed	Restrictions on F or G	Examples from data
<i>joyol</i>	F encircles G or F is encircled by G	encircling item (F or G) is either linear (like a rope) or multiple items arranged in a circle	necklace on neck, wire encircling toy man
<i>sut'ul</i>	F is tightly bound around G		necklace on neck, rubber band around tape recorder, headband around head
<i>chojol</i> <i>chuk'ul</i> , <i>chuk'bil</i>	F is loosely bound around G F is tied around G	F is thin and flexible	necklace on neck, ribbon around candle, belt around waist, hatband around hat
<i>xojol</i> , <i>xojbil</i>	F is completely around/in G	F is single item	necklace on neck, paper on spike, popbeads in/on each other, apple on skewer, glove on hand, ring on pencil, clothespeg on line, hose coiled around stump, necklace/ring around body part, two cats curled up together
<i>xotol</i>	F is arranged in a circle		hose coiled around stump, tortillas in cloth
<i>bech'el</i>	F is coiled around G	F is long/thin	hose coiled around stump
<i>potzol</i>	G is wrapped around F	F is made of flexible, wrappable material	masa in banana leaf, camera in case,
etc.			

Table 5. Some AROUND use types: different kinds of encircling relations

other words, it seems possible that 'supported in container by virtue of container-shape and gravity' is simply a special case of 'supported from underneath by gravity', as opposed to 'supported by a hook from above', 'supported by sticking on surface', 'supported by being squeezed between two vertical boundaries', 'supported by tight encirclement', 'supported by being pierced through flexible material', etc. (There are Tzeltal dispositional for each of these concepts, and many more). Thus Tzeltal pays careful attention to the form of attachment of figure to ground rather than subsuming all sorts of forms of attachment under general spatial relations like IN or ON. Table 6 presents some of these attachment relations expressed in Tzeltal dispositionals.<sup>31</sup>

Having considered in general the kinds of semantic distinctions made in Tzeltal locatives, it remains to examine the most striking fact of all about them: these kinds of spatial relations are not conveyed in mutually exclusive ways. Ways of expressing IN, ON, and AROUND in particular lend themselves to a characteristically Tzeltal form of what we call (for lack of a better analysis) systematic figure/ground ambiguities.

### 3.2. Figure/ground ambiguities

A number of dispositional adjectives can indicate not only an object of a certain shape and orientation canonically sitting ON its support, they can also refer to something IN an object of that specific shape and orientation.

For example, *pachal* describes the location and configuration of a figure, but the shape restrictions (wide-mouth-gourd-shaped) apply either to the figure or to the ground. Thus, either the CONTENTS of a wide-mouthed container are described as *pachal*, in which case the conflated nominal qualities apply to the ground, as in (30),

- (30) *pachal-0 ta bojch tulesna*  
sitting-3A in gourd-bowl peach

'The peaches are in the gourd bowl.'

or the container itself can be the subject and thus the figure, in which case the conflated nominal qualities apply to it, as in (31):

- (31) *pachal-0 bojch ta mexa.*  
sitting-3A gourd-bowl on table

'The gourd bowl is on the table.'

Thus, although in both cases *pachal* is predicated of the figure (which in [30] is the peaches, in [31] the gourd bowl), the relation between figure

Dispositionals	Spatial relation conveyed	Restrictions on F or G	Examples from data
<i>jipil, jok'ol</i>	hanging on		clothes on line, coat on hook, balloon on stick, clothespeg on line, apple on branch, calendar/picture/mirror on wall, bag hung by strap on hook, lamp on ceiling, telephone on wall, jewel on necklace, earring on ear, toy train hooked onto and hung vertically from another one, popbeads held vertically, spider stuck on ceiling by web
<i>pak'al, noizol, map'al</i>	stuck on	F is thin and flexible	stamp on letter, mud on sausage, bug on wall, rubber hooks stuck on door, dirt on shirtfront, man on ladder, bandaid on foot, apple on branch, spider on ceiling, telephone on wall, bull on stake, balloon on stick, belt on waist
<i>chukul</i>	pierced through	F is relatively long/thin OR F is clothes	paper on metal spike, needle in woven mat, ribbon in book, shoe on foot
<i>lapal</i>	F is tightly inserted in/through	F is long/thin, G supports F	paper on metal spike, pole in ground, key in lock, plug in socket, candle in holder
<i>tz'apal</i>	G at one end		

Table 6. Some form-of-attachment use types



and ground is different in the two cases. In other words, *pachtal* encodes the notion 'sitting' of a container of a certain sort (wide-open-mouthed container in canonical upright position), or 'sitting in a container of that sort'; it can therefore be used to specify the position/location of EITHER an open-mouthed container of roughly hemispheric shape (a plate, basket, half-gourd container, etc.) or something IN such a container.

Similarly, *waxal* may be predicated of a 'standing' figure that is a taller-than-wide container (a bucket, basket, or bottle, for example) or even of a solid (noncontainer) tall object (e.g. a book):

- (32) waxal-0 ta ch'ujte' te moch/balti/limete/jun  
standing-3A PREP shelf ART basket/bucket/bottle/book  
'The basket/bucket/bottle/book is standing on the shelf.'

But also, for the set of appropriately shaped containers, it may apply to the contents as figure, with the shape restrictions applying to the container as ground:

- (33) waxal-0 ta pojip ich  
standing-3A PREP sack chili  
'The chilis are vertically-upright-positioned in the sack.'

In the same way, *nujul* (encoding either 'is upended', or 'is in/under an upended container of a certain shape') may describe the configuration of a figure ('corn') enclosed under an upturned vessel (the ground):

- (34) nujul-0 ta moch ixim  
upturned.hemisphere.shaped-3A PREP basket corn  
'The corn is under the upturned basket.'

or it may describe the upturned vessel (now the figure) itself:

- (35) nujul-0 moch ta lum  
upturned.hemisphere.shaped-3A basket PREP ground  
'The basket is inverted on the ground.'

And for some speakers at least, *jochol* (encoding 'is an empty container' or 'is in an empty container') can apparently describe either a figure located in an otherwise empty vessel (the emptiness applying to the ground):

- (36) jochol-0 ta balti setz'  
empty-3A PREP pail plate  
'The plate is in the (otherwise) empty pail.'

or an empty container alone (now the figure):<sup>32</sup>

- (37) jochol-0 ta lukuchte' chojak'  
empty-3A PREP wooden.hook net.bag  
'(The) empty net bag (is hanging) on the wooden hook.'

In these four cases the dispositional describes equally either the position/location of a specific sort of oriented container-shaped object *vis à vis* a ground, or something in/on the container. It is as if the shape of the container imposes itself on the objects supported by it in a way analogous to the way the shape of the container imposes itself on — or perhaps more aptly, creates a gestalt with — its support. But not all dispositionals to do with container shape display this ambiguity (those derived from transitive 'insertion' roots, such as *itk'il* 'inserted in' do not: as a specialized insertion predicate, it can only convey that the figure is 'in' the ground object), and some noncontainment relations do display it.<sup>33</sup> Figure 3 displays graphically some of these figure/ground ambiguities.

This kind of systematic "ambiguity" seems to be a pervasive phenomenon in Tzeltal dispositionals, suggesting that IN/ON are not primitive notions receiving linguistic encoding, but that the figure/ground gestalt as a whole is conveyed in the dispositional, and either figure or ground may be taken as the grammatical theme without altering the description.<sup>34</sup> The figure/ground ambiguities suggest that what many dispositionals — including those that may convey (among other things) 'containment' — really capture is a locative RELATION between figure and ground as a gestalt, which is constructed out of the shapes of both in relation to each other, and which is constrained by facts about gravity, slopes, intrinsic vs. malleable shapes, etc., which affect how objects can be configured in relation to each other.

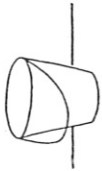
This interpretation is reinforced by the plural of these predicate adjectives. They take a special plural suffix *-ajtik*, which is optional but which, when it does occur, means not simply plural figural objects but plural figure/ground configurations. For example, in each of the following examples the plural version means that there is more than one figure/ground set described by the dispositional:

- (38) a. but'ul-0 ta p'in ixim  
stuffed.full-3E AT pot corn  
'Corn fills the pot.'  
b. but-ajtik ta p'in ixim  
stuffed.full-PL AT pot corn  
'Corn fills (more than one) pots.'

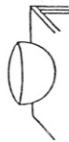
- (39) a. j'il-0 kajpej ta s-k'iyobil kajpej  
spread.out-3A coffee PREP 3E-drying.place coffee  
'Coffee is spread out (to dry) on the coffee patio (in one place).'

Shape/orientation/position characteristics may apply to EITHER the figure OR the ground object

to FIGURE:



waxal ta mexa te baltie  
standing AT table bucket  
'The bucket is on the table.'



pachal ta mexa bojch  
sitting AT table gourd bowl  
'The gourd is on the table.'



nujul ta mexa te basoe  
inverted AT table the cup  
'The cup is inverted on the table.'

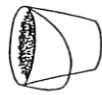


xojol ta sk'ab te spotzil sk'abe  
inserted AT his-hand the covering  
his-hand (i.e. the glove)  
'The glove is inserted onto his hand.'



joyol ta lum te ch'ajan tak'in  
circle-shaped on the ground the wire  
'The wire is in a circle on the ground.'

to GROUND:



waxal ta balti ixim  
standing AT pail corn  
'The corn is in the bucket.'



pachal ta bojch te mantzanae  
sitting AT gourd the apple  
'The apple is in the gourd bowl.'



nujul ta bojch te basoe  
inverted AT gourd bowl the cup  
'The cup is inside/underneath (the)  
gourd bowl.'



xojol s-k'ab ta y-util ala tzajal tzotz  
inserted his-hand AT its-inside red yarn  
(= glove)  
'His hand is inside the glove.'



joyol ta ch'ajan tak'in te ach'ixe  
encircled by wire the girl  
'The girl is encircled by (the) wire.'

b. ji'-ajtik kajpej ta jujun na ta majosik'  
spread.out-PL coffee PREP each house PREP PLACE  
yu'un ay-0 k'aal  
because EXIST-3A sun  
'Coffee is spread out (to dry) at each house in Majosik',  
because it's sunny.'

- (40) a. pamal-0 ja' ta lum  
flat.lying-3A water PREP ground  
'Water is lying (in a puddle) on the ground (in one place).'
- b. pam-ajtik y-a'lel balti  
flat.lying 3E-liquid bucket  
'Liquid is lying in (more than one) bucket.'

Levinson (1990) has suggested that "selectional restrictions" construed as constraints on shape/orientation/animateness of the figure are the core of the meanings of Tzeltal dispositionals. Such an analysis, however, fails to capture the essential fact that in many cases it is the overall gestalt presented by the configuration of figure and ground together that the dispositional adjective describes — for example where one object is screwed into another, or wrapped around another, or tightly encircling another, or hung from another. Thus, as mentioned above, if a human presents such a gestalt (e.g. by walking on all fours, or curling up on his/her side like a cat does, or even tightly up into a ball shape) then the adjective "selectively restricted" to animals, or to inanimate masses (*kotol*, *mochol*, *wolol* in these examples), is happily applied to the human.

Nonetheless, the central puzzle of these figure/ground ambiguities remains unresolved: in them the conditions flip from figure to ground. Levinson's proposal of a bipartite meaning for such words (where *pachal*, for example, is taken to mean either sitting OF a container of a certain shape, or sitting IN a container of that shape) captures the distributional facts but leaves one hankering for an alternative analysis that will preserve the essential unity of *pachal* presented in the gestalt of a certain container shape canonically sitting.

#### 4. Discussion

##### 4.1. Division of labor among word classes in locative resources

Looking at the stative predicates that appear in locative descriptions, and trying to come up with an analysis of the underlying semantic dimensions, has proved a daunting task, since a good proportion of the

entire verbal lexicon — positional roots, bivalent roots, and many transitive roots — can be inflected with a *-V<sub>1</sub>l* and/or a *-bil* suffix and cooccur with a locative *ta* phrase to specify WHERE and HOW something is positioned. Our field dictionary of dispositionals in locative descriptions contains more than 250 different roots at present reckoning, and new data continue to produce new roots to add to the list of the verbal roots that can perform this dispositional locative role. The underlying semantic distinctions involved do not, however, ramify endlessly: as we have seen, the core distinctions are of spatial attributes like shape, body position of figure, orientation and configuration of figure in relation to ground, form of attachment, quantity/size of figure, and occlusion. But it is important to realize that these semantic categories do not create notional sets of roots that in their adjectival form display any distinguishing morphological or syntactic features separating one set from the others.

Clearly, a language that expresses locative relations in the predicate has a quite different capacity for semantic differentiation than languages that extract certain semantic dimensions in a relatively small set of adpositions. And equally clearly, in Tzeltal this differentiation is not simply a matter of making finer distinctions among the same primitive dimensions that prepositional languages make more grossly.

These dispositional predicates often play a role in indicating where precisely the figure object is located, in a manner much more specific than the information carried in Indo-European prepositions. They do this by describing the configuration of one object in relation to another (for example, *bech'el* describes a long thin flexible figure object coiled around a ground object, like a hose around a pole; *lot'ol* describes a figure pinched between two prongs of a ground object; *lechel* describes a flat surfacelike object lying flat on a flat ground). Not all dispositionals provide such figure/ground configurational information explicitly, however. A body-position dispositional (e.g. 'standing', 'sitting', 'kneeling', 'lying face-down', etc.) doesn't contribute anything to the locative information carried in an accompanying *ta* phrase; it simply describes the body position of the figure,<sup>35</sup> leaving the *ta* phrase to spell out where the figure is so positioned. The same goes for dispositionals of pure shape (e.g. 'round', 'oval', 'disk-shaped'), and for many of attachment ('stuck on' [attached to surface of], 'hung on' [attached by gravity from projecting hook]), and so forth. Yet most if not all of these seem to be essentially RELATIONAL; a body is positioned in relation to a support, a figure is situated or attached in relation to a surface of some sort.

Can we conclude anything at all, then, about the division of labor in the Tzeltal locative systems? In some ways it is relatively clearcut. Body parts (as locatives) are clearly specialized for conveying spatial relations

of proximity to a surface part of the ground. Relational nouns are more diverse, with a subset specialized to the system of absolute angles (uphill/downhill, vertical) and others indicating regions defined in relation to an object's body or object configuration (its top/bottom surface, side, inside, middle — and some of these can also implicate the absolute angles). Geographic nouns provide axes in an analogous fashion to the absolute 'uphill/downhill' ones (a basis for drawing an axis from referent object to fixed point and indicating the relative location of figural object to reference object along this line). Dispositionals encode details of shape, configuration, position, orientation, which in describing the figure/ground gestalt help to locate it.

There are also some complex interconnections between the different systems. One of the most intriguing is the intimate relation between dispositionals and body parts: a given figure must be taken to have certain body parts in order to be considered as describable with a body positional. You can't 'sit' or 'squat' without a 'butt' to sit on, or 'kneel' without bendable 'legs'. What sort of an object something is (whether for example it is a certain immutable shape like a stone, or a body jointed so that it can take on specific body positions, or composed of mass stuff that can take on any shape required) constrains what dispositionals can be used to describe it, as well as what body parts it may be taken to have. And in Tzeltal this means that what sort of an object something is is intimately connected to how its location can be expressed.

To sum up: there is no neat lexical set of words for expressing locative relations like 'in', 'on', 'beside', 'in front of', 'behind', 'to the left/right of', in Tzeltal. The nearest translation equivalents of these sorts of spatial relations may involve using body-part terms, relational nouns, or dispositional adjectives — or indeed, all three at once, as these are not mutually exclusive options but express different degrees and kinds of precision about a particular figure/ground relation. For example, one might well use all three systems to indicate the location of a bucket underneath a cow:

- (41) waxal-0 ta y-anil x-ch'ujt waxak  
standing.vertically-3A PREP 3E-underneath 3E-belly cow  
'(It's) standing underneath the cow's belly.'

Nor is it unacceptably redundant to say (as one speaker did, in telling the Frog story),<sup>36</sup>

- (42) in te kerem-e, kajal-0 ta y-ajk'olal te  
DEIC ART boy-CL mounted.on-3A PREP 3E-aboveness ART  
jol-chij niwan  
head-deer perhaps  
'As for the boy, he is mounted on top of the deer's head perhaps.'



How do these different systems relate to the concepts of contiguity, support, and containment? Body-part terms convey simple contiguity, AT, never IN. But a spatial relation describable in English as 'on' or 'under' may in fact be inferrable from the use of a specific body part plus knowledge of how the body is oriented. For example use of a body-part term can indirectly indicate ON (above and supported by) if the relevant body part when the body is in its canonical orientation ('upright' for that particular kind of entity) can provide gravitational support (for example, 'head' of human, or 'back' of four-legged animal), similarly 'under' can be implied if the body part is canonically underneath (e.g. 'belly' of four-legged animal, or 'base' of tree). Explicitly however, *ta* BODY PART merely indicates adjacency to the specified body part no matter what the orientation of the body is. And the use of these body-part terms for inanimates can never indicate 'in' in the sense of 'enclosed within' (e.g. *ta xch'ujit* 'AT its belly' never means 'inside the belly of').<sup>37</sup> Relational nouns can convey certain spatial notions like 'inside of' (enclosed space), 'underneath', 'between', 'on top surface of', 'uphillwards of' or 'downhillwards of'. But the possessed relational noun that means 'its-inside' (*y-util*) is not an all-purpose way of conveying containment; it indicates the inside region of an enclosed space ('at its inside' of a house, cave, fence, container, etc.) within which a figure may be located. By contrast, 'inside-a-container' (bowl, bag, box, bottle, etc.) is most naturally conveyed by a dispositional adjective (which may be *pachal*, *waxal*, *chepel*, etc., depending on the shape or other attributes of the bag or container), and, as we have seen, many of these equally well convey 'on' relations (the container, empty, canonically supported underneath). The same holds for other dispositionals that can encode specialized forms of 'insideness' such as encirclement (*joyol*, etc.) or enclosure — a great many of them equally happily convey 'containment within' or 'encirclement around'.

The conclusion is inescapable that spatial relations like 'containment', 'contact with surface', and 'support' are not essentially what these dispositionals are about. Rather, their job is to portray very specific figural attributes (e.g. being of a specific shape, or body-positioned in specific ways, of specific sorts of objects) or figure/ground relations (e.g. encircling/encircled, or attached in a specific way — hooked, glued, hung, inserted at end, stuck through, stacked between, etc.). Use of such predicates can sometimes implicate IN, as we have seen, but there is a tendency with many that can convey IN to display figure/ground ambiguities as to whether IN or ON/OVER or AROUND is expressed.

The difference between this sort of 'where' system and that expressed by English prepositions is not simply a matter of Tzeltal using the same

spatial dimensions but splitting them finer, distinguishing them for certain categories of figural object, as Landau and Jackendoff characterize the situation. The very separateness of figure and ground objects is what Tzeltal obscures; specificity can apply to one or the other, or indeed to both taken as a unit.

#### 4.2. Theoretical implications

Where does this discussion bring us, in terms of projected universals in the linguistic encoding of 'what' vs. 'where'? The interrelation of distinct spatial systems in Tzeltal locative descriptions demonstrates that whatever kind of semantic specificity characterizes verb roots — and in the Mayan languages, as in many other Mesoamerican ones, this can be enormous — is inextricably involved in saying 'where' something is, as well as 'how' an action is done.<sup>38</sup> The weight of the Tzeltal spatial-relations system is in the predicate and therefore in these verb roots, not just in the prepositional phrase.<sup>39</sup>

It is not entirely clear how the Tzeltal case relates to the interesting claims of Landau and Jackendoff mentioned at the beginning of this paper. In the English case it is clear what would count as a counterexample to their argument: namely, an adposition such as their suggested *sprough* 'reaching from end-to-end of a cigar-shaped object', encoding a spatial relation combined with explicit shape information. But it is not so clear how their generalizations about languages that fractionate out the spatial relation in an adposition apply to a language like Tzeltal. Two possible versions of their claims are as follows:

1. Underlying descriptions of the location of objects in all languages is a conceptual structure of the following sort (Jackendoff 1987: 153):

(43) [State BE ([Object]<sub>x</sub>), [Place (PLACE-FUNCTION ([Object]<sub>y</sub>))] ]

where "place-function" in English surfaces as the spatial preposition. The Landau and Jackendoff claim is that place functions belong to the shape-impooverished 'where' system.

2. Place functions are encoded directly in linguistic expressions like prepositions, postpositions, cases, etc. Then one must point out that in languages like Tzeltal the BE relation also encodes much spatial information, including much of what is encoded in English prepositions.

For Landau and Jackendoff, either Tzeltal would appear to be the limiting case, with one spatially vacuous preposition proving the rule; then everything spatial in Tzeltal is done somewhere else, outside their purview. Or it looks as if there is a cognitively viable solution to the



expression of locative relations involving putting everything into the verb BE-LOCATED and downplaying dedicated spatial relator functions. And in this case WHAT is inextricably tangled with WHERE.

This characteristic of Tzeltal is closely tied to the nature of spatial conceptualization in the language and culture. Tzeltal places heavy reliance on "intrinsic" systems of spatial reference — where it is the INTRINSIC properties of objects (including shape and position and configuration of multiple objects) that define the coordinates or "frame of reference" for relating objects spatially. Egocentric perspective, and viewpoint information, is (relatively) suppressed. In a language with no locative cases and a single contentless preposition, meaning distinctions for locations are to be found in specific subsets of the classes of noun and verb roots.

Our analytical thinking about spatial language has been so dominated by prepositions that we have failed to notice how important the predicates are — the contrast between, for example, 'sit'-'stand'-'lie' is a very general property of locatives. The preoccupation with prepositions has corresponded to a neglect of predicates in the Indo-European languages.<sup>40</sup> And a language like Tzeltal carries the spatial distinctions in predicates to an extreme, incorporating many of the sorts of distinctions relegated to prepositions in Indo-European languages (e.g. 'lying-acrosswise', 'sitting-on-top-of', 'inserted-into', 'positioned-tightly-between-prongs-of'). Since the meanings like 'across' and 'between' are in the verbal roots and their adjectival derivations, looking for spatial relators in prepositions or cases alone is to miss the phenomenon altogether in Tzeltal. Note also that the shape/position/configuration is not just an aesthetic embellishment; it is actually FUNCTIONALLY important in defining the relative spatial arrangement of objects.

The Tzeltal body parts look even more like general spatial relators, relatively ungrammaticalized adpositions with most of their nominal properties intact, and with more shape in them than is consistent with the Landau and Jackendoff argument (see Levinson, this volume). In other Mesoamerican languages body parts have become grammaticalized affixes incorporated in the verb that contribute to the intrinsic description of locative relations in a way analogous to Tzeltal (see, for example, Levy 1994).

Tzeltal (and indeed, other Mayan languages) demonstrates that there is an alternative way to identify objects, make them countable, and locate them. This — as John Lucy (1992) has eloquently demonstrated for Yucatec Maya — trades off specificity in the noun for specificity in the verb; nouns for inanimate objects can be generally masslike, leaving verb roots (derived into classifiers) to specify the shape/form information that makes the noun individual, definite, and countable, just as these same

verb roots (derived into adjectives) make the noun definitely configured and therefore locatable. Any theory of the universal attributes of conceptual systems for WHERE and WHAT must take languages of this sort more seriously into account.<sup>41</sup>

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### Notes

1. A version of this paper was presented at the Workshop on Space in Mayan Languages, February, 1992, at the Cognitive Anthropology Research Group, Max Planck Institute for Psycholinguistics. Thanks are due to the participants in the workshop for their comments, in particular to Stephen Levinson, John Haviland, and John Lucy for numerous helpful pointers. I am especially indebted to Melissa Bowerman for sharing both her perspective on the issues raised herein and her notes, drawings, and props for eliciting descriptions of topological spatial relations in the field. I am also grateful to Paulette Levy, for her trenchant comments on the manuscript. Correspondence address: Cognitive Anthropology Research Group, Max Planck Institute for Psycholinguistics, P.O. Box 310, 6500 AH Nijmegen, The Netherlands.
2. Slobin (personal communication) has recently revised his views on this matter.
3. See Brown (1991, i.p.), Brown and Levinson (1992, 1993), Levinson (1990, 1991, 1992a, 1992b), Levinson and Brown (i.p.) for more details of the Tzeltal systems.
4. Tzeltal is a primarily VOS language; unmarked word order is verb-initial. See Aissen (1992), England (1989) on Mayan word orders.
5. The Tzeltal transcription follows the conventions for a practical orthography now accepted in Chiapas. These (where they differ from the IPA) are as follows: /j/ represents /h/, /ch/ represents /tʃ/, /x/ represents /s/, /tʃ/ represents /ts/, and /' represents either phonation with glottalic air stream mechanism or a glottal stop. Abbreviations for morpheme-by-morpheme glosses are as follows: 1,2,3E indicates 1st, 2nd, 3rd person ergative prefixes (these mark both subjects of transitive verbs and noun possession); 1,2,3A indicates the corresponding absolutive suffixes; IPLE is 1st person plural exclusive; IPLI 1st person plural inclusive; PL 2nd or 3rd person plural; ASP neutral aspect; BEN benefactive; CMP complete aspect; ICP incomplete aspect; ART article; AUX auxiliary verb; CJ conjunction; CL clitic; DEIC deictic element; DEM demonstrative; DIM diminutive; DIR directional; EXIST existential predicate; IMP imperative; NAME personal or place name; NC numeral classifier; NEG negative particle; PASS passive; PLACE place name; PREP preposition; PT particle; Q question particle; QUOT evidential clitic; REFL reflexive; REL relational noun; STAT stative (perfect) aspect; SUBJ subjunctive. T stands for transitive root, P for positional root, T/P for bivalent root.
6. These and other deictics are described in more detail in Brown (1991: 7–13).
7. As in many other languages with body parts used as locatives, contact is not a critical factor. There is a region associated with all body parts; in the dialect of Tzeltal we are describing this is quite small and is limited by what other objects are in the vicinity that

might be used as *relata* for the figure. There are a few body parts for which this region in some circumstances can be extended: most notably *pat* 'back'.

8. See Brown (1991, 1993), Levinson (1992b, this volume) for more details of the Tzeltal body part system, and de León (1991, 1992b, 1992c) for the analogous Tzotzil system. 9. They may, however, be historically derived from body-part names; there is evidence of this for *ba* 'top surface/edge' from the word for 'face' (see de León 1992c for an argument for grammaticalization of the Tzotzil cognate *ba*). But synchronically in Tzeltal these do not label body parts, and their meanings are more abstract than those of the inalienably possessed body-part nouns.

10. Brown and Levinson (1993) described this system in detail.

11. These strategies are shared with the closely related Mayan language Tzotzil (see, for example, de León 1991a, 1991b, 1992a, 1992b), although the details differ somewhat (Tzotzil seems to allow a more regional interpretation of the location of an object AT a body part, for example). But Tzeltal speakers talking about the location of objects also make extensive use of a fourth possibility, which is perhaps not so freely used in locative expressions in Tzotzil, because the latter has a general locative particle *te* that is lacking in Tzeltal (Haviland 1992).

12. Motion is handled largely by a set of intransitive motion verbs, and their grammaticalized auxiliary and directional forms. Thus the description of motion involves to a very large degree a system distinct from the description of static locations, although there is some overlap — for example the same positional roots we consider here in their stative adjective form can also be derived into transitive stems and used to convey transitive motion, actions of putting things into particular positions. See Brown (1991) for Tzeltal, and Haviland (1991) and de León (1992a) for Tzotzil.

13. They can also be expanded by a directional adverb, such as *tal* 'coming here', *bel* 'going there', *ochel* 'entering', *lok-el* 'exiting'. There are some 15 of these in Tzeltal, derived (mostly) from intransitive verbs of motion, which typically characterize the direction of movement for verbs of motion of perception. But (as Haviland 1992 points out for the corresponding Tzotzil forms) some of them may equally apply to static descriptions, indicating the direction along a path or axis involved in the relative placement of figure and ground objects in a static configuration (e.g. coming toward or going away from speaker, entering into or departing from an enclosed space). (See Brown 1991 for Tzeltal, Haviland 1991 for a detailed analysis of these in Tzotzil, and de León 1991b, 1992a for their acquisition in Tzotzil.)

14. It is also possible to use a stative form of a transitive stem (with the suffix *-oj*) or intransitive stem (with the suffix *-em*) as the predicate in locative expressions. These are eliminated from consideration here because their semantics is quite different from that of the dispositional predicates — an intransitive inflected with *-em* indicates that the intransitive motion has affected the object (it has 'entered', 'exited', 'passed by', 'returned', etc.). The transitive stem inflected with *-oj* indicates that someone (not necessarily specified) has performed the transitive action on the figure object (someone has 'grasped', 'inserted', 'piled-up', etc., the figure). See Haviland (1992, this volume) for details of the semantics of cognate Tzotzil verbs.

15. In our data the subject NPI is frequently omitted, having been given by the preceding context ('Where is NPI?') and its properties indicated by the predicate; in spatial descriptions it is also often preposed before the prepositional phrase (e.g. *k'otzol laso ta lum* 'the rope is in a.random.heap on the ground').

The corresponding Tzotzil locative structure is schematized by Haviland (1992: 5) as follows, where P is the predicate adjective (or a stative form of a verb) and Y is the

'ground' or 'landmark' in relation to which the 'figure' or 'trajector' is being located:

- (i) te P ta Y (ll X e)  
there P at Y ART X CLTIC

The Tzotzil 'general locative' *te* has a Tzeltal cognate *tey*, which does not have the corresponding general-purpose function: it is the anaphoric or distal deictic adverb 'there (the place just mentioned)'.<sup>1</sup>

A diagrammatic representation of these locative systems (with the exception of landmarks) is given in Levinson (1992b: Figure 22), which also contrasts them with the analogous systems for English.

The uniquely positional affixes (according to Kaufman 1971) include a set that transitivizes (*-p/Vn*, *-tz/Vn*, *-ch/Vn*, *-k/Vn*, *-za'an*, and *-Han*), and another set that intransitivizes (including all the ones above but ending in *-Vj* rather than *-Vn*, plus *-Vnaj*). Other suffixes attach to P roots as well as to some T, I, or A roots, and therefore don't distinguish P roots from these others; the adjectival *-V<sub>1</sub>l* suffix is one of these. The morphophonemic conditions for infixed *-j-* are given in Kaufman (1971).

Judging by their relative numbers in our field dictionary (based on that of Berlin et al. 1990), and our dispositional dictionary, as well as Berlin 1968, Kaufman 1971, Berlin and Kaufman 1962. There is as yet no adequate description of the morphological classes of Tzeltal verbs analogous to that for Tzotzil (Laughlin 1975; Haviland 1992).

There is considerable confusion in the literature on Tzeltal as to which class a particular root falls into; Berlin and Kaufman changed many of their ascriptions in their dictionary between the years 1961 and 1990, and the latter is still inconsistent.

John Haviland is currently investigating the morphological properties and the semantic packaging of analogous Tzotzil verb roots (see, for example, Haviland 1991, 1992, i.p., and this volume). As he points out, this task is essential if we are to understand what sort of resource for spatial description these roots are, and this is in fact only a part of their overall role in these languages.

The same sorts of features were identified as well in Berlin's (1968) semantic analysis of Tzeltal classifiers, which are based to a large extent on positional and 'bivalent' roots; Berlin distinguished some 80+ semantic domains. However, the meanings he identified for numeral classifiers seem in many cases to be semantically more restrictive than those of the corresponding dispositional adjectives.

This connection between position and location appears in various Mayan languages. Norman (1973) claims that the special thing about positionals in Quiche is this combination of locative and shape/size. And Smith-Stark (1981) makes a similar observation for Pokomam positional roots, which when inflected mean 'be located, said of something [with some specific character]'.<sup>2</sup>

Berlin et al. (1990) have *wolol* derived from a positional (P) root, *nolol* from a bivalent (T or P) root, and *k'olol* from a P root; if the latter attribution were correct the form *k'olbil* would be disallowed, it would be *k'olambil*.

See Haviland (1992, this volume) for detailed descriptions of the various root classes and their morphological properties in Tzotzil. See also Levinson (1990) for Tzeltal.

Haviland (this volume) examines the question of morphological groupings in detail for Tzotzil verb roots. See Levinson (1990) for a more detailed argument justifying this decision in Tzeltal.

Containment can also be conveyed, as mentioned above, by a directional derived from the intransitive verb *och* 'to enter, or by a stative form of this verb (*ochem* 'having entered into').

27. These have since been used by Bowerman and de León in Tzotzil fieldwork in Zinacantan and have been incorporated into the standard "stimuli kit" for spatial relations developed by the Cognitive Anthropology Research Group (Danziger 1993).  
 28. *k'atal* 'positioned across' is another dispositional that displays some of the same distinctiveness as *kajal*, and the semantics of which is also becoming rather prepositional-like, although it does not encode any notion of support. Both *kajal* and *k'atal* can also appear in grammatical constructions into which other dispositionals do not readily fit, in particular, as adverbs to describe the direction of action of verbs (and here the element of location + support is missing):

- (1) *k'atal*-0    *ya*    *x-mo-0*    *bel*    *ch'ail* *ail* *k'ajk'* *ta*    *s-xujk* *na*  
 crossways-3A ICP ASP-go.up-3A DIR (go) smoke fire    PREP 3E-side house  
 'The fire's smoke goes up outwards crossways at the side of the house' (i.e. it describes a diagonally upwards exit path).

Note that although the smoke is in motion and therefore describable by the motion verb *mo* 'to climb', it presents a constant figure appropriately described by the dispositional *k'atal*.

29. John Haviland points out (personal communication) that these facts about *kajal* setting it apart from the other dispositionals may indicate a process of grammaticalization at work.
30. According to John Haviland (personal communication), there are "metaphorical" extensions of the cognate *ba* in Tzotzil that do not insist on the vertical orientation — to the front side of tortillas or the tips of fingers, for example. In Tzetal the *ba* side of a tortilla is the canonically upward side, the side that swells up after turning.
31. It is worth mentioning that UNDER, though not a strictly topological spatial relation, is expressed in completely analogous ways in Tzetal. 'Under' may be straightforwardly conveyed by a relational noun, *ta y-anil*, 'at its underneath', which can mean either vertically underneath a ground object or 'below' it in the sense of in the downhill direction from it. For any ground object that has a hollow underneath area (e.g. a table, chair, or hat), *ta y-anil* specifies a search area within that hollow region. For solid objects, *ta y-anil* may mean either vertically underneath or downhillwards from. Items from the body-part set can also describe configurations of a figure underneath a ground: if the body part is canonically underneath (e.g. belly of a four-legged animal) or provides the support (as with *y-ok* 'its base or lower limbs'), an object located adjacent to it may well be 'under' it. In either case, a dispositional adjective may cooccur spelling out the body position, configuration, or shape, exactly as with the ones that can convey ON.
32. Some informants expressed doubt about the acceptability of the sentence in example (36); for others it is unexceptionable.
33. Of the dispositionals that cannot convey equally IN or ON it seems clear that certain notional categories predominate: those expressing pure shape, pure orientation, or pure body position. For example, with *wolol* and *k'olol* 'spherical (of different-sized ball shapes)' — the sphericity can only apply to the figure.
34. Melissa Bowerman (personal communication), following Pinker and Fillmore, observes that a possibly analogous phenomenon in English is the "locative alternation" for certain verbs that can be flexible about which noun arguments — that is, which thematic roles — they allow to perform particular syntactic functions like subject or direct object. English expressions like 'Bees swarmed in the garden' vs. 'The garden swarmed with bees' are an example of a quite productive pattern in English, applying to a variety of verbs, including verbs of putting things into containers or onto surfaces

(e.g. 'Water filled the tank', with both a stative and event reading, vs. 'The tank filled with water', with only an event reading), and some that conjure up a Tzeltal-like vivid visual image ('Corn bulged in the bag' vs. 'The bag bulged with corn'). However, these English sentences do not perform the same sort of locative role as the Tzeltal sentences we've been considering. It would be distinctly odd, for example, to say where the bag is by saying (as would be unexceptionable in Tzeltal) 'the bag is sitting bulging on the table'. What is distinctive in Tzeltal is that these are stative predicates, and there is no syntactic or morphological differentiation between the two cases. In Tzeltal you simply have a stative verb predicate indicating a figure/ground relationship, and an NP that tells you what object to take as the figure.

35. With a presupposition that the figure so positioned is supported underneath, by the natural effect of gravity, not hung for example in that position from an overhead support.
36. Dan Slobin and his colleagues have pioneered the use of the children's picture book, *Frog Where Are You?*, by Mercer Mayer, as a resource for eliciting narratives in cross-linguistic studies of language acquisition (see Berman and Slobin i.p.).
37. An exception is when body parts are used qua animate body parts; then internal ones can convey IN. For example, the body part for 'heart', *y-o'tan*, can indicate 'contained within' an animate creature's heart, but this is not one of the body parts productively extended to inanimate objects.
38. Landau and Jackendoff note in passing that there are, in addition to prepositions, many verbs that incorporate spatial relations in English, but they claim that "these can (almost invariably) be paraphrased by a simpler verb plus a preposition. For instance, *enter* can be paraphrased by *go into*, *approach* by *go toward*, and *cross* by *go across*." This is emphatically not the case for Tzeltal verb roots with their incorporation of specific features of the figure and/or ground and/or figure/ground relationship encoded, and the multifunctional vacuous single preposition.
39. As Levinson (1992b, this volume) argues in detail, shape is also crucially implicated in the prepositional phrase part of locatives: in the assignment of body parts to objects.
40. Sinha and Kuteva (1994) have recently argued this point in more detail.
41. Landau and Jackendoff, as well as Talmy, hedge their claims by asserting that they apply to languages where spatial relations are encoded in a closed-class set of words, which encode only pure location. In the first place, in Tzeltal (as Haviland has pointed out for Tzotzil) the only genuinely open class is nouns, into which all borrowings from Spanish are received. The class of verbal roots that can become dispositionals is large (somewhere between 250 and 400) but not open. In the second place, the fact that they convey more than pure location is precisely the point: shape-plus-location (in dispositionals) and shape-as-location (in body parts) is how location is expressed in Tzeltal. There is no pure location, except in very restricted contexts.

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## Vision, shape, and linguistic description: Tzeltal body-part terminology and object description<sup>1</sup>

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### Abstract

The Mesoamerican languages are renowned for shape discriminations. The Mayan language Tzeltal is no exception, and the theoretical implications are here explored for one area of the vocabulary that plays an important role in locative descriptions. Tzeltal body-part terms are "metaphorically" mapped onto parts of inanimate objects strictly according to a complex volumetric analysis of shape. This raises a number of fundamental issues:

a. In what sense is this a "metaphorical" process?  
 b. What is the relation of the volumetric analysis reflected in the language to the volumetric analysis involved in visual object recognition?

The answers given are the following:

a'. The mapping of body-part terms to shapes is not done by any form of creative analogy, but by a precise geometrical algorithm. Contrary to assumptions in the Mesoamericanist and cognitive linguistics literature this then has few of the properties of metaphor.

b'. There is a coincidence between the kind of volumetric analysis involved in visual object recognition and that involved in the application of these terms.

The conclusions from (b') may be far-reaching. According to modularity arguments, linguistic processes should have no access to strictly visual processes. Although the present facts are not decisive, together with other observations they favor models where there is shared linguistic and visual access to the underlying processes of volumetric shape analysis.

The paper suggests that cross-linguistic data might play an important role in general speculations about the relation between different kinds of mental representation, and that the Mesoamerican languages might have a special pertinence to the relation between visual and linguistic representations.

