

Directional Precision in Zinacantec Deictic Gestures: (cognitive?) preconditions of talk about space

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Résumé : Précision directionnelle des gestes déictiques en Zinacantec : conditions (cognitives ?) de la parole sur l'espace. L'étude comparée de la cognition spatiale établit un contraste entre les systèmes de calcul de la position et de la trajectoire qui reposent sur des raisonnements relatifs au corps - souvent le corps d'un observateur égocentré - et les systèmes fondés sur des coordonnées globales, des points de référence absolus n'impliquant pas la position ou l'orientation d'entités mobiles. Je considère ici le cas - issu de données enregistrées auprès d'un locuteur Tzotzil du haut Chiapas, au Mexique - où les ressources orales pour décrire des relations spatiales sont moins élaborées que les représentations gestuelles correspondantes. Des travaux antérieurs sur le Tzotzil montrent que dans cette culture l'expression des relations spatiales repose, cognitivement et interactivement, sur des représentations très précises de l'espace présent et distant, caractérisées par une orientation absolue. Je décris des situations semi-expérimentales qui visent à examiner ces ressources expressives et leurs conceptualisations sous-jacentes. Les gestes révèlent avec évidence non seulement la spécificité de la connaissance spatiale mais aussi le type d'opérations conceptuelles - comme la transposition ou le recentrage - disponibles auprès des interactants pour communiquer à propos de cette connaissance.

Mot-clefs : langage spatial, conceptualisation spatiale, Tzotzil, langues Maya, gestes, descriptions d'itinéraires.

Abstract: Comparative work on human spatial cognition contrasts systems of calculating position and trajectory that involve body-relative reckoning - frequently where the body in question is that of an egocentric observer - with systems which rely on global coordinates such as compass directions not relative to the positions and orientations of moveable entities. I consider here a case - from a Tzotzil speaker from highland Chiapas, Mexico - in which spoken resources for describing spatial relations are less developed than corresponding gestural representations. Previous studies of Tzotzil suggested that expressing spatial relationships relies, cognitively and interactively, on quite precise, absolutely oriented representations of both microspace and distant locations. I describe semi-experimental studies designed to examine expressive resources and their conceptual underpinnings. Gesture provides striking evidence not only about both the specificity of spatial knowledge, but also about other conceptual operations - transpositions and re-centerings - available to interactants for communicating about such knowledge.

Keywords: spatial language, spatial conceptualization, Tzotzil, Mayan, gesture, route descriptions

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INTRODUCTION

Recent comparative work on human spatial cognition contrasts systems of calculating position and trajectory that involve largely body-relative reckoning - frequently where the body in question is that of an egocentric Observer - with heretofore rarely recognized systems which rely on global coordinates, compass directions (or winds, the path of the sun, unchanging coordinates like up- and down-river, etc.) not subject to the positions and orientations of moveable entities. That the cognitive operations required for one sort of spatial reckoning differ from those of the other is hardly in doubt, and much recent work concentrates on links between spoken expression of spatial relationships and the corresponding conceptual underpinnings. I consider here a case - from a Tzotzil speaker from highland Chiapas, Mexico - in which spoken resources for describing spatial relations offer considerably less delicacy than corresponding gestural representations. Evidence from narrative route descriptions suggested that expressing spatial relationships relies, cognitively and interactively, on quite precise, absolutely oriented representations of both microspace and distant locations. I describe semi-experimental studies designed to pursue the nature of these expressive resources and their conceptual underpinnings. Gesture provides striking evidence not only about both the specificity of spatial knowledge, in the so-called "absolute" frame, but also about other conceptual operations - transpositions and re-centerings - available to interactants for communicating about such knowledge. The current report also furnishes evidence about the precision of directional gestures, even when the spatial knowledge involved is retrieved from rather remote memory.

1. SPATIAL "FRAMES OF REFERENCE" IN ZINACANTEC TZOTZIL

Recent work on spatial language (see Levinson, 2003) distinguishes conceptually different "frames of reference" for calculating position, trajectory, and location. In the simplest, canonical case, a certain entity (usually called the Figure) is located with respect to some other reference object (or Ground-Talmy, 1985) imports these terms from gestalt psychology to apply them to linguistic descriptions of motion events), by specifying a "search domain" in relation to the Ground in which the Figure can be found. When the Figure is spatially displaced from the Ground, defining the search domain requires specifying both distance (how far the Figure is from the ground) and angle: in which direction to look. In practice, of course, there may be multiple Grounds in play or available for calculating the position or trajectory of any given Figure, and therefore complex triangulation may be involved.

Levinson (1996b) distinguishes three major "frames of reference" that natural languages use for specifying such an angle. Two are familiar and reasonably well-described. The simplest is an "intrinsic" frame in which the built-in geometry of the Ground provides distinguishable angles from which to project a search domain. For example, the Ground may have a (partly conventionalized) anatomy, with certain parts labeled front or back, head or tail, and so forth. Thus, in Tzotzil (a Mayan language spoken in Chiapas, Mexico) one can locate an object by saying

(1)¹

te tz-jip ta y-ok tem
 THERE INC+3E-throw PREP 3E-foot bed
He throws it there by the foot of the bed.

Here the “anatomy” of the bed includes a named “foot” section, thus identifying an area around the bed where the object is to be found.

The “relative” frame requires that an angle be projected from the Ground but relative to the perspective of some viewer, whose “intrinsic” parts and orientation are mapped in one way or another onto the Figure/Ground relationship. Such a frame of reference is especially useful when the Ground has itself no relevant anatomy. Thus, although for Tzotzil speakers, a mountain has a clear head (its summit) and foot (its base), it has neither “sides” nor “front/back” from which horizontal angles can be projected. It is the perspective of some observer, typically the speaker, whose “front” or “back” can be projected onto the mountain.

(2)

te nakal ta pat vitz
 THERE resides PREP back mountain
He lives there behind the mountain.

Convention will also be involved here: for Tzotzil speakers this expression means that the person lives on the FAR side of the mountain with respect to the relevant perspective, e.g., on the opposite side of the mountain from where the speaker finds himself. Other speech traditions calculate an angle expressed in the same terms differently, for example by placing the residence of the person referred to BETWEEN the mountain and the observer (Hill, 1982).

Levinson’s third frame of reference he calls “absolute” (or “environmental” or “geocentric”) because it instead uses Ground- and Frame-independent “antecedently fixed bearings” that can be given by reference to a larger, sometimes global environment. Perhaps the best described examples of languages which prefer this sort of frame of reference to the others are from Australia and involve the use of expressions like “upriver/downriver” (Dixon, 1972) or global “cardinal directions” like North/South/East/West (Haviland, 1979c, Haviland, 1989c, Haviland, 1998a). Although Tzotzil does not have a well-developed terminological system encoding such “absolute” directions, it uses a simple opposition between *ak’ol* ‘above’ and *olon* ‘below’ to encode - at least in the community of Zinacantán I know best - the opposition East-West, also captured by explicit reference to the rising and setting sun.

(3)

oy parajel ta y-ak’ol ech’el muk’ta be
 EXIST village PREP 3E-above DIR(away) big road
There is a village to the East of (lit., above) the highway on the other side.

¹ Examples are drawn from recorded conversations and narratives. I employ a practical orthography for Tzotzil in which letters and digraphs have their Spanish pronunciations, in which ’ follows a glottalized or ejective consonant, and ` represents IPA /ʔ/.

(4) (from Laughlin 1976, Dream 151²)

laj tal xi ta lok'eb k'ak'al ti mixa une
 finish DIR(coming) THUS PREP rising sun ART mass CL

The Mass finished there to the East.

As can be seen from the examples, Tzotzil uses all three of Levinson's frames of reference, though it probably makes most frequent use of the "intrinsic" frame by exploiting elaborated conceptual anatomies for objects and a hypertrophied lexicon of "positional" roots whose semantics depend on these anatomies (Haviland, 1992c).

Different languages (and communities of speakers even within a single language) combine the different frames of reference in different ways, and each frame of reference seems to imply different sorts of conceptual calculations about objects and their spatial relations. In particular, to use an "absolute" frame of reference based on cardinal directions, it seems that for at least certain spatial tasks a speaker must keep track of cardinal directions or some similar "global" coordinates, and her interlocutors must equally be able to apply those coordinates in understanding spatial description. Evidence for such directional tracking comes from behavior other than speech (see, for example, Levinson, 1997): performance on memory tasks, for example, and crucially for the present paper, gesture - both accompanying speech and independent from it. In other work (Haviland, 2000c), I have used the oriented gestures of Zinacantec Tzotzil speakers to argue that, despite the relative lexical poverty of the cardinal direction system in the language, Zinacantecs do in fact continually monitor cardinal directions in some spatial tasks and descriptions. The "absolute" frame of reference is thus exhibited in their gestures more prominently than in verbal descriptions of location or motion, since the spoken language has relatively undeveloped resources for describing such directions. In this paper I will explore further the nature of the cognitive processes involved, or, more exactly, of the precision of orientational awareness. Here, too, my evidence comes from gesture.

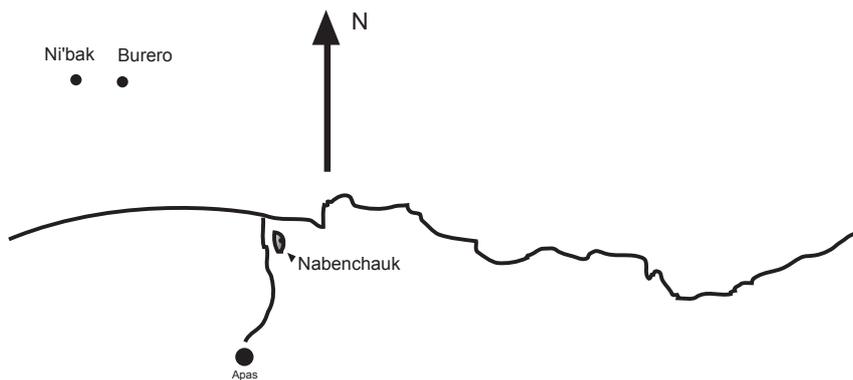
2. GESTURE AND LOCATION

In an early study of the "absolute" frame of reference in the Pama-Nyungan language Guugu Yimithirr (Haviland, 1986b, Haviland, 1993), spoken in northeastern Australia, I compared two serendipitously collected filmed narratives, separated by a couple of years, in which the same Guugu Yimithirr man tells a story about a shipwreck when he was a young man. Careful comparison of pointing and other oriented gestures in the two performances reveals a remarkably exact coincidence between the verbal expressions of orientation, the actual known geography of the area where the events took place, and the orientations of locations and vectors in pointing and representational gestures accompanying speech. Given the ubiquitous and insistent use of cardinal direction terms in all Guugu Yimithirr discourse, such a coincidence is perhaps not unexpected, simply because to manage the elaborate morphology of cardinal direction terms, speakers of the language cannot avoid keeping track of directions.

² Laughlin did not publish the Tzotzil versions of these Zinacantec dreams, and I am indebted to him for sharing some of the Tzotzil texts.

In a subsequent study, using films of two occasions on which a Zinacantec Tzotzil speaker described how to get from his home village in the highlands of Chiapas, Mexico to the distant resort city of Cancún, I argued that although the narrator used almost no Tzotzil expressions specifically mentioning direction or orientation, nonetheless his gestures were oriented in much the same way as those of Guugu Yimithirr speaker to coincide precisely with the actual geography he was describing. That is, if one calculated the exact compass directions involved in gestures illustrating different segments of the route, they corresponded segment by segment to the compass directions of the trajectories involved. Further details can be found in Haviland (2000c). In fact, attention to the orientation of gestures in many different sorts of Zinacantec discourse suggested that Tzotzil speakers are not unlike speakers of Australian languages in being attuned to cardinal directions in communicating a wide variety of spatial situations, although spoken Tzotzil almost entirely omits verbal reference to such directions.

Consider, for example, the use of gesture to invoke geographically anchored spaces in the following segments from different kinds of Tzotzil narrative, which illustrate more of the verbal resources available for spatial description. In the first fragment, a Zinacantec named M - whom we shall meet again later in this paper - is asked where a specific town named Burrero is located.³ He answers first with a gesture and a simple deictic, *li`toe* 'just here.' The rough representation in Map 1 shows the village of Nabenchauk, where M was conversing, in the wider context of the local geography, which includes the other villages M mentions.



Map 1: the villages of Nabenchauk, Burrero, and Ni`bak.

Based on how M was sitting and the angle from which he was being filmed, it is possible to assign a rough cardinal direction to his pointing gesture (roughly 310 degrees, calculated clockwise from due North at 0 [=360] degrees.). In Figure 1 we see M's pointing gesture and a representation of the vector it would project in the wider geographic space. Note that he sits at the bottom of a valley, from which vantage point he can see only the surrounding mountains and not the distant village of Burrero at which he points. Still, since

³ I am indebted to Lourdes de León for sharing her videotaped interaction with M. Note that she has asked M explicitly to locate Burrero in space, a question he may have taken either as genuine or as a kind of test (assuming, that is, that she already knew where it was).

it is possible to see Burrero directly from the top of the mountains ringing the valley, it is presumably not hard for M to know in which direction to point.

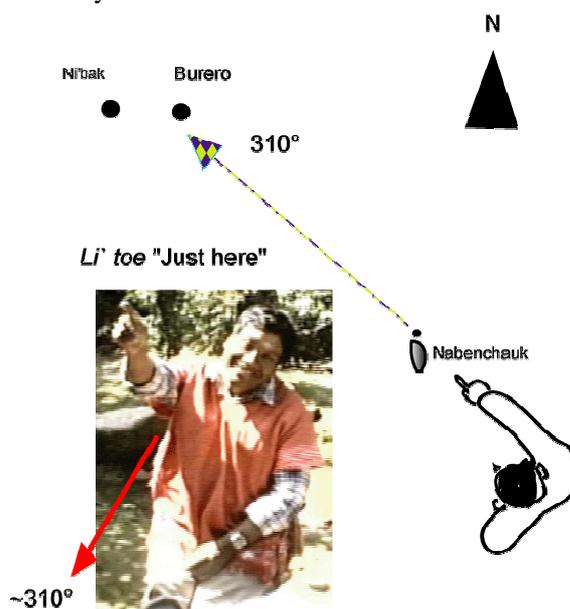


Figure 1: "Burrero is just here (pointing)."

However, M gives a slightly more detailed follow up to his locational description, which displays further knowledge of spatial relationships across the territory. He amplifies his description by saying

(5)

ta y-ak'ol talel Ni`bak.

PREP 3E-above DIR(coming) Ixtapa

(Burrero is) above Ixtapa, in this direction (i.e., toward here.)

He now explicitly locates Burrero in relationship to two other places: first it is "above" (that is east of) the larger and better known town of Ixtapa (*Ni`bak*). He appends to the possessed form of "above" a directional element - "coming" - that adds a further deictic dimension to the description. It indicates that Burrero is between Ixtapa and the place where he and his interlocutor are now; thus the trajectory from Ixtapa towards Burrero is both easterly and "coming" towards where they sit. (M thus combines an "absolute" and a "relative" frame of reference in the same complex morphosyntactic construction.)

Figure 1 shows the accuracy of M's characterization. Moreover, as we can see in Figure 2, as he pronounces each of the crucial words in his locative description M's manual gestures correspond in an interesting way to his description. As he says "above" he gestures with a kind of beckoning gesture in his own direction (seemingly illustrating "coming"). As he says "coming" he flips his hand from west to east, seemingly illustrating "above/east." Finally, as he names *Ni`bak*/Ixtapa, he points in the direction of that village (using a pen he is holding in his hand). Gesturally, he projects the relevant spatial relations involved in his verbal description, using true cardinal directions to anchor the projected relationships.

"above Ni`bak on this side"

y-ak'ol talel Ni`bak
 POSS- above come-DIR

ya- k'ol



ta- lel



Ni`- bak



Fig. 2: above Ni`bak, on this side

3. SOCIAL GEOGRAPHY

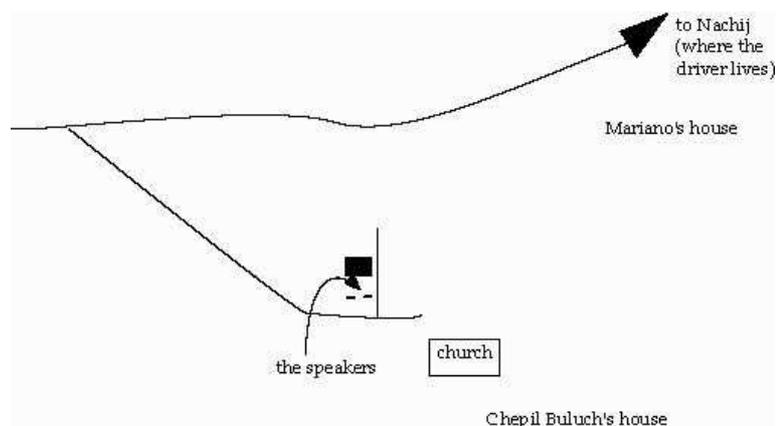
Evidently, then, this speaker's understanding of the local territory includes the locations and orientations of nearby places. Although I shall have little more to say about such matters in this short essay, partly because of the semi-experimental nature of some of the materials to be presented, it is clear that M marshals communicative resources in this little performance that are specifically tailored to the interactive situation. Both his verbal "formulations of place" (see Schegloff, 1972) and his gestures are designed for his interlocutor and take into account what he assumes his interlocutor to know (and what his interlocutor shows himself to know) about local geography. They are "designed" for his "recipient" in the normal way, and they thus presume certain

interpretive skills and geographic knowledge on her part.⁴ Of course, geography is saliently populated by social entities as well as physical ones. Let me demonstrate how such entities are placed onto the interactive stage with a brief digression, which involves a slightly more interactively natural communicative exchange.

A man is telling his neighbor about a truck crash involving local people. The conversants are seated in a fenced house patio. In fragment 6, M asks X, the principal narrator who knows details of the crash, who the driver of the ill-fated truck was (line 1), and he goes on to venture a guess (line 2) that it was a certain man named “Pancho” from another hamlet called Nachij. X confirms the guess (line 3). (Gaze, gestures, and other movements are informally notated above the accompanying speech, aligned so as to show rough synchrony between the onset of movement and verbalization.)

(6)

- [M lifts head toward Nachij
- 1 m: much'u spas manejar
Who was driving?
- [M's gaze turns to X
[X's RH starts out to his R
- 2 pero ja` li pancho ta na[chij
I suppose it was Pancho from Nachij.
- [RH up, index finger up
- 3 x: ja` li pancho ta nachij une
Yes, it was Pancho from Nachij.



Map 2: Social geography in the conversation about the truck crash.

Consider how the interlocutors indicate specific social geography in this short interaction. There is virtually no locative talk here, except for the reference to the town of Nachij. Instead, more precise directions are communicated via gesture. The two men are seated facing north, as indicated on Map 2 where

⁴ It is not clear, and now much too late to try to discover, how much M assumed his interlocutor knew about nearby towns.

by convention North is towards the top of the map. (In the video stills, X, the narrator is seated on the left - i.e., to the east - of M, his interlocutor.) Both name the nearby hamlet of Nachij, where the truck driver “Pancho” lives. They also indicate the absolute location of Nachij, in two different ways. M, just before he ventures his supposition that Pancho was the driver (i.e., between lines 1 & 2 on the transcript), lifts his head and gazes in the direction of Nachij “as the crow flies” - that is, he gazes briefly and tosses his head in the direction one would head to go to Nachij by the shortest normal route (see Figure 3).

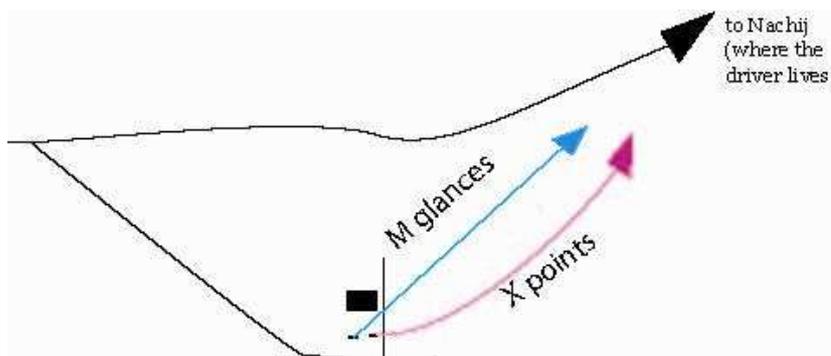


Fig 3 But was it Pancho?

X confirms M’s guess, very briefly pointing with the index finger of his right hand raised in the same direction, toward Nachij (Figure 4).



Fig 4: It- was Pancho



Map 3: the truck driver

The named town of Nachij is thus explicitly and interactively located with respect to the place the men sit, via gaze and a subsequent interactive echo: an oriented pointing gesture.

Evidence like this suggest that Tzotzil speakers, despite the lack of insistent verbal reinforcement for directional precision in speech, nonetheless maintain orientation in their bodily representations of local geography. In this small interactive fragment, the interlocutors mutually produce multiple aspects of these representations - a topic worthy of study in its own right, but one which I shall not pursue here. Instead, in the rest of this paper I consider how detailed and exact these representations are, and how far they extend away from immediately available, commonly known local landmarks.

4. ROUTE DESCRIPTIONS: LOCAL SPACE

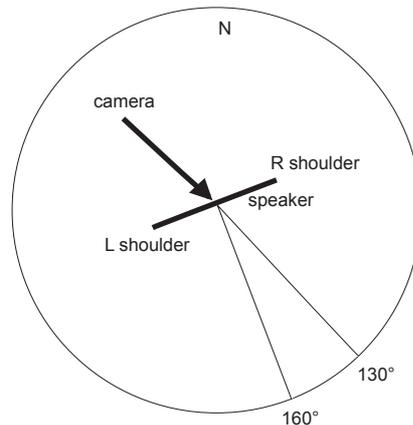
As part of a larger project⁵ National Science Foundation KDI program, Grant No. BCS-9980054, “Cross-Modal Analysis of Signal and Sense: Multimedia Corpora and Tools for Gesture, Speech, and Gaze Research.” to examine the relationships between speech, gesture, and gaze by using video and computational tools to facilitate exact calculation of motion vectors in gesture (see Bryll and Quek, n.d.), I decided to look more closely at gestural evidence for an “absolute” frame of reference in Tzotzil spatial conceptualization. Let me describe the experiment, before discussing the results. To allow for computer-assisted calculation of directional vectors in gesture, a procedure was designed involving multiple digital video recordings of the same interaction, precisely calibrated. For the purposes of this work, in July 2001 I asked my Zinacantec compadre, M, to describe to me the route he used to take to travel to Cancún. This was the same man who had serendipitously described the identical route ten years previously, and although in the intervening years he had made the trip only once (by air - he said he had no idea what route the airplane had followed because he had been too frightened to look down at the earth below), he had no hesitation in performing the task for the five digital cameras arrayed around us.⁶ Because of the vagaries of natural light and color

⁵ Support was from a subcontract to Reed College from National Science Foundation KDI program, Grant No. BCS-9980054, “Cross-Modal Analysis of Signal and Sense: Multimedia Corpora and Tools for Gesture, Speech, and Gaze Research,” Frances Quek, Principal Investigator.

⁶ Clearly the experimental situation differed, in obvious ways, from a natural interaction, partly because of the multiple video cameras, but more importantly because my compadre could assume that I already

(as contrasted with videos filmed in a controlled laboratory), it never proved possible to use computer-assisted vector analysis on the resulting videotapes. However, since the different video cameras were carefully positioned and their directional orientations precisely measured, it has been possible to hand-code approximate directional vectors at salient points in M's narrative.

Figure 5 diagrams M's rough orientation in the 1991 films, when he described how to get to Cancún from the vantage point of his home village of Nabenchauk. In fact, in 1991, M described the route twice, once for me in the morning, and again, later that same day for my colleague Lourdes de León. The comparisons below draw on videotapes of both versions.



1991 filming of Cancún route, Nabenchauk

Figure 5.

On the basis of the narrated route description in 1991, I was able to calculate a very approximate rendering of the directions involved in the different stages of the trip, as shown in Figure 6, which can be compared to a standard Western map of the same territory in Figure 7.⁷ A principal aim in the present study was to understand not simply the overall course of different trajectories in M's descriptions of this route, but further to tease out his point-by-point or intersection-by-intersection tracking of (and memory for) directions all along the route between highland Chiapas and Cancún. It seems clear, from the maps, that in the 1991 tellings M had a strong memory for the overall trajectories .

knew the route in question as well as he, thus changing his formulations and "recipient design" in general.

⁷ Note that while the orientation of each segment can be calculated from M's gestures, there is of course no comparable way to work out the corresponding distances, which are thus represented on Figure 6 so as to coincide with the standard measurements. I do not mean to privilege the graphic and metrical representations of Western maps but only to allow comparison of the represented directions.

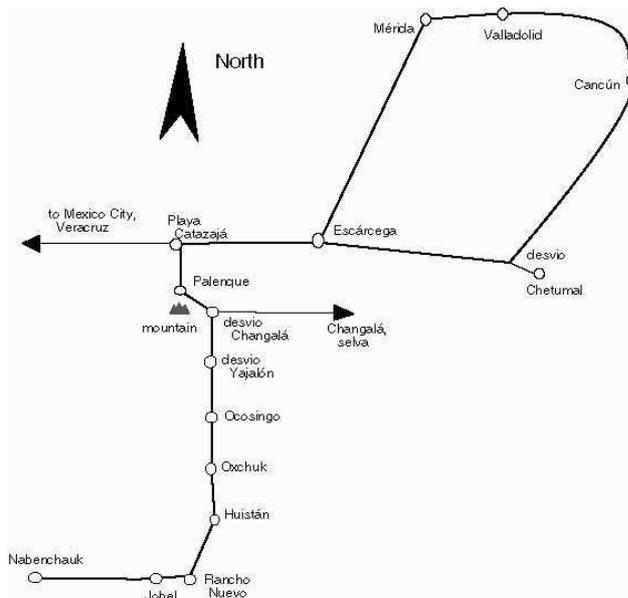


Figure 6: M's approximate "gestured" map of the route to Cancún, 1991 telling

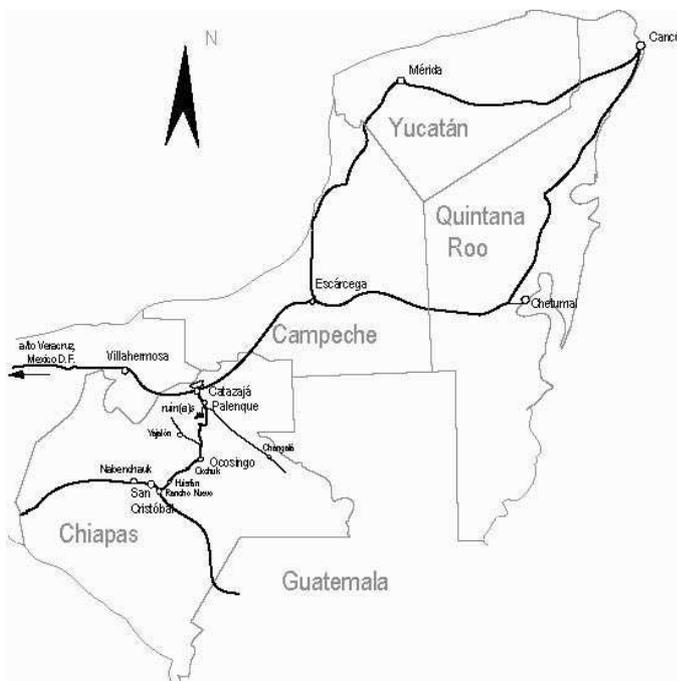
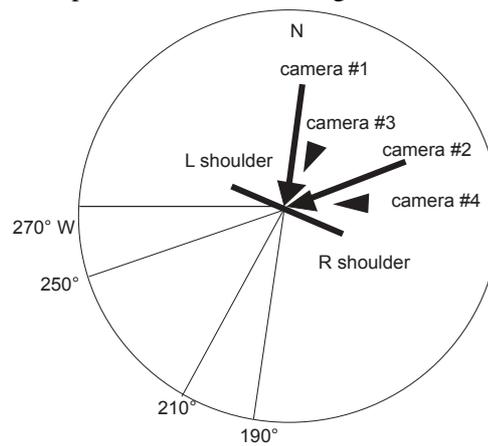


Figure 7: standard map of the route between Chiapas and Cancún.

In 2001, ten years later, armed with more elaborate digital recording equipment, I again asked my compadre M to describe the route from highland Chiapas to Cancún. On this occasion we were seated not in M's home village

of Nabenchauk, but rather in the nearby Mexican town of San Cristóbal de las Casas. Moreover, multiple cameras were arranged as shown in Figure 8.



2001 Cancun route description, SCLC

Figure 8.

Most of the video frames from the 2001 narrations that I use in this paper were extracted from camera #2, which, as the diagram shows, was facing just to the south of west. To illustrate how one can thus read directions from the video frame, here is how M gestured when - at the very end of the video recording session - I asked him explicitly to show me where he calculated the sun to rise. Figure 9 shows the result.

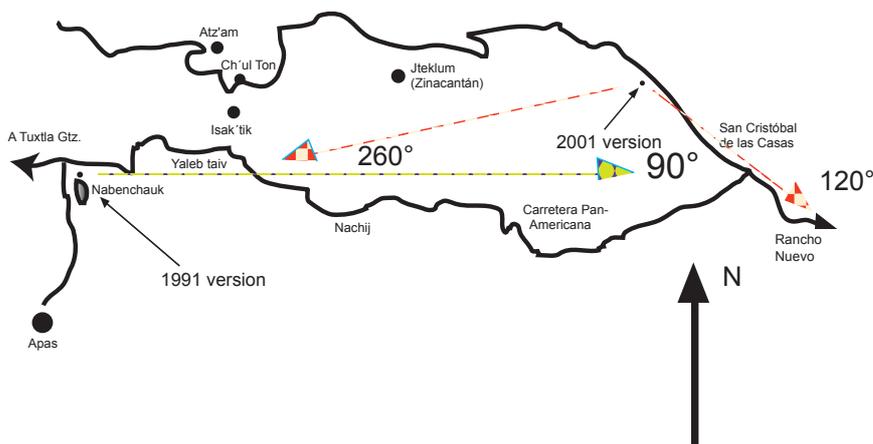


Fig. 9. Where the sun comes up (2001, camera #2).

Returning to the description of the route to Cancún, interestingly, M reported no memory of having performed a similar task a decade before, and,

indeed, he first remarked that he couldn't really tell me about the route because he had not made the trip for many years and could no longer remember the names of all the intermediate points.⁸ Finally he recounted the route, and the striking consistency between his directed gestures on this occasion and those from a decade before is suggestive of the spatial representations he must maintain of his travels across southeastern Mexico.

Consider, first, Map 4 which shows the relative positions of the two places M sat as he described the route in 1991 (he was in the village of Nabenchauk at the left part of the map), and again in 2001 (on the outskirts of San Cristóbal, northwest of the city - towards the right of the map).



Map 4: Two route descriptions, two locations.

Map 4 shows how M oriented himself to local geography on the two occasions. In 1991 he pointed in the direction both of Burrero (pronounced Bureró in Tzotzil) - in the gesture we considered earlier, shown on the Map with a blue arrow - and of San Cristóbal, shown with a green arrow. In 2001, sitting in San Cristóbal, he oriented himself with respect to his home village of Nabenchauk and of the place known as Rancho Nuevo, through which one must pass to begin the trip to Cancún. What these pointing gestures seem to show is that M, just like the other Zinacantecs talking about social geography, is firmly anchored in the local area, precisely oriented with respect to nearby locales. Within this locally anchored space, M is able to point directly at named places.

5. ROUTE DESCRIPTIONS: PLAYAS DE CATAZAJA

Now consider how M's gestures are oriented when he describes distant places along the route to Cancún. To anticipate, the evidence from these route descriptions, separated by a decade, suggests that M maintains a representation of the route sufficient to fuel an "absolute" or globally-based frame of reference which he *transposes*, point-by-point, as he projects himself from where he actually is to an imagined point along the route. What remains constant in these projections is the set of absolute cardinal directions, which, as it were, anchor

⁸ Traditional Zinacantec route descriptions concentrate on reciting named spots along the route, an indirect way of describing the amount of time required to walk from one place to another by associating specific times - the moment of dawn, or of taking a meal - with named locales.

or re-center the projected distant place in the orientation of present local space. I shall consider three salient moments along M's narrated route to show how this works. (The reader may wish to consult again Map 3.) The first is the intersection of major highways that M describes to the north of Palenque, near a town called Playas de Catazajá. Details of the intersection can be seen in Map 5.



Map 5. Intersection near Playas de Catazajá.

In the first of his route descriptions from 1991, M has narrated the journey as far as the town of Palenque, site of famous Mayan ruins. He continues as shown on the following transcript fragments. (As before, gestures are notated above transcript lines, with numbers in the notations corresponding to movements of the hands and arms shown on the accompanying drawings.)



m0101

4

98 m; ta- . ta jtamtik ech'el xi to e ta jnuptik xa li ali =
We.. we set out this way, we meet, uh-

In line 98, he extends his arm out northwards as he says *ta jtamtik ech'el* 'we set out away', and just as he says *ta jnuptik* 'we meet it' his hand drops slightly (as shown by the 4 on the drawing and above the word on the transcript line). He then initiates an apparent word search (with the hesitation marker *ali* 'uh'), which leads to a short gestural performance without words. Note that to interpret his gesture as "absolutely oriented" one must perform a conceptual transposition, as the point to which he is apparently "pointing" (and

whose name he is apparently trying to produce) lies north not from where he sits — in his village recounting the route description — but from Palenque, the point he has already reached in his narrative.



m0103 hand dips downward slightly

| 1 (gaze to fingers)

2 3 (fingers splay slightly)

Apparently visualizing the intersection where the road leads north to Palenque and meets a larger East-West highway, he appears to indicate both with the shape of his hand and an East-West movement the T-junction and the trajectory of the highway.



m0104

| (down to)

4

5 (up again)

100

playa: katasaja chtal ali jun be ta Merida

Catazajá Beach; a road comes to/from Mérida

Finally, in line 100 he pronounces the name of the place at the intersection in question - Playas de Catazajá - and he goes on to indicate that the road continues east if one will travel to Mérida (see the sweep of his flat hand at 4 & 5 here).



m0105 (up) 1 (down)
2 up

3 (then back to 2) and backhand out

101 ta mejiko chlik tal chava`i li jun karetera-
It starts in Mexico, you know, a highway-

Still using his right hand, M now reaches across his body, to show that this same highway he is describing originates in Mexico City, far to the west.



M0114

LH starts up, and head tilts down and to right
highest point of left hand up NW

| 1 2 3

108 m; tuk' onox chtale ch`ech' ta verakrus ch`ech' ta =
It comes straight, passes Veracruz, passes

109 =viyaermosa
Villahermosa

M now switches to his left hand and performs a broad sweeping motion, left to right (that is, west to east, as he sits), as he describes how the highway in question, after leaving Mexico City, passes through Veracruz and then Villahermosa.



M0116...1-2....(held high)...

111 m; chbat onox yech

It goes on that way

Finally, this section of the route description ends, as M remarks that after leaving Villahermosa, the highway continues in the same direction. His second sweeping gesture to his right suggests both that the trajectory continues eastward and that the highway goes on for a considerable distance. (Consulting map 3, one sees that essentially the same road continues all the way to Chetumal on the Caribbean coast.)

There are for me, two striking features of this short segment. First although considerable information about directions and orientations seems to be conveyed in M's performance, virtually none of this directional information is encoded in his *words*. Instead, the gesture, coupled with M's current orientation in space, do the work. Moreover, as anticipated, the orientations associated with M's gestures - if, that is, we are to read them as consistently designed to convey information about cardinal directions - involve a **projection**: from the current space, with its attached cardinal directions, to a narrated space onto which the same orientations from the here and now must be superimposed. That is M's narrative creates a projected or narrated *origo* from which cardinal directions are calculated from the spatial context of the narration itself.

What evidence might we have that it is any more than coincidence that the cardinal directions of M's narrating gestures correspond to what the map seems to tell us about the intersection at Playas de Catazajá? First, consider the second 1991 telling of the route to Cancún, filmed independently later on the same day by Lourdes de León. Once again, the extract begins at the point that M is describing how one departs from Palenque and arrives at Playas de Catazajá.



59

playa de katasaja

Playas de Catazajá

|RH up and pointing down in front

|RH just E, and gaze down to it

60

ja` taj- ta jtatik li desvio le`

So we get as far as the turn-off there

Using his left arm, M reaches out in front of his body and makes a slight gesture downwards and slightly to his right, indicating a trajectory just west of north (which corresponds to the direction one must travel from Palenque to the turn-off in question).



|RH moves up to W and back down and out E

|then back to point down in front

1---2---3

61

jtatik xa li ali .

We get as far as .. uh ..

repeats same sweeping gesture as above

| then RH sweeps out and up E

62

karretera chbat ta merida

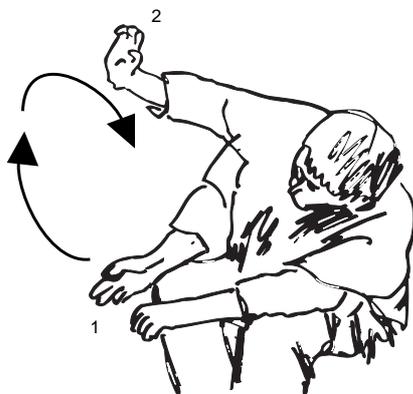
..as the highway that goes to Mérida

There follows a complex gesture in which M makes a repeated sweep back and forth with his right arm (see Fig. 10), as he again traces the path followed by the highway one encounters at the turn-off to Catazajá: it follows a west to east trajectory as one heads off towards Mérida.



Fig. 10: "the highway that goes to Mérida."

M continues by showing how one would continue WNW to reach the next major town of Escárcega.



| back to rest, then lean forward on L knee

1-----2.....

| circles back to near head

64

bweno . chibatik un .

OK, then we go...

| and swoops down NE to point....held...

65

eskarsega

on to Escárcega.

Once again, in this second filming in 1991, M's gestures are apparently oriented so as to preserve the directions indicated, as transposed onto the narrated highway intersection.

More striking confirmation that M actually maintains a representation of this part of the route - complete with cardinal directions - can be found in his performance 10 years later when he again described the route to me, this time being filmed by several separate video cameras. The following screen shots were taken from Camera #4, which (as the reader will appreciate from consulting Fig. 8 once more) was facing directly to the west. M describes arriving

to the intersection with a gesture that faces North (see the first panel of Figure 11). He then traces a perpendicular path, from west to east, as he says *ta jva`anbetik ech`el* ‘lit., we stand it up, going away’ demonstrating with the trajectory of his arm⁹ how the road continues to the east.

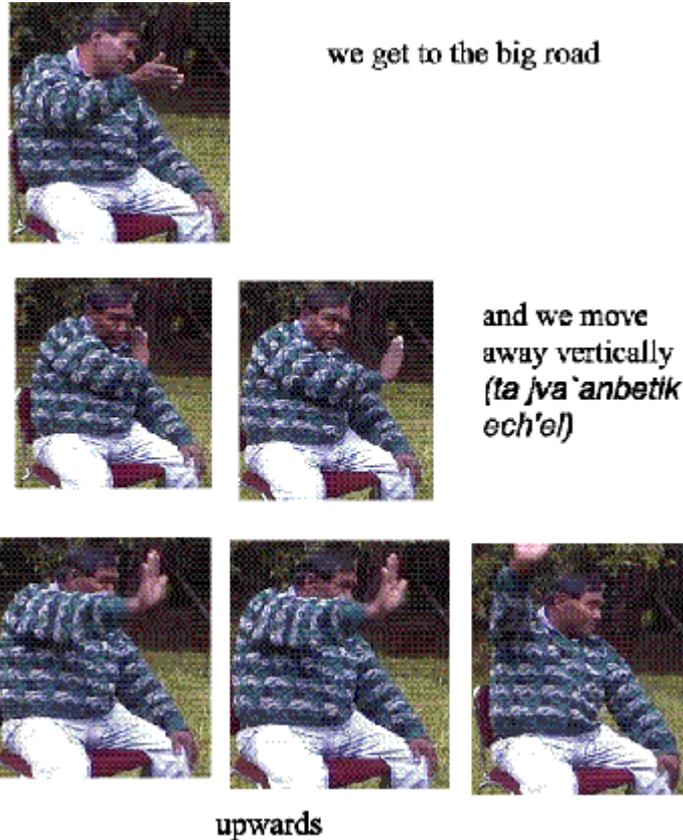
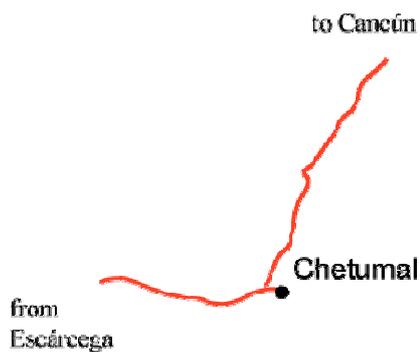


Fig. 11. The intersection at Playas de Catazajá, 2001, Camera #2.

6. THE CHETUMAL TURN-OFF

Consider a different comparison. There is another point on M's route where a road branches, namely the spot near the entrance to the coastal city of Chetumal where the main highway bypasses the city, which lies to the east and south, and turns northeast heading to Cancún. (See Map 6.)

⁹ That the highway continues for a considerable distance is suggested by the upward sweep of the arm, a gestural convention also noted for French gesture (Calbris, 1990) and encountered repeatedly below.



Map 6. Turn-off to Chetumal

In one of the 1991 films, from which an extract is shown below, M describes arriving at the Chetumal turn-off. Silently he indicates the trajectory of the turn-off road, branching away from the main highway.



| Body and head turn to E, hand extends out

| RH retracts again to pos. 1

He then explicitly locates where the city of Chetumal is, flipping his right hand slightly backwards, at line 89.



89

xi ta xkom chetumal xi toe

Chetumal is over that way.

In the 2001 narrative, M is less demonstrative about the Chetumal turnoff, simply noting, with a brief turn of his hand back to the southeast, that it lies off the main trajectory of his route. The comparable images from the two video recordings are shown in Figure 12.

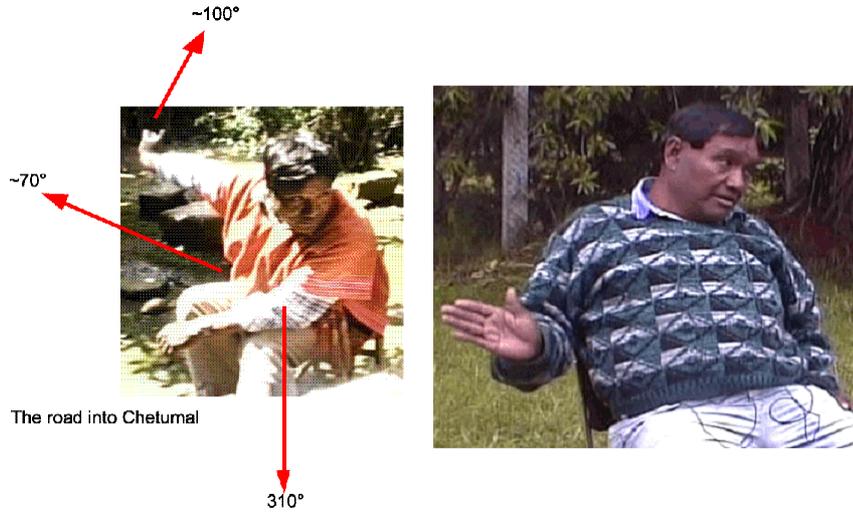
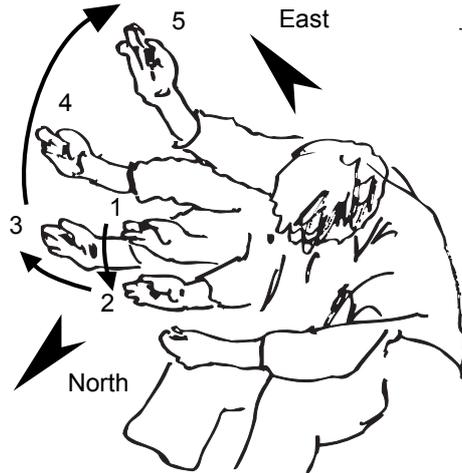


Fig. 12. "Chetumal is this way"

By contrast, returning to the 1991 narration, after mentioning the location of Chetumal, M makes a sweep of his arm to show which direction Cancún lies from that point.



m0143 gaze to E and hand
 | hand up
 1 down

2 -----3... (rise)

4...(head dips) 5..

135 ora li jun be xi chbat xi to skwenta kankune chbat une
Now, the other road that goes to Cancún goes this way

I have juxtaposed images from the two narrations, showing the contrasting direction M explicitly signals for Cancún, in Figure 13. Note that in the 2001 performance (where the direction of the gesture can be calculated by recalling Figures 8 and 9), M shows the direction from the Chetumal turn-off toward Cancún as east and north. In all of his narrations the gestured direction seems consistent, so that - whether exactly accurate or not by European cartographic standards - his gestures reflect a consistent sense of orientation and direction which receives similar expression across the decade-long span that separates the different tellings.



Fig. 13. Cancún that way

7. CANCÚN TO MÉRIDA

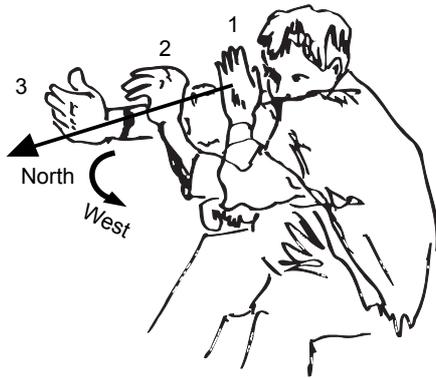
For a last example, consider M's quick description of how one returns home to Chiapas, following a different route: from Cancún to Mérida, and then back to Chiapas, via Escárcega and Palenque. (See Map 7.) Here I present a 1991 version of the first segment of this journey. Recall that in this telling, M is seated with his right side facing just north of east, shoulders roughly aligned east-west.



Map 7: From Cancún to Mérida and Chiapas

One important difference from the previous segments is that in describing this trajectory M explicitly mentions directions, in this case *olon* 'down' which

in Zinacantec Tzotzil signifies west or the direction of the sunset, as he compares where Mérida lies in relation to Cancún. He accompanies his words with a rather striking sweep of the arm, fully extended in front of him, and moving east to west.



m0158 RH retracts and
 LH up from knee
 | to face
 straightens up
 | 1--2--3.....

148 mas xa olon ikom xi xa ikom xi toe
It lies down lower, it lies this way



Fig. 14. From Cancún to Mérida.

In the 2001 retelling, M again mentions the long trajectory from Cancún to Mérida. First he places Cancún to the southeast (Figure 15).



Fig. 15. "Cancún is this way."

He then switches hands and traces a long sweeping arc, starting where he has located Cancún, and moving west-north-west to where he locates Mérida. His gesture, that is, suggest both the directional vector and the fact that it is a long (and, for a Chiapas highlander from the mountains, somewhat featureless) journey. (See Fig. 16.)



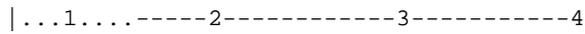
Fig. 16. "And Mérida is this way."

In the 1991 telling, M simply eliminates details from the rest of the return trip, characterizing it as a long haul on a bus from Mérida back to San

Cristóbal. His gesture, another long curving sweep, shows that the trajectory is roughly north-to-south.



M0315 . . . hand vertical, palm E



205 m; Merida un ctal xa ta Jobel un

From Mérida, it comes all the way to san Cristóbal.

In the 2001 version, by contrast, M mentions a couple of intermediate points along the way, but again, gesturally, the trajectory is characterized as north to south, with little flips of the fingers from the north back toward his present location..

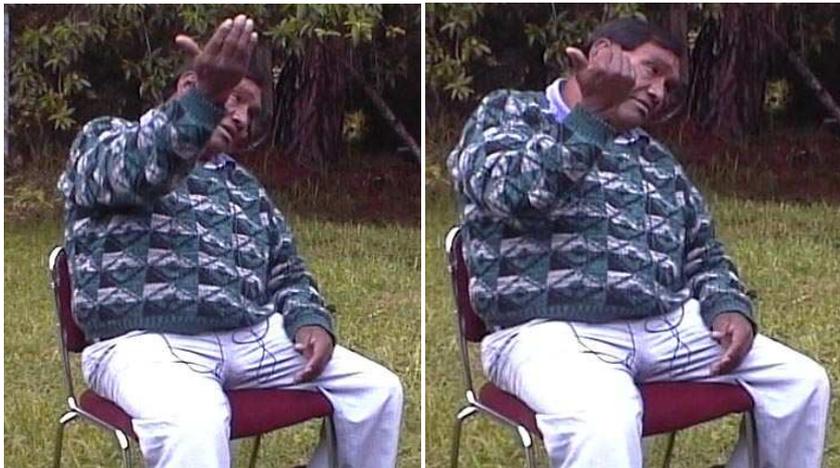


Fig. 17 “Mérida to Escárcega”



Fig. 18. "Passing through Palenque"

8. CONCLUSIONS: COGNITION, SPACE, & DEIXIS

Clearly, considerably more evidence is required, from more Tzotzil speakers, and in different kinds of spatial tasks, to be able to make firm claims about a linguistic or cultural preference, in this community, for one or another of Levinson's spatial "frames of reference." In particular, ongoing work with younger Zinacantecs, with women, and with people with different kinds of travel experience (M was a truck owner who made frequent trips to Cancún to sell contraband) may reveal something about the acquisition, transmission, refinement, and maintenance of an apparent absolute frame of reference, and its connection (or lack thereof) with explicit resources of spoken Tzotzil. Such research, in Zinacantán and elsewhere, may reveal whether the use of one or another frame of reference is tied to specific cultural practices, communicative traditions, or even physical environments. Does an absolute frame of reference fade into irrelevance in some circumstances, or become more salient in others? Does its use vary with different interlocutors, different sorts of locations or trajectories to be described, or with different communicative purposes involved? One supposes that there may be imbalances, functional differentiation, and varied communicative virtues to different frames of reference, and more work is required to untangle the details of their use, especially in a language community like the one described here where all three frames are frequently employed, often in the same locative utterance.

Nonetheless, there is little doubt, from the material presented here, that my compadre M - and from personal experience in Zinacantán I know that he is not alone among his countrymen - actively monitors cardinal directions as he moves through his life, both near and far from home. M's gestural and terminological precision, and his consistency in narrative performance over a decade in which he has stopped visiting faraway Cancún, suggest that spaces, in his cognitive representations, come with directions attached. This is all the more remarkable since, by contrast with the Australians I have worked with who enjoy similar directional awareness and acuity, reference to directions in ordinary Tzotzil speech is scant. The east-west central axis, lexically labeled in terms of an up/down contrast and the movement of the sun, is clearly highly salient for all Zinacantecs, and they monitor such directions carefully, although

from the limited material examined here it is hard to be sure whether similar precision is maintained on the transverse axis.¹⁰

Exactly how “directions come attached” to spaces remains mysterious, although it seems likely that the spatial representations that give rise to gesture - whatever their nature - are involved. In particular, the analogue nature of directional gestures, contrasting with the necessarily more discrete digital calculus of verbal directionals,¹¹ suggests that it is precisely through a kind of imagistic “dead reckoning” - of the sort involved when we *work out* how to point at something out of sight - that directional precision in gesture is achieved. Thus, it is in some sense no surprise that the “absolute frame of reference” surfaces in M’s gestures more than in his words. Precisely oriented gestures thus give a somewhat unexpected confirmation of the conclusion, argued by prominent students of gesture (for example, McNeill, 1992), that verbal and gestural channels in utterance are inextricably linked, psychologically, but also inherently *complementary* expressively. That theoretically distinguishable frames of reference should thus be non-trivially linked or merged in different communicative modalities - speech and gesture, for example - also provides further evidence for the conceptual and cognitive complexity of deictic practice (Hanks, 2005).

Finally, consider the sorts of interactive practices required for such spatial representations and the performances in which they are incorporated to work at all. M’s route descriptions demonstrate that some oriented gestures must be calculated in the “here and now,” whereas others must be *transposed* and *projected* (see Bühler, 1934 ; Hanks, 1990 ; Haviland, 1996a). It is clear that complex processes of inference and interactive collaboration between interlocutors are required for such transpositions to succeed - that is, if interactants are expected to work out the appropriate referents for locative descriptors. It is also clear that, at least in the case of the sorts of talk exchanges considered here, a major part of the information intended to be communicated by an utterance is contained in gesture. Therefore, here at least gestures are by design communicative (see Kendon, 1994), and they depend in just the way that other collaborative actions (Clark, 1996) do on the active knowledge and participation of interactants.

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¹⁰ The transverse axis, and, indeed, ‘north’ and ‘south’, have no standard terminological representation in Tzotzil, as far as I know, though it has been argued (see Gossen 1974) that in Chamulan Tzotzil, reference may be made, in a culturally conventionalized way, to right and left hands to refer to north and south. I know of no such convention in Zinacantán, where people speak indifferently of *ta katal* ‘sideways.’ Brown and Levinson (1993) report that for Tzeltal speakers in nearby Tenejapa, where the lay of the land is different, the “up-down” axis runs South to North, but they do not comment on whether the transverse East-West axis of the sun can be used complementarily to complete a four-way directional system.

¹¹ Even in a language with hypertrophied directional morphology, such as Guugu Yimithirr - see Haviland, 1998a) - the range of directional discriminations possible is severely limited compared to that of an analogue pointing gesture.

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