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'Left' and 'Right' in Tenejapa: Investigating a Linguistic and Conceptual Gap.[1]

1. Linguistic and conceptual gaps and linguistic relativity

The idea that linguistic categories, differing across languages, might reveal something about distinctive conceptual categories, was of course widely entertained before the tide of rationalism associated with the rise of the Cognitive Sciences in the 1960s. But the Cognitive Sciences have given us the working presumption that conceptual structure is universal, and that linguistic differences reveal only complex differential mappings from the same conceptual structure to various linguistic categories. Recently there have been signs that the tide is turning: there is a growing insistence on linguistic difference and its possible conceptual implications (see e.g. BOWERMAN 1991, SLOBIN 1991, GUMPERZ & LEVINSON 1991, LUCY 1992 a, b). But the 'new relativists' are cautious, and they have to prove their case against the prevailing working presumption.

What kind of a case is required? What would it take to convince us that they (the "natives") really do not think as we (the ethnographers) do? Suppose they lack a word for 'blue', and talk happily about how 'grue' the sky and grass are. We are now inured to that: we have learnt to accept that lurking under 'grue' is good old green and blue (BERLIN & KAY 1969). Suppose they lack a word for 'canines' (covering assorted dogs, foxes and wolves): well, it can often be shown that a linguistic taxonomy constructs an unnamed category of that sort (BERLIN 1968). And we expect most peoples to lack a term that means just 'father' (as opposed to all his brothers), even though the extended father category must be defined in terms of father and his brothers (LOUNSBURY 1969). No, linguistic gaps are not the sort of thing that shake our belief in the psychic unity of mankind.

What about a linguistic gap associated with a demonstrable conceptual gap? Suppose the natives have nothing corresponding to our concept of sonata or logarithm – we will hardly be shocked; these concepts are mere icing on the cognitive cake. So what would it take to shock us?

One kind of candidate would be a gap corresponding to the conceptual underpinnings of our entire web of beliefs. Something like the absence of beliefs about causality, or failure to believe in the irreversibility of time, or different views of the basic parameters of space. Take space: KANT argued forcefully that notions of space are conceptual bedrock – for they are what make the acquisition of other concepts possible. He argued that we conceive of regions of space as three dimensions projected out from our bodies along the orthogonal planes above/below, before/behind, and right/left.

> "In physical space, on account of its three dimensions, we can conceive three planes which intersect one another at right angles. Since through the senses we know what is outside us only in so far as it stands in relation to ourselves, it is not surprising that we find in the relationship of these intersecting planes to our body the first ground from which to derive the concept of regions in space ...
> One of these vertical planes divides the body into two outwardly similar parts and supplies the ground for the distincition between right and left; the other, which is perpendicular to it, makes it possible four us to have the concept before and behind." (1991: 28–9 [1768].[2]

[1] This paper is a brief summary of some of the material and only some of the theoretical issues raised in greater detail in LEVINSON & BROWN 1992; it was first presented at the Workshop on Space in Amerindian Languages, organized by the Cognitive Anthropology Research Group, Max Planck Institute for Psycholinguistics, Nijmegen, in December 1991.

[2] All KANT quotations are from the translation in VAN CLEVE & FREDERICK (1991).

This view is deeply embedded not only in Western philosophy but also in psychology (CLARK 1973) and linguistics (FILLMORE 1971): the natural human conception of space is egocentric and relative, and we must strive to make "a psychological characterization of "egocentric" perceptual space in terms of coordinates established by the vertical ... and by reference to anatomical properties – front and back, bilateral symmetry – of the perceiver" (MILLER & JOHNSON-LAIRD 1976: 58). Of course, scientific theories of space may be rather different: but the philosopher, psychologist and linguist must understand the intuitive base-line of our natural ways of thinking about space:

> "Ordinary languages are designed to deal with relativistic space; with space relative to objects that occupy it. Relativistic space provides three orthogonal coordinates, just as Newtonian space does, but *no fixed units of angle or distance* are involved". MILLER & JOHNSON-LAIRD 1976: 380 (our italics).

So perhaps the absence of one of these spatial parameters or coordinates in a natural language and culture might indeed be shocking. This paper reports on such a conceptual and linguistic gap among a Mayan group. It is not however a condescending "deficit theory": indeed that is not the point at all. The point is rather that natural languages and cultures can construct a coherent concept of space on different lines from those we take for granted. And that is what just might give pause for thought.

2. Right and left in spatial conception and description

As far as is known, the tendency to right-handedness is universal among mankind. Judging from tool-use, even early hominids seem to have been predominantly right-hand-ed. A regular asymmetry of this kind is not shared by the apes, or indeed other animals, and it may be supposed to be related to hemisphere lateralization. However, the actual genetic processes controlling handedness are probably indirect, and in any case remain controversial.[3]

The asymmetry of handedness is a slight physiological cue which makes it possible to identify one's own leading hand. On the distinction between the strong, skilled hand and the weaker, clumsier one may be hung a number of further distinctions. First, we may designate the hands differentially on a community-wide basis, identifying the one that the majority find the stronger as e.g. the <u>right</u> one. Second, we may learn to perform activities or responses with only one designated hand (as in shaking hands, or making the sign of the cross). Often symbolically devalued or unclean activities may be restricted to the left hand. We may also learn to extend the notion of right hand to right side of our bodies. Third, we may learn to identify other peoples' left and right hands. Fourth, and most importantly, we may project our bilateral asymmetry onto the outside world, so that not only do we have a left and a right side, but so does the structure of the space around us (as in the earlier quotation from KANT). This makes possible a range of distinctions: (a) we may think of things as passing in front of us from our left to our right side, (b) we may think of static arrays as organized from left to right (or vice versa), as with words on a page, (c) we may distinguish otherwise identical shapes that are inverted around the verti-cal axis (mirror-image objects or <u>enantiomorphs</u>), recognizing a <u>d</u> to be distinct from a <u>b</u>, or a left shoe from a right shoe. Fifth, we may go on to make the mental rotation required to think of left and right regions not only from an egocentric point of view but also from the perspective of our interlocutors. And so on.

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[3] Useful summaries of the enormous volume of research on all these issues can be found in COR-BALLIS & BEALE 1976, CORBALLIS 1991.

This is a complex conceptual and behavioural superstructure on a slender physiological basis (as HERTZ (1909) pointed out over eighty years ago). How natural or inevitable is this assemblage? It is interesting to note that even animals lacking handedness can make some systematic left-right response differentiations. But few animals can distinguish enantiomorphs, and humans have to be trained (e.g. many children have lengthy problems with b vs. d). It takes Western children many years to learn the range of extensions of our terms left and right, as PIAGET (1928) discovered: they are often not able to identify their own left/right hands till 5 or 6 years of age, they take another three years or so to be able to make the mental rotation to identify another's left/right, and another two or three years to project abstract left/right regions into the visual field. Indeed the cross-cultural prevalence of much of this assemblage, HERTZ argued, owes more to sociological and symbolic utility than to conceptual necessity.

In any discussion of left/right differentiation, it is essential to bear in mind the many kinds of analytical distinctions summarized in Table 1. Thus armed, we may proceed to discuss the various kinds of labelled distinctions and the conceptual gap associated with 'left' and 'right' in Tenejapa.

Table 1: Analytical distinctions in the study of Left/Right discrimination and response[4]

1. **Mirror-image discrimination**
   1.1 Perception of enantiomorphs (e.g. seeing a 45 degree diagonal as distinct from its mirror-image)
   1.2 Memory of those percepts
   1.3 Discrimination (e.g. of pairs) vs. Identification (e.g. of 1)
   1.4 Labelling/coding of asymmetries: consistently (e.g. calling your left your 'right') correctly (calling your left hand your 'left')
2. **Left-Right Response Differentiation**
   2.1 stimuli types
   2.1.1 With systematic cues (e.g. turn left on red)
   2.1.2 With iconic cues (arrows. T junction)
   2.1.3 with arbitrary stimulus (e.g. salute when you see a Colonel)
   2.1.4 with 'left'/'right' linguistic labels as stimuli (see 3.)
   2.2 response types
   2.2.1 own body parts (e.g. raise left hand)
   2.2.2 motion (e.g. go to the left)
   2.2.3 location (e.g. push button to the left)
   2.2.4 linguistic label (say "left") – see 3.

3. **Linguistic system of 'left/right' labels and its use**
   3.1. body part labels
      3.1.1 ego's parts (Piaget's stage 1)
      3.1.2 alter's parts (Piaget's stage 2)
      (a) in side-by-side position,
      (b) in 'confrontation' position,
      (c) in 'single file' position
      3.1.3 object parts
      (a) intrinsic ("the left of the cow/desk")
      (b) non-intrinsic ("the left of the table"??)
   3.2   as labels for spatial regions
      3.2.1 regions on ego's sides
      3.2.2 regions on alter's sides
      3.2.3 regions projected from oriented objects (e.g. "to the left of the cow")
   3.3   as deictic angles projected on the relationship between two objects (PIAGET'S stage 3)
   (e.g."the cat is to the left of the tree" where ego imposes a 'left side' on the tree)

3. Left and right in Tenejapa.

Tenejapa is a municipio in Chiapas Mexico, in which live perhaps 15,000 Mayan Indians who speak the language Tzeltal; they form a distinct ethnic unit, although there are many other ethnic groups that speak various varieties of the same language. Tenejapan

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[4] Some of these distinctions are drawn from CORBALLIS & BEALE 1976, passim.

conceptions of space are currently under investigation, using a mixture of traditional ethnographic and linguistic techniques and informal experimentation (BROWN 1991; LEVINSON 1991a, b; BROWN & LEVINSON 1991).

Tenejapans have compound names for the left hand and the right hand, and also a term for hand/arm in general. But they do not generalize the distinction to spatial regions – there is no linguistic expression glossing as 'to the left' or 'on the left hand' or the like. And there is no elaborate system of value associations with the left and the right – indeed, none at all to our knowledge.

Here we lay out what we know about Tenejapan concepts of 'left' and 'right', in so far as they have such concepts. We should note that our research has focussed on the systems that effectively replace those concepts, so that we have failed to pay enough attention to exactly what there was as residue. But first some ethnographic background.

3.1 Ethnographic background

Until 1951, when the National Indian Institute arrived in the local town, the Indians of Tenejapa were insulated from the influences of metropolitan Mexico by an apartheid system that forbade them to be in town after dark, or to walk on the sidewalks in the day.[5] Under such conditions, Tenejapans were illiterate, largely monolingual, and few ventured into town. Today, the situation is under rapid change, with roads under construction, electrification, influence of religious reformers, and effective schooling in Spanish. Tenejapan women, and also men over forty or so in the remoter areas, are still likely to be effectively monolingual, and to have grown up in a world constructed along traditional lines.

Traditional houses have a square floor plan, with one door (no windows) centrally placed. The door itself opens neither to the left nor the right, being split into two vertical half-doors, both opening inwards. (Modern houses are mostly rectangular but normally retain the split-doors located centrally in the longer side.) By virtue of the location of the fire, which might be a little off-centre, or of the bench for food preparation formed by lashing a board to stakes, there may be a side of the house clearly allocated to the household women, and another to the men and visitors. But there seems to be no pattern in the assignment: either area may be to the left or right of the entrance. In short, domestic architecture encourages a symmetry, or if needs be, an arbitrary allocation of space. Nor is orientation of any ritual significance – houses can face in any direction and, unlike in some other Highland Chiapas cultures, there are no obligatory directions for sleeping (e.g. in the opposite direction to that in which the dead are laid to rest).[6] When people die, they were traditionally buried under the floor of the house in a vertical crouching position; now they tend to be laid out lengthwise but in any direction. In general, symmetry pervades material culture; for example, traditional vessels do not have one handle, but either none, two, or sometimes three equally placed around the top.

Other aspects of daily life tend to show the same pattern of symmetrical design or arbitrary asymmetry. In traditional weaving patterns, symmetry is enforced by mirror-image reflection around a vertical line, and dress is in general symmetrical, bags being

[5] LAUGHLIN, 1984: 21.

[6] The preferred direction, informants said, was head 'uphill', but they noted they themselves often deviated.

slung on the back by a tump-line over the forehead, or indifferently over left or right shoulder.[7] Babies are slung on the back in a shawl tied over one shoulder, but which shoulder seems to be a matter of convenience.[8] Body posture tends again to be neat and symmetrical (slouching or leaning not being typical), as indeed do gestures, generally not expansive, which are often double-handed. Men, though, in ritual or civil office may greet each other by touching limply their right hands.

In the ritual system, cardinal point orientation does not seem to play any important symbolic role as far as we know. Although major Christian churches are oriented East (the church in Tenejapa centre having been built by Spanish monks), individual household or community shrines may face in other directions. Since houses have no favoured orientation, and household shrines are placed inside opposite the door, it follows that the orientation of the shrine follows the orientation of the building, which is a matter of convenience. Ritual processions may go both clockwise and anticlockwise around a town or focal area, and although in major festivals a specified route is always followed, there is no particular reason to believe that there is any attention paid to clockwiseness.[9]

Hertz (1909) suggested a universal symbolic association of 'right' and rectitude, strength and purity, counterposed to 'left' and turpitude, weakness and filth (see Needham 1973 for even stronger universal claims). But in Tenejapa there is no such Hertzian symbolic system of oppositions associated with right and left. The word for 'correct', 'real' is *batz'il*, for 'straight' is *tojol*, unrelated to *wa'el* 'right hand/arm' (unlike in neighbouring Zinacantan); the word for 'bad' is *chopol*, for 'dirty' *papas,* unrelated to *xin* 'left', and so on. The body of officials we would call the President's 'right-hand men' are called *yok sk'ab kunerol* 'the president's legs and arms'. And so on.

3.2 Concepts of left and right

We come now to consider the perceptual, conceptual and linguistic aspects of left/right differentiation in Tenejapa. In Tenejapan Tzeltal there are words for left-hand and right-hand; Berlin et al. (1990) give the following entries:

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[7] On weaving and dress see Branstetter 1974.

[8] It may be that a given woman always tends to do it on the same shoulder. Similarly, women pleat their skirts and wrap belts many times around themselves, but although a given woman always does it in the same direction, the direction (towards the left or right) varies across individuals, possibly correlating with handedness. Films we have taken of festivals indicate that male office-holders tend to wear their ceremonial white net bag on the right hip and grasp their ceremonial staffs, unsurprisingly, in the right hand.

[9] That is, Tenejapans – including ritual experts – do not articulate any rationale for the direction of a given ritual circuit in terms of clockwiseness or handedness; its direction is 'simply the way we've always done it'. In fact there does seem to be a tendency for such circuits to go counterclockwise: Rostas (1986) notes that in the fiesta for San Tziako, a major festival in Tenejapa centre, the route followed by the procession through the town is always the same, a counterclockwise circuit, and in some fiestas a small counterclockwise circuit is also conducted inside the church before returning the saints to their places. In the prayer for restoring someone's lost 'soul', the curer searches from municipio to municipio, circling in a counterclockwise direction around Tenejapa. But 'counterclockwise' is our description of a route which they do not conceive of in these terms. And some ritual circuits differ: in a minor local festival we have watched a perambulation of the sacred image which started out counterclockwise, but then retraced its steps clockwise.

xin, Noun, 'left-hand side'
xin k'ab(al), Nominal Compound, left hand
wa'el, Noun, 'right-hand side'
wa'el k'ab(al), Nominal Compound, 'right hand'

However, our informants do not accept that these terms designate the left (or correspondingly the right) side of the body. Their explications are somewhat complex. Although *xin* and *wa'el* are clearly nominals, they normally occur in collocation with just two body part terms, *-k'ab* 'arm/hand' and *-akan* 'leg/foot' of either humans or animals (the front legs of quadrupeds are designated 'arms').[10] Now such body-part terms are inalienably possessed, requiring a possessive prefix, but in the collocation with *xin* or *wa'el* the possessive marker is prefixed to the latter, indicating that *a'-xin-k'ab* ('your-left-hand') is a nominal compound. Most people we asked did not accept the generalization of *xin* and *wa'el* to other body parts; but a few would accept the extension to 'ear', 'eye', 'breast'. In sum, *xin k'ab* 'left arm/hand' and *xin-akan* 'left foot/leg' are complex body-part terms but Tenejapans deny that the body is split between left and right halves.

If one turns for comparison to the better-studied neighbouring language Tzotzil, one finds only a word for left-hand (LAUGHLIN 1975):

tz'et2 Nld 'left hand'
ta jtz'et 'with my left hand'
ta jtz'et k'obtik 'on the left hand side, to the left'

the right-hand being designated as the 'true' or 'correct' hand *batz'il k'obtik*, revealing already a value judgement at least not overt, and perhaps not present, in Tenejapan Tzeltal.[11]

The use of the Tenejapan terms *xin* and *wa'el* may be elucidated by comparison to PIAGET's three stages for the acquisition of *left* and *right* in English (or *droite* and *gauche* in French), which are as follows. At first, prior to any proper acquisition of the concepts, there is only confusion. In the first stage of actual acquisition, there is correct naming of the child's own left- and rigth-hands and other body parts. In the second, the child learns to make the rotation reqired to name the body-parts of a confronting interlocutor. In the third stage, the relation between two inanimate objects can be specified by taking into account another relation, namely how the reference object lies with respect to ego's left and right (as in *The orange is to the left of the bowl*).

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[10] Like many languages, Tzeltal has a single term for upper limb (including hand) and another for lower limb (including foot). See STROSS (1976) for the details of Tzeltal anatomical terminology.

[11] BERLIN et al. (1990) list a separate adjectival root *xin 2* (distinct from the noun root *xin 1*) with negative connotations: *xin 2* A root, aj, 'stinking'; *xinal*, A, aj, 'stinking' (attributive form); xinal (il), A, n 3, 'stench'. But Tzeltal informants do not seem to make any connection between this adjective and the noun *xin* for left hand. An explanation for the source of *xin* as 'greasy' comes from the related language Tzotzil, which, although lacking the noun *xin* 'left-hand' (or cognates) has the same adjectival root, *xin* 'rancid, smelly, of body odour, acid flavour given to food by metal pot' (LAUGHLIN 1975). HAVILAND (p.c.) thinks this may be of recent origin, a corruption of *señora* (to *xinora* and hence to *xin*), the Indians making associations between fateating and the city-dwelling Ladinos. Certainly no Tenejapan informants offered us any association of this sort with 'left hand'. It should, however, be noted that recent missionary activity has drawn the attention of converts to biblical references to 'the right hand of God' and the weakness of the left hand.

Tenejapan usage of the terms *xin* and *wa'el* is very infrequent; there are hardly any practical issues where the terms are essential, as we shall see. Nevertheless, Tenejapans have perhaps only a little more than the usual difficulty specifying which hand is their own left or right (PIAGET's stage 1). They are noticibly hesitant, but perfectly able, to do the mental transfer required in assigning 'left' and 'right' to the hands of a facing inter-locutor (stage 2). But there simply is no usage corresponding to PIAGET's stage 3. The reason is that the terms are not terms for regions; hence in the usage that PIAGET labels stages 1 and 2, there is also no usage corresponding to 'to the left', whether this is ego-centric ('to my left') or altercentric ('to your left'). The terms *xin k'ab* and *wa'el k'ab* are basically body-part expressions – they name human or animal parts. And although Tzeltal makes extensive use of body-part terms for spatial description, these also primarily deno-te actual parts of things, rather than projected regions from named facets.

It follows of course that Tzeltal fails to make the KANTian cleavages of space along the three planes of the human body. Unlike in English or German, there is no entire system of orientation extended from ego's body. [12]

KANT argued (1991 [1768]) that 'left' and 'right' are not dispensible notions. One might think that one could instead resort to maps or cardinal points or mirror-image objects like left vs. right shoes or concepts of clockwise vs. anticlockwise rotation. But in fact these devices and concepts in turn rely on, or are interdefinable with, 'left' and 'right'. Following KANT's reasoning, one might search for such other notions in Tenejapa, like clockwise/anticlockwise, or a sequence of cardinal points read clockwise from say North. Equally, one might have distinct labelled enantiomorphs that appear as reflections about the vertical axis, like / vs. \ or [vs.], which would serve the same purpose.

First then 'cardinal points': in Tenejapan Tzeltal there is a system of 'uphill'/ 'downhill' orientation that is fundamental to the spatial system. We have described this in detail elsewhere (BROWN & LEVINSON 1991). Suffice it to say here that this system is based on the overall inclination of the terrain of Tenejapa from high South to low North, so that although 'uphill' *(ta ajk'ol)* (and correspondingly, 'downhill' *(ta alan)* has pri-mary reference to the actual inclination of the land, which may or may not be tilted up to the South, the terms may be used on the flat to refer to cardinal orientations, or prototypi-cal 'uphill' direction. This system then replaces our use of left/right in many contexts: when there are two objects oriented such that one is to the South of the other, it can be referred to as the 'uphill' object. Unlike PIAGET's stage 3 use of 'left' and 'right', the position and orientation of the speaker is completely irrelevant to this usage. [13]

Now curiously, this system of North/South alignment is not complemented by a similar differentiation of the orthogonal. There is a named orthogonal *(ta jejch)*, but the term is indifferent as to whether it refers to East or West; what it really means is 'transverse to the incline'. So there is a three-way distinction: uphill (related to South), downhill (relat-ed to North), transverse (related to East/West). Significantly, then, it makes no difference whether one rotates clockwise or anticlockwise from 'uphill' – either way, one comes first to 'transverse' then to 'downhill'. The system is also reflected in corresponding

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[12] DE LEÓN (this volume; and 1992) makes an analogous observation for Tzotzil, which she argues lacks the cleavage of space along the front/back axis of the body.

[13] There is another usage, described in BROWN & LEVINSON 1991, which does take into account the orientation of the speaker; in this special and restricted use, 'uphill' means 'further from speaker'. See discussion below.

motion verbs with a verb meaning 'to go up, ascend'*(mo), a verb meaning 'to go down, descend' (ko), and another meaning 'to go across, to traverse' (jelaw).

There is some evidence that speakers think of life as all uphill, i.e. the canonical situation is viewed as walking uphill. When wishing to talk of the facets of an object which lacks intrinsic facets of this sort, the 'flanks' (xujk) may be assigned to the sides that lie on the transverse line, across the uphill/downhill axis. When the system gives rise to temporal metaphors, the future lies uphill. The ceremonial center of Tenejapa lies 'uphill' from much of the rest of the municipio. Most telling, there is a restricted special deictic use of the 'uphill', 'downhill' opposition, in which the term 'uphill' can be applied to one of two objects within my reach – in this case it refers to the one further away from me (i.e., 'higher' is arrived at later if one is walking uphill). If this supposition of canonical direction is correct, then there is a correspondence between the lack of a left/right differentiation for any spatial descriptive use and the absence of any East-West orthogonal to the North-South line.

How could any peoples ignore the rising and setting of the sun, with all its natural symbolism? Of course the Tenejapans don't. They refer to the relevant directions as the 'coming out of the sun' slok'ib k'aal, and the 'spilling of the sun' smalib k'aal, but this is an independent axis, not thought of as orthogonal to 'uphill'/'downhill' (nor indeed would it be geometrically related, since the one system is tied to a fixed terrain, and the other to the movement of the sun across the edges of the mountains from solstice to solstice). Tenejapans use many other geographic landmarks as points of fixed reference in order to make up for the absence of 'left' and 'right': they utilize the locations of other villages, mountains, named features like cliffs, etc., so that one can refer, e.g. to a particular branch of a tree as the one pointing out towards the Red Cliffs. The possibility of reference to East and West belongs to this system and not to the 'uphill/downhill' system with its well-developed grammar of location and motion description.

What about enantiomorphs, especially left-right reflections about a vertical axis? As already mentioned, the culture provides little in the way of paired objects of this sort, with the exception of shoes which are still only worn, especially by women, on special occasions, and have never been made locally. Our evidence, for what it is worth, suggests that the perception and conception of left-right asymmetries is in line with the linguistic resources of the language, i.e. such asymmetries are not salient, and are not easily described in systematic terms. We conducted a number of informal experiments and structured elicitation sessions, described in detail elsewhere (LEVINSON 1991b, BROWN 1991). All in all, our informants performed on at least eleven tasks where left/right discriminations were at issue. (It should be noted however that many of these tasks were devised not for the purpose of elucidating Tzeltal concepts of 'left' and 'right' but for exploring the indigenous alternatives.) With that caveat in mind, the reader will find these tasks sketched in Table 2.

Task 1 was a set of interactive 'space games' (see DE LEÓN 1991a; BROWN 1991) played by Tzeltal speakers, one a Director who describes, one by one, a set of photographs so that the other, the Matcher, can distinguish the photo being described from the others in the set. Among these were pairs where, for example, (i) a model man was either to the left or right of another model man; or a dog was lying down either to the left or right of a standing one; (ii) a bag of corn was either to the left or the right of a pot; a cylindrical shape of corn dough was either to the left or right of a cube.

Under these conditions (where both images were visible and had to be contrastively

Table 2: *Some relevant tasks given to Tenejapan informants*

Task 1: Matcher to choose a photo, from a set laid out in front of him, as described by Director who has the identical set; each set containing **inter alia**
 – left-right inversions of inanimate objects
   result: failure to distinguish, no left/right labels
 – left-right inversions of model people and animals
   result: failure to distinguish OR left/right use from point of view of models (informants either back-to-back or same orientation separated by screen)
Task 2: Director to describe an arrangement (made by the investigator) of familiar objects or animal and human models set out in each square of a 4 × 4 matrix, so that Matcher can reconstruct the arrangement in each square of his matrix. (Informants back-to-back or in side-by-side positions, screened off.) Arrangements of objects include:
 – left-right inversions of objects in 2 of the squares
 – asymmetric arrangements in the left/right visual field in some of the squares
   results: left/right never used (even with model persons); instead uphill/downhill, body-part and deictic systems
Task 3: Matcher to put an artist's maquette or 'wooden man' into position described by Director looking at stimulus photos of particular arrangements of the same maquette (Director can see and verbally correct Matcher):
 – includes need to lift left arm, raise right leg, etc.
   results: descriptions avoid the 'left/right' terms wherever possible, substituting 'uphill/down-hill', 'towards sunset', etc. Where a 'left'/'right' term is used, it refers strictly to hand or leg body parts and is usually corroborated with an absolute direction description ('towards uphill, sunset' etc.).
Task 4: Informant describes location of one of two identical inanimate objects arranged on large plane surface; one object has been characterized as having special associations and must be kept track of. The objects are arranged in various positions, including cases where each lies to the left/right in the informants' visual field.
results: no use of 'left/right' terms; instead use of three systems (deictic proximal/distal, body part segmentation of the plane surface, 'uphill/downhill' system). Where these are all collectively neutralized, informants are at a loss for any description.
Task 5: Director instructs blind-folded Finder where to go to find objects distributed on large level patio
results:
(a)   English trial: 'turn left, forward, right' etc.
(b)   Tzeltal: no left/right, 'turn uphill (i.e. South), downhill (i.e. North), ascend, descend, straight ahead'
Task 6: Commentator gives running commentary on movements of model car (plus driver, passengers) through model landscape
results: no use of left/right; instead 'ascend', 'descend', 'uphill' etc.
Task 7: Informant draws 'map' on ground with running commentary on how to reach each place
results: no left/right
Task 8: Two informants role-play request for route-directions
results: no left/right; instead 'ascend, descend, traverse, turn away, turn towards, uphill, downhill' etc.
Task 9: Sorting enantiomorphs (left/right inversions in photographs)
results: informants could sort photos into pairs of left/right inversion vs. identical pairs vs. singletons; ie. they could perceive the differences in this context
Task 10: Describing abstract enantiomorphs (e.g. diagonal lines, oblongs, rectangles)
results: no left/right; informants distinguished them in terms of orientation of the parts of figures with respect to one another, or in terms of absolute co-ordinates (e.g. pointing towards sunset)
Task 11: Labelling human and animal body parts and divisions of the body
results: informants labelled e.g.'hand/arm', 'foot/leg', but never volunteered 'left' or 'right' designations

described in order to be identified by the Matcher), often identical descriptions were used for both enantiomorphic pairs. For example:

<1> (corn in net bag on left, corn in basket on right)
    x; ay   xan yan   te   chepel sok   chojak'
       EXIST again another ART sitting CONJ netbag
       'There's another one with a net bag sitting

       sok   pachal moch tey a
       CONJ sitting   basket there DEIC
       and a basket sitting there.'

    p; ja' bal te cha'-ch'ix   tek'-ajtik   te   ixim-e?
       it-is Q ART 2-NC+sticklike standing-PL ART corn-CL
       'Is it the one with the two ears of corn standing up?'

    x; ja' nax bi,   s-jun-ej   ^j   ta   chepl-ej te   chojak'
       it-is just TAG 3E-accompany-VN PREP sitting-VN ART netbag
       'That's it, in its (netbag-like) sitting the netbag's accompaniment

       sok   jun moch
       CONJ one basket
       (is) with one basket.''

<2> (corn in net bag on right, corn in basket on left)
    x; ja' nanix jich xan te   yan-e,
       it-is really thus again ART other-CL
       'The other one is really the same,

       s-jun-ej ta chepl-ej sok te moch-e
       its accompaniment in (netbag-like-) sitting (is) with the basket.'

In effect, informants simply failed to recognize the difference, or at least failed to realize its pertinence to the task. Where the objects to be related were animate in kind (model people or animals), two of our informants resorted to left-right descriptions from the point of view of the people or animals in the photos. So where a model man had at his (intrinsic) left hand a model women, the following description was used:

<3> *ay   j-tul   winik sok j-tul   antz*
    EXIST one-NC man   CONJ one-NC woman
    'There's one man plus one woman.

    tek'el   ta,   ta   s-wa'el k'ab te   antz   te   winike
    standing PREP PREP 3E-right hand ART woman ART man
    the man is standing at the woman's right hand.'

which distinguished it from the description of its enantiomorph:

<4> *ay   j-tul   winik sok   j-tul   antz,*
    EXIST one-NC man   CONJ one-NC woman
    'There's one man plus one woman.

    tek'el   ta,   ta   xin k'ab te   winik-e.
    standing PREP PREP left hand ART man-CL
    the man is standing at her left hand.'

In the case of some of the photographs, the two models were almost touching – so that *taxin k'ab* 'at the left hand/arm' implied contiguity. In some cases, the figures were at some remove – roughly the same distance as the breadth of the model figure itself. The *taxin k'ab* expression could still be used to refer to the separated figure. This might be held to indicate that 'left' and 'right' here <u>do</u> have regional extensions after all. We do not

believe this to be the correct interpretation. All body part terms in Tzeltal allow some latitude in contiguity, although the extent of this varies with each term; but in no cases are we really dealing with <u>projective</u> as opposed to <u>topological</u> notions, to use the Piagetian terminology. None of the body-part expressions are used to assign planes that cut up space, or divide the whole visual field. Instead they denote just <u>body parts</u>, which in collocation with the preposition *ta* designate <u>positions</u> of adjacency to the body part; and just like English *at* they allow a certain latitude (often very small) of interpretation (cf. *John is waiting at the station* which is a correct description even if he is outside it).

Now this system of 'left/right' description from the point of view of animate entities could not be generalized to the inanimate objects in the photos, because that would require a convention of sidedness for such objects that simply does not exist. (In English the sidedness is projected from the point of view of the speaker's visual field, giving us a true projective use of 'left/right' as in *the cat to the left of the tree*). Here the pairs were given identical or near-identical description and successful matching was a matter of chance. After one game we confronted some informants with two such paired photos of left-right inversions of inanimate objects and asked them what difference they could see. They claimed them to be identical, *pajal*, 'the same'. When pressed, they replied by finding tiny details of asymmetry either in the arrangement of the objects or the finish of the photograph. In some way, in the context of this task at least (in contrast to Task 9, described below), the asymmetry of left/right reflection was 'invisible' or irrelevant to the informants. The differentiation of paired animals or people in photographs were the only cases where left/right terms were used for identification.

Another type of task (Task 4) involved differentiation of two identical three-dimensional objects where these fell in a left/right relation in the visual field. A pair of identical bottles on a table, or a pair of benches on a patio, were never distinguished by reference to their left/right place in the visual field: instead they were located by reference to one of three strategies. Where they lay along the absolute 'uphill'/'downhill' axis mentioned above, this was used to distinguished them ('It's the one *ta ajk'ol*, uphillwards' for example). Where the pair lay on the transverse to the uphill/downhill axis, even though the two sides of this transverse are labelled identically, *ta jejch*, the two objects could be distinguished using deictic descriptions. Thirdly, where the objects lay near a labelled part of the reference area, use was made of another aspect of Tzeltal spatial description, the segmentation of objects into 'body-parts' (see BROWN 1991); then one bench could be said to be at the 'ear' (i.e. corner) or at the 'lips' (ie. side edge) of the patio, or to be at its 'top' (*sba*) or 'bottom edge' (*yejtal*) – these terms being in turn related to the 'uphill'/'downhill' dimension. All these systems break down if the objects are perfectly arranged on a diagonal to the uphill/downhill line, at the middle of the table or patio (where no body part differentiations are possible), and the speaker is himself orthogonal to that diagonal so that the two objects are equidistant from him). In these circumstances, speakers were at a loss – any right/left terms applicable to objects in the visual field would have rescued them, but none are available. Figures 1 to 4 present diagrammatic illustrations of these three possibilities and the fourth, unsolvable one.[14]

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[14] In fact the fourth is not in principle unsolvable by an ingenious Tzeltal-speaker: a geographic landmark can be used to provide an axis (speaker-landmark) in principle in any direction 360° around the speaker. (See DE LEÓN 1992 for the analogous system in Tzotzil.) That this solution was not actually used in this context is possibly due to the lack of salient landmarks in the relevant direction.

Two other tasks cited in Table 2 deserve special mention. One, Task 3, involved one informant instructing another to put an artist's 'wooden man' with flexible joints into certain positions – e.g. raising an arm or a leg, bending it to a certain angle, etc. What was striking here was that terms for 'left' and 'right' would have been extremely useful, and for this task – naming body-parts – they are of course available. They were nevertheless used just three times (note the similar result from Task 11). Instead, absolute directions in terms of 'uphill'/'downhill' (quasi-cardinal points), 'towards the sunset', 'towards the big banana tree', etc. were used to distinguish the two hands or legs. For example, in <6> the Director uses right and left to distinguish the two hands, but in <5>, <7> and <8> he uses alternatives:

<5> (woodman.doc: 1)
    D; *toj*   *tek'el.*   *x-bich-oj*   *s-k'ab*
           straight standing. ASP-stick+up-STAT 3E-arm
           'He is standing straight up. His arm is extended.'

    M; *ta*   *toyol?*
           PREP up+high
           'Vertically upwards?'

    D; *jm'm. jich k'atal*   *x-bich-oj*   *bel*   *ta,*   *ta*   *Turuwit.*
           No.   thus crossways, ASP-extend-STAT DIR (go) PREP PREP NAME
           'No. It (the arm) has extended out crossways away towards Turuwit mountain.

           k'atal   *x-bich-oj*   *,bel*   *ta*   *Turuwit,*
           crossways ASP-extend-STAT DIR (go) PREP NAME,
           It is extended crossways towards Turuwit,

           koel   *y-ak'-oj*   *te*   *j-ch'ix*   *s-k'ab*
           Dir (descending) 3E-give-STAT ART one-NCsticklike 3E-arm
           (and) one arm (ie, the other one) is placed downwards.'

<6> (woodman.doc: 2)
    D; *jm. ta*   *x-cheb-al,*   *ja'*   *nanix jich.*
           hm PREP 3E-two-NOM it+is really thus
           'Hm. Secondly, it's like this.

           koel   *y-ak'-oj*   *te*   *s-wa'el k'ab,*
           DIR (descend) 3E-give-STAT ART 3E-right hand
           His right hand is placed downwards.

           k'atal   *y-ak'-oj*   *bel*   *ta*   *mali k'al te*   *xin k'ab-e*
           crossways 3E-give-STAT DIR (go) PREP fall   sun   ART left   hand-CL
           his left arm is going outwards crossways towards the sunset.'

<7> (woodman.doc: 3)
    D; *x-bech-oj*   *me te*   *j-ch'ix*   *s-k'ab*   *ta*   *ajk'ol.*
           ASP-bend-STAT PT ART one-NCsticklike 3E-arm   PREP uphill
           'He has bent one arm uphillwards.'

           bechel tebuk,   *teb*   *nax.*
           bent   a+bit   a+bit just
           A bit bent, just a bit.'

<8> (woodman.doc: 5)
    D; *jich. ma ba lom mali* *k'al*   *ay*   *s-jol.*
           thus. NEG very falling sun   EXIST 3E-head
           'That's it. His head isn't very much towards the sunset.

jich   nax   ay   koel   ta   s-tojol   tz'ajal   ch'en.
thus   just EXIST   DIR (descend) PREP   3E-front   red   cliff
It's just downwards in front of Red Cliffs.

peru te   j-ch'ix   y-akan, ma ba s-ta-oj   lumilal.
but   ART   one-NCsticklike 3E-leg, NEG   3E-meet-STAT   ground
But one of his legs doesn't touch the ground.'

M; ja'   bal   ta   alan?
    it-is Q   PREP downhill
    'The downhillwards one?'

D; ja'.
    it+is
    'That's it.'

From inspection of the dialogue, it seems that one reason for the avoidance of 'left/right'
terms is an uncertainty that they will be correctly interpreted: when they were used by the
Director, the Matcher tended to ask for confirmation in 'absolute' terms. This is reminis-
cent of the following anecdote published as a short note in "Science", 1931: there was an
American boy who was noted to have an outstanding sense of absolute direction; investi-
gation showed that the source of this unusual development was that his mother frequently
confused left with right, and so had substituted cardinal points, as in "Get me the brush
on the north side of the dresser".[15] Where one or more parties is unsure of the application
of 'left' vs. 'right', it will pay to abandon it as a routine mode of reference. And this
seems to be the case in Tenejapa.

This may also illumine another task we would like to describe in more detail (Task 5).
This involved a game of 'blindman's bluff' where a Director had to manoeuvre a
blindfolded Finder by verbal instructions over a large flat expanse. Our 10-year-old son
did this for us in English by the device of indicating rotation in terms of left/right ('turn a
little to the left, a bit more' and so on). Our Tenejapan informants did not do this. Clearly
rotation of the body is not usually so described. Instead they took the absolute, non-body-
centered perspective, and directed the Finder to move 'uphill', 'downhill', 'traverse',
even though the search area was dead flat and the Finder blindfolded. For example:

<9> (games8.doc)
    a; jich   ya   x-walk'o-at   xan   ala   teb-uk
        thus ICP ASP-turn-2A again DIM a+bit-CL
        'Just turn again a little bit more.'

    x; jich   mene
        thus DEIC
        'Like that?'

    a; ben-an   bel   tz'in
        walk-IMP DIR (go) PT
        'Walk away, then'

    x; jm
        'OK'

    a; tey   nax   a   mene
        there just DEIC DEIC
        'Just there.'

15 DeSilva (1931). Thanks to Eve Danziger for drawing the reference to our attention.

x; *jm*
   'OK'

a; *jitz'-an   koel   ala   tebuk. jitz'-an*
   slide-IMP DIR (descend) DIM a+bit   slide-IMP
   'Slide over descending (ie. downhillwards) a little bit. Slide over.'

x; *jm*
   'OK'

a; *jm. tey   a'-le-ix   a   mene*
   hm   there 2E-search+for-CMP DEIC DEIC
   'Hm. Look for it there.'

   .
   .
   .

a; *ben-an   xan   bel   tey a mene, toi   x-a'-walk'o   bel*
   walk-IMP again DIR (go) there DEIC   straight ASP-2E-turn DIR (go)
   'Walk away again there. Turn away straight.'

x; *mm*
   'Hm.'

a; *toj.   ajk'ol.*
   straight uphill
   'Straight. Uphill.'

x; *ajk'ol*
   'Uphill?'

a; *jm, ajk'ol. lek   ay   tey a mene. le'-a   tey a mene.*
   hm uphill good EXIST there DEIC search+for-IMP there DEIC
   'Hm, uphill. there that's good. Look for it there.'

The assumption was that the developed absolute sense of direction in terms of canonical 'uphill' (South) etc. would be sufficient to overcome the handicap of blindfolding. And so indeed it was.

In summary, Tenejapans make no essential use of 'left' and 'right' terms in daily life. There are such terms, referring strictly to body-parts. But there is evidence that Tenejapans are slow and uncertain in their processing of these terms, further undermining their limited utility.

If we refer back to Table 1, we may briefly indicate where we have positive evidence of the nature of Tenejapan left/right discrimination. Our informants gave us equivocal evidence about the perception of left/right reflection enantiomorphs (point 1.0 in Table 1): the very same informant could in some sense 'see' the difference (e.g. specifying a model man as to the left hand of a model women in a photo), and yet on another occasion fail to 'see' the difference (e.g. asserting that left/right reflections of inanimate objects in a pair of photos were identical). This behaviour is of course in line with the linguistic resources, which permit left/right terms only for animate entities. Confronted, informants were quite adamant that there <u>was no difference</u> between the left/right inversions of inanimate objects in photos, and this ratiocinative opinion was also reflected in the failure to give differential descriptions in Tasks 1 and 2. On this evidence alone one might infer that the linguistic gap actually determines a partial perceptual gap. Later tests however (Task 9) made it clear that when informants were asked to sort photos into identical pairs vs. mirror-image pairs without other distractions, they could certainly do this. Although denied a simple linguistic formulation of the systematic character of e.g. left-

inversions, they described the difference between mirror-image pairs as *sjeloj sbaik*, "they have exchanged themselves".[16]

With regard to left/right response differentiation, Tenejapans of course (like virtually all vertebrates!) can no doubt give consistent responses on one side or the other of the body. But it is possible that stimuli may not be conceived of as in the left/right half of the visual field, for example; they may immediately be 'coded' in terms of absolute directions. Where the stimuli are terms for left/right body parts, there is definite if unsystematic evidence that informants are slow and uncertain in their interpretation of these terms, and they also had difficulty in identifying photographs of a single hand as being the 'left' or 'right' hand of the person.

As for the linguistic system of labels itself (Table 1, point 3.0), the Tzeltal terms are restricted to those of type 3.1, not being used to label regions as in 3.2 (with the exception of some very limited topological 'stretching'), and not being projectable on the relation between two inanimate entities as in 3.3. Tenejapans thus have available linguistic resources a bit like those attained by English children in Piaget's stage 1 and 2, except that these have no regional extensions from ego's or alter's location; but they lack the system that Piaget thought so significant in the development of Western children, where the terms become truly projective (Piaget's stage 3). We hasten to add that we use the Piaget classification merely as a typology of systems, without any attribution of retarded development; that would be an impossible charge, since Tenejapans master their absolute system of projective space probably as early as age 4 or 5, when European children cannot even systematically label their own left and right.[17] That is the beauty of a system divorced from left and right: an absolute system of directions has a conceptual elegance, with only one drawback, but a substantial one: the need for a developed sense of direction, and the constant demand for a mental 'dead-reckoning' conducted in the mental 'background'.[18]

4. Conclusions

Tenejapan Tzeltal exhibits a linguistic gap: there are no linguistic expressions that designate regions (as in English *to my left*) or describe the visual field (as in *to the left of the tree*) on the basis of a plane bisecting the body into a left and right side. There are expressions for left and right hands, but these are not generalized to form a division of space. There is a lot of evidence that this corresponds to a conceptual gap: this is simply not the way Tenejapans think about space. When tasks are devised in which concepts of left and right would provide a simple solution, other notions are employed, even when the

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[16] These were photographs with two objects portrayed in each photograph, but with a left/right reversal of the objects in the corresponding member of the pair. For these sorts of paired objects the description "they have exchanged themselves" is applicable, as the two objects in one photograph have 'exchanged' their positions in the other. The root *jel* here gives rise also to notions of counterpart, namesake, etc.

[17] Here we illegitimately extrapolate from findings by Lourdes de León (1991b) on the acquisition of spatial competence in Tzotzil children. Tenejapan children's absolute directional system needs to be checked. The youngest subjects in our tasks were about 9, and used the absolute system flawlessly.

[18] For some remarks on the processing demands, see Levinson 1991b: 20ff.

relevant linguistic distinctions could be made in Tzeltal (e.g. describing the position of one's limbs, or describing rotation of one's body). Even perceptual saliency of left/right inversions seems muted; informants can distinguish these when that is the sole focus of a task, but do not routinely do so when they are embedded in other tasks with other distracting stimuli. This is in line with the culture, which puts little weight on bilateral asymmetries.

Instead of using the left/right distinction to construct a division of space, Tenejapans utilize a number of other systems. They use an absolute, 'cardinal direction' system, supplemented by reference to other geographic or landmark directions. Or they use a generative segmentation of objects and places into analogic body-parts or other kinds of parts, and describe locations in these terms. Or they use a rich system of positional adjectives to describe the exact disposition of things, These systems work conjointly to specify locations with precision and elegance. The overall system is not primarily egocentric, and it makes no essential reference to planes through the human body.

Thus Tenejapans do not give route directions of the sort 'take the second turning to the left'; they do not ask one another to move or turn to the right; they do not direct another's attention to the left or right of a landmark in the visual field. Instead they use alternative conceptualizations with their corresponding linguistic expressions.

KANT, one supposes, might have been shocked to find missing what he took to be conceptual bedrock. Psychologists and linguists who have followed his lead, and have in this respect at least adopted the working presumption of a universal conceptual framework, should be surprised. Anthropologists too, following HERTZ and NEEDHAM, have predicted a universal binary opposition between left and right upon which symbolic values are systematically hung. We may thank Tzeltal for reminding us of the older view that languages may reveal startling differences in conceptualization of the world.

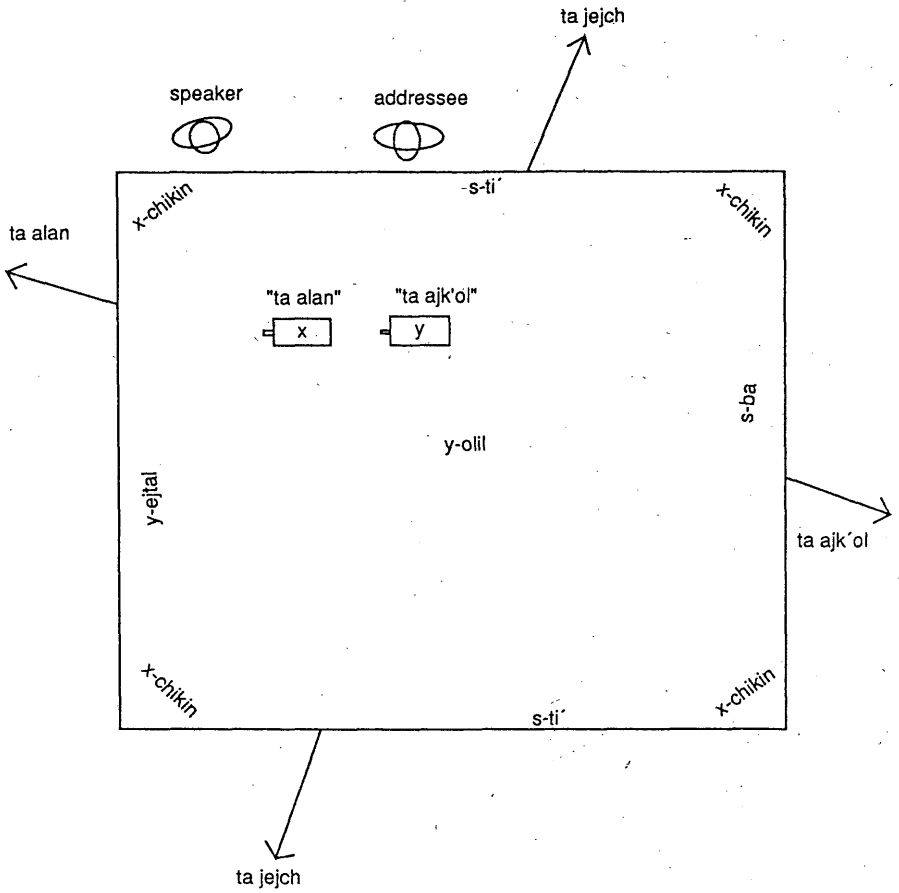Figure 1:   How to describe things in visual field without "left" & "right"

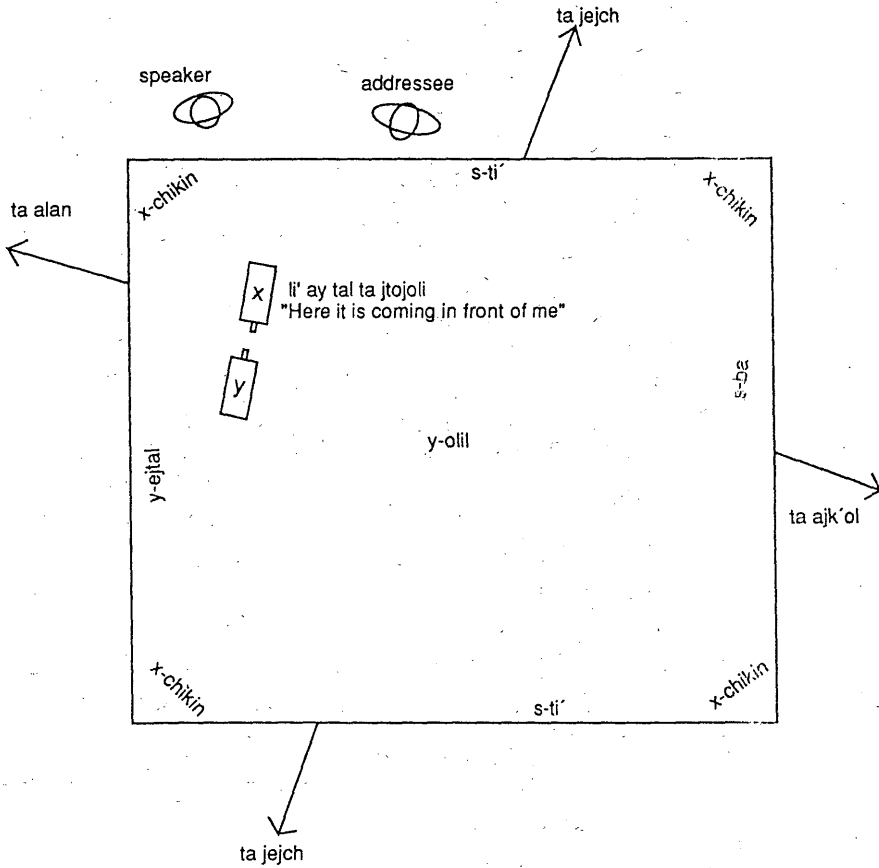Figure 2:   How to describe things in visual field without "left" & "right"

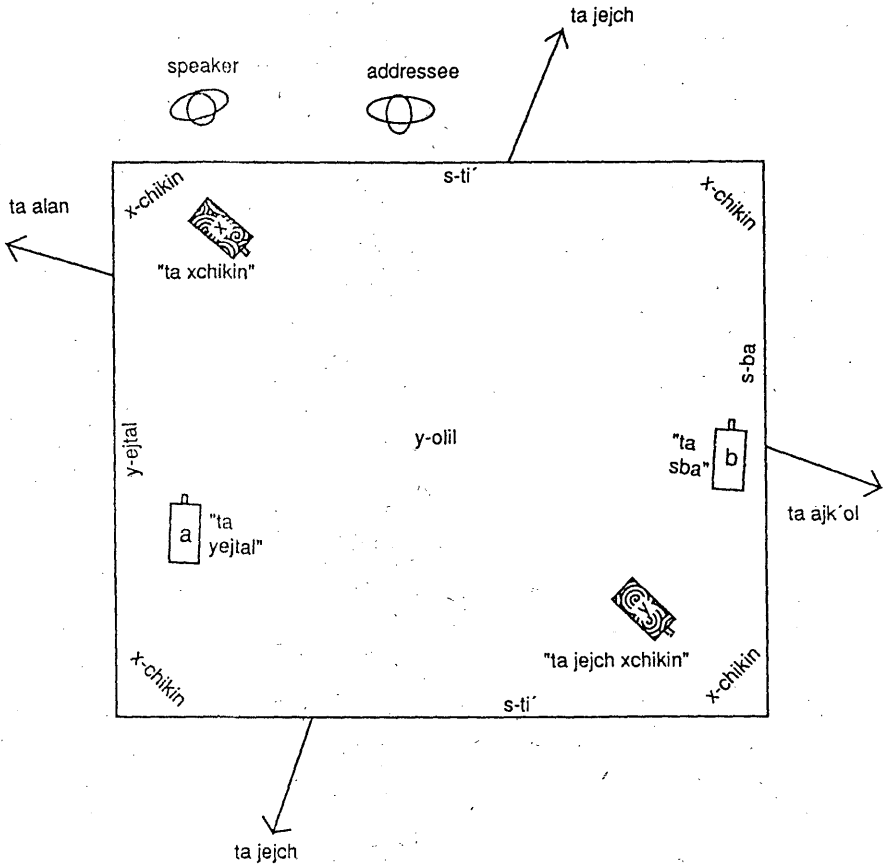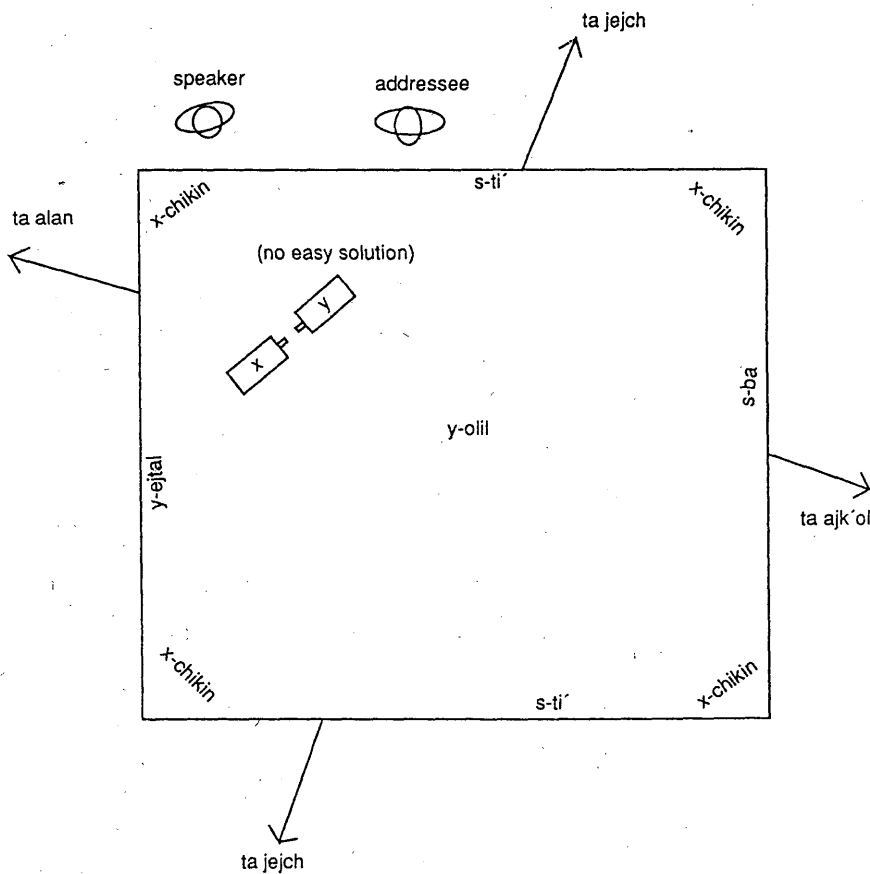Figure 3:   How to describe things in visual field without "left" & "right"

Figure 4:　How to describe things in visual field without "left" & "right"

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