Space in Language and Cognition

Yvon Keromnes

Space in Language and Cognition : Explorations in Cognitive Diversity
Stephen C. Levinson
Language, Culture & Cognition 5
Cambridge University Press, 2003
xxiii 389p
The relation between language and thought is a long-standing problem, one which has been regularly tackled by philosophers, later by psychologists, anthropologists and linguists as well and which, to this day, has failed to meet a satisfying answer. S. Levinson's monograph 'Space in Language and Cognition' (henceforth SILC) is about the relation between language and spatial cognition, and is more precisely concerned with the *frames of reference* commonly used in spatial language and thinking. The crucial importance of spatial thinking in our cognition is evidenced, for instance, by the widespread use of spatial metaphors in everyday language (see Lakoff & Johnson 1980), and the author's hypothesis as to the reason of this importance is that spatial cognition may be (xvii) 'the evolutionary earliest domain of systematic cross-modal cognition', i.e. a domain combining information from different sources (visual, auditory, proprioceptive, kinesthetic, equilibrium, olfactory) into spatial representations that must correlate to some extent.

The question about frames of reference can be illustrated by the two readings of such statements as 'the cat is behind the truck', corresponding to two distinct mental representations, i.e. that of a cat on the other side of the truck from the viewer's standpoint, or that of a cat at the rear-end of the truck. The spatial framework yielding the first reading will sometimes be called *deictic*, the second *intrinsic*. The thesis presented in SILC, as stated in the 'blurb' (and in somewhat more cautious terms inside the book) is that 'even in a core cognitive domain such as spatial thinking, language influences how people think, memorize and reason about spatial relations and directions.' This argument in favour of a 'Whorfian' effect of language on spatial cognition (the so-called 'linguistic determinism' thesis) together with the observation (xix) that 'different human groups use different spatial frameworks', for instance *absolute* frameworks (e.g. 'there's an ant north of your foot!') go against most cognitive literature, in which until now space has been regarded as possibly the strongest candidate for a cognitive universal.

SILC contains a short preface and seven chapters. The first introductory chapter gives a brief outline of Western ideas on spatial thinking, from Plato's materialistic view of air as a substance with geometrical properties, Aristotle's view of space as a nested series of places, to Newton's distinction between absolute and relative space (taking up Plato), confirmed by Kant's discovery of *enantiomorphs* (the paradoxical relation between two gloves in a pair, exactly similar yet not interchangeable), which in turn lead to the *egocentric* and *anthropomorphic* view on human spatial thinking prevalent today, the notion (11) that 'spatial coordinates are derived from the planes though our body, giving left and right, front and back, up and down as the primary planes'; these egocentric and anthropomorphic characteristics are widely assumed to be universal, and this, in Levinson's view (14), 'is a major ethnocentric error.' Instead, SILC (22) proposes to show that 'there is diversity in cognition just as there is diversity in language, clothing, hairstyle, kinship practices, modes of subsistence, ritual and religion'.

The second chapter presents different frames of reference used by humans while reviewing the concepts used in variously combined oppositions to describe these frames of reference in different fields (e.g. 'egocentric' vs. 'allocentric' or 'viewer-centred' vs. 'object-centred' vs. 'environment-centred') as well as the linguistic expression of these frames of reference in a cross-linguistic perspective. In that respect, Levinson (34) remarks that 'the analysis of spatial terms in familiar European languages remains deeply confused, and those in other languages almost entirely unexplored', and he goes on to propose a ternary typology, 'intrinsic',

'relative' and 'absolute', each of these categories comprising several related yet semantically distinct subcategories. This typology is based on the work of the *Language and Cognition Group* at the *Max Planck Institute for Psycholinguistics* in Nijmegen (headed by S. Levinson) on (xix) 'over forty, mostly unwritten languages spoken in small-scale, traditional societies.' The three linguistic frames of reference are then distinguished according to a number of parameters, and aligned according to the concepts previously reviewed, which leads Levinson to take up Molyneux's question to Newton (if a blind man, who knew by touch the difference between a cube and a sphere, had his sight restored, would he recognize the selfsame objects under his new perceptual modality or not?). The conclusion offered in SILC is that if frames of reference are not entirely translatable from one to the other, then 'representational systems of different kinds, specialized to different sensory modalities (like visual memory) or output systems (like gesture and language), may be capable of adopting different frames of reference' (60); i.e. the answer is 'yes'.

Chapter three deals with linguistic diversity in a survey that is not exhaustive (such an exhaustive survey is presented, along with its methodology, in a companion book, *Grammars of Space*, Levinson & Wilkins 2006) but offers enough evidence of radical differences in this respect to show, in the author's opinion (111), 'that the assumption of uniformity [in spatial semantics] is entirely mistaken'. This is illustrated, in particular, by the fact that some frames of reference are prevalent in certain languages and not in others; but frames of reference are here studied in a wider approach of spatial semantics, along with location systems in which no frame of reference is used, placenames (where the figure is located at a named place/ground), deixis (where the figure is located relative to the ground) and topology (where the figure is located as contiguous to the ground), and motion. Consideration is given to the respective advantages and disadvantages of the different systems. The most simple system, naming the location, is very well for underpopulated areas, but would be cognitively too costly elsewhere. In most cases, deixis crucially lacks angular specifications, so that (70) 'deictics are often (and often obligatorily) accompanied by gesture.' Topology also involves a loss of information regarding angular and distance specifications, but may come first in language acquisition. It has also been shown that in many languages, some prepositions and adverbs used in frames of reference originate in topological notions, as in the English 'back', first designating a body part, then a part of an object, then the space contiguous to that part, and eventually the space behind it (106). As for spatial systems involving frames of reference, the greater complexity of (ternary) relative systems compared to (binary) intrinsic ones raises the question of the reason why languages would develop the former. The answer offered in SILC is threefold:

First, not all objects offer distinguishable facets suitable for intrinsic orientation; secondly, relative systems allow logical inferences such as 'if A is to the left of B and B to the left of C, then A is to the left of C'; thirdly, these systems correspond directly to visual experience. And finally, an absolute frame of reference is prevalent in some languages and even, in the case of the Australian language Guugu Yimithirr, the only frame of reference available. This system also allows complex logical inferences and (91) 'is by far the most elegant solution to the problem of angular descriptions on the horizontal'. There are, in Levinson's words, 'only two catches' in the absolute system; the first is that it does not capture egocentric constancies (on which the directionality of our writing systems rely, among other things), and the second is that speakers have to keep constant track of their bearings.

Chapter four gives us some insight into the 'cognitive style' of two so-called 'absolute communities', speakers of Guugu Yimithirr (an Australian language, henceforth GY) and of Tzeltal (a Mayan language) and investigates the hypothesis that non-verbal cognition might evidence characteristics similar to those of the languages spoken in these communities. In order to study non-verbal cognition (mostly spatial memory), special tests have been devised,

which are presented in some detail in this chapter. GY is a language almost completely absolute in spatial description, with the exception of (120) 'a few body-part terms which have slightly extended spatial uses, for example *walu* (temple), *baaru* (front), *buthiil* (nose), all used to indicate the front of a man or animal, usually in conjunction with an orientational specification by cardinal direction.' GY makes essential use of cardinal directions, which actually refer to quadrants (or edges). This is somewhat misleading, because what in SILC is glossed as 'north' seems to really mean 'somewhere approximately between north-west and north-east'. The orientational terms appear in various derivations to constitute a remarkably detailed absolute system. Also remarkable is the absence of relative terms. There is, for example, no spatial term for 'right' or 'left'. Not surprisingly, GY speakers seem to keep constant track of their bearings and are impressively able to point immediately to known locations in various circumstances (127). Levinson has tested the coding of visual perception in GY speakers using, in particular, what he calls the 'rotation paradigm', a test he designed himself in 1992: if, facing north, a subject is asked to remember the picture of an arrow pointing to the right, hence to the east, and the subject is then made to turn round 180° to face a similar table, a 'relative coder' will show an arrow pointing right, whereas an 'absolute coder' will show an arrow pointing left (and still pointing east). The results of several experiments seem to show a majority of 'absolute coders' in that community. Tzeltal possesses both intrinsic terms and absolute terms, but the only absolute orientation is on the north-south axis. East and west are both glossed as 'across'. Members of the Tenejapan community, who speak Tzeltal, also tend to show a surprising incapacity at distinguishing between images which are symmetrical on a vertical axis, and this, it seems, independently of cardinal orientation. And a majority of the Tzeltal speakers tested seem to be 'absolute coders'.

From these results, SILC concludes that there is the possibility of a 'Whorfian effect' in the relation between language and cognition.

Chapter five of SILC is concerned with the hypothesis of spatial language influencing spatial non-linguistic cognition, but presents the results of a study investigating another (171) 'more easily directly tested, and crucially a weaker correlational hypothesis', namely that the frames of reference used in a language to describe specific scenes are likely to correlate with the non-linguistic coding of the same scenes. This chapter starts with a description of the methods used to test the correlation hypothesis in field conditions on small-scale, traditional communities. An important consideration is given to the way of assessing test results that do not fit into the expected relative/absolute dichotomy. In SILC, the data are analysed along a 'relative-to-absolute' gradient (Levinson suggests the hypothesis of a competition between possible frames of reference for each informant and in each trial, p.178). These data seem to confirm the correlation hypothesis. But the study also serves to eliminate different factors on spatial coding, such as ecological conditions (communities living in similar conditions may use different frames of reference), gender, age and literacy (although literacy does seem to play some role in the results). Competing factors having been more or less brushed aside, Levinson is able to conclude that (214) 'linguistic determinism seems the most likely explanation for the correlation.'

Chapter six investigates the cognition of navigation. The literature on animal navigation is very large, but we know very little about the human cognitive aspects involved in wayfinding. One major aspect of the problem, though, is that (218) 'human groups vary enormously in their navigational systems and abilities: navigation is quite largely a cultural matter.' One cannot, therefore, talk of human navigation in quite the same way as one would talk of the salmon's or the stork's navigations. The point, here again, is to show a correlation between the characteristics of a given language and the navigational abilities of its speakers, and the working hypothesis is that (227) 'speakers of absolute-coding languages should be better dead

reckoners', a fact that the reader will accept readily, as this ability has already been presented as characteristic of GY and Tzeltal speakers (see chapter four). But this study on three absolute communities, GY, Tenejapan (Tzeltal speakers) and Hai///om bushmen compared to two relative communities (Dutch and English) seems to be the first systematic study on the subject. And as expected, the results of this study shows that people in absolute communities are markedly better at pointing toward a specific location than people belonging to relative communities (although there are some differences in the degree of accuracy in different absolute communities, Tzeltal speakers are not as good dead reckoners as the other two communities). Also under investigation in this chapter are gestures made by speakers of absolute and relative communities. The outcome is that there seems to be a typical gesture system in the former, which include for instance large gestures with extended arms, the frequent use of both hands, and pointing behind oneself and though oneself, the speaker's trunk remaining mostly stable through sequences of gestures. This leads the author to infer the use of absolute mental maps by these speakers, as opposed to so-called 'strip maps' by relative speakers.

In the final chapter, the author attempts to elaborate a model of the human mind's representational system drawn from the observations presented in the preceding chapters. The main point is that there cannot be a single spatial representation in the mind, there must be many different representations, e.g. visual imagery, mental maps and propositional representation. Absolute and relative orientation for instance, which can coexist, imply two different kinds of representations that are not directly translatable into one another. The implications of all this are described as 'Whorfian perspectives' but the theory as such (301) 'is not Whorfian in any strict sense.' The main argument is that (ibid.) 'language is an output system. The output must meet the local semantic requirements. Consequently, the input to language production must code for the right distinctions.' And consequently (302), 'semantic parameters are not universal.' To account for the possibility of universals (the three spatial frames of reference seem to be such universals) and what is described in SILC as a variety of cognitive styles, the author presents in the last section of this chapter his 'co-evolution hypothesis'. According to this theory, already envisaged by biologists R. Dawkins and J. Thompson, and anthropologist D. Sperber (319), 'both genome and culture are conceived of as vertically transmitted lines of self-replicating and modifying information, which interact with one another in systematic ways.'

Assessment: the overall impression given by SILC is that of a rich, complex and thought-provoking book. As an interdisciplinary work, it reaches significantly beyond the scope of cognitive linguistics, convincingly calling up theoretical resources from anthropology, biology, philosophy and psychology. Every point is discussed in detail and taken up from various angles (except, understandably, for the concluding hypothesis); this richness and complexity also has its downside, as it entails a certain amount of repetitiveness, and sometimes backward logic. Something presented as established, e.g. that (218) 'one cannot talk of human navigation in the same breath as one might talk of the navigation of the arctic tern' will often be taken up later as mere conjecture, as in the mention of observations (241) 'rendering talk of a single uniform kind of basic human navigation suspect.' Apart from the obvious complexity of the question of space, this 'patchwork effect' is probably partly due to the fact that SILC integrates research conducted by different teams, in different locations, with different methods and over many years. The unifying thread is the aim to show how language may influence the way we think. A highly creditable point in SILC is that although the author's conviction on the subject is palpable, he never tries to downplay the difficulties raised by methods used, a limited amount of available data or the interpretation of particular results. The size of the groups tested is particularly crucial, as human navigation abilities are highly variable, but also eminently trainable. Also, one might suspect in SILC an

overestimation of the 'otherness' of exotic communities, as is often the case in Whorfian-related approaches. 'Otherness' is not always exactly what or where it is taken to be. For instance, when Levinson, to illustrate absolute thinking, notes (1) that in Balinese, to *lose the north* means *to be crazy*, the French reader cannot help exclaim that the French language, although undoubtedly a relative language in Levinson's classification, has precisely the same expression, *perdre le nord* (to lose the north), and also *perdre la boussole* (to lose one's compass). Even though SILC will probably not convince those who are not ready to be convinced (as Levinson himself states, p.303, 'all arguments here are controversial, including the ones in this book'), it is sure to give every reader a lot to think about; and it will be followed by more studies to confirm – or try to disprove – the results presented here. And so, there is no doubt that SILC is a major contribution to the debate about the mind-language relation.