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REVIEW ARTICLE

Spatial frames of reference in language and thought

STEPHEN C. LEVINSON, *Space in language and cognition: Explorations in cognitive diversity*. Series in Language, Culture and Cognition. Cambridge: Cambridge University Press, 2003. Pp. xxiii, 389. Pb $27.99.

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OVERVIEW OF THE BOOK

This is an important book that makes basic arguments of real consequence for current understanding of the relation among language, gesture, and mind. Convincing new experimental and field data from a wide range of languages are used to argue that human spatial cognition is organized into a limited set of types, that cross-linguistic variation in spatial categorization is far more extensive than previously known, and that language structure has a profound, if mediated, influence on thought, gesture, and other modalities of nonlinguistic cognition. Levinson carefully separates linguistic from cognitive analyses in order to trace the relations between them. His book is also an exercise in comparative linguistics, and a strong proposal for a typology of linguistic systems of spatial representation. The scope and strength of the arguments ensure the significance of the book and the debates it has already begun to provoke (see Gallistel 2002, Levinson et al. 2002, Li & Gleitman 2002, Majid 2002).

A central finding reported in the book is the diversity of spatial expression, based on careful studies of about forty languages, predominantly non-Western and many unwritten, which are spoken under hugely varying ecological conditions (urban, rural, mountainous, flat, wooded, open, etc.). The surprising diversity gives way to a generalized model of what Levinson calls Frames of Reference (FORs), of which there are exactly three from which all languages must select. Though the FORs are distinct, some languages show more than one, a fact that permits further linguistic typology according to which FORs languages display. Through a series of ingenious experiments, spatial reasoning is plotted apart from language. Using visual memory tasks, gestures and other nonverbal modalities, it is argued that the three FORs account for how people apprehend space. Language structure plays a double role, both "selecting from" the universal set of three cognitive types, hence as output, and guiding speakers to notice and deal with those scenes in specific ways, hence as input. Linguistic differences "correlate with and seem to induce, major differences in spatial cognition across

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human groups" (p. xviii). Thus the typological argument is pushed to its cognitive consequences. If this thesis is sustained, it implies that the classic ideas about linguistic relativity are accurate in important ways, and speakers of different languages really do inhabit different "spatial worlds." Levinson presents a formidable array of evidence in favor of his position, which he distinguishes from classical Whorfian relativism, dubbing his version "neo-Whorfian" (301). It is worth noting that this is a line of argument Levinson has pursued for over a decade in dialogue with others at the Max Planck Institute, a collaboration he is keen to acknowledge. Indeed, the book can be read as a call for collaborative research and an example of its promise.

The book grows out of remarkably productive and sustained research collaboration among scholars at the Max Planck Institute for Psycholinguistics at Nijmegen, of which it presents Levinson's synthesis. It also draws on an extensive literature on space, spanning linguistics, psychology, cognitive studies, and, to a considerably lesser extent, philosophy and anthropology. The empirical density of the work is such that it will be a valuable reference for students of space, regardless of whether they agree with Levinson's broader claims. The exposition of concepts and arguments is clear and concise, as is typical of Levinson's writings, and this recommends the book for graduate-level seminars in linguistics, linguistic anthropology, and psycholinguistics. The writing is mostly excellent and imparts the excitement of discovery, allowing the reader to be surprised and to follow the thinking that lies behind the analysis.

The thesis of the book is concisely stated: "I will advance the thesis that human spatial thinking is quite heavily influenced by culture, and more specifically by language; when languages differ in crucial respects, so does the corresponding conceptualization of spatial relations. This can be thought about, if one likes, as a limited kind of 'Whorfianism'" (18). The first step in the argument is to demonstrate cross-linguistic variation, to counter preemptive universal claims. The capacity for human languages to differ in this respect has been "drastically underestimated." Having demonstrated linguistic differences, the challenge is to show their consequences for cognition beyond and apart from language. The research strategy is to pick a domain (space), to examine the linguistic encoding of the domain across widely differing languages, and to examine NONLINGUISTIC encoding in cognition, by inducing it in experimental tasks involving spatial arrays. The evidence adduced includes observations of usage (including gestures), experimental tasks in spatial memory, dead reckoning, statistical analysis of aggregate results, and a good dose of linguistic analysis. There is some mention of ethnography, especially chap. 4, but this is not an ethnographic study either in method or in content. It is more directly engaged with comparative linguistics, cognitive science, and psychology. The result is a set of proposed universals. The basis of the universals is not a simple nativism, but local adaptations of mutually influencing modalities in the spatial domain (21). The argument is sufficiently important and complex to be outlined here in some detail.

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6CHAPTER-BY-CHAPTER SYNOPSIS

Chap. 1 sets up the basic thesis of the book. It distinguishes the metric precision and visual detail of thought from the absence of these in language (2), and proceeds to argue that cognitive diversity nonetheless runs parallel with and reflects linguistic diversity. The idea of a coordinate system implies more than the simple "at" relation of a preposition to a place. Simple locators like 'at' rely on the contiguity of the figural object to the landmark or ground, as in 'the wolf is at the door'. This does not require a coordinate system. However, as soon as distance is introduced between the object and the landmark, then we need the complexity of a FOR with coordinates to explain the representation. There are at least two frames of reference, absolute and relative, and languages can be classified according to which one is predominant (3). The relative frame is illustrated by 'The cat is behind the tree', where the tree is between the speaker (Spr) and the cat, and the spatial relation therefore involves the Spr's position. Contrast that to the absolute frame in 'The cat is north of the tree', which does not depend for its validity on the position of the speaker, but rather depends on the fixed coordinates of the cardinal directions. The choice of one or the other of these FORs as the core one in a language has "deep consequences" for users of the language. Having stated the central claim, Levinson presents a list of fascinating observations of Guugu Yimidhir and Tzeltal Mayan, whose absolute systems triggered some of the reasoning in the book (4–5).

Some of the history of thought pertaining to space is reviewed by way of situating Levinson's questions: Newton's distinction between relative (movable, relational) and absolute (immobile, without relation) spaces; and Kant's arguments for the irreducible necessity of absolute space. Kant observed that "incongruent counterparts" such as right and left hands, where the two are identical except for the counterpart relation, can be distinguished only by locating them in an encompassing absolute space. This observation will reemerge in the form of a fascinating experimental design in which subjects must decide on similarity among spatial arrays involving counterpart relations (also called "enantiomorphs"). Subjects using a relative frame of reference make different judgments than do those using an absolute system. For the sake of generality, Levinson lumps egocentric, anthropomorphic, and relativistic spatial concepts under the relative frame, and allocentric, abstract, fixed spatial information under the absolute one (9). Levinson argues against the standard claim that egocentric space is more basic than other kinds of spatial schemas (12–13), demonstrating far more cross-linguistic diversity than has been traditionally assumed (15). The basic argument of the book is then outlined (18–24).

Chap. 2 develops the pivotal concept of a spatial frame of reference (FOR), which Levinson will split into three types, Intrinsic, Relative, and Absolute. Before developing his own approach to these terms, Levinson reviews literature on space and the terms proposed by others. The discussion starts as general, with

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brain science and psychology and such phenomena as visual recognition and mental rotation, and works toward language by way of cross-linguistic variation and proposed primitives for the three linguistic frames of reference.

The reader should note that Levinson's terms are for the most part not new, but he redefines them according to his own typology. This requires a close reading to avoid confusion. The term "frame of reference" is a case in point. It is common in English to speak of "frames of reference" in nontechnical terms; there is a well-known approach to semantic description in terms of "frames"; Erving Goffman famously developed what he called "frame analysis," and so on. Thus, the expression is a familiar one. But for Levinson, Frame of Reference (FOR) is a specific concept, and there are precisely three subtypes. The phrase "deictic frame of reference" is also common in the literature, but Levinson rejects it as a "malapropism" and "conceptual nonsense," because none of the absolute, relative, or intrinsic spatial FORs requires reference to deixis (71). But a reader might counter that such a term is only "conceptual nonsense" if we accept Levinson's claim that there are three and only three frames of reference, if we accept his use of the term "deictic," and if we accept the initial move of using space as the defining domain for broader analytic concepts like frame, reference, frame of reference, and deixis. That's a hefty promissory note. Elsewhere in the book, technical definitions are proposed for other familiar terms, such as "coordinate system," "translation," and "reflection," which become the labels for increasingly narrow concepts as the book develops. Some of this is an inevitable part of developing a new approach to space, which the book does effectively. At other points, particularly in relation to deixis, stipulative definitions advance a spirited line of argument but ultimately weaken it by ruling out important counter-evidence.

The intrinsic FOR is illustrated by the statement 'the ball is in front of the house', where the ball is located relative to the "intrinsic" front-back orientation of the house. (The house is what Talmy called a "biased reference object" – that is, it has a front, back, top, bottom and sides.) In this case, the spatial relation is a binary one in which a figure (the ball) is located according to the intrinsic facets of the ground (the house, with its front). Contrast this to the sentence 'The ball is to the left of the tree', where trees have no intrinsic side-facets, and what the sentence conveys is that the ball appears to the left of the tree FROM THE VIEWPOINT OF AN OBSERVER (typically, but not necessarily, the speaker). If the observer were to circle around to view the scene from the other side, the same ball would appear to the right of the tree. This is the relative FOR, in which the spatial construal is relative to a "Viewpoint." Both intrinsic and relative FORs involve figure-ground relations (ball-house; ball-tree) but the relative FOR has the additional feature of Viewpoint (ball [F], tree [G], observer [V]). The intrinsic FOR is therefore binary, whereas the relative one is ternary.

The third FOR is what Levinson, following others, calls "absolute." We can redescribe the ball and house in absolute terms, saying 'the ball is north of the

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house'. Here the viewpoint of the observer is not defining, since the direction indicated by 'north' is independent of any specific viewpoint. The cardinal directional terms, heavily used in some languages, illustrate an absolute FOR, although fixed bearings can also be established by reference to topography or prevailing weather systems (48). Speakers of languages in which absolute FOR is dominant must maintain their orientation with respect to the fixed coordinates at all times if they are to understand and properly use the language. One of the fascinating subplots in the book is the discovery and description of absolute spatial construal in Guugu Yimidhir (GY), an Australian language treated in some depth (see also the studies of GY by John Haviland cited by Levinson in bibliography). The consequences of this fact are traced out in the kinds of gestures speakers use, the remarkably precise spatial orientation they maintain, and the ways they describe spatial scenes (see chap. 4, "Absolute minds"). The question to which Levinson builds is how the FORs work across different modalities, such as language and visual memory, posing what he calls "Molyneux's question." The cross-modal validity of the FORs is indeed an important piece in the puzzle of how language can affect thought: Languages select for FORs, which in turn have consequences for cognition.

Chap. 3 outlines the linguistic diversity that has come to light in recent research, much of it amply reflected in the book's bibliography. The lesson for Levinson is that linguistic systems require cognitive systems that support them. The absence of certain features in language tells nothing of the underlying cognitive systems, but the presence of linguistic distinctions requires supporting cognitive ones.

The major semantic subfields of spatial language are brought together in a proposed typology (66), which begins with the division between Location and Motion. Location is divided into Coincidence and Coordinate systems. Coincidence divides into Regions and Places, with Deixis as a subbranch of Region. Places split into Topology and Toponymy. By contrast, Coordinate systems come in two kinds, Vertical and Horizontal. Horizontal Coordinate systems split into Intrinsic, Absolute, and Relative. Absolute systems split into Landmark and Cardinal. All Coordinate systems involve angular specification (e.g. 90° for 'left'), whereas the Coincident categories involve the simple 'at' relation. Looked at as a whole, this is a powerful typology which nicely embodies Levinson's positions on coordinate systems (which imply FORs, a critical part of the language of space) and on deixis (which Levinson reduces to regional location, not implying any FOR).

The terms in this typology are then illustrated, starting with solutions to spatial specification NOT involving coordinate systems. Next come those that do involve coordinate systems, effectively illustrated from different languages, and showing subtypes of the FORs. The chapter concludes with a sweeping synthesis of the grammar of space, reminiscent of Berlin & Kay's famous analysis of color terms. In fact, there is a strong echo in this book of the comparative study

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of color terms, a battleground for arguments about relativity to which Levinson has contributed. The two have in common analysis of the linguistic treatment of a nonlinguistic phenomenon (color or space) into basic types (BCTs, FORs) whose presence in languages can be arrayed in terms of implicational relations (e.g., any language that displays feature 2 also displays feature 1). They differ in that Levinson is arguing in favor of a modified Whorfian position, whereas Berlin & Kay were arguing AGAINST Whorf-style relativity. Also, Levinson's evidence includes a wider range of tasks, beyond ostensive reference to exemplary scenes (or Munsell chips, in the color case). Levinson's three basic frames are differentially encoded in languages and differentially suited to performance of nonlinguistic tasks.

Chap. 4 presents the intriguing data from Guugu Yimidhir (GY) as well as data from Tzeltal Mayan (Tze), a language on which Penelope Brown has worked for many years (see citations in bibliography). Levinson has worked on both languages, albeit to a lesser extent. This major chapter presents a sustained line of evidence in favor of the absolute FOR, a system really different from our own and likely to intrigue the reader. The GY data occupy the first 35 pages, and the Tze data the remaining 22. Levinson argues convincingly that speakers of these two languages not only describe spatial scenes differently than speakers of European languages do, but actually cognize them differently. The data are fascinating and will make a rewarding read for anyone curious about how people in different cultures apprehend, remember, and judge sameness and difference between spaces. The strength of the chapter is the juxtaposition of two compelling case studies and the argument that speakers of these languages must maintain special orientations to space whenever they speak – orientations that differ in the two cases, but both involve fixed bearings. The weakness is the paucity of ethnography, beyond experimental results and some terse observations of ordinary practices. It was not Levinson's goal to present an ethnographic argument, but more ethnography would strengthen the case.

Chap. 5 adduces more linguistic, experimental, quantitative, and observational data. The hypothesis of cross-linguistic cognitive variation is argued for directly on the basis of the methods and results of the cross-linguistic sample. As Levinson emphasizes, these results rely on research conducted by a number of people, and collaboration is a key part of his approach. Here, as at the outset of the book, it is enjoyable to follow the author's reasoning and the development of ingenious tests, such as tests for congruent counterpart relations, to tease out the requisite distinctions. The chapter is 45 pages long and presents the maximal array of cross-linguistic materials and various indices of cross-linguistic differences (literacy, ecological zones, gender, schooling). The objective is to show that the variation among the different cases cannot be explained on the basis of any factors other than language spoken. This is interesting and important to the overall thesis. Anthropologists will be uncomfortable with Levinson's apparent alignment of culture with variation from the universal structures; as though cul-

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tures are relevant only as specific variations from what is universal. This framing of the problem doubtless reflects Levinson's aim of demonstrating that linguistic and cultural specificity matters to cognition. From a social perspective, by contrast, what makes a fact "cultural" is not that it is unique, but that it is somehow systematic to a social group. We want to know how space itself is culturally constructed: What do the FORs look like when embodied in culturally meaningful landscapes. How do speakers orient in ordinary practice? How do they talk about space, and what can we know of the historical emergence of these cultural practices?

Chap. 6 is substantial, at 63 pages, and Levinson's argument culminates here. It hints at the broader tableau he has in mind, adducing comparative data from wayfinding among pigeons and from other primates, as well as from human groups whose subsistence relies on dead reckoning. One theme is the broad variation in human navigation systems, and the special demands placed on anyone who speaks a language in which the absolute FOR dominates. As Levinson emphasizes, the semantic organization of language is partly independent of cognition, marked by redundancy, indexicality, and adaptation to communicative needs. Hence, there can be no direct projection from the one to the other, and the relation between spatial language and spatial cognition is an empirical question. The book pursues this question by rigorously separating the linguistic analysis from the nonlinguistic experimental tasks, a substantial contribution in itself. The languages discussed at this stage are Guugu Yimidhir, Hai//om (Khoisan "bushmen" of the Namibian Kalahari), and Tzeltal Mayan, all of which show absolute linguistic and gestural systems. Illustrating relative systems are Dutch, British English, and Japanese. The prediction was that the speakers of absolute systems would be good dead reckoners, whereas those who speak languages with dominant relative FOR would be poor dead reckoners. The reasoning is that the absolute speakers must maintain orientation at all times, which Levinson likens to a dedicated background processor, just in order to speak and understand their language. They are effectively dead reckoning all the time. This prediction is borne out in the experimental data.

At this point, the argument turns to gesture among the speakers of the aforementioned languages. Levinson introduces the terms "absolute gesture systems" and "relative gesture systems" to distinguish the two types (247). The two categories are defined by the coordinate systems used within gestural depictions themselves – that is, gesture as a dynamic part of communicative practice. The argument is that absolute gesture systems are basically different from relative ones. Not only are they guided by fixed coordinates, but the gestures themselves appear different, with absolute gestures more commonly produced on the periphery of the frontal gesture space, with the torso maintained fixed and more commonly pointing in some direction through the gesturer's own body. Gesturers who speak languages with relative FORs tend to produce their gestures toward the central area of gesture space, often shifting their torso to face the direction of

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the point and with less frequent awkward points through or behind their own body. There is a useful summary of ten distinctive properties of absolute gesture systems (265–66). Thus gesture and language are distinct modalities, but the typological properties of a language have consequences for the gestures its speakers use. The remainder of the chapter explores different kinds of mental maps, helping to frame the results reported here. In terms of linguistic relativity, the position is that the different languages require one or another of the FORs, and these FORs place constraints on the way speakers cognize space, with dead reckoning, fixed angles, and distances required for absolute systems, and visual memory and viewpoint required for relative ones.

The final chapter of the book examines the relation between language and thought. The general line of argument will be familiar from the preceding synopsis, although the three-way split of Relative, Absolute, and Intrinsic is reduced. At this point in the book, Levinson makes a binary split between two polar linguistic types of FOR, which jointly subdivide the domain of space: Absolute and Relative (282). The absence of the Intrinsic FOR in Figure 7.1 is confusing, since all languages in the sample display Intrinsic systems (cf. 182, Figure 5.4) but may be motivated by the contrastive consequences of the Absolute ≠ Relative split. These two are strongly correlated with different aspects of nonlinguistic cognition (including propositional, imagistic, kinesthetic, and mental maps). An inventory of representational systems involved in spatial processing is presented (286), alongside a schema showing (somewhat awkwardly) relations between the different systems (287). The argument is that these different systems are module-like components evidently required to support different spatial computations. Levinson's position differs from standard modularity in that the different systems are not encapsulated, as they would be for true modularity, and they are locally "tuned" rather than invariant. He also distances his position from standard Whorfian relativity, on the grounds that linguistic and cognitive representations are distinct, that linguistic representations are in principle underdetermined and enriched by inference (293). Moreover, Levinson is not concerned with obligatory categories, but rather with entire sets of lexical and phrasal forms, and, crucially, he makes no appeal to habitual usage. Rather, the argument is "architectural:" Language is the output system, which must conform to local semantic requirements, and this in turn requires that the input to language make the requisite distinctions. The linguistic system is not a necessary determinant of spatial cognition, but it is a sufficient one. The proposed universals of frames of reference in language and related cognition are summarized in Table 7.1 (314), a handy reference to consult in conjunction with chap. 1.

QUIBBLES AND QUESTIONS

This book makes arguments of basic importance to linguistic typology, spatial cognition, field methodology, and experimental design, the relation among

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thought, language, and gesture, and a host of less central topics. The sheer scope of the argument and the verve with which it is advanced make the book an exciting read and a major contribution to scholarship. Nonetheless, there are a few points, more or less significant, on which it is more limited than need be. The first is that, from an anthropological perspective, the universalizing impulse of the central argument results in what most ethnographers would consider thin ethnography. This is consistent with the tendency to reason in terms of methodological individualism, in which the capacities of individuals (mental, linguistic, gestural) are the explanatory framework, to be tested, aggregated statistically, cognitively grounded, and acquired in the ontogenesis of individual lives. By contrast, there is little attention paid to the social constitution of space, the histories over which any of the language systems has developed, the colonial realities of places like Chiapas, the community-level values invested in different places, or any sustained description of culture in terms other than specialized variations on the universal theme. It is fair to say that this book is not concerned with that level of fact, a judgment the author (a dedicated ethnographer) has every right to make. It is also consistent with the fact that Levinson argues the language–cognition nexus not from routine use (which would necessitate a different level of ethnography), but from system architecture (for which ethnography is mostly irrelevant). The problem is that there is an enormous literature on space, territory, and landscape in anthropology, geography, and history whose absence will limit the impact of the book. Hallowell 1955, Gell 1985, Bourdieu 1972, Munn 1986, Schegloff 1972, and de Certeau 1984 come to mind, but space is a *locus classicus* of social analysis of many sorts. Ethnographic grounding would be required to demonstrate that speakers in ordinary practice reason about space from the FORs and not from other, "external" factors.

I believe it is the same generalizing impulse that accounts for the relative paucity of pragmatics in the book. Levinson has made important contributions to the study of inference, "presumptive meanings" (2000), "social deixis" and interaction, yet there is little of that here. The goal of presenting a fairly lean argument, already complex, doubtless motivates the absence. But there is at least one question on which more attention to actual speech practices in the object languages would have helped: How are the different FORs combined in speech? We learn that languages, looked at through the lens of their entire grammar, may well use all three FORs, but what about given speakers, or even given utterances? Levinson notes several times in passing that the FORs may be combined, but there is little discussion of the principles that guide combination. Point 8 in Table 7.1 (314) makes the intriguing proposal that individual sentences may combine information in distinct FORs, but usually not describing the same Figure-Ground relation. If the two systems correlate strongly with contrasting spatial cognition in other modalities, what does it mean to combine, blend, or switch between systems in practice? What would be the cognitive economy of a bilingual speaker whose two languages show distinct predominant FORs? The polar

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opposite cases of Guugu Yimidhir and Tzeltal, on the one hand, and English and Dutch, on the other, are important in this connection, because in their relative purity, they reveal polarities in the FORs that might be difficult to identify when mixed. But if the ordinary business of speaking in a mixed language involves combination of FORs, then what does this imply for the cognitive abilities of the speakers? What happens when an erstwhile absolute system, like cardinal directions, is actually used differently by different communities of speakers, according to which regions of the total landscape they come from (e.g., Icelandic; see Haugen 1969)? On the face of it, this involves relativized usage of an absolute system, where the Viewpoint element is indexed to provenience of Spr. Given the limits in translatability between the two FORs and given their apparent cognitive consequences, a systematic look at how they combine would appear necessary to the overall thesis.

The book supports the widely held position that spatial cognition is critical in a range of other abilities. It also argues that space is a coherent domain, such that it is meaningful to investigate how it is linguistically structured. However, there is one point on which the presumptive centrality of space is open to debate. This is the question of deixis, which recurs throughout the book and on which Levinson's position appears equivocal. In most cases, what Levinson is discussing under the rubric of deixis is not what most linguists would call "deictic forms," or just "deictics," like 'here' and 'there' or 'this' and 'that'. Rather, he is discussing indexically relative uses of "non-deictic" expressions, such as English 'in front of X' when meant to convey 'between me and X' (35–36). This is "deictic" in that it presupposes the reference to ego, but Levinson goes on to collapse this into the Intrinsic FOR (35). The precedent for such a usage of "deictic" is stronger in the psychological literature than in the linguistic. By contrast, he classifies the standard linguistic deictics as simple locationals, for which no FOR is needed (65–71). Thus there are two basically different usages of the term "deictic," and they correspond to different FORs.

The problem is that it is doubtful that standard linguistic deictics are spatial locators in the first place. To be sure, there is a hackneyed tradition of describing them in terms of what is close and what is far, but this is little more than a debilitating stereotype that fails to explain how they are actually used. Unlike the erstwhile "deictic" uses of spatial expressions like 'in front of', deictics in the standard linguistic sense do not fit the framework of this book. Levinson assimilates deixis to the 'at' relation, which is based on contiguity (65–66). But some deictics involve great distance or other distinctive relations like anaphora, attention focus, or perceptual access to the object. It is misleading to treat such forms as all encoding the 'at location' proposed here. It is also widely recognized that deixis crucially involves other pragmatic features, including definiteness and directivity, which simply fall outside the scope of spatial location. In order to treat deixis in the way proposed here, one must accept that it can be analyzed properly in terms of the 'at' relation, but that seems unlikely.

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Deixis therefore poses a significant methodological challenge, because ordinary deictic usage systematically responds to nonspatial factors that are difficult to control in experimental settings. The focus on isolated utterances, referring to anonymous objects in solitary or simple dyadic contexts, is typical of experimental work but is a poor proxy for ordinary practice (Hanks 1990, 2005). The experimental design must control for and determine the frame of relevance in which an act of referring is produced, whereas in ordinary usage, acts of deictic usage are a major resource for managing relevance. By presenting a subject with a spatial array in an otherwise "null" context, the experimenter fixes in advance what the ordinary speaker must achieve. It might be countered that factors like ones mentioned only demonstrate that linguistic deictics combine spatial with nonspatial information, but do not challenge the basic analysis of the spatial features. If we assume that the conveyed meanings of deictic utterances involve inferences, like virtually all other speech, then we might simply claim that the spatial information is what is encoded and the other pragmatic effects are derived by inference. This is essentially the position Levinson 2000 adopts as part of a wide-ranging "neo-Gricean" theory of presumptive meanings. To make the question still harder, many deictic oppositions are "privative", involving an unmarked vs. a marked form. In these cases, we would naturally expect the unmarked form to have a broader range of potentially nonspatial uses. Thus, one solution might be to posit a purely spatial semantics with marking relations, augmented by nonspatial pragmatics. The problem is that it is nearly impossible to defeat such an account, since the semantic hypothesis of spatial location is protected from counter-evidence by the flexibility of unmarked forms and conversational inference (cf. Hanks 2005). At stake here are both how we conceive of "utterance space" and the kinds of methodology we devise to test our conceptions. Levinson's analysis of deixis would be more compelling if we could say confidently what would it take to falsify it. No amount of experimental evidence involving spatial arrangements of speakers and objects can determine whether the deictic forms encode space or some other dimension.

The care with which Levinson determines the FORs of different types of spatial expression calls for equally careful study of the speech practices in which the expressions are used. In ordinary deictic usage, reference relies on other, nonspatial factors, which may also combine with spatial FORs (cf. 'the one on the north there', 'that one downhill'). Bilingualism, code-switching, and conversational shifting between FORs all suggest that the framework laid out here needs to be studied at the level of speech practices. This will require more ethnography, a broader sense of "frame of reference," and attention to "space" as it is socially defined. In short, it will require that we introduce society alongside language and cognition. This creative and challenging book contributes to a better understanding of how speakers of different languages construe space in different ways. It merits close reading, critical debate, and further research into the social embedding of both language and cognition.

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