Edited by

MICHAEL TOMASELLO

Volume 2

THE NEW PSYCHOLOGY OF LANGUAGE

Cognitive and Functional Approaches to Language Structure

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Contents

Introduction: Some Surprises for Psychologists

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Linguistics can sometimes be a technical discipline, with a reality and a vocabulary all its own. For this reason, psychologists have often waited for linguists to tell them what language is—that is, give them a good description according to the latest theory—so they can go on to study its comprehension, processing, and acquisition. But much of the theoretical framework and vocabulary of modern linguistic theories relies on the categories and terminology of traditional Western linguistics. Traditional Western linguistics arose historically in the Middle Ages (from Greek and Roman sources), mainly for the teaching of Latin as a language of scholarship. Nouns and verbs, subjects and objects, predicate adjectives and predicate nominals, are manifestly not phenomena that were created by psychologists, or even linguists with a psychological bent, with the goal of describing how all the people of the world, speaking more than 5,000 different languages, actually comprehend and use a natural language. Many of them are not applicable at all to many non-European languages (Croft, in press; Dryer, 1997).

It may be that some of these categories are indeed useful for the explanatory purposes of psycholinguists, But some may not be; it is in each case an empirical question. And that is one of the revolutionary aspects of the new wave of linguistic theories that fly under the banner of Functional and/or Cognitive Linguistics. Although they too use technical terminology—some

of it from the traditional vocabulary—in principle each linguistic entity is defined with respect to the function it serves in real processes of linguistic communication. In addition to this general functional orientation, Cogni tive-Functional (Usage-Based) linguists also make the "cognitive commitment" to couch their definitions and explanations as much as possible in theoretical constructs and terminology that are compatible with those of the other Cognitive Sciences (Lakoff, 1990). This makes the work more ac cessible to psychologists, and indeed it is even possible now that psycholo gists can share in the discussion and help to identify psychologically real linguistic entities involved in processes of linguistic communication.

This is the reasoning behind the title *The New Psychology of Language.* which is descriptive of the chapters both in Tomasello (1998) and in the current volume. Structural linguistics adopts many categories of traditional Western linguistics uncritically—indeed positing them as innate aspects of a supposed universal grammar—and then goes on to create new linguistic categories based not on their cross-linguistic applicability or on their psychological plausibility, but rather on their formal adequacy within the framework of a specific mathematical theory of language. (Thus, when a formal advance is made in the theory, as in the new minimalism [Chomsky, 1993], it is automatically assumed to be a part of universal grammar, with no empirical verification deemed necessary.) Cognitive—Functional Linguistics, on the other hand, adopts the categories of traditional Western linguistics only tentatively and provisionally based on their correspondence to the actual patterns of use of particular people using particular languages; when it creates new categories it justifies them on the basis of how people in a particular language, or set of languages, use them in acts of linguistic communication.

In the introduction to the first volume, I attempted to give an overview of Cognitive-Functional Linguists for psychologists and psycholinguists, in the hopes that this might provide them with some new perspectives for viewing basic processes of linguistic communication (Tomasello, 1998). In the more modest introduction to this the second volume, I simply wish to highlight, and to briefly explore, some of the discoveries—or in some cases, rediscoveries with modern reformulations—of modern Cognitive-Functional (Usage-Based) Linguistics, with special reference to those that seem to have most direct relevance for psychologists. Many of these discoveries—or at least the new light in which they are cast in modern Usage-Based theories—will be surprising to psychologists and psycholinguists who have not kept up with recent research on such things as grammatical analyses of non-Indo-European languages, grammaticalization in language history, the relation between written and spoken language, and the relation between language and human cognition and social interaction. In my opinion, a serious consideration of these new facts about language could change fundamentally the way psychologists and psycholinguists go about their business.

Spoken Language Does Not Work Like Written Language

Everyone agrees that the primary focus of Linguistics, and *a fortiori* Psycholinguistics, should be spoken language. Spoken language was primary by many tens of thousands of years in human history, and indeed, until quite recently, the majority of human beings on the planet have not used a written language at all. Today, spoken language is still primary by several long years in individual ontogeny, and the struggles of many children in learning to read—as compared with the relative ease with which they learn to speak—attests to the "unnaturalness" of written language.

The problem is that learning to use a written language—not to mention learning metalinguistic skills for talking about it, as in Western grammar schools—profoundly influences the way we think about language. Olson (1994, pp. 258–265) argued this point forcefully in a series of principles, some of which are: (a) Writing was responsible historically for bringing aspects of spoken language into conscious awareness, that is, for turning aspects of language into objects of reflection, analysis, and design; (b) No writing system brings all aspects of what is said in spoken language into awareness, and those aspects of spoken language that are not represented by written language are extremely difficult to bring into consciousness; and (c) Those aspects of spoken language represented by written language are felt by individuals, erroneously, to be a complete model of language, and once this model has been internalized, it is extremely difficult to unthink it and look at spoken language "naively."

The way to deal with this problem, of course, is to focus not on "grammatical sentences" found introspectively—as is common in much of Linguistics—but rather to actually observe, record, and analyze spontaneous spoken speech (see Ford, Fox, & Thompson, this volume). This is not as easy as it sounds, and indeed it is only with the invention of affordable recording equipment (and resources for paying transcribers) that it has become a possibility at all. With the invention of computational tools for tagging and searching transcripts of spoken language, a whole new world of corpus linguistics is opening up that allows for the analysis of decent-sized corpuses that represent what people actually do when they speak (e.g., Biber et al., 1998; Sinclair, 1991), Here is a partial list of some of the findings that emerge when one looks at spontaneous spoken speech (SSS) in comparisons with writing:

- There is very little in SSS that corresponds to a "sentence," as many people discovered when they first read transcripts of the informal conversations of politicians as recorded on the infamous Watergate tapes. People speak in "intonation units," which consist of prosodically and semantically coherent stretches of language typically containing only one new piece of information (DuBois, this volume). These intonation

units are typically grammatical units of one sort or another (e.g., Noun Phrases, Adpositional Phrases, Clauses), but only sometimes are they entire "sentences" on the model of written language.

- What are often thought of as prototypical utterances in a language actually are not. For instance, utterances like the English "John bonght a motorcycle," in which there are full nouns (i.e., noun phrases) designating both of the main participants, are extremely rare in SSS (but reasonably frequent in writing). In SSS, what people prefer to do mostly is to introduce the main referent in one intonation unit, and then predicate something about it in another (often using a pronominal reference to the just intro duced entity), as in: "hey…ya know that guy John…down at the poolhall …he bought a Harley…if you can believe that." (Chafe, 1994, 1998).
- What are thought of as the prototypical uses of certain linguistic constructions often are not. For example, textbooks tell us that English relative clauses serve to "restrict" reference, as in "The motorcycle that he bought uses diesel fuel," and they often do do this in writing. But, it turns out, in English SSS people very seldom use a relative clause to restrict the reference of the primary participant (subject), which, as noted previously, is most often a pronoun. Also, people seldom use the word *that* to introduce a relative clause in SSS. This leads once again to more natural utterances like "ya know that motorcycle he bought…. [it uses diesel]" (Fox & Thompson, 1990).
- Utterances high in transitivity (an agent does something to cause a change of state in a patient), which are often used as the prototype of a sentence in many languages, are not so frequent in SSS. In one analysis, Thompson and Hopper (in press) found that only about one quarter of the clausal intonation units in SSS had two participants, and many of these were low in transitivity (primary participant not very agentive or secondary participant did not undergo change of state). There were also many dispersed verbal predicates instead of single lexical verbs (e.g., *have a hard time V-ing, go to all the trouble of V-ing, wander around V-ing Xs,* etc.).
- When one systematically compares such things as noun phrases, subordinate clauses of all types, focus constructions of all types, and many others, one finds that SSS and written language are very different grammatically (Miller & Weinert, 1998). Many constructions occur only or mainly in speech, for example, imperatives and interrogatives, or only in writing, for example, some types of complex nominals (e.g., "a rigorous and valid examination of Applied Economics that consists of three papers"), but not in both.

These are enough examples to make the point. The real thing—spontaneous spoken speech—has properties of its own that are different, in some cases very different, from the intuitive model of language that literate, educated

people carry around in their heads. This internalized model may of course be used to generate hypotheses about the structure of SSS, but the fact is that SSS must be studied in its own right, by the normal processes of scientific observation and experimentation, however difficult and costly this mav be.

Grammar Arises Historically From Language Use

Although it is not well known in the Cognitive Science community, the fact. is that virtually all linguists who are involved in the detailed analysis of individual languages cross-linguistically—mostly known as linguistic typologists—now agree that there are very few if any specific grammatical constructions or markers that are universally present in all languages. There are many languages that simply do not have one or the other of relative clauses, sentential complements, passive constructions, grammatical markers for tense, grammatical markers of evidentiality, ditransitives, topic markers, *a copula* (to be), case marking of grammatical roles, subjunctive mood, definite and indefinite articles, incorporated nouns, plural markers, and on and on. Typological rescarch has also established beyond a reasonable doubt that not only are specific grammatical constructions not universal, but basically none of the so-called minor word classes of English that. help to constitute particular constructions (e.g., prepositions, auxiliary verbs, conjunctions, articles, adverbs, complementizers, and the like) are universal across languages either (Croft, in press; Dryer, 1997).

This does not mean that there are no language universals—there demonstrably are—but only that we must look for those universals in places besides particular linguistic items and constructions. One place to look is human cognition, and of course that is one of the central tenets of Cognitive Linguistics. Talmy (this volume) outlines four "concept structuring systems" that, by hypothesis, underlie all languages. Thus, all human beings conceptualize the world in terms of certain configurations of space and time, force dynamics and causality, perspective and attentional distribution; and so languages, as conventional symbolic systems designed to communicate about this world, obviously reflect these conceptualizations as well. Kemmer (this volume) analyzes how many different languages construe events and elaborate their participants, proposing a universal event model that then different languages instantiate differently in their various constructions. Haspelmath (this volume) illustrates graphically some of the interesting and complex ways in which universal forms of conceptualization get symbolized into languages cross-linguistically, with both some universal patterns and also a healthy dose of language-specific idiosyncrasies. Another place to look for universals is human communication in the sense of the communicative goals and needs of human beings—some of which are universal and some of

which are particular to particular speech communities. Comrie (this volume) outlines some possible linguistic universals due to the kinds of things that humans need to talk about most urgently and the ways they need to talk about them in order to avoid ambiguities and achieve their communicative goals.

If grammatical items and constructions are not universally given to human beings, then where do they come from? Beginning in the last century, historical linguists have observed that many grammatical items in a language seem to come from more contentful lexical items. Some of the best-known European examples are as follows:

- The main future tense marker in English comes from the full lexical verb *will,* as in I *will it to happen*. At some point expressions arose of the form *It'll happen* (with the volitional component of *will* "bleached" out). Similarly, the original use of go was for movement *(I'm going to the store)* and this became *I'm gonna do it tomorrow* (with the movement bleached out).
- The English past perfective, using *have,* is very likely derived from sentences such as *I have a finger broken* or *I have the prisoners bound* (in which *have* is a verb of possession). This evolved into something like *I have broken a finger* (in which the possession meaning of *have* is bleached out).
- English phrases such as *on the top of and in the side of* evolved into *on top of* and *inside of* and eventually into *atop* and *inside.* In some languages relator words such as these spatial prepositions may also become attached to nouns as case markers (although not in English)—in this instance as possible locative case markers.
- In French, the main negative is the expression *ne...pas,* as *in Je ne sais pas.* Currently in spoken French, the *ne* is becoming less often used and *pas* is becoming the main negative marker. But the word *pas* was at one point the word for "step," with the expression being something like the English "not one bit" or "not one step further."

In addition, larger constructions themselves are products of grammaticalization processes, albeit these processes may be somewhat different and so they have been called *syntactitization* (Givón, 1979, 1995). The basic idea is that instead of sequences of words becoming one word, or a word changing from a more referential to a more grammatical function, or a word turning into a grammatical morpheme, in this case whole phrases take on a new kind of organization; that is, loose discourse sequences, often across intonation units, become tighter syntactic constructions. Some possible examples:

- Loose discourse sequences such as *He pulled the door and it opened* may become syntacticized into *He pulled the door open* (a resultative construction).

- Loose discourse sequences such as *My boyfriend…He plays piano… He plays in a band.* may become *My boyfriend plays piano in a band.* Or, similarly, *My boyfriend…He rides horses…He bets on them,* may become *My boyfriend, who rides horses, bets on them.*
- Similarly, if someone expresses the belief that Mary will wed John, another person might respond with an assent *I believe that,* followed by a repetition of the expressed belief that *Mary will wed John,* which become syntacticized into the single statement *I believe that Mary will wed John.*
- Complex sentences may also derive from discourse sequences of initially separate utterances, as in *I want it…I buy it,* evolving into *I want to buy it.*

Interestingly, along with plenty of idiosyncratic grammaticalization paths in individual languages, there would seem to be some universal, or nearly universal, grammaticalization and syntactitization paths as well. Among the most widely attested are such things as (a) main verb → auxiliary verb → tense-aspect-mood marker (e.g., a process begun by English *will* [future] and *have* [perfective]); (b) demonstrative → definite article (e.g., English *the* from *that*); (c) the numeral "one" → indefinite article (Spanish *uno/a,* French *un,* English a); and (d) demonstrative → complementizer (e.g., in English *I know <u>that</u> → I know <u>that</u> she's coming*). These happen separately in separate languages, presumably attesting to common processes of change based on universal principles of human cognition and linguistic communication (Croft, 2000).

Bybee (this volume) proposes some specific explanations for these common grammaticalization paths in terms of cognitive and communicative processes well known to psychologists, such as automatization, habituation, decontextualization (emancipation), categorization, pragmatic inferencing, and others. These processes occur as individuals use pieces of language in communication over time, with speakers constantly trying to say no more than is necessary and listeners trying to make sure that speakers say enough that they can understand adequately the intended message. Van Hoek (this volume) explains why certain processes of reference and anaphora across clauses and intonation units operate the way they do in language. Her explanation focuses on the way people package their conceptualizations for purposes of interpersonal communication.

The Units of Language Are Many and Various and Do Not Constitute "A Grammar"

In traditional Western linguistics we speak of "The Grammar" of a language, and Chomsky has followed in this tradition by speaking of children as

working with "A Grammar." But languages as they are really spoken and used are very messy, and to maintain the myth of "The Grammar" of a language as a coherent entity many interesting structures must simply beignored. For example, it is well known that in traditional terms English is an SVO (Subject-Verb-Object) language; subjects typically precede the verb and agree with it in number, Thus we say:

She plays the piano.
They play_ the piano.

But a class of the most frequent constructions in English does not work in this way (see Lakoff, 1987, for a thorough analysis). Thus, we say:

There is my shoe.	Here is my shoe.
There are my shoes.	Here are my shoes.

In this case, it is the element following the verb that agrees with it in number and so is, by that criterion, its subject. (Making matters even more complicated, the very similar looking utterance *It is my shoe* does not also have the form **It are my shoes*.) It is also well known that many so-called ergative languages have ergative organization in, for example, first and second person utterances, but accusative organization in third person utterances (there can also be split ergativity based on tense; DeLancey, 1981).

The point is that different constructions in a language often have their own idiosyncratic properties that do not fit neatly into the rules of "The Grammar." Fillmore, Kay, and O'Conner in their famous 1988 paper in *Language* (reprinted in abridged form in this volume) explore some of the many and various idiosyncratic constructions of English, focusing especially 011 the construction exemplified in utterances such as *She wouldn't live in New York, much less Boston*. Whereas it was always known that all languages have some idioms, metaphors, proverbs, and quirky constructions, what this paper underlines is the fact that many constructions in a language are in fact mixtures of more "regular" and more "idiomatic" subconstructions. Subsequent studies on various other "odd" constructions have turned up many other similar examples, most famously:

- the nominal extraposition construction (Michaelis & Lambrecht, 1996), as in *It's amazing the people you meet here.*
- the WXDY construction (Kay & Fillmore, 1999), as in *What's my sister doing in a bar?*
- the way-construction (Goldberg, 1995), as in *He smiled his way into the meeting.*

- the twisting-the-night-away construction (Jackendoff, 1996), as in *He's sleeping his college career away.*
- the -er construction, as in *The richer they are, the nicer they are.*
- the incredulity construction, as in *Him be a doctor!*

These constructions are not just totally weird idioms, but rather they represent complex mixtures of regular and idiomatic components, and so in traditional Linguistics it is difficult to know what to do with them,

The theoretical move in traditional as well as Chomskian linguistics has always been to simply designate some items and constructions of a language as irregular or idiomatic; they are then relegated to the lexicon. This approach has been most clearly instantiated in Chomsky's (1980) distinction between the Core and the Periphery in The Grammar of a language. More recently, it is also evident in the Words and Rules approach of Pinker (1999) and Clahsen (1999), in which all irregular aspects of a language are in the lexicon—and so must be learned by rote—whereas all the regular aspects of a language are a part of its grammar and so fall under a rule that then generates its structural description. The problem again is that this tidy distinction is very difficult to maintain in the face of mixed constructions such as those listed, in which it is almost impossible to segregate the regular and idiomatic aspects. To look more closely al just one example, the incredulity construction *(My mother ride a motorcycle!)* is fully productive. A native speaker of English can generate new exemplars indefinitely. In some ways it is like other English constructions (e.g., it has SVO ordering, the NPs are regular), but of course the S is marked as an object pronoun (accusative case) and the verb is nonfinite (not marked for agreement). And so the question is: Is this a rule-based construction or an idiom? If it is an idiom, it must be called a productive idiom. The problem is that there are thousands and thousands of productive idioms in a language that are regular and idiomatic in myriad different ways—so that they merge into more regular constructions with no clear break (Nunberg, Sag, & Wasow, 1994).

The discovery—perhaps best credited to Bolinger (1977) but due mostly to the work of Fillmore, Kay, and colleagues—is that there is no clear distinction between the "core" and the "periphery" of a language, and this un dermines the whole idea of The Grammar of a language as a clearly defined set of rules. It is interesting and important that when linguists who have worked for years in the Chomskian tradition look carefully at particular grammatical items and constructions, they find that many of them that were at one time considered members of the same category (e.g., complementizer) or construction (e.g., complement clause) turn out to be very different from one another in detail—and so not assimilable to the same rigid rule (Cullicover, 1999; Jackendoff, 1996).

The alternative is to conceive of a language as "a structured inventory of symbolic units," each with its own structure and function (Langacker, 1987). These units may vary in both their complexity and generality. For example, the one word utterance *Fore!* is a very simple and concrete construc tion used for a specific function in the game of golf. *Thank you* and *Don't mention it* are multiword constructions used for relatively specific social functions. Some other constructions are composed of specific words along with "slots" into which whole classes of items may fit, for example, *Down with __!* and *Hooray for__!* There are also constructions that are extremely general and abstract. Thus, the ditransitive construction in English proto typically indicates transfer of possession and is represented by utterances such as *He gave the doctor money,* abstractly described as NP+VP+NP+NP. Abstract linguistic constructions such as this have their own meanings, in relative independence of the lexical items involved, and indeed this is the source of much of the creativity of language (Goldberg, 1995). Abstract constructions are thus an important part of the inventory of symbolic resources that language users control—and they do much of the work that would be done by core grammar in more traditional accounts—but they are best seen as just one form that linguistic constructions may take.

In general, the breakdown of the distinction between linguistic "core" and linguistic "periphery" is a genuine scientific discovery about the way language works, and sorting out its implications will play a key role in creating a new psychology of language, When we conceive of linguistic constructions as cognitive schemas of the same type as we find in other cognitive skills, that is, as relatively automatized procedures for getting things done (in this case, communicatively), it is quite natural that they should not be of only two kinds (regular and idiomatic) but rather that they should vary from simple to complex and, independently, from concrete to abstract. in many complex ways.

Frequency Counts

Individuals do not hear abstract constructions; they hear only individual utterances. To create abstract constructions, they must find patterns in the language they hear around them. Children begin with constructions based on concrete items and phrases; they then discover a variety of relatively local constructional patterns; and only later do they discover more general patterns among these local constructional patterns (Tomasello, 1992, 2000). But as children create more general constructions, they do not throw away their more item-based and local constructions. The idea that people operate always and only with the most abstract structures that linguists can find is what Langacker (1987) called the *rule-list fallacy.* It reflects a

very deep difference in the theoretical goals of formal linguists and more psychologically oriented linguists.

In cognitively and functionally oriented (usage-based) approaches, people can possess abstract cognitive structures that they use in certain instances, but they still operate on some occasions with the more concrete structures that instantiate the abstraction. As just a handful of many thousands, or tens of thousands, of relatively concrete and fixed expressions that native speakers of English control (which may or may not instantiate more abstract constructions): *I'm simply amazed, I looked everywhere for it, You keep out of this, That was a close call, It's a matter of priorities, From time to time ..., I'd do it all over again, I'm surprised to hear that, Do what you're told!, I see what you mean, I thought you 'd never ask, Have some more, You can't be too careful. Where did you find it?, He's busy right now, You can't believe a word he says,* and on and on (Pawley & Syder, 1983).

Bybee and Scheibman (1999) provided evidence that people sometimes produce complex utterances—which they know at some level have internal structure—as single processing units. They analyze in some depth various uses of the English word *don't* and find that in highly frequent and relatively fixed expression like *I don't* know people tend to reduce the pronunciation of *don't,* in some cases so much that it is barely recognizable if listened to in isolation. Thus, the most common pronunciation of *I don't know* is actually something more like *Idunno,* and in some cases the expression is barely more than a characteristic intonation contour. This same reduction of the word *don't* does not occur in other, less frequent expressions and constructions. Although most adults can analyze this expression into its components—for example, if a questioner persists they can say each of the words slowly and emphatically, "I…DON'T…KNOW!"—from a processing point of view its great frequency has made it a production routine. Bybee (1995) argued that the token frequency of an expression serves to entrench it in a speaker's repertoire and make it a processing unit. Type frequency—repeated instantiations of the same pattern but with different concrete items—entrenches the pattern but also, at the same time, makes it more generally applicablc to more items. Thus, young children initiallv form and use only very concrete and local constructional islands (based on specific lexical items) but with high type frequency in one or more slots, for example: *Where's the X?, I wanna X, More X, It's a X, I'm X-ing it, Put X here, Mommy's X-ing it, Let' s X it, Throw X, X gone, I X-ed it, Sit on the X, Open X, X here, There's a X, X broken* (Braine, 1976; Lieven, Pine, & Baldwin, 1997; see Tomasello, 2000, for a review of the evidence).

Frequency also plays a crucial role in grammaticalization and language change. Thus, it is well known that the linguistic constructions that are most resistant to change are those that are most frequent. That is why most irregular verbs in a language are typically highly frequent (e.g., in English

the verbs *to be* and *to have*). Bybee and Thompson (in press) analyzed the example of the subjunctive mood in Canadian French, which has basically been lost. However, in a few highly frequent fixed expressions it lives on (as it also does in frequent English expressions like "If I were you…."). At the same time, highly frequent expressions also in some contexts become grammaticalized, and so change their function, sometimes retaining the old function in other contexts (as in the English main verbs *have* and *go* and their more recent instantiations as auxiliary verbs as well). In the context of language acquisition, Brooks, Tomasello, Lewis, and Dodson (1999) argued and presented evidence that the entrenchment of particular verbs in particular constructions (in both comprehension and production) is a major factor preventing children from overgeneralizing their abstract constructions to inappropriate verbs. This finding (in combination with that of Brooks & Tomasello, 1999, who demonstrated the importance of two other usage-based factors) thus solves in large measure the puzzle of why children do not use their powerful grammatical rules indiscriminately with their entire lexicons, as they might be expected to if they possessed the abstract rules that formal grammar writers often attribute to them (e.g., Pinker. 1984, 1989).

Talk of frequency and entrenchment raises the specter of Behaviorism, which, as is well known, was exorcised from Linguistics once and for all by Chomsky (1959), But just because frequency and entrenchment were important concepts for behaviorists—who knew little of the structure of language—does not mean that they are useless in other, more cognitively and functionally sophisticated approaches. It turns out that both the type and token frequency with which particular constructions are used makes an enormous difference both in their historical fate and in the way they are understood, acquired, cognitively represented, and used by contemporary speakers of a language.

CONCLUSION

Linguistics as a discipline hovers between the Humanities and the Behavioral/Cognitive Sciences. For much of its history Linguistics consisted solely of the analysis of texts and the teaching of rules. Many linguists thus did not consider it their concern to worry about psychological reality, or to acquire expertise with the kinds of rigorous methods of data sampling and statistical analysis that are the foundation of the Behavioral/Cognitive Sciences. But, with the rise of Cognitive Science as an interdisciplinary enterprise, with the rise of new technologies that make possible the recording and analysis of real live linguistic communication, and with the rise of Cognitive-Functional (Usage-Based) approaches to linguistic theory, the balance is

beginning to tip toward the side of science. In a utopian future, linguists and psychologists will work together to investigate the actual psychological processes by means of which human beings comprehend, produce, and acquire a natural language. The chapters in this volume—as well as those in the first volume—represent theoretical approaches that will help us to make progress toward that goal.

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Chapter **1**

Concept Structuring Systems in Language

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This chapter is built around a selection of topics within the framework of cognitive semantics set forth in Talmy (2000a, 2000b). The topics here have been selected (with the help of Michael Tomasello) for their specific relevance to psychology. The framework is governed by certain major organizing factors, and several of these are briefly sketched now as a background for the topics discussed in greater detail later.

A universal design feature of languages is that their meaning-bearing forms are divided into two different subsystems, the open-class, or lexical, and the closed-class, or grammatical (see Talmy, 2000a, ch. 1). Open classes have many members and can readily add many more. They commonly include (the roots of) nouns, verbs, and adjectives. Closed classes have relatively few members and are difficult to augment. They include such bound forms as inflections (say, those appearing on a verb) and such free forms as prepositions, conjunctions, and determiners. In addition to such overt closed classes, there are implicit closed classes such as the set of grammatical categories that appear in a language (say, nounhood, verbhood, etc., per se), the set of grammatical relations that appear in a language (say, subject status, direct object status, etc.), and perhaps also the grammatical constructions that appear in a language.

One crucial finding here is that the meanings that open-class forms can express are virtually unrestricted, whereas those of closed-class forms are highly constrained, both as to the conceptual category they can refer to and as to the particular member notions within any such category. For example, many languages around the world have closed-class forms in

construction with a noun that indicate the number of the noun's referent, but no languages have closed-class forms indicating its color. And even closed-class forms referring to number can indicate such notions as singular, dual, plural, paucal, and the like, but never such notions as even, odd, a dozen, or countable. By contrast, open-class forms can refer to all such notions, as the very words just used demonstrate.

The total set of conceptual categories with their member notions that closed-class forms can ever refer to thus constitutes a specific approximately closed inventory. Individual languages draw in different ways from this inventory for their particular set of grammatically expressed meanings. The inventory is graduated, progressing from categories and notions that appear universally in all languages, through ones appearing in many but not all languages, down to ones appearing in just a few languages.

In accordance with the different semantic constraints on them, a further major finding is that the two types of classes have different functions. In the conceptual complex evoked by any portion of discourse, say, by a sentence, the open-class forms contribute most of the *content,* whereas the closed-class forms determine most of the *structure.* Thus, the inventory of' conceptual categories and individual concepts that closed-class forms can ever express amounts to the fundamental conceptual structuring system used by language.

The concepts and conceptual categories in the inventory can be seen to cluster together so as to form several distinct extensive and integrated groupings, termed *schematic systems.* Each of these handles a certain portion of the concept structuring function of the whole inventory. One such schematic system—that of *configurational structure*—includes the schematic (often geometric) delineations that partition scenes, structure entities, and relate separate entities to each other within space or time or other qualitative domains. A second schematic system—that of *force dynamics*—covers the forces that one entity delineated by the first schematic system can exert on another such entity. This force dynamic system thus also covers all the various forms of causation. A third schematic system—that of *perspective*—governs where one places one's "mental eyes" to look out over the scene whose delineations and force interactions have been determined by the first two schematic systems. And a fourth schematic system—that of *distribution of attention*—directs one's attention differentially over the structured scene that one regards from one's perspective point. The next four sections illustrate these four schematic systems.

SPACE-TIME CONFIGURATION

Several fundamental properties of the first schematic system, configurational structure, are sketched here. A further pervasive property of concep tual

organization in language—a homologous structuring of space and time—is also demonstrated for this schematic system.

Figure-Ground Organization

In language, the spatial disposition of any focal object in a scene is largely characterized in terms of a single further object, also selected within the scene, whose location and sometimes also "geometric" properties are already known (or assumed known to an addressee) and so can function as a reference object (see Talmy, 2000a, ch. 5). The first object's site, path, or orientation is thus indicated in terms of distance from or relation to the geometry of the second object. The sentences in (1) can illustrate. For their apparent relation, if not identity, to the figure and ground concepts in Gestalt psychology, these first and second scene objects are respectively termed the *Figure* and the *Ground*—capitalized to mark their specific func tion in language.

(1) a. The bike stood near the house.
b. The bike stood in the house.
c. The bike stood across the driveway.
d. The bike rolled along the walkway.

The bike's site is characterized in (la) by *near,* in terms of distance from the house's location ("proximal"). The bike's site is characterized in (1b) by *in,* in terms of the house's location *and* geometry ("colocational"+"part of interior"). The bike's site *and* orientation are characterized in (1c) by *across* in terms of the driveway's location and geometry ("colocational"+"one's length perpendicular to the other's length"). And the bike's *path* is expresscd in (1d) by *along* in terms of the walkway's location and geometry ("colocational"+"colinear with the long axis"). The bike functions as the Figure in all four sentences, while the house functions as the Ground in the first two sentences and the driveway does so in the last two. Throughout characterizations of this sort, it remains implicit that the Ground object can be used as a reference only by virtue, in a recursive manner, of its own known spatial disposition with respect to the remainder of the scene. That is, those spatial characterizations that are expressed overtly (as with prepo sitions) ultimately rest on certain further spatial understandings that are unexpressed.

The definitional functions that have here been isolated for a scene's Figure and Ground are represented by the top entry in (2). These definitional functions are seen generally, though not absolutely, to correlate with other associated property differences between the two objects. The alignment is shown in (2):

(2)

	Figure	Ground
definitional characteristics	has unknown spatial (or temporal) properties to be determined	acts as a reference entity. having known properties that can characterize the Figure's unknowns
associated characteristics	• more movable • smaller • geometrically simpler (often point-like) in its treatment • more recently on the scene/in awareness • of greater concern/relevance • less immediately perceivable • more salient, once perceived • more dependent	• more permanently located • larger • geometrically more complex in its treatment • more familiar /expected • of lesser concern/relevance • more immediately perceivable • more backgrounded, once Figure is perceived • more independent

It might be argued for cases like (1) that language simply relates two objects in space without any inequality of status, that is, without one object serving as reference for the other. But the semantic reality of their func tional difference can be demonstrated simply by interchanging the nominals, as in a sentence-pair like the following:

(3) a. The bike is near the house.
b. The house is near the bike.

One could have expected these sentences to be synonymous on the grounds that they simply represent the two inverse forms of a symmetric spatial relation. But the obvious fact is that they do not have the same meaning. They *would* be synonymous if they specified *only* this symmetric relation, that is. here, the small quantity of distance between two objects. But in addition to this, (3a) makes the nonsymmetric specification that the house is to be used as a fixed reference point by which to characterize the bike's location, itself to be treated as a variable. These nonsymmetric role assignments conform to the exigencies of the familiar world, where in fact houses have locations more permanent than bikes and are larger landmarks, so that (3a) reads like a fully acceptable sentence. The sentence in (3b), on the other hand, sounds quite odd, and is thereby well flagged as semantically distinct from (3a). As

the assertion of nearness is unchanged, the reason for the difference can only be that (3b) makes all the reverse reference assignments, ones that in this case do not happen to match the familiar world.

It might at first be thought that certain grammatical constructions, for example, the reciprocal, are means available in a language specifically to avoid assigning different referencing roles, which otherwise are inescapably imposed on a basic proposition in formulations like (3). But in fact, the reciprocal does not abstract the symmetric relation common to the inverse asymmetric forms, but rather *adds* the two together. This is shown by the fact that the reciprocal for the preceding example:

(4) The bike and the house are near each other.

sounds odd in just the same way as (3b) itself, that is, because of the implication that the house is somehow a floating entity to be fixed with respect to a stable bike.

As they specifically function in language, the Figure and Ground concepts can be characterized as follows:

(5) *The general conceptualization of Figure and Ground in language*
The Figure is a moving or conceptually movable entity whose site, path, or orientation is conceived as a variable, the particular value of which is the relevant issue.
The Ground is a reference entity, one that has a stationary setting relative to a reference frame, with respect to which the Figure's site, path, or orientation is characterized.

In a linguistic context, the Figure and Ground notions amount to semantic roles or "cases," in the sense of Fillmore's (1968) "Case Grammar." The present notions, in fact, compete with those of Fillmore, and certain advantages can be claimed for them. Full comparison aside, one main difference is that four Fillmorian cases, "Locative," "Source," "Path," and "Goal," because they incorporate particulars of direction, fail to capture the crucial spatial factor they have in common: their function as reference object for a figural element, a function specifically delegated to our Ground notion. Further, because it names separate cases for several different incorporated directionals, Fillmore's system is open to question over how it can handle novel directional distinctions that some language might mark or directions that do not clearly fit one of his four established cases. For example, should the directionals represented by the prepositions in *The ball rolled across the crack./past the TV./around the lamp* all be classed as Fillmore's "Path"? By identifying a distinct Ground notion, our system can set up a separate Directional component for the various attendant path types—one that can, within universal constraints, expand or contract and exhibit somewhat different structurings as appropriate for each

particular language. This separation, moreover, corresponds to the usually encountered division of morpheme classes, where the Ground notion is expressed by a noun root (plus any modifiers) and the Directional notions by grammatical elements such as noun affixes or adpositions.

As part of a system of spatio-temporal homology extensively found in language, the reference of Figure and Ground to the relative location of objects in space is generalized to the relative location of events in time. Paralleling their characterization earlier for spatial objects, the categories of Figure and Ground can be given the following more specific characterization for temporal events:

(6) *The lemporally specific conceplualizations of Figure and Ground in language*
The Figure is an event whose location in time is conceived as a variable, the particular value of which is the relevant issue.
The Ground is a reference event, one that has a stationary setting relative to a reference-frame (generally, the one-dimensional time line), with respect to which the Figure's temporal location is characterized.

The fact that these semantic categories also apply to temporal structures can be seen in a complex sentence like

(7) He exploded after he touched the button.

This sentence seems to assign a Ground interpretation to the button-touching event—setting it up as a fixed, known reference point—and to assign a Figure interpretation to the explosion event—establishing the temporal location of this more salient event with respect to the other event. As with the earlier demonstration for the "bike/house" example, we can confirm that these different functions have been assigned here simply by noting that the inverse sentence

(8) He tonched the button before he exploded.

is different in meaning. To me, in fact, it sounds comical, and acquires a suitable seriousness only after one imagines special circumstances, such as an official search into the possible causes of a known death.

Topological Properties of Space-Time Schemas

The prepositions and conjunctions of the earlier examples are closed-class forms that specify spatial and temporal structure with their "geometric"type schemas. Such schemas abstract away from the bulk of physical objects and the

activity of events, idealizing them down to particular configurations of points, lines, and planes. Further, such schemas abstract away from any specificity as to shape (curvature) or magnitude for these points, lines, and planes—and hence, also from any specificity as to angles or distances between them as they relate within the schema. This sort of further abstraction is characteristic of the relations defined within the mathematical field of topology. Euclidean geometry, by contrast, distinguishes shape, size, angle, and distance. Distinctions of this latter sort are mostly indicated in languages by open-class forms, for example, *square, huge, right,* and *inch.* But closed-class forms show greater affinity with topology (see Talmy, 2000a, ch. 1). (One might further postulate that it was this subsystem—and its counterparts in other cognitive systems—that gave rise to intuitions from which the field of topology was developed.) I illustrate linguistic topology here with respect to two of its characteristics.

Irrelevance of Magnitude. Possibly without exception, the spatial closed-class forms of languages specify the same schemas for small objects and distances as for great ones, This is not some necessary fact to be taken for granted. It would be easy to imagine that, say, objects capable of fitting in one's hand and broad geographic terrains might have different spatial characteristics of relevance to humans and that closed-class forms would reflect such differences. Yet, the evidence is that much the same spatial structures are recognized all along the size spectrum, a fact that points to a unified cognitive system for structuring space in language. To illustrate, consider these two sets of sentences:

(9) a. The lamp stood in the box.
The man stood in the barn.
The building stood in the valley.
b. The ant crawled across my palm.
The man walked across the field.
The bus drove across the country.

Here, the range in the size of a Reference Object, from a box to a valley for the static cases, or from a palm to a country, with the corresponding range in the length of the path traveled, is irrelevant to the choice of the schema-specifying prepositions *in* and *across.* Such closed-class forms are *magnitude neutral.*

Comparably, the use of the closed-class demonstratives *this* and *that*—indicating objects relatively nearer and farther from the speaker—can be equally used in the two sentences in (10).

(10) This speck is smaller than that speck.
This planet is smaller than that planet.

Again the difference in size between a speck and a planet, and the difference in the distances involved—from millimeters to parsecs—is irrelevant to the use of the spatial terms.

Magnitude neutrality is also seen in closed-class forms referring to time. Thus, the English past tense inflection *-ed* can be used in the sentence *Alexander died with dignity* with equal felicity whether the time referred to was last year, in speaking of an acquaintance, or over two millenia ago, in speaking of Alexander the Great. As before, this closed-class form refers to a particular schematic arrangement in time—in idealized form, that of a point event located within the period leading up to the point of the present moment—and is neutral to temporal magnitude.

Irrelevance of Shape. Spatial closed-class forms generally also permit wide ranges of shape variation. For example, the use of *in* requires that a Ground Object be idealizable as a surface so curved as to define a volume. But that surface can be squared off as in a box, spheroidal as in a bowl, or irregular as in a piano-shaped swimming pool *(The ball is in the box/ bowl/ pool).* It can be open over some area as in the preceding examples, or wholly closed to form a complete enclosure, as in a silo. And it can be an unbroken solid as in the previous examples, or have gaps, like a birdcage or a house with its doors and windows open. As we see, none of these variations of shape affect the use of *in*. Likewise, whereas the *across* schema may prototypically specify a strip-shaped Ground object, like a street, the Ground can readily diverge from having parallel edges or even a strip shape. Thus, one can swim "across" a lake with irregular curved "edges" that join to form a rough circle.

This property of *shape neutrality* applies not only to the Ground Object itself but also to the path the Figure takes with respect to it. Thus, I could have swum along an irregular path "across" the irregular lake. Similarly, the closed-class spatial form *through,* in its use referring to a linear path within a medium, can apply to a path of any shape:

(11) I arced/zigzagged *through* the woods.

Fictive Motion

I posit the extensive occurrence in cognition of a certain pattern in which an individual concurrently has two discrepant representations of the same entity. The individual holds one of these representations, the *factive* one, to be more veridical than the other representation, the *fictive* one. It is assumed that the two representations are the products of two different. cognitive subsystems, and that the veridicality assessment itself is produced by