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CHAPTER 1

Foreword: A Taxonomy of Cognitive Semantics

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ABSTRACT: In this Handbook's spirit of overview, the present Foreword proposes a taxonomy of the field of cognitive semantics overall. It divides the field's central concern—how language structures conceptual content—into ten categories. One main category involves the mechanisms used by language for this structuring function. One mechanism is the use of closed-class (grammatical) forms. Such forms can specify configurations of space and time, perspectives on a scene, the allocation of attention, force-dynamic relationships, an individual's cognitive state, a proposition's reality status, the speaker's communicative purpose, and participants' roles. Another mechanism includes the patterns in which conceptual content is arranged over a sentence or within a morpheme. Other mechanisms involve the speaker's selection of which content to express and how to express it; the hearer's inference of unexpressed content; and the use of context for both these processes. The taxonomy's other categories include diachronic comparison, organized by how slow or fast a conceptual change occurs; and cross-linguistic comparison, organized by whether a linguistic phenomenon is absolutely universal, part of a typology or repertory, or indefinitely variable. The taxonomy's final category discusses the methodologies that address cognitive-semantic research and the profiles of what they are better at and worse at.

Keywords**:** cognitive semantics; conceptual structure; schematic systems; organizing mechanisms; closed-class forms; methodologies

1 Introduction*

The central concern of cognitive semantics is how language structures conceptual content. That is, it concerns the patterns in which and processes by which a conceptual range that includes ideation and affect is organized in language. This concern distinguishes it from such other areas of linguistic research as phonology and syntax when undertaken without consideration of meaning.

Cognitive semantics, further, treats the conceptual structuring that it observes in language not as a research end in itself, but as a window onto cognitive organization in general—that is, how the mind works. It thus allies with such other approaches as cognitive psychology and forms part of cognitive science. This larger concern is what distinguishes it from traditional semantics.

Since its origins, cognitive semantics has grown greatly in the range and depth of its research on conceptual structure in language. This expansion now calls for the present Handbook to document it. The forty-five other chapters in this volume provide overviews of portions of the field that together map out its present extent.

* I would like to thank Thomas Fuyin Li for his unparalleled work over the years in promoting and contributing to cognitive semantics, thus helping in the expansion of the field that this Foreword and Handbook report on. And as always, my great thanks to Stacy Krainz for her help with research and editing.

In the spirit of this undertaking, this Foreword presents a taxonomy of cognitive semantics. The intention is to approach the field comprehensively and outline its main contours. But the taxonomy is only heuristic—it is an initial endeavor to survey the field and is meant to be developed. It inevitably has omissions that could be filled and analyses that could be structured otherwise. The aim, though, is to provide a basis for discussion.

The taxonomy is organized in terms of categories and subcategories into which conceptual structure in language or research on it can fall. The focus and methodology of a cognitive-semantic study may then largely represent a particular selection from these entries. In fact, a potential advantage of the taxonomy might be to reveal combinations of the entries that are understudied.

In the remainder of this Foreword, the taxonomy is first presented in table form and is then discussed.

2 The Taxonomy in Table Form

Our taxonomy of cognitive semantics is presented below in table form. The table represents up to three levels, marked from high to low by upper-case letters, numbers, and lower-case letters. Each level appears with increasing indentation. If the entries at a given level are short, they are placed on the same line to save space, rather than each on a separate line. The discussion after section 3 often presents distinctions still more granular than the lowest level indicated in the table (with the fourth level indicated again by numbers).

Table 1.1

TAXONOMY OF COGNITIVE SEMANTICS

A. Major language divisions—The three main compartments of language
   1. Form 2. Grammar 3. Meaning (semantics/pragmatics)
B. Participant structure—the sending vs. receiving of a communication
   1. Participant types 2. Participant numbers 3. Participant directionality
C. Arenas of assembly—the venues in which meaning-associated units come together
   1. Inventory 2. Expression 3. Part inventory part expression
D. Content structuring mechanisms—the major systems by which language structures conceptual content
   1. Closed-class semantics—the conceptual "schematic systems" represented by explicit or implicit elements of grammar
      a. Configurational structure b. Perspective c. Attention d. Force dynamics e. Cognitive state
      f. Reality status g. Communicative purpose h. Ontology i. Role semantics. j. Quantity
   2. Content patterning—the patterns in which the conceptual continuum is partitioned and arranged
      a. In the morpheme b. In the lexicon c. In expression
   3. Content selection—whether/which content is expressed by a speaker
      a. Inclusion vs. omission b. Alternatives for inclusion
   4. Content inference—The hearer infers conceptual content additional to what is explicit
   5. Context—constraints from, e.g., linguistic/thematic/physical/interlocutory/epistemic/social circumstances
   6. Interaction—the structuring of content through cross- participant accommodation
      a. Cross-consideration b. Turn taking
E. Combination—the patterns in which linguistic elements can combine
   1. Additive 2. Operational 3. Idiomatic 4. Constructively discrepant
F. Diachronic comparison—comparing conceptual structures in a single language across different points of its temporal continuum

1. Long time scale 2. Medium time scale 3. Short time scale

G. Crosslinguistic comparison—comparing conceptual structures across different (varieties of) languages
   1. Absolutely universal 2. Typological 3. Repertorial 4. Indefinitely diverse

H. Quantity of manifestation—(changes in) the amount of conceptual content that is represented or occurs
   1. Elaboratedness—the comprehensiveness and granularity of conceptual content
      a. In a communication system b. In a language user c. In a lexicon d. In expression
   2. Prevalence—the frequency of occurrence of conceptual content
      a. Compared across languages b. In a single language

I. Communication systems—the use of different channels based on the mode of the sender's production and the receiver's perception
   1. Co-speech gesture 2. Signed language

J. Research characteristics—the methodologies and other aspects of approach that shape a language study

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3 Discussion of the Taxonomy: Introduction

The aim of the discussion that follows is to balance the overview character of the table above with enough detail and illustration to make its categories recognizable. To this end, each section below generally presents a variety of linguistic phenomena to show the range of application of the category it is describing. Where the description in one section relates to that in another section, the latter is indicated within parentheses. A speaker is referred to as "she" and the hearer as "he."

The fact that the taxonomy is an overview of an entire field prevents citing most work in the area, so that only a small subset of relevant references is provided. However, a personal advantage of the taxonomy is that it has provided a grid over which elements of my own work can be located, and some of these are indicated at pertinent points. The letter T followed by a number from 1 to 14 gives the publication (this number is shown as well in the references section), the letter "c" plus a number gives the chapter, and the letter "s" plus a number gives the section.

The ten main categories of the taxonomy are presented in the next ten sections of this Foreword. Space limitations have required the omission of several further categories, but two of these—evolution and the relation of language to other cognitive systems—are addressed respectively in T11 and T8.

4 A. Major Language Divisions

In accord with linguistic tradition, language as a whole can be partitioned into three main divisions or compartments: form, grammar, and meaning. These divisions are not wholly independent but in part interrelate. Accordingly, though cognitive semantics focuses on meaning, it readily brings in the other divisions where they relate to meaning.

4.1 A1. Form

Form in spoken language rests at base on vocally produced sound. Five types of form might be recognized. One type, "vocal dynamics," is wholly gradient and includes pitch, loudness, speed, timbre, and precision of articulation (T12 s2.2.1). In any given language, three further types consist of discrete elements in specific arrangements and conform to certain constraints universally. These are phonetic distinctive features, phonology, and morphemic shape. And a fifth type of form—intonation—within any given language is a closed class of sentence-spanning sequential patterns

consisting mainly of different relative pitches and loudnesses, themselves in part gradient and in part discrete.

4.2 A2. Grammar

To characterize it in a first-approximation, grammar consists of all closed-class morphemes. Excluded from grammar then are both open-class morphemes and closed-classed linguistic phenomena other than morphemes, for example, such phonological phenomena as distinctive features and phonemes. Because of their significance in this taxonomy, the notions of morpheme, closed class, and open class are expanded on next.

4.2.1 A2a. Morpheme

The term "morpheme" here refers to any minimal linguistic construct that is associated with a concept—its "meaning." "Minimal" here indicates that the construct's overall meaning is not a combination of meanings associated with any components the construct may have. Because our analysis bases grammar on morphemes and morphemes on meaning, the division of grammar cannot be fully characterized apart from that of meaning.

The linguistic construct here considered to be a morpheme can be divided into three groups, each with its own types. In the first group, a morpheme has phonological substance. In one type within this group, the morpheme is a particular segmental sequence (potentially with suprasegmental tone or stress), like that in *flask* expressing the concept of a kind of bottle. In another type, it is an intonation pattern, like the singsong contour expressing the concept of mock threat in *I'm gonna tickle you!* In yet another type, it is a suprasegmental element, like heightened stress on a constituent (indicated throughout this Foreword by an exclamation point before the constituent), representing the concept and operation of a correction, as in *No, I was in !-Paris, not !-London.* And in a still further type, it is an idiom, like *have it in for* which expresses the concept 'nurse a grudge against'. A complex like this, though composed of what would otherwise be morphemes themselves, is a morpheme in its own right because its meaning cannot be derived from their meanings.

In the second group, a morpheme does not itself have phonological substance but is a pattern involving phonological morphemes, a pattern largely based on affordances or constraints on their co-occurrence. As with all morphemes, such a pattern morpheme is associated with a concept. In one type within this group, the morpheme is a particular constituent order (i.e., word order), such as auxiliary before subject, as in *had I known*, expressing the concept 'if'. In another type, it is a constituent category (a term used here as a generalization over the more traditional "lexical category") like that of adjective, such as *blue*, expressing the concept 'attribute'. In a further type, it is a particular phrase structure, like that of adjective-noun, as in *blue hat*, expressing the relationship of attribute to substrate. And in a still further type, it is a grammatical relation like that of direct object, exhibited by *plum* in *I ate the plum*, expressing the concept 'affected Patient'.

The third group has one type, that of complex construction, where a morpheme is a composite that generally includes both phonological morphemes and morphemic patterns but that has an overall

meaning not derivable from those of its components. An example is the construction seen in *Could you pass the salt?*, expressing a request by the speaker to the hearer (8.3).[1]

4.2.2 A2b. Closed class

A closed class in any given language is a formally distinguishable set with few members that it is difficult to add to. Our concern here is with those closed classes whose members are (largely) concept-associated morphemes.

Within the first group, two of the morpheme types are closed-class. Thus, perhaps every language has a small and relatively fixed set of intonation contours over a sentence, each with an associated concept or polysemous set of concepts. And any concept-associated suprasegmental morphemes in a language like that of heightened stress constitute a closed class, sometimes with just one member. Further, the segmental and idiomatic morphemes in perhaps every language include closed classes, whether free like prepositions and conjunctions or bound like inflections and derivations. But the remainder of these two types consists of one or more open classes

Within the second group, seemingly every language's set of constituent categories, of phrase structures, of grammatical relations, or of constituent orders (where these are not wholly free) constitutes a closed class. A further supposition here is that every member within each of these second-group closed classes is itself a morpheme with an associated concept or polysemous set of concepts, however general. For example, within German's closed class of constituent orders, the final positioning of the tensed verb in a syntactically subordinate clause can be interpreted as a morpheme associated with the concept that the clause's event is conceptually subordinated to a main event. This supposition would be faulted, however, if it is determined that a particular language has certain constituent categories, phrase structures, grammatical relations, or constituent orders that simply lack all conceptual associations. In that case, though, the original characterization of grammar as consisting of all closed-class morphemes would be shifted to its consisting of all closed classes with some (concept-associated) morphemes.

In the third group, finally, every language has complex constructions that can incorporate members from any of the preceding types of closed classes as well as particular open-class morphemes. Suppositionally, each such construction is itself a morpheme associated with a concept. But it may well be that, in every language, such complex constructions constitute a closed class.

4.2.3 A2c. Open Class

An open class in any given language is a formally distinguishable set with many members that can be readily added to. Though possibly applicable to other phenomena such as a polysemous range, the term mainly applies to segmental morphemes and idioms. Within the former of these, an open class can consist of the roots of nouns, verbs, adjectives, or mimetics, where a language includes such distinctions. Open-class morphemes can be associated with certain closed classes such as that of constituent category but, apart from this, they are not in themselves part of grammar.

[1] In the wide application it has here, our term "morpheme" is close to the "construction" of construction grammar. In turn, the term "construction" is here mainly used for the kind of complex described in the text.

4.2.4 A2d. Morpheme Types within Multimorphemic Words

The morphemic types in the first two groups of (4.2.1) were mainly characterized in terms of free forms, but their adaptation under morphology to word-internal morphemes can be considered. While syntax mainly addresses the combination of mono- and multimorphemic words into phrases, clauses, and sentences, morphology addresses the combination of morphemes into multimorphemic words in the languages that have them. A multimorphemic word commonly consists of an open-class morpheme as the root and one or more closed-class morphemes as bound affixes.

Within the first group, morphemes of the segmental type clearly occur for both root and affix, as in *retest*. Idioms also occur, whether involving root and affix as in English *considerable* 'fairly great in amount' or involving just affixes, as where Atsugewi *-tip* 'out of a container' and *-u•* 'along an extended path' together in sequence mean 'into a pit'. But it is unclear whether the morpheme types consisting of an intonation contour and a suprasegmental element have counterparts within multimorphemic words.

For the second group of morpheme types we look at the morphological pattern of Atsugewi, whose polysynthetic verb consists of a "slot" for the verb root surrounded by up to some dozen prefixal and suffixal slots in a fixed order. The constituent category type of morpheme carries over here in that each slot is a distinct constituent representing its own semantic category. Thus, the slot immediately before that of the verb root is the "instrumental constituent" expressing a causal event. The phrase structure morpheme type also has a counterpart—thus, the instrumental constituent and the verb root together form a structure that expresses the relation of cause to result. But there are no counterparts for grammatical relations or constituent order—the latter since the fixed-order slots allow no morphemes consisting of alternative sequences with distinct semantic correlates.

4.3 A3. Meaning

Meaning in language consists of conceptual content associated with form or grammar. Such meaning can then be divided into semantics and pragmatics.

By one analysis, semantics in the first instance refers to those associations that are pre-established in a language. In such associations, elements of form and/or grammar are lexicalized to represent particular concepts and appear as such in the lexicon. Semantic meaning here is thus the conceptual complex associated with a morpheme of any of the types presented in (4.2). In addition, semantics refers to combinations of such associations in a multimorphemic word or an expression.

Pragmatics, on the other hand, refers to conceptual content that a hearer—through world knowledge, association, or inference—adds to what is present explicitly—that is, semantically—in a speaker's expression.

To illustrate (T11 s1.6.1), a hearer might process the sentence *The goblet of wine slowly went around the banquet table* to form first a semantic conception of a goblet moving along a closed circuit path near a table's perimeter; then an "immediate pragmatic" conception of the goblet successively passed from hand to hand by diners adjacently seated at the table's perimeter; and then a "further pragmatic" conception of the event as the custom of a social order that the diners are members of, each in turn sipping the wine as part of a ritual.

Cognitive-semantic research largely focuses on the meaning division of language and brings in form and grammar mainly for their relation to meaning—a balance reflected in this taxonomy.

5 B. Participant Structure

A communication has certain participants in its execution—a sender that produces it and a receiver that interprets it. Such production (7.3) and interpretation (7.4) engage different cognitive processes in the structuring of conceptual content. A cognitive-semantic study can involve the one, the other, or both participants—or neither if the subject of analysis is judged to be neutral to the distinction. A study can also focus on any of the alternatives distinguished next.

5.1 B1. Participant Types

A communication can occur in different modalities (12), and the terms for its participants can vary accordingly. Thus in English, the sender can be a speaker, signer, gesturer, or writer, while the corresponding receiver is a hearer, sign viewer, gesture viewer, or reader. For ease, though, the discussion here largely refers only to speakers and hearers.

Receivers can be divided along a further parameter. An addressee is one to whom the speaker has overtly directed her communication, while a bystander has perceived the communication otherwise. And a bystander can be further subdivided into an incidental type and an "indirect addressee," where the speaker tailors her communication to function as a message to him.

5.2 B2. Participant Numbers

A communication may prototypically have one sender and one receiver but can readily diverge from this pattern. Thus, a producer can lack an addressee, as with internal speech. Two individuals can function as a single speaker as when completing each other's sentences while addressing a third person. And a sender can have multiple receivers, as in public speaking or published writing.

5.3 B3. Participant Directionality

A communication can proceed in just one direction, as in the last two cases. Or it can proceed in both directions with the participants alternating their roles, as in written correspondence or in verbal turn taking (7.6.2).

6 C. Arenas of Assembly

A cognitive-semantic study can address a language's basic meaning-associated units individually or as they are assembled in either of two arenas: the inventory or the expression. An inventory consists of pre-established elements in the language in a structured atemporal collection, while an expression consists of elements selected from the inventory by a speaker and placed in a structured temporal sequence.

6.1 C1. Inventory

At any given time in a language's history, its morphemes—that is, its minimal concept-associated constructs (4.2)—numbering in the thousands, constitute a fixed inventory. As a whole, this inventory is the language's lexicon or construction.

A research study might address this whole. Or it might address any of the innumerable subinventories within the whole, themselves formally and/or semantically characterized. A formally

based subinventory could vary quantitatively with greater or lesser size, like that of open-class morphemes and that of mass nouns, respectively. Or it could vary qualitatively like the set of affixes that make up an inflectional paradigm. A semantically based subinventory in turn might consist of those morphemes whose meanings include a semantic component of path or negation, or of those whose meanings are judged to be universal. And a subinventory defined both formally and semantically might consist of Manner verbs or topicalizing constructions.

6.2 C2. Expression

In the arena of expression, a speaker selects elements from her language's lexicon and joins them temporally in a nonce formation. This process can occur over the scope of a single multimorphemic word, as with the six morphologically assembled morphemes in the word *unredirtiably*, or over the scope of a syntactically assembled sentence, as in *This high-tech polish has made my counter unredirtiably clean*.

6.3 C3. Part Inventory, Part Expression

A language generally has numerous temporal assemblies of morphemes that are not idioms—their overall meanings arise compositionally from their components—but that occur so frequently that they, as it were, have honorary status as members of the lexicon. Such "collocations" straddle both the arenas of expression and inventory. They can occur over the scope of a single multimorphemic word like *unforgettable*; over that of a phrase like *every last vestige of*; over that of a clause like *I never cease to be amazed (that S/at NP)*; or over that of a complex sentence, like the formulation *just because S1, (it) doesn't mean S2,* as in *Just because their lights are on, (it) doesn't mean they're home*.

The effect at work in such lexicalizing is called "entrenchment" by Langacker (1987) and "unitization," "routinization," or "automatization" in the psychological literature.

7 D. Content Structuring Mechanisms

Language has certain major mechanisms, that is, extensive organized systems, that function to structure conceptual content. Six such mechanisms are proposed next.

7.1 D1. Closed-Class Semantics

A principal mechanism by which language structures conceptual content is closed-class semantics. The closed-class morphemes that occur across languages, as they were characterized in (4.2), largely represent conceptual complexes that function to structure conceptual content.[2] These conceptual complexes can in turn be analyzed into basic semantic components.

Gathered crosslinguistically, these basic semantic components constitute a certain set. In turn, they can be grouped into a smaller set of conceptual categories, and those into a still smaller set of large-scale "schematic systems." At each level, the units are under strong semantic constraints so that

[2] My work has systematically used the term "conceptual content" at two different levels. At the lower level, it refers to the semantic contribution only of open-class morphemes within an expression or the lexicon and contrasts with that of closed-class forms, characterized as providing "conceptual structure." At the higher level, it refers quite generally to all linguistic meaning. This Foreword mainly invokes the latter sense.

the sets are mostly closed, each constituting a universally available "repertory" (10.3). This entire three-level mechanism is one of language's most fundamental conceptual structuring systems.

From this hierarchy, every language draws a representative sample of semantic components that it assembles into the meanings of its own particular closed set of closed-class morphemes. These together provide the language with a local conceptual structuring system of its own.

The following discussion is organized in terms of the large-scale schematic systems that have been reliably determined. The first four were proposed in T1, while the remaining six are newly proposed here.

7.1.1 D1a. Configurational Structure

In the schematic system of configurational structure, closed-class morphemes represent or form delineations—often geometric-like structures or schemas—in space, time, quality, or other ontological domains.

7.1.1.1 D1a1. In Space

In space, configurational structure is seen in the scene partitioning of a closed-class preposition like *above*, as in *The lamp is above the radio*, which requires a division of the referent scene into three components and their relations. The components are a Figure object (the lamp), a Ground object (the radio), and the "secondary reference entity," here the vertical axis of the earth-based grid—where the Figure must be on the same vertical axis as the Ground and in a positive direction from it.

Due to the semantic constraints on the closed-class mechanism, closed-class forms can represent space only with respect to certain conceptual categories, and those categories can include only a certain few basic semantic components (T4). To illustrate, the conceptual category of "number" includes only the four semantic components of one, two, several, and many (never: even, odd, dozen), and there are English prepositions requiring a particular one of those components for the Ground, as seen respectively in *The basketball lay near the boulder/between the boulders/among the boulders/ amidst the cornstalks*. The category of "motility" has two components, stationary and moving (never: fixedly vs. temporarily stationary), as represented by the prepositions in *I stayed at / went into the library*. The category of bounding has two components, unbounded and bounded (never: gradient transitional zone), as in *I walked along the shore / the-length-of the pier*. And the conceptual category of "contour" has only four semantic components, straight, arced, circular, and meandering (never: spiral, zigzag, square), as in *I walked across the plain / over the hill / around the flagpole/ about the town*.

7.1.1.2 D1a2. In Time

In time, configurational structure is seen in the episode-partitioning of a closed-class conjunction like *after*, as in *I went home after I shopped*. This form requires that an episode be divided into a Figure event (going home), a Ground event (shopping), and the time line, where the figure must lie on the time line in a positive direction from the Ground without overlap (T1 c6).

It is also seen in the closed-class morpheme marking tense, which represents the timeline relation of an event not to another event, as in the preceding example, but to the moment at which the morpheme is uttered (T11 c11).

7.1.1.3 D1a3. In Quality

In the qualitative domain, configurational structure is seen in the "axial" properties of closed-class forms like *somewhat* and *almost* in construction with adjectives like *sick* and *well* as against the inadmissible **He is somewhat well / almost sick*. A single qualitative configurational structure underlies the meanings of all four forms. This structure is: a point and an unbounded line extending from it. *Sick* refers structurally to the line and *well* to the point. Then *somewhat* indicates a fictive path from the point to a location along the line a short distance away, while *almost* indicates a fictive path from further along the line back to the closer location (T1 c1 s5.7).

7.1.1.4 D1a4. Across Domains

A number of conceptual categories within configurational structure apply to more than one domain, thus showing a commonality of conceptual structuring. For example, the category of "plexity" with its two main members "uniplex" and "multiplex" is in play where certain closed-class forms represent either the pluralization of a noun's reference to a uniplex object in space while others represent the iteration of a verb's reference to a uniplex action in time. And the category of bounding with its two main members "bounded" and "unbounded" is at work where certain closed-class forms respectively represent the count or mass status of a noun's reference while others represent the telicity or atelicity in the aspect of a verb's reference.

7.1.2 D1b. Perspective

In the schematic system of perspective, closed-class morphemes determine the location, distance, or motility of a perspective point from which a referent scene is to be conceptualized (T1 c1).

For example, the location of the perspective point within the scene represented by *The lunchroom door opened and two men walked in* must be inside the lunchroom but is outside it or neutral in *Two men opened the lunchroom door and walked in*. In accord with certain English rules, the difference arises from the closed-class factor of whether the initial verb's subject is its Patient (the door) or its Agent (the men).

With regard to distance and motility, the perspective point is distal and stationary in the scene represented by *There were some houses in the valley*, whereas it is proximal and moving for the same scene when represented by *There was a house every now and then through the valley*. This distinction is effected by the following closed-class differences: plural vs. singular subject number, a construction representing spatial vs. temporal distribution, and a static vs. dynamic preposition.

7.1.3 D1c. Attention

In the schematic system of attention, closed-class elements direct greater and lesser degrees of attention to different aspects of a referent situation (T14 s1.2.1).

For example, in referring to a multiplexity of entities, English has numerous pairs of closed-class constructions that direct greater attention either to the full complement of the entities en masse or to a single exemplar representative of the set (T1 c1). Where the entities are doctors, these constructions include: doctors/a doctor(generic); all doctors/every doctor; all the doctors/each doctor; many doctors/many a doctor; some doctors here and there/a doctor here and there; doctors one after

another/one doctor after another; hardly any doctors/hardly a (single) doctor; no doctors/no (nary a) doctor.

For another example (T14 s7.1.3), the closed-class grammatical relation of subjecthood generally directs greater attention to the referent with that status than to other such referents. Thus, in *The landlord rented the apartment to the tenant*, the owner as subject is more salient than the user as oblique object, and as such may evoke thoughts of collateral actions by him such as preparing the apartment for new occupancy, advertising it, and interviewing interested parties. But in *The tenant rented the apartment from the landlord*, the user as subject is now more salient, and as such may evoke thoughts of collateral actions like checking publicized listings and visiting other vacancies.

7.1.4 D1d. Force Dynamics

In the schematic system of force dynamics, closed-class morphemes represent the patterns in which one entity exerts force on another. These patterns include the exertion of force, resistance to such exertion, the overcoming of such resistance, the prevention of a force effect, and the removal of such prevention, and hence can represent causing, letting, helping, hindering, blocking, and unblocking (T1 c7).

Two of the basic steady-state patterns, the extended causing or hindering of motion, are seen in *The ball rolled on because of the wind/despite the stiff grass*, where the closed-class forms representing force dynamics are *on*, *because of*, and *despite*.[3] The ball in the first case has a tendency toward rest which the stronger wind overcomes, but in the second case has a tendency toward motion that overcomes weaker opposition from the grass.

The closed class of modals largely represents force-dynamic patterns as well. Thus, *should*, as in *She should lock her door*, pits the speaker's values as to what is good and beliefs as to what is beneficial against the subject's contrary behavior. And *dare*, as in *He dare not leave the house*, opposes the subject's courage against external threat.

7.1.5 D1e. Cognitive State

In the schematic system of cognitive state, closed-class forms represent certain psychological conditions in a sentient individual. Such states largely fall into four categories: knowledge, expectation, intention, and affect.

7.1.5.1 D1e1. Knowledge

A major grammatically represented category of cognitive state is an individual's state of knowledge. One example of it is a speaker's choice between a definite and an indefinite determiner to represent her assessment of the hearer's state of knowledge. Thus, in saying *I fed the cat*, the speaker judges that the hearer knows (can readily identify) the particular cat. But in saying *I fed a cat*, she judges that the hearer does not know the particular cat.

Or again, in using a question construction, as in *Who was at the party?*, a speaker indicates a lack of knowledge on her part that she wants the hearer to fill in. And some epistemic modals indicate

[3] Force dynamics in the predicate can be represented not only by the satellite *on* but also by the verb *keep* (*keep rolling*), which is presently open-class but seems amenable to grammaticalization.

the speaker's lack of definite knowledge about the proposition, as in *The tower may have collapsed in the earthquake*.

Further, some disjunctions represent a certain pattern of both knowing and not knowing. An example is *Either Wayne or Rose spoke next*, where the speaker knows that one of those two spoke but does not know which one. A comparable pattern is represented by some conditional constructions, as in *If Lynne presided, then the meeting ended on time*. Here, the speaker does not know who in fact presided, but does know that, of the alternative possibilities, the one in which Lynne presides finishes punctually.

7.1.5.2 D1e2. Expectation

Another grammatically represented category of cognitive state is expectation. This is an individual's relatively strong belief that a certain outcome was or is to occur. Constructions expressing expectation can present the outcome as either known or unknown.

A construction with a known outcome can further evoke a sense of confirmation or surprise if the outcome respectively does or does not conform with the expectation. To illustrate, the closed-class conjunctions *and* and *but* mark their clause as being confirmingly in or surprisingly out of accord with prior expectation. A possible example is *He knocked on her door and/but her husband answered*. This distinction is an English realization of the general expectational category of "mirativity."

An expectation regarding a known outcome can also concern an aspect of it rather than its overall occurrence. Thus, the closed-class particle *only* as in *Sue read only one poem*, concerns quantity within an outcome and can be glossed as 'surprisingly less than expected'. Comparably, the particle *even*, as in *Even Trent sang*, ranks a set of entities along an expectational hierarchy and indicates the participation of the least expected one in addition to that of the others.

For the case where the outcome is unknown, the expectation can concern the occurrence of a future event. This holds for the closed-class particle *yet*, as in *The governor is not implicated in the scandal yet*. It also holds for the conjunction *when*—unlike the expectationally neutral *if*—as in *We'll watch the movie when/if they come*. In some constructions, an unknown outcome can take place at any time, including the present. Thus, in contrast with a simple yes/no question like *Is she in college now?*, a tag question indicates the speaker's expectation that the polarity of the main clause is correct, as seen in *She's in college now, isn't she?* as against *She isn't in college now, is she?*

7.1.5.3 D1e3. Intention

Closed-class morphemes can further represent the cognitive state of intention—an Agent's aim that certain actions she performs lead to a desired outcome. For example, the particle *to* with an infinitive can introduce the intended result, as in *She broke open the bone to get at the marrow*. And the grammatical relation of indirect object status as well as the preposition *for*—as in *I bought Jane a cake/a cake for Jane*—indicate the subject's intention to give, while the preposition, as in *I bought a cake for the party*, indicates the intention to provide.

Further, a deictic demonstrative, like the *there* in *You can hang your coat over there*—accompanied by a targeting gesture (T11 c5)—expresses the speaker's intention that the hearer join his attention with her own on a particular target (here, a certain location). And unlike English, as in *I*

broke my arm, many languages e.g., Spanish, have different constructions or inflections indicating whether the outcome was intentional or accidental.

7.1.5.4 D1e4. Affect

Closed-class morphemes can also represent certain types of affect, another category within cognitive state. For example, a speaker's desire or wish is expressed by the desiderative or optative inflections of some languages as well as by the English constructions in *May she succeed!* and *Would that she succeeds!* The particle *so*, as in *That sequoia is so wide!*, expresses the speaker's amazement at the extremeness of the indicated quality. And the subordinating conjunction *lest*, as in *They cleared the path lest she trip*, represents the main-clause subject's concern or worry over the potential occurrence of an undesired event.

While closed-class representation of affect is limited in English, it is broader and more extensively used in other languages. Thus, to the three types of affect just cited, Yiddish adds endearedness with its noun suffix *-ele*, impatience with its verbal clitic *-zhe*, and pity and willfulness with its verb phrase particles *nebekh* and *dafke*.

7.1.6 D1f. Reality Status

In the schematic system of reality status, closed-class morphemes represent or determine the state or degree of a referent's realization. This schematic system interacts closely with the preceding one, specifically with state of knowledge. Thus, certain types of reality status are known to be realized or unrealized, while others are unknown.

7.1.6 1 D1f1. Known as Realized

The main type of known realization—the factual or actual—is largely represented across languages by their indicative declarative constructions with positive polarity in either the past or present, as in English *He danced/is dancing*.

Further, realization can largely be conceptualized as a gradient, achieved only to some degree along a one-dimensional scale, and some closed-class forms can specify that degree and indicate that it is known. An example is *almost* as in *This peach is almost ripe*.

And in a performative construction, the speaker causes the specified proposition to become realized by the act of uttering the construction, and thus knows that it is in fact realized. This construction is grammatically indicated in English by the simple present and by the closed-class form *hereby*, as in *I hereby declare this meeting adjourned*.

7.1.6.2 D1f2. Known as Unrealized

As for known nonrealization, one main type is simply indicated by a negative, as in *I didn't dance.* Another type appears in a counterfactual construction, as in *I should have danced*, or *I would have danced if I'd had the time*—which express the known fact that I did not dance.

A third type is represented by a future tense construction, as in *I'll bake the apple*, where it is known that the referent event is not (yet) realized. Languages can have different future constructions based on where the potential event is located on a scale from prediction to a commitment to bring it about.

And the referents of all tropes are known not to be realized as represented literally. However, this fact fits the present schematic system only where closed-class elements signal the presence of the trope. This can be the case with sarcasm, as in *Here comes Mr. Sure-footed*, where the singsong intonation, and the "Mr." before an adjective are the indicators that the stated attribute must be conceptually reversed (8.4.2).

7.1.6 3 D1f3. Unknown State of Realization

As for unknown reality status, one main type is a yes/no question construction, as in *Did she swallow the pill*, where the speaker does not know a referent event's state of realization and wants the addressee to provide information specifically on that issue.

Further, without knowing the state of a referent's realization, a speaker can still estimate its probability, indicating this value from lesser to greater with closed-class elements like *just maybe, perhaps* or the epistemic modal *may*, and *likely*, as in *It may have/It likely rained there last night*. In fact, seemingly all epistemic modals represent the speaker's lack of knowledge about the referent's actual realization while providing an estimate of its probability. Thus, the *should* in *Bess should be home by now* indicates that the speaker does not know specifically whether or not Bess is home but estimates it as probable on the basis of other knowledge.

Comparably, evidentials other than the factive kind seem to indicate that the speaker does not know the referent's state of realization but infers that it is probable on the basis of certain types of evidence. For example, the Atsugewi verb suffix - *ít*, an "aftereffect evidential," indicates that the action of its verb can be surmised as having taken place from currently perceivable consequences of it. Thus, on seeing dirty dishes on a table, a speaker might add it to the verb for 'eat' to indicate the likelihood that people had eaten there based on the residue.

7.1.7 D1g. Communicative Purpose

In the schematic system of communicative purpose, closed-class morphemes indicate the effect that a speaker intends to have on the hearer by communicating with him. Among these effects, the speaker can inform, order, request, question, suggest, warn, and correct—all expanded on next.

7.1.7.1 D1g1. Informing

The speaker's seemingly most frequent communicative purpose is to inform the hearer of the proposition being represented—that is, to present certain information to the hearer with the aim that he store it at least in working memory, available for reference in the immediate discourse. This purpose is represented crosslinguistically by declarative constructions, as in English *They signed the petition*.

7.1.7.2 D1g2. Ordering

In ordering, the communicative purpose of the speaker is, through her socially based influence, to induce the hearer, through his own volitional activities, to perform the specified action. Ordering is largely represented by imperative constructions, like the subjectless English construction in *Sign the petition!*

7.1.7.3 D1g3. Requesting

In requesting, the speaker's communicative purpose is to let the hearer know of some action that she would like the hearer to perform voluntarily. English can represent requesting with what might be called the "modal-request construction," which consists of the interrogative construction with certain modal forms and optionally the particle *please* (8.3). An example is *Could you (please) sign the petition?*

7.1.7.4 D1g4. Questioning

In questioning—represented by closed-class interrogative words and constructions, as in English *Did they dance?* and *Who danced?*, the speaker lacks certain information and her purpose in communicating is to fill that lack by requesting the hearer to provide it verbally. Questioning is thus a subtype of requesting, where the hearer's response is to be verbal. Its effect can accordingly be equaled by a request construction that specifies such a verbal response, as in *Could you please tell me if they danced / who danced?*

7.1.7.5 D1g5. Suggesting

In suggesting, as when represented by specialized constructions like those in *Why not go to Hawaii* and *How about going to Hawaii?*, the speaker's purpose is to present or advocate for an action that the hearer can consider undertaking as his choice among alternatives.

7.1.7.6 D1g6. Warning

In warning, a speaker's communicative purpose is to inform the hearer of a potential risk to him that he might therefore want to avoid. Atsugewi has an entire "admonitive" verb conjugation expressing warning, a conceptual area that can extend to mock threat and teasing. An example is *tamlawwilcahki*, a verb inflected for 'I' as subject and 'you' as object, that, serving as a mock threat, can be glossed as *I'm going to tickle you*. As seen in (4.2), English has closed-class representation of just such mock threat—a certain singsong intonation contour—which could, for example, be used with the gloss just cited.

7.1.7.7 D1g7. Correcting

In correcting, the speaker, who believes she has noticed a mistaken reference in the hearer's preceding utterance, provides the correct reference and her purpose is that the hearer substitute the latter for the former in his cognitive representation (T11 s13.1.2). One closed-class element that English uses for this purpose is heightened stress on a constituent. It here appears on the replacement constituent, as where the hearer first says *I heard you were in London last year* and the speaker responds *No, I was in !-Paris*.

As another example, beside the ordinary closed-class morpheme in French for 'yes', *oui*, is the alternative morpheme *si*, which is lexicalized to correct a mistaken negative polarity in the hearer's prior utterance and replace it with a positive one.[4]

7.1.8 D1h. Ontology

In the schematic system of ontology, closed classes indicate which category a referent belongs to within an ontology, that is, a classification of phenomena into basic categories—another respect in which language structures conceptual content. Different linguistic closed classes commonly divide their respective conceptual areas differently, though the resulting ontologies can share certain features, such as a distinction between the domains of space and time.

The closed class of triggers (deictics and anaphors, including all pro-forms) can be analyzed crosslinguistically as distinguishing twelve ontological categories for their targets (T11 s2.2.1). Five such categories are seen in the English monomorphemic triggers *that* 'that entity', *there* 'at that location', *then* 'at that time', *thus* 'in this/that manner', and *such* 'of this/that kind'.

Another ontology is seen in the closed class of constituent categories that can comprise the nodes of a phrase structure. They are prototypically associated with certain categories of conceptual phenomena, as suggested next with some approximation.

Thus, a count noun is prototypically associated with the concept of a thing (or a phenomenon reified as a thing). A mass noun is associated with the concept of "stuff" (or other phenomenon reified as stuff). A verb is associated with an action or a state. A clause is associated with an event. A sentence is associated with a proposition. An adjective is associated with an attribute of a thing or of stuff. An adverb or adverbial marker is associated with an attribute of an action. A preposition is associated with a relationship of one thing to another. A subordinating conjunction is associated with a relationship of one event to another. A coordinating conjunction is associated with a relationship between equipollent events. And a trigger is associated with properties of a target.

In addition, a closed class of syntactic categories other than constituent types can augment the preceding ontology. Here, a word is associated with a concept and a morpheme with a basic concept. And closed-class morphemes are associated with conceptual structure while open-class morphemes are associated with conceptual content.

Further, there are closed-class operational (8.2) morphemes that shift a constituent's category and associated concept. Thus, the suffix *-ery* as in *bravery* changes an adjective expressing an attribute to a mass noun expressing stuff, while *-ous* as in *courageous* effects the reverse change.

7.1.9 D1i. Role Semantics

In the schematic system of role semantics, a closed-class morpheme represents the conceptual relation that one syntactic constituent has to another, each of the two belonging to a particular constituent category. The two constituents can occur within a phrase, a clause, a complex sentence, or a compound sentence, discussed next in order.

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[4] We have analyzed cognitive state, reality status, and communicative purpose as distinct schematic systems on semantic grounds. But the traditional linguistic term "mood" has generally covered all three, and indeed languages often use the same closed-class elements to represent more than one of, or combinations of, those systems.

7.1.9.1 D1i1. In a Phrase

To address one portion of its semantic range, the English possessive *-s*, as in *chef's hat*, can be cliticized to a noun representing an animate entity, the combination then in construction with a noun representing an inanimate entity. It then indicates that the second entity has the role of a possessum and the first entity the role of a possessor in a relationship of possession in which the second entity belongs to the first.

7.1.9.2 D1i2. In a Clause

Within a clause containing a verb and one or more major nominals, closed-class morphemes like constituent order, adpositions, and affixes can indicate that the nominals have such grammatical relations as subject, direct object, indirect object, and oblique object to the clause. The full set of such grammatical relations in a language is itself a closed class. For each of its polysemous senses, a verb has a certain "syntactic argument structure" that determines which nominals must or may appear with particular grammatical relations. In turn, the referent of each such nominal has a certain semantic role in relation to the event represented by the clause. Together, these referents in their particular semantic roles constitute the verb's "semantic argument structure."

Such roles can be conceived as coarser-grained and potentially universal, like the roles of Agent or Patient, Figure or Ground. Thus, the nominals in *The cyclist threw her helmet onto the bed* refer to objects with the respective semantic roles of Agent, Patient/Figure, and Ground in the event represented by the clause. The role of the Agent here includes acting on the Patient, while that of the (affected) Patient includes being acted on by the Agent. The Patient here also exhibits the role of Figure, which includes moving along a path, being located at a site, or having some orientation relative to the Ground, while the role of the Ground includes serving as a reference object with respect to which that path, site, or orientation is characterized.

Alternatively, the semantic roles can be finer-grained and specific to a small set of verbs. Thus, the nominals in *I bought a car from the dealer for $30,000* refer respectively to a person, an object, another person, and money with the relations of a buyer, goods, seller, and payment relative to the commercial frame represented by the verb (Fillmore, 1976).

7.1.9.3 D1i3. In a Complex Sentence

Within a complex sentence, subordinating conjunctions are closed-class forms that represent the semantic role of the main clause's event in relation to the subordinate clause's event (T1 c6). Some of these relations can be analyzed under other schematic systems above. Thus, the main-clause event's anteriority, posteriority, and concurrence seen in *I shopped before the sun set/after I jogged/while it snowed* can be treated as temporal schemas under configurational structure (7.1.1). And the causality and concession in *The bench is wet because it rained/although I wiped it* can be treated under force dynamics (7.1.4).

But other relations would be treated here alone. These include conditionality, as in *She'll move back here if she loses her job*; counterfactual exceptivity, as in *I'd join you, only I'm feeling tired*; and negative additionality, as in *I can dance no more than I can sing*.

Further relations are represented by constructions that are not technically complex sentences but like them in representing two events separately and hierarchically. These include additionality, as in *I was promoted besides (in addition to) getting a raise*; substitution (of a less for a more expected event), as in *The wind blew instead of the rain falling*; and degree covariation, as in *The hotter it is, the worse I feel.*

7.1.9.4 D1i4. In a Compound Sentence

Within a compound sentence, many of the same role relations just seen for complex sentences—though now it is the role of the second clause to the first—are represented by closed-class "adverbial pro-clauses" (T1 c6). They are shown capitalized in the following counterparts to the earlier sentences: *The sun set, but FIRST I shopped; I jogged and THEN I shopped; It was snowing, and I shopped THE WHILE; It rained, and SO the bench is wet; I wiped the bench but it was STILL wet; I'm feeling tired or ELSE I'd join you; I can't sing, and I can't dance EITHER; I got a raise and I ALSO got promoted; The rain didn't fall but the wind blew INSTEAD*.

7.1.10 D1j. Quantity

Within the schematic system of quantity, closed-class morphemes represent the number, amount, or degree of a referent. This system, potentially quite extensive in a language, again structures conceptual content. Closed-class elements can represent either a single quantity or a comparison between quantities, as discussed next in order.

7.1.10.1 D1j1. Single Quantity

A language can have distinct, though sometimes partially overlapping, sets of closed-class forms that represent the number, amount, or degree of a phenomenon that is respectively individuated, continuous in substance, or continuous in quality.

Thus, for the individuated referents of a plural count noun in English, the number of them from zero to the entirety can be represented by closed-class forms like those in *No/few/some/many/most/all members were present.* Closed-class indication of two units is seen in English *both, either, neither*, and *between* as well as in some languages' noun affixation for dual, while the English plural noun suffix *-s* indicates two or more units.

For the continuous substance represented by a mass noun, the amount of it can be represented by closed-class forms like those in *No/little/some/much/most/all water is polluted*. And for the continuously qualitative referent of an adjective, the degree of it can be represented by closed-class forms like those in *He is un-/somewhat/rather/quite/very friendly*.

7.1.10.2 D1j2. Comparison of Quantities

Other closed-class forms represent the comparison of one quantity with one or more others. This is seen for the individuated referents of a plural count noun in *As for books, he has more than you/fewer than you/as many as you/the most/least of anyone*. It is seen for the continuous referent of a mass noun in *As for money, he has more than you/less than you/as much as you/the most/least of anyone.* And it is seen for the continuous qualitative referent of an adjective in *He is friendlier than you/less friendly than you/as friendly as you/the friendliest/least friendly of all.*

Some closed-class forms represent a comparison with a set comparand. This comparand is semantically constrained and may refer to little more than necessity, desire, and expectation. Thus, *enough*, as in *I have enough food*, can be glossed as 'at least as much as needed'. *Too*, as in *I have too much food*, can be glossed as 'more than desired'. And, as seen (7.1.5), *only* as in *Only a hundred people came* can be glossed as 'less than expected'.

And closed-class prefixes can be added to verb roots to represent an increase or decrease in amount, as in *up/downsize*, or to indicate too much or not enough in degree, as in *over/underestimate*.

7.2 D2. Content Patterning

Another major mechanism by which language structures conceptual content might be called "content patterning." This consists of the patterns in which a language partitions and arranges what might otherwise be considered a conceptual continuum. Such patterns occur in the morpheme and the two arenas of its assembly, the lexicon (inventory) and the expression, discussed next in order.

7.2.1 D2a. In the Morpheme

The mechanism of content arrangement is first in effect in that every language bounds off portions of the conceptual continuum to form the individual meanings associated with its morphemes. This is the process of "lexicalizing" or "packaging." The mechanism is further in effect in that the content within those portions is structured. the patterns of such structuring constitute "frame semantics" (Fillmore, 1976).

With respect to such frame semantics, the content of a morpheme can in the first instance be divided into a core meaning and an associated meaning. In turn, its associated meaning can be subdivided into at least five sectors (T14). This patterning holds for both open-class morphemes and closed-class morphemes, but only the former are illustrated here.

The "holistic sector" within a morpheme's associated meaning represents the conceptual whole that the morpheme's core meaning is necessarily a part of. Thus, the core meaning of the verb *buy* most directly represents a buyer's acquisition of certain goods. But the verb's holistic sector represents the whole commercial transaction—including the transfer of goods from the seller to the buyer and of money from the buyer to the seller—of which that acquisition is only a part.

The "infrastructure sector" is a conceptual underpinning that the core meaning presupposes but is not wholly determined by. Thus, the core meaning of the noun *heaven* most directly represents a luminous space in the sky near God. But it rests on an infrastructure of particular beliefs about divinity, soul, afterlife, goodness, and reward vs. punishment.

The "collateral sector" adds concepts commonly associated with the core meaning but incidental to it. Thus, the core meaning of the noun *bucket* represents a roughly cylindrical tapered foot-high and wide object with an open top spanned by a handle. And its collateral sector represents the commonly associated function of using the object to convey material placed in it. But that association is only ancillary, suspended when referring, say, to a gold bucket sitting on a pedestal as an art exhibit.

The "disposition sector" comprises the aspects of a morpheme's meaning that arise from its grammatical properties. Thus, the core meaning of the Spanish noun *puente* is the concept of an

inanimate bridge. But its grammatical masculine gender can induce a penumbra of concepts of maleness in its disposition sector.

And the "attitude sector" mainly consists of speaker attitudes pertaining to the morpheme or its use. Thus, the core meaning of the adjective *paltry* is the concept 'small in amount'. But its attitude sector represents a disparaging attitude by the speaker toward that smallness.

For its part, a morpheme's core meaning can—through procedures often called componential analysis or unpacking—be taken to include or consist of certain semantic components. These components can be either idiosyncratic or structured and, when structured, either outside or part of a closed class.

Idiosyncratic semantic components are seen in the core meaning of the verb *pry*, as in *I pried the board off the wall* (T6). The main components are 1) the force comes from an object inserted and pivoted between the Figure and Ground; 2) The Figure resists; 3) The Figure moves away gradually; 4) the Figure is relatively rigid.

Or a component within a core meaning can belong to a structural set unrelated to a closed-class category but recur across a family of open-class morphemes. Thus, English nouns referring to animate entities that include a semantic component for the species often differ by whether they also include a semantic component for the young or for a castrated male (as well as for an adult male or female), as seen in *cow/calf/ox; horse/foal/gelding; sheep/lamb/wether; pig/piglet/barrow; chicken/chick/capon; person/child/eunuch*.

A component anywhere in the meaning of an open-class morpheme may also belong to a closed-class semantic category, as does the singular or plural component respectively in the nouns *cow* and *cattle*, or the negative component in the verb *fail*.

7.2.2 D2b. In the Lexicon

The mechanism of content arrangement when at work in the lexicon is seen in the size of different morpheme classes, in the balance between closed-and open-class forms, and in the semantic relations among the extant morphemes, discussed next in order.

7.2.2.1 D2b1. Morpheme Class Size

Across the lexicons of different languages, particular classes of morphemes, as defined by certain criteria, can vary greatly in size from prodigious to minimal. The pattern of certain large and small classes in a language often correlates with the presence of a particular productive closed-class construction—also in the lexicon—that assembles the larger classes in an expression. This design can be seen, for example, by comparing a satellite-framed with a verb-framed language, here, respectively English and Spanish (T2 c3).

The English lexicon includes a prodigious number of colloquial Manner verbs, few colloquial Path verbs, and very many Path satellites and prepositions. It also includes a colloquial construction in which all the sizable ones of these categories of elements readily fit together. The main portion of this construction—Manner verb-Path satellite-Path preposition—can be seen in *I ran out of the house*. The lexicon, however, lacks a colloquial construction that would string together a Path verb, a Manner-verb gerund, and a Path preposition, as in *I exited running from the house*, awkward at best.

By contrast, the Spanish lexicon includes comparatively fewer Manner verbs, a sizable number of colloquial Path verbs, almost no Path satellites, and a small number of Path prepositions. It also includes a colloquial construction—the one uncolloquial in English—that compatibly combines the more sizable ones of these categories, as seen in *Salí corriendo de la casa* which can be glossed much like the awkward English sentence above. Correlatively, it lacks the full colloquial English construction.[5]

7.2.2.2 D2b2. Closed- and Open-Class Balance

The presence in a lexicon of a closed class expressing a certain concept tends to correlate with the absence of that concept in the open class associated with it, and vice versa. This is the pattern of "semantic unilocality" (T13). Thus, the presence in English of an extensive system of satellites and prepositions expressing Path seems to correlate with the fact that the verbs associated with it express little Path. Complementarily, French has only a small closed-class system expressing Path while its verbs express it extensively, whether by itself or together with manner. Of the latter Path+Manner type, French for example has *grimper* 'climb up', *debouler* 'roll down a slope', *deriver* 'drift off from an expected course', and *arpenter* 'pace back and forth along the same straight bounded line'—a type of verb much rarer in English.

Semantic unilocality can also be in effect where the closed class at issue consists of just one or a few members. For example, the productive availability in English of the prefixes *un-/dis-/de-* expressing "reverse versality" (T13 s3.5)—as in *untie/disassemble/defund*—may correlate with a relative dearth of verb roots representing such reversal. But Mandarin, which lacks such a closed-class form, seemingly has more simplex verb roots expressing reversal, like *jiě* 'unknot' (e.g., a tied sack/braid), *chāi* 'disassemble' (e.g., a bookshelf) or 'unfasten' (e.g., a plaque on a wall), and *qù* 'remove' (e.g., a stain). And other actions that in English are conceptualized as reversals, like *unwind* (wire from a spool) and *unroll* (cloth from a bolt), are reconceptualized in Mandarin as "proverse" actions by constructions glossable respectively as "pull straight" and "pull flat" (Jian-Sheng Guo, p.c.).

7.2.2.3 D2b3. Cross-Morpheme Relations

The meanings represented by the morphemes present in a language's lexicon can in turn bear certain semantic relations to each other. Certain of these relations fall under the category of "hierarchy." Four specific hierarchies—indicated by the subordinate level first and the superordinate second (T14 s2)—are hyponym-hypernym (e.g., dog-mammal), part-whole (e.g., petal-flower), member-category (e.g., Chicago-city), and analytic-synthetic (e.g., two-pair).

Still further relations are synonymy—various forms with a roughly single meaning—and polysemy—a single form with various meanings. In the latter case, content patterning is again evident in the arrangement formed by the various meanings. By radial category theory (Brugmann and Lakoff, 1988), this arrangement is one in which one of the meanings is basic and the remaining meanings differ from it and from each other by conceptual increments that largely have a structuring function across languages.

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[5] A simpler form of the English construction, however, is available for non-boundary-crossing paths.

7.2.3 D2c. In Expression

Where a larger conceptual whole is represented by a portion of discourse, the mechanism of content patterning is in play where the whole can be parceled out in different arrangements within that portion (T2 c4 s2). We can illustrate first with a crosslinguistic pattern difference over the scope of a sentence. Thus, where the conceptual whole is an agentive Motion situation, English characteristically expresses the Agent in the subject nominal, the coevent+Motion in the verb, the Figure in a direct object nominal, the Path in a satellite+preposition, and the Ground in an oblique nominal, as seen in *You tracked mud into my house*.

But Atsugewi places the Figure+Motion in the verb root, a causal coevent in a prefix, the path+ground in a suffix, and the pronominal Agent in inflections. This pattern occurs in the polysynthetic word /m-'-w-ma- sťaq́ -ipsn^{u}-ik•-a/, which can function as a sentence referring to the same whole situation as the English example. In this word, an inflectional suffix (m-) expresses the Agent 'you'; a closed-class prefix (ma-) expresses the causal coevent 'by acting on the Figure with the feet'; a verb root (-sťaq́-) expresses the Figure+Motion concept 'for runny icky material to move or be located'; a closed-class suffix (-ipsn^{u}) expresses the Path+Ground concept 'into a volumetric enclosure'; and a closed-class suffix (-ik•) expresses the deictic concept 'hither'. The English and Atsugewi representations of the same conceptual complex can thus be seen to arrange its content in quite different patterns.

Or, within a single language, elements of a larger conceptual complex can be arranged in different patterns over a discourse. For example, the events of an adventure can be recounted iconically in their original order or in a range of different sequences, each with its own semantic effect on the hearer (T2 c8).

7.3 D3. Content Selection

The remaining four major mechanisms for structuring conceptual content in language operate in concert to a great extent but, as feasible, are presented separately to highlight the characteristics of each. The present mechanism, then, "content selection," involves the speaker in the arena of expression. It is how the speaker "frames" her utterance(s). Specifically, given that she has a particular conceptual complex in mind to convey, it is largely her choice between whether to include or exclude the representation of certain content in that complex and, if included, the choice among alternative representations of it. We discuss these two types of choice next in order, and then constraints on choice.

7.3.1 D3a. Inclusion vs. Omission

In her production process, a speaker generally first has a conceptual complex that she wants the hearer to experience, and then selects enough of that complex for explicit representation so that he can infer the remainder. What the hearer infers thus complements the portion of the conceptual complex overtly included by the speaker and fully or approximately captures the omitted portion. The included concepts represented explicitly are generally more salient and belong to the area of semantics, while the omitted concepts to be inferred are less salient and belong to pragmatics (4.3).

Both the speaker and the hearer processes are presented here together due to their close correlation—though, in this taxonomy, the hearer's inference is also listed without further discussion as D4 in (7.4). The role of context in the speaker's selections and the hearer's interpretation of an utterance is discussed separately in (7.5).

Speaker omissions of different scopes can be considered and they are presented next roughly from smaller to larger. Correlatively, the hearer's process of inference generally proceeds from more to less constrained.

7.3.1.1 D3a1. Ellipsis

In ellipsis, the speaker omits the smallest amount of explicit content within a sentence under strict syntactic conditions and the hearer is under strong constraint in restoring it. The constraint is greatest where the hearer is to copy concepts already expressed overtly elsewhere in the current or preceding sentence. This covers most of the types of ellipsis addressed in the literature, such as gapping, stripping, sluicing, comparative deletion, and answer fragments. For example, gapping is seen in *Wes likes wine with dinner and his wife (likes) beer (with dinner).*

In other types of ellipsis, the concept supplied by the hearer is not represented in the surrounding material but is one of a small set of alternatives, determined by the context—hence, still under much constraint but less than above (T11 s3.4). This circumstance is seen in *Rice is easy (for one/me/us/you/him/her/them) to digest*. It is in *Can I have some (of this/that)?*, as said to someone standing nearby holding a pitcher of lemonade. And it is in *The bus stop you want is across the street* (*from here/there).*

7.3.1.2 D3a2. Other Intrasentential Omission

A sometimes larger and less constrained type of content omission within a sentence occurs in a form of coercion (8.4.1) where one element of a construction is altered. Thus, the modal-request construction (8.3) basically requires the second person as subject. But in a certain circumstance, the third person can appear instead, as in *Could your kids please turn their music down?* The circumstance is that the second-person hearer has sway over the actions of the third-person actors, a concept that the hearer can insert mentally, as if the speaker had represented it explicitly with an expression like *Could you please ask/tell your kids to turn their music down?*

In addition, a generally larger portion of conceptual content can be omitted from explicit representation in a sentence in the process of "windowing" (T1 c4). The full content represented by the sentence is a conceptually bounded "event frame" such as a bounded path, causal sequence, or turn of a cycle. To illustrate for a bounded path, a speaker might express the whole of it, as in *The crate fell out of the plane through the air into the ocean*. Or she could omit one or two of the path's beginning, middle, or terminal portions. Thus, she could omit the middle, as in *The crate fell out of the plane into the ocean* or the middle and end as in *The crate fell out of the plane*. Here, the hearer's conceptual restoration would be respectively more and less constrained.

7.3.1.3 D3a3. Intersentential Omission

A speaker often omits a substantial amount of conceptual content between neighboring sentences, and the hearer, generally under less constraint than before, can infer it largely through general

knowledge. For example, a host might say to a guest *Would you like some music on? I have to go put my daughter to sleep*. The hearer here is constrained by the conceptions expressed by the two sentences, but might infer that the conceptual content connecting them resembles what would be expressed if the speaker had inserted something like *I ask because you might like the entertainment that music can provide to compensate for your remaining alone without my company, since I will be gone for a while due to the unavoidable fact that ....*

7.3.1.4 D3a4. Extrasentential Omission

The greatest amount of conceptual content generally unspecified in an utterance consists of what is taken for granted in our physical, psychological, and societal knowledge of the world—that is, notions at large in the culture whose validity generally does not come under our conscious consideration. It would in fact be all but impossible to specify the entirety of such knowledge. Every utterance is thus conceptually abstractive (T6).

We can illustrate such omission first just for physical knowledge close to the conceptual scope of a sentence. Thus, a speaker saying *I put the glass of water down* would generally not specify the concepts that the glass was upright, not upside down; a few inches across, not three feet wide; gripped by my hand during its descent, not by a mechanical device; and at the end supported on a clear horizontal surface, not balanced on a wire. The hearer will supply all these unspecified concepts in his conceptualization of the utterance's total meaning.

And we can illustrate a broader scope of omission with the classic example of a guest saying to a host: *It's a bit chilly in here*. Within the content omitted by the speaker, the more immediately pertinent aspects of general knowledge include such physical concepts as that, in cold weather, cold air can enter an enclosure through an aperture; such psychological concepts as that a person can feel uncomfortable from contact with cold air; and such socio-cultural concepts as that, typically, a guest does not act directly on the host's property and a host aims for the guest's comfort. The hearer infers all this from the utterance and, from its context, infers that it is not a simple assertion of opinion but an indirect request for him to close the window.

7.3.2 D3b. Alternatives of Inclusion

Where a speaker has selected a certain portion of a conceptual complex for explicit representation in an utterance, she can further select among alternatives for such representation. This is her cognitive capacity for "conceptual alternativity" (T1 c3). The speaker selects among different construals (Langacker, 1993), "perspectives" (Clark, 1997), or conceptualizations (T1 c1) of that portion of content. Such alternatives can occur on a smaller or larger scale.

Within the scope of a single sentence, there are innumerably different categories of alternative choice, several of which are selected here to illustrate the range. In the category of spatial frames, a speaker opting to include reference to the spatial relation between a particular Figure and Ground—say, a bike and church—can select any of the alternatives in *The bike was behind/west of/left of the church* to represent respectively a Ground-based, field-based, and observer-based frame (T1 c3). Or for the category of reality status (7.1.6), a speaker might say either *I regret that I didn't see the film* or *I wish I had seen the film* to foreground either a factual or a counterfactual stance on the same situation (T1 c4 s7.2).

Or again, a speaker choosing to represent a subject's affect can select between representing inner state or outer behavior, as in saying either *He was happy/afraid/cold* or *He was smiling/trembling/shivering*. And a speaker choosing to express the concept 'very small' can lexically represent it together with any of a range of attitudes, such as that of amazement over the degree in *tiny*, scorn in *puny*, endearedness toward a child in *itsy-bitsy*, sarcasm in *teensy-weensy*, and seriousness in *minuscule* (T14 s6.5.2).

The alternatives available within a sentence can also range along innumerable parameters. Thus, a speaker choosing to represent a subject's Manner of motion can select its degree of specificity by saying *She went/walked/limped to the party*. Or where a hearer had heard the name "Chris" and mistakenly asked "Who is he?," a speaker might correct his gender choice with different degrees of elaboration from slight to great, as by saying *She's my boss* or *!-SHE's my boss*, or *It's a "she," not a "he": she's my boss*.

On a larger scale, a speaker can for example choose different styles in which to present the same conceptual content over a discourse. She might present it, say, earnestly, humorously, or melodramatically.

7.3.3 D3c. Constraints on Selection

The mechanism of content selection includes not only affordances, the focus so far, but also constraints. The speaker is constrained first regarding what to include—both obligatory inclusions and omissions. An example of obligatory inclusion is the requirement in English that a count noun indicate whether its referent is singular or plural—a speaker wanting to use the noun cannot choose to omit the conceptual category of number. And an example of obligatory omission is a "blocked argument" (T14). Thus, though the argument structure of the verb *buy* readily permits mention of the seller, as in *I bought a book for $50 from a clerk today*, the verb *spend* blocks explicit reference to the seller, though one is implicitly present, as seen in *I spent $50 for a book *from/by/with/to/at a clerk today*. A speaker wanting to include reference to the seller must use means other than a simple preposition.

A speaker is also constrained regarding the alternatives to select among. For example, she is limited to the constructions available in her language relevant to a given semantic domain. Thus, in the domain of argument prominence, a speaker of English, with its stronger constraints on constituent order, cannot select among the extensive constituent-order possibilities available to a Yiddish speaker to express subtly different patterns of emphasis. If comparable effects are to be achieved, she must draw on means other than constituent order (T2 c6).

7.4 D4. Content Inference

This fourth major mechanism for structuring content in language, "content inference," involves the hearer in the arena of expression. By it, a hearer infers the portion of the conceptual content that the speaker had intended him to become aware of but had omitted from explicit representation. This speaker process of omission was discussed in (7.3.1) and the hearer process, which complements it, was treated there as well and so is not further discussed here.

7.5 D5. Context

A fifth major mechanism by which language structures conceptual content is the use of context. This mechanism specifically pertains to language's built-in *reliance* on context for certain structuring functions that it accordingly need not mark explicitly.

For one characterization of it, context includes everything that can affect an utterance's framing by a speaker or interpretation by a hearer. Context outside an utterance proper can include personal or cognitive dimensions of its speaker and hearer, including status, common ground, and general knowledge; its spatial and temporal location; its physical surrounding; the societally defined category of its circumstances; and the thematic character of the discourse it is embedded in. Two further forms of context lie within the scope of an utterance. For any morpheme within an utterance, the remaining morphemes are context for it. And an utterance's modality—whether it is, say, spoken, signed, or written—can be considered part of its context. We next discuss context under three headers based on speaker and/or hearer use of it.

7.5.1 D5a. Context for Speaker Omission and Hearer Inference\

In each example of (7.3.1), the use of context enabled the omission of content by the speaker and the inference of it by the hearer. Several of these are discussed next, organized by the type of context used.

The type of utterance-internal context consisting of the morphemes present there enabled the speaker to omit and the hearer to infer the gapped content in *Wes likes wine with dinner and his wife beer*. Specifically here, the constituents *likes* and *with dinner* already occurring in the earlier clause were tapped for a second application in the later clause.

The type of context consisting of the thematic character of the discourse containing an utterance was in play in the sentence *Rice is easy to digest*. If the theme had been the speaker's health, the likelihood was that she had omitted and the hearer had inferred the concept 'for me', referring back to herself. If the theme was about different kinds of foods, the likely concept was 'for one', referring to a generic eater.

But if the theme was the speaker's health, the likelihood was that she had omitted and the hearer had inferred the concept 'for me', referring back to herself.

Or again, the type of context consisting of the utterance's spatial location would have been in play in the lemonade requester's saying *Can I have some?*, where the speaker was able to omit and the hearer to infer the concept 'of this' or 'of that' in accord with the pitcher's distance from the speaker.

And another type of context consists of the speaker's and hearer's general knowledge. Knowledge about the physical world enabled the speaker to omit and the hearer to infer the middle portion—the concept 'through the air'—of the bounded path depicted in *The crate fell out of the plane into the ocean*.

And knowledge about the social world was in play in the two-sentence "music-daughter" example. It enabled the speaker to omit spelling out the connection between her offer of music and her need to attend to her daughter—and for the hearer to infer the connection.

A further type of context not illustrated above is the interlocutors' "common ground" (Clark and Brennan, 1991), which includes the concepts that the speaker and hearer know they hold jointly

largely due to their history together. Thus, a speaker who shares the knowledge with a friend that the friend had planned to go to a movie earlier that day can begin a discourse by saying simply *What did you see?*, without further specifying time or category, and the friend will infer the event intended.

7.5.2 D5b Context for Speaker Selection among Alternatives

The speaker's use of context was just addressed for her selection of what to omit and is now addressed for her selection among alternatives for inclusion. The new examples here also illustrate still further types of context.

Thus, a speaker can select among different registers for expressing the same conceptual content based on certain personal dimensions of the hearer, as where she addresses either a toddler by saying *Gramma's going bye-bye* or an adult by saying *Your grandmother's leaving now*.

And the same conceptual content can be represented differently in accord with the societally defined circumstance of its expression. Thus, the sentence *Would you like to sit down?* might be produced in a coffee house; *Please take a seat* in a lawyer's office; and *I pray you be seated* in a medievally set fantasy novel.

7.5.3 D5c Context for Other Hearer Interpretation

In the preceding two subsections, context was discussed for its use in both kinds of speaker framing—inclusion/omission and alternative choice—as well as in one kind of hearer interpretation, his inference of omitted content. We here address its use in other kinds of hearer interpretation, namely, picking the relevant sense from a polysemous range, determining the target of a trigger (i.e., a deictic or anaphor), and resolving an ambiguity. Again, a range of context types helps these processes.

One major task for a hearer is to select the relevant sense from a morpheme's polysemous or homophonous range, and one kind of context abetting this task is utterance-internal—the morpheme's neighbors. Thus, if a speaker says *I checked the market figures—my stock is down*, the morphemes in the expression form each other's context. They lead the hearer to select the 'ascertain' sense of *check*, the 'financial exchange' sense of *market*, the 'number' sense of *figure*, the 'financial instrument' sense of *stock*, and the 'reduced' sense of *down* (T6 s2.3.2).

Another type of context abetting this task of polysemy selection is a discourse's overall theme. Thus, a discussion of cooking will lead a hearer to select the 'soup base' sense of *stock* instead of, say, its 'financial instrument' sense of the preceding example.

Or again, the type of context consisting of the perceivable physical surroundings can help a hearer determine the target of a deictic. Thus, if a speaker atop a hill points down toward a lagoon and says *Mist forms there in the morning*, the lagoon's having an outer perimeter as a perceivable element of environmental structure helps the hearer settle on the whole surface of the water as the target rather than the single point that the speaker gestures at (T11 s9.2.1).

And several types of context in concert can help a hearer resolve ambiguities. For example, consider a speaker saying *I got snowed under in my work and had to come up for air*. The hearer will decide against the more basic meaning of *snowed under* as 'buried under snow' and of *come up for air* as 'swim to the surface of a body of water'. He will instead opt for their more idiomatic senses respectively of 'overwhelmed' and of 'take some respite'. This choice may be based on the following

forms of context. The utterance-internal type of context from the presence of the phrase *in my work* militates against the concepts of snow or water. A type of context consisting of conceptual coherence makes it implausible to combine being buried under snow and swimming through water. The thematic topic type of context may inform the hearer that the discussion had been about projects, not about last winter's weather or diving. And the common ground type of context may inform the hearer that the speaker's life circumstances exclude any likelihood of snow burial or underwater activity.

7.6 D6. Interaction

A sixth mechanism by which language structures conceptual content is interaction among the interlocutors of a speech event. Such interaction can consist of their taking each other's needs and actions into consideration, or the alternation of their roles as speaker and hearer—two possibilities addressed next in order.

7.6.1 D6a. Cross-Consideration

A speaker and hearer cannot simply undertake their respective processes of production and interpretation independently, heedless of each other's constraints and requirements, but rather must take these into consideration for a speech event to succeed as a communication. In particular, the speaker must function as a proactive agent ensuring that her framing (i.e., what she includes explicitly and how she phrases that) and the available forms of context are adequate for the hearer to reconstruct the conceptual complex she wanted him to experience. In turn, the hearer must maintain a model of such endeavors by the speaker to guide him in determining the relevant context and concepts.

This mechanism of cooperation was not foregrounded during the discussion of speaker-hearer complementation above (7.3.1 and 7.5.1) but can be retroactively considered as an addition to it. For a fresh example here, a speaker needs to ensure cue adequacy in an act of targeting (T11 s1.5.1). Thus, a birder in thick woods who points and says *That's a whippoorwill* to a novice some meters away must ensure that he is at or can move to a location from which he can see her finger (gestural cue) and the bird (targetive cue); that he can act fast enough so that the bird is still there when he looks (chronal cue); and that he knows to peer up deep into the branches that he will spot (epistemic and environmental cues). The hearer in turn must recognize these speaker's aims for cue adequacy in order to act quickly in spotting her gesture and following it to search visually through the branches for the target.

Such cooperation is also seen in Gricean maxims (Grice, 1975). Though these maxims are largely cast in terms of how the speaker should frame her utterance, their characterization as cooperative conversational principles also indicates that much of what guides the speaker is her understanding of the hearer's cognition. Thus, the maxim of quantity—basically, that a speaker's utterance should provide neither too little nor too much information—mainly depends on the needs of the hearer, not of the speaker. And the maxim of relevance can as readily concern what is relevant to the hearer as to the speaker.

7.6.2 D6b. Turn Taking

Another type of interaction is turn taking, where an utterance by one interlocutor can provide the basis for a response from a second interlocutor, which can in turn occasion a further response from the first, and so on. There are specific sequences of such alternations in which each turn consists of a particular type of utterance (T11 s13.1). Sequences from two to five steps in length are discussed next in order.

There is a partial overlap between the phenomena covered here and earlier under "communicative purpose" (7.1.7). The differences, though, are that earlier the communicative purpose had to be marked grammatically, which is not necessary here, and that a response was not in every case forthcoming from the initial addressee, which it is here.

7.6.2.1 D6b1. Two-Step Sequence

Frequent two-step turn-taking sequences—the "adjacency pairs" of conversation analysis (Schegloff and Sacks, 1973)—include a question and an answer (X: *Where are you?* Y: *In the kitchen*); a statement and a same-theme augment (X: *I didn't sleep much last night.* Y: *Yeah, I got up early myself*); a misstatement and a correction (X: *She is green-eyed.* Y: *No, she has !-blue eyes*); an offer and an acceptance or refusal (X: Have some chocolate. Y: *Okay, I will*); a degreeting and its reciprocation (X: *Bye now*. Y: *See you later*); and an order and a nonverbal action (X: *Pass the salt.* Y: <passes it>). Content is structured here in that the initial speaker's utterance provides a conceptual template with certain conditions for a complementary response, which the addressee then fulfills.

7.6.2.2 D6b2. Three-Step Sequence

An interaction sequence can also consist of three alternating turns. Thus, the "follow-up question sequence" consists of a statement, a question about some of its particulars, and an answer, as in: X: *The game is over*. Y: *Who won?* X: *The Warriors*.

Another three-turn sequence is a "Wh-echo-question" repair. Here, X makes a statement; Y did not clearly hear one constituent there and, to request its reutterance, uses a heightened-stressed Wh-word in its place along with sustained high pitch over the whole expression; and X repeats the unclear constituent with heightened stress—as in: X: *My son totaled his car.* Y: *!-Who totaled his car?* X: *My !-son did*.

7.6.2.3 D6b3. Four-Step Sequence

Four-turn sequences occur as well, for example the sequence whose steps in succession represent the illocutionary effects of assertion, opposition, insistence, and concession. It is seen in: X: *I'm going to the store for cigarettes.* Y: *Please don't go—I need you here to get ready for the guests.* X: *Well, I'm going anyway.* Y: *So !-go then*. Here, each turn could end the sequence, but it is in effect lexicalized to occur at its particular step. Thus, the second utterance could end a two-turn "opposition sequence," the third utterance could end a three-turn "insistence sequence," and the fourth utterance could end a four-turn "concession sequence." It is this last case that exemplifies the four-turn sequence.

7.6.2.4 D6b4. Five-Step Sequence

The possibly longest sequence might be called the five-turn "exasperation sequence." It begins with the same three turns as in the Wh-echo-question sequence seen above. The fourth turn is then the

"redoubled Wh-echo question construction" in which Y asks again about the still unclear constituent, now using doubly heightened stress on the Wh-word, as in: Y: *!!-Who totaled his car?* And in the fifth turn, the original speaker repeats the unclear word now with doubly heightened stress on it and at times also with an intonation pattern suggesting exasperation in what could be called the "redoubled Wh-echo answer construction," as in X: *My !!-son totaled his car*. This last construction is thus lexicalized to appear as the fifth turn in the five-turn exasperation sequence.

8 E. Combination

A foundational design feature of language is that it is richly "combinant"—in every system at every level, smaller units combine to form larger units (T12). Where the units are semantic, such combination is ipso facto a means by which language structures conceptual content (and might have been included as a further mechanism under (7) but is presented here as a separate category in part due to its extensiveness).

Perhaps the main parameter along which the combination of semantic units varies is their type of relationship—additive, operational, idiomatic, or constructively discrepant—subtypes treated next in order. Additional parameters involve whether the units combine cooccurrently or sequentially; whether they combine as a simple aggregate or in a structured pattern; and whether their combinations are pre-established in the language in a closed inventory or can be generated open-endedly by the speaker in an expression.

8.1 E1. Additive

In the first type of combination, the values of the combining units add together without interfering with each other. This relationship can be seen within a hierarchy, across language divisions, in contraction and suppletion, in conflation, and in nesting addressed next in order.

8.1.1 E1a. Within a Hierarchy

The combination of units can form a hierarchy in which—moving upwards, as it were—smaller units combine to form larger units at a lower level, and these in turn can function as the smaller units that combine to form still larger units at the next higher level. At each such level, the combination is not fully free but accords with certain "rules," that is, with a particular set of affordances and constraints. The units relate to each other in terms of their places within the hierarchical structure. But they are additive in that the total effect consists of the accumulation of their values within those relationships, and in that the units do not interfere with each other, each manifesting its value independently of the others.

Units of form can comprise this type of hierarchy as readily as those of meaning, and their hierarchy is addressed first because the addition of meaning units largely conforms to it.

8.1.1.1 E1a1. The Form Hierarchy

What might be called the "main sequence" for form begins in any language with a closed inventory of phonetic distinctive features. These features can combine cooccurrently into phonemes in accord with rules of feature cooccurrence restrictions. Those phonemes that are licensed by the language then themselves form a second closed inventory, the phonemic inventory. In turn, these phonemes

can combine sequentially into full segmental morphemic shapes (with the potential of cooccurrent stress or tone) in accord with rules of phonotactics. Those morphemic shapes that the language licenses then themselves form a third closed inventory, the lexicon of morphemic shapes. These morphemic shapes provide the form component of full segmental morphemes, as addressed in (8.1.2). To this point in the main sequence, all the elements of form belong to closed inventories and are pre-established in the language. Forms at higher levels are generated by the speaker in expression.

Continuing the main sequence, in some languages, certain segmental morphemes in the inventory can next combine sequentially into multimorphemic words in accord with rules of morphology. In turn, segmental morphemes and multimorphemic words (if present) can combine sequentially and open-endedly into sentences in accord with rules of syntax. Such sentences can in turn be combined sequentially and open-endedly into a single-speaker discourse partly in accord with rules of information structure, and then such discourses into a dialog in accord with rules of turn taking.

8.1.1.2 E1a2. The Meaning Hierarchy

Semantic combination largely tracks this formal main sequence, beginning at the level of the segmental morphemic shape where meaning first enters. For each such morphemic shape, semantic components can combine cooccurrently as a simple aggregate to yield a morphemic meaning in accord with rules of conceptual compatibility. Such components can be unrelated to closed-class semantic categories, like the 'nuclear family' and 'preceding / current / next generation' that cooccur to form the meanings respectively of *parent / sibling/ child*. Or they can all represent closed-semantic categories, as for the deictic in *My wife likes these* (said while gesturing). The semantic components of the morpheme *these* indicate that the target is entity-like (not, say, a location), multiplex, proximal, inanimate, and third-person, and that the ensemble is a "trigger" for the hearer's targeting process (T11 c2). All such semantic combinations form a closed inventory—the lexicon of morphemic meanings—larger than that for morphemic shapes due to polysemy.

The remaining types of additive semantic combination are all sequential, all generated by the speaker in the arena of expression and, beyond the multimorphemic word in some languages, all open-ended. To begin with the multimorphemic word, the combination can be a simple aggregation, as in *walked*, where the gait and tense concepts simply compound. Or it can exhibit a structured pattern, as in *juggler*, where the meaning of the suffix *-er* might be represented as 'person who __s', requiring that the meaning of the verb occur at the locus of the blank. In neither case do the combining concepts interfere with each other.

At the next level, that of the sentence, as in *The young woman walked slowly up to the juggler in the plaza to ask for lessons*, the meanings of the mono- and multimorphemic words that compose it do not simply aggregate but combine in accord with the rules of compositionality, which follow the branched hierarchical patterns of the sentence's phrase structure (with special provision for discontinuous constituents). Here, for example, the concept associated with the morpheme *young* combines in the first instance with that associated with *woman* in an attribute-substrate relation—rather than with the concept associated with, say, *plaza*. And this higher-level combination, together with the contribution from *the*, combines in the next instance with the concept associated with the verb *walk* in an Agent-action relation—and not, say, with the concept associated with the verb *juggle*.

The meanings of such sentences can in turn combine to form the meaning of a single speaker's discourse in accord with rules of coherence/cohesion. And the meanings of such discourses can in turn combine into the meaning of an interlocutor dialog in accord with, among other rules, Gricean maxims.

8.1.2 E1b. Across Language Divisions.

For many of its types, a morpheme—that is, a minimal concept-associated linguistic construct (4.2)—constitutes a combination of elements from all three major divisions of language: form, grammar, and meaning (4). In any given language, all such cross-division combinations together constitute its lexicon of (full) morphemes. This three-part association thus amplifies Saussure's (1959) two-part association between form and meaning.[6]

To illustrate with a segmental type of morpheme, the morphemic shape consisting of the phonemic sequence /mʌðəɹ/ is combined with the semantic components 'woman who has borne a child', 'uniplex', 'entity', 'animate', and 'female'. It is further combined with the grammatical complex consisting of the lexical category "noun" and its subcategories "count," "common," and "relational"—the last of which generally requires it to be the head of a possessive construction. Further, it requires singular agreement, the anaphor *she*, and the relative *who* rather than *which*.

The reason for assigning the components of such a triune morpheme to the additive type of combination is that they are largely independent of each other. This independence is the basis for the principle of arbitrariness commonly associated with symbols.

However, this principle needs some hedges. One is that morphemic shapes associated with closed-class semantic categories tend to be shorter than those for open-class ones. Another is that some morphemic shapes are semantically constrained—for example, heightened stress readily combines with a concept of 'correction' but would be less likely to combine with one of, say, 'dog'. And a third is onomatopoeia or sound symbolism—a type of iconicity—where a morpheme's sound is taken to resemble its meaning, as in the reference of *bong* to a resonant large-bell sound.

8.1.3 E1c. In Contraction/Suppletion

A contraction and a suppletive form (of one type) are alike in that both consist of a single segmental form that represents the combined meanings of what would otherwise be two or more adjacent morphemes. They occur in a paradigm, some of whose other entries still consist of separate forms. In both cases, the single form adds together the meanings of the represented forms and their grammatical relationship. One difference is that, in a contraction, some phonemes of the represented morphemes are still present, whereas, in suppletion, the form is phonologically unrelated to them. Another difference is that the represented forms in general are free in contraction and bound in suppletion.

In English, an example of contraction is *won't* representing *will not*—/wont/ for /wil nat/. An example of suppletion is *went* representing *go* plus the past-tense suffix *-ed*.

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[6] Some closed-class morphemes—for example, the one consisting of the association between the lexical category "adjective" and the concept 'attribute'—do combine only two language divisions, but these are those of grammar and of meaning without that of form.

8.1.4 E1d. In Conflation

Seemingly every language can represent certain complex event structures either more analytically or more synthetically. In such a complex structure, one event is in a certain semantic relation with another event. The analytic representation consists of one clause in a corresponding syntactic relation with another clause. But the synthetic representation consists of a single clause, one in which the two analytic clauses and their relation are "conflated." Such a single clause thus represents all the components of a multi-event structure combined additively. It can be taken to represent the structure as if it were a new single complex event—what (T2 c3) calls a "macro-event."

Some complex event structures—for example, an if-then conditional—seem never to have single-clause representation. But others frequently do. One such is a "Manner" structure in which, to simplify, one component is a motion event consisting of a Figure moving with respect to a Ground, a second component is an activity event in which the Figure exhibits a certain action, and the third component is a relation in which the second event functions as the Manner in which the Figure moves in the first event. To illustrate, the first event could be that of a top moving into the kitchen and the second event that of the top spinning. English could represent this structure analytically with two clauses, as in *The top went into the kitchen, spinning the while*, or synthetically in the single clause: *The top spun into the kitchen*. This single clause represents all the components of the total Manner structure additively.

Another complex event structure often represented synthetically involves agentive causation. To specify one physical type, the first event is a Manner structure like that just described, the second consists of a volitional Agent acting physically on the Figure of the first event, and the relation of the second event to the first is that of causation—the first event takes place because of the second. English can again represent this structure more analytically as in *The top spun into the kitchen because I acted on the top* or more synthetically as in the single clause: *I spun the top into the kitchen*.

8.1.5 E1e. In Nesting

Multiple instances of the same conceptual category can be combined within a single sentence to represent a nesting pattern in which each level does not interfere conceptually with the others. Such a pattern can be represented by a mix of both closed- and open-class forms.

Thus, as (T1 c1) analyzes in detail for certain schematic systems, five levels of temporal configuration are nested in *The beacon flashed 5 times at a stretch for 3 hours*; five levels of spatial configuration in the exact same pattern are nested in *I saw 3 ponds full of groups of 5 ducks each*; and four levels of perspective are nested in *At the punchbowl, I was about to meet my first wife-to-be*. To these can be added the five levels from the schematic system of quantity seen nested in *I've gotten very much too many more summonses than him*.

8.2 E2. Operational

A second type of combination is in the arena of expression. In it, the meanings of two morphemes in a construction are not statically additive, but rather one of them dynamically operates on the other. Such an "operational" morpheme is lexicalized to alter a certain component of the other morpheme's

meaning in a specific way. In particular, it initiates an operation which shifts that component from one specific value to another along a certain parameter.

A morpheme with this operational type of combination can be bound or free, closed- or open-class. A bound closed-class example is the English suffix *-s* that combines with a noun whose meaning includes a semantic component of 'uniplexity', such as *cow*. It performs an operation of "multiplexing" on it to yield the combination *cows* referring to a multiplexity—a different value along the parameter of plexity. The suffix requires a component of uniplexity to operate on and so cannot combine with a noun whose meaning includes multiplexity such as *cattle*—hence, the form **cattles* does not exist. Thus, *-s* does not independently represent a concept of multiplexity and show up additively in a noun whenever that concept occurs, but rather is dependently keyed to the uniplex semantics of the noun it combines with. Another example is the verb prefix *un-*, as in *untie*, which shifts 'proverse' to 'reverse' along a parameter of 'versality' (T13 s3.5).

A free closed-class example is *almost* which, when combining with an accomplishment verb as in *My leg almost healed*, operates on the aspectual component of the verb. When unaltered, the aspect of accomplishment indicates that some process affects progressively more of a finite phenomenon through some interval at whose endpoint the process stops and all of the phenomenon is affected. The operational morpheme shifts the time at which the process stops from that endpoint to a nearby earlier point, leaving a lesser portion of the phenomenon still unaffected.

And a free open-class example is *fake* as in *fake gun* (Lakoff, 1982). This operational morpheme is keyed to the semantic component of 'function' in the adjoining morpheme's meaning and shifts it from operable to inoperable along a parameter of operability, while leaving intact semantic components pertaining to appearance or feel.

8.3 E3. Idiomatic

A third type of combination constitutes an idiom. In it, two or more morphemes with their own meanings combine, largely in accord with rules of morphology or syntax, but this combination is associated with a novel meaning. That is, its overall meaning does not result additively (compositionally) or operationally from the input meanings, though some components of the latter may persist. Idioms are pre-established constructs in a language—not freely generated by a speaker—and so are part of a language's lexicon in the arena of the inventory. Idioms can occur within a multimorphemic word, across free words, and in a complex construction.

An example of an idiomatic multimorphemic word is *untold*—a morphological combination of three morphemes: *un-*'negative', *tell* 'recount', and the past participle indicating a passive-like focus shift to the Patient. The overall concept associated with this word is 'vast', which cannot be derived from its morphemic components.

An example of an idiom composed of free words is *have it out with*, whose overall meaning, again not derivable from its components, is '(for X to) finally air openly with (Y) an implicit dispute that had been growing between X and Y'. All the components conform with syntactic rules except that the expectedly anaphoric *it* has no target.

And an example of an idiom consisting of a complex construction is the "modal-request construction" seen in *Could you all please sign in?* and *Won't you take a seat, please?* Somewhat simplified, the general pattern of the construction can be represented as in (1), where at most one

instance of *please* can occur. This construction is an idiom because the meanings of its components—which include ability, futurity, contingency, negation, and interrogation—do not combine into the concept of a request. However, some of the input meanings are consistent with that concept. Thus, the meaning of the interrogative intonation pattern is itself a request, though one for a verbal response; the futurity of *will* is consistent with the fact that the hearer's response follows the request; and the particle *please* expresses politeness in requesting.

(1) *can*/*will* (CONDITIONAL) (NEGATIVE) YOU (*please*) VP (*please*) INTERROGATIVE

8.4 E4 Constructively Discrepant

A fourth type of combination again lies in the arena of expression. In it, the speaker intentionally combines linguistic elements that are conceptually incompatible with each other. The hearer can discern that a discrepancy is present. But the speaker intends that this discrepancy will initiate a process of resolution in the hearer that, through certain cognitive operations he performs, will yield the coherent conceptual complex that she had intended to convey. This type of combination can accordingly be characterized as "constructive discrepancy" (T11 c14).

Such constructive discrepancy is the basis for all tropes, as well as some linguistic phenomena not usually classed as tropes. Such tropes and other phenomena can be divided into two types based on whether the conceptual discrepancy is between morphemes within the utterance or between the utterance and general knowledge. These "inner-conflict" and "outer-conflict" types are discussed next in order.

8.4.1 E4a. Conflict between Morphemes

In the inner-conflict type of constructive discrepancy, the speaker intentionally combines morphemes whose standard meanings conflict with each other and so disaccord with rules of coherence. The hearer reconciles these conflicts, largely through general knowledge, using a certain range of semantic operations (T2 c5). The illustrations that follow are sequenced by the type of operation required.

8.4.1.1 E4a1. Concept Insertion

One operation a hearer can perform to reconcile discrepant meanings is "concept insertion". The tropes of the type under discussion here indicate their presence to a hearer through semantic conflict between morphemes, and a subset of these relies on this operation for resolution. Take the trope of metonymy (e.g., Radden and Kövecses, 2007), which largely rests on specifying an action together with an entity that cannot perform the action—hence the discrepancy—but that is related to the entity that can. The hearer can resolve the discrepancy by conceptually adding in the relation of the one entity to the other. Thus, in *The ham sandwich just left without paying*, the conflict lies in the hearer's knowledge that a sandwich cannot leave or pay. But he can resolve this conflict in his cognition by inserting the concept 'the person who had ordered' before the concept represented by *the ham sandwich*.

Another trope in the same subset is fictive motion, which predicates motion of a stationary object (T1 c2). An example is *The fence goes from the plateau down into the valley*. A hearer can

reconcile this by inserting the concept ‘one’s focus of attention in scanning along’ before the concept represented by *the fence*.

What might also be considered a trope in this subset is coercion (Pustejovsky, 1995), where the conflict generally involves a mismatch in grammatical agreement. Though underrecognized, coercion can also occur within a multimorphemic word, like the final one in *Our experiment uses several nitrogens*. The suffix *-s* standardly combines with a count noun having a uniplex referent and multiplexes that referent (8.2), but here it is combined with a mass noun. The hearer may resolve this discrepancy through concept insertion, here adding the notion of different types (e.g., isotopes) or multiple units (e.g., molecules), as if the phrase were reworded as *several types/units of nitrogen*.

8.4.1.2 E4a2. Concept Adaptation

An additional reconciling operation is “concept adaptation.” It can be seen in metaphor—another trope that identifies itself through semantic conflict between its constituents—where the concepts of a source domain are structurally aligned with and adapted to the concepts of a target domain (e.g., Lakoff, 1993). An example is *I’m lurching through my term paper*. The conflict is between the verb *lurch*, which refers to a person in physical space stepping jerkily ahead in short irregular bursts punctuated by halts, and the nominal *term paper*, which refers to a written composition on an academic topic. But the hearer may resolve these by adapting the former concepts to the latter where they now consist of short irregular bursts of activity, punctuated by periods of inactivity, and without progression in a concerted thematic direction (T11 s14.4.1).

The operation of concept adaptation has a close variant in “cue adaptation,” used where the combination of cues in a speaker’s act of targeting are in conflict. Consider, for example, a woman who sits across a restaurant table from a man and, while looking at his mouth, says *You’ve got something in your teeth right here* and gestures by touching her own teeth (T11 s14.1). The hearer/viewer recognizes the conflict between, on the one hand, the core cue from the deictic *here* and the gestural cue from her pointing finger, both indicating the speaker as the target, and, on the other hand, the co-form cue from the phrase *in your teeth* and the ocular cue from the speaker’s line-of-sight, both indicating the hearer as the target. The hearer resolves this conflict by adapting the former set of cues to the latter, as if the woman instead had said *there* and had pointed toward his teeth.

8.4.1.3 E4a3. Concept Blending

Another operation that a hearer (or viewer) can perform on conflicting concepts associated with different morphemes in a sentence (or parts of an image) is to generate a conceptual blend that joins portions of each into a single conceptual structure (Fauconnier and Turner, 1996). This operation is generally also at work in a metaphor in conjunction with the operation of concept adaptation, since the latter does not act thoroughly without a trace (if it did, a metaphor would be indistinguishable from its literal counterpart). Thus, in the “lurching” metaphor example above, the hearer probably does not convert the physical gait totally into a type of authorial progress but may also construct a blended image. The image here might consist of, say, the speaker corporeally lurching along on a field consisting of a giant physicalized term paper.

8.4.1.4 E4a4. Concept Cancelation

A further reconciling operation is "concept cancelation" (T4 s4.3). It is seen in an example like *The shopping cart rolled across the boulevard and was hit by an oncoming car*. The preposition *across* prototypically refers to a point-like Figure moving horizontally from one edge perpendicularly to the opposite edge of a planar Ground bounded by two parallel edges. But the second clause introduces a conflict: the cart did not reach the other side. The hearer resolves this conflict by canceling the concept 'to the opposite edge', otherwise part of the preposition's meaning.

8.4.1.5 E4a5. Concept Stretching

Yet another reconciling operation is "concept stretching." To illustrate it, we first note that the meaning of the preposition *across* includes an additional concept not cited in the characterization just above: the length of the Figure's perpendicular path is less than or equal to that of the edges. This concept is complied with in *I swam across the river/square pool from one side to the other*. But it is moderately conflicted with in *I swam across the oblong pool from one end to the other.* The hearer, however, can resolve this conflict by stretching the permitted ratios of the two axes just a bit. It cannot be stretched too much, though, as seen in **I swam across the river from one end to the other*.

Constructive discrepancy in language affords a number of advantages. Concept insertion permits a shortened utterance. Concept adaptation permits a quick setting up of an analogy. And concept cancelation and stretching permit a much smaller lexicon. Here, for example, English does not need multiple different prepositions for each slight geometric variation.

8.4.2 E4b. Conflict between Utterance and General Knowledge

In the outer-conflict type of constructive discrepancy, the speaker intentionally produces an utterance that is internally unconflicted—its literal compositional meaning affords no problem—but that conflicts with general knowledge. This discrepant combination again leads the hearer to undertake a reconciling operation.

Certain tropes rest on this type of discrepancy. Two such tropes are hyperbole and sarcasm, both of which in fact call on the hearer for a still further type of reconciling operation, "concept rescaling."

Hyperbole is illustrated by a speaker saying *I met the most interesting person on the planet last night*. The hearer's knowledge that the speaker does not know all the world's people and that encountering a pinnacle among them is improbable leads him to assess the utterance as a trope of hyperbole and hence to scale the superlative 'most (… on the planet)' down to just 'very'. That is, along a scale of interestingness which, from a neutral point, rises into a positive zone and descends into a negative zone, the virtually topmost point specified by the utterance is conceptually relocated downward to a much lower point, though one still in the positive zone and well above the neutral point.

Sarcasm is illustrated by a speaker who, on seeing a friend trip in climbing the stairs to her door, says *That was graceful*. Here, the hearer realizes that the conceptual content represented by her utterance conflicts with what he knows the actuality of his actions to have been and concludes that it was a trope of sarcasm. He reconciles the literal content of her utterance with the different conceptual complex she presumably had in mind through another operation of downscaling, here along a scale of

gracefulness. But for this trope, unlike that of hyperbole, the shift takes the overtly indicated point in the positive zone down past the neutral point into the negative zone, here, that of clumsiness.

9 F. Diachronic Comparison

Another major means for investigating how language structures conceptual content is to compare its attributes across different instantiations of language. Such instantiations can consist of different stages in the temporal continuum of a single language under a diachronic comparison, as discussed here. Or it can consist of a single stage within different languages under a crosslinguistic comparison, as discussed under the next category. Where the next category will include a comparison of different dialects separated geographically, the present category compares different "chronolects" separated temporally.

Diachronic comparison is one branch of a larger category of "time scope" whose other branch is synchronic analysis. This covers any analysis of a language at a single stage of its existence. Most of the descriptions in our discussion are in fact cast in synchronic terms.

On the diachronic branch, comparison can show that some aspects of language—linguistic universals (10.1)—never change. But all other aspects of language can change. There are several major parameters of such change that could have formed the basis for organizing the present discussion, for example, the different causes of change such as analogy and borrowing. But the parameter selected here has received less attention—the time scale over which different types of change tend to occur, from long to short, discussed next in order. The investigation of what in language can change and what cannot and, in the case of change, the time scale over which it takes place, can reveal much about cognitive organization.

9.1 F1. Long Time Scale

One seemingly long-term aspect of language is its "body plan"—the patterns in which it characteristically arranges conceptual content (7.2) in certain classes of propositions. For one of the most enduring classes, from the earliest records of them to the present day, Indo-European languages seem to have maintained the same basic pattern for representing a proposition of "object maneuvering" (T2 c4 s2). In this pattern, a subject and direct-object noun phrase respectively represent the Agent and the Figure—the maneuvered object—while the verb represents the maneuvering.

This is seen in *I threw/kicked/carried/brought/took/pushed/pulled/held/had the ball* as well as in *I gave her the ball* and *I put the ball in the box*. The verb can represent such different aspects of maneuvering as phase and direction of placement: *hold, put, take (out);* transport: *carry, bring, take (to)*; instrument: *throw, kick, bat*; of force: *push, pull*; deixis: *bring (to), take (to)*; and possession: *have, give, take (from)*.

Though this pattern may be continuous in Indo-European languages and seem inevitable to their speakers, Atsugewi presents quite a different body plan, possibly one of some time depth since forms of it appear in other Hokan languages. To begin with, Atsugewi simply lacks verb roots with meanings like those of *have, give, take, hold, put, carry, bring, throw, kick, push*, and *pull*.

Instead, the verb root characteristically represents a particular type of Figure object or material as moving or located, for example, *-qput-* 'for dirt to move/be located'. Different

"instrumental" prefixes represent concepts like those of throwing, kicking, pushing, and pulling as prior events causal of the Figure's motion or location. Different directional suffixes represent concepts of placement and transport as paths or locations of the Figure relative to a Ground entity. This set of suffixes also includes three that represent the concepts of 'having', 'giving', and 'taking (from)' as directional concepts, respectively 'in (the subject's) possession', 'into (the object's) possession', and 'out of (the object's) possession'. And two deictic suffixes represent the direction of motion as toward or not toward the speaker.[7]

Somewhat less abiding, though still on a longer time scale, is the class of propositions that represent a macro-event (8.1.4) and that are subject to the framing typology (T2 c3, T9). A proposition of this class places a "co-event" in a particular relation with a "framing event." The framing event can express Motion, temporal contouring, state change, action correlating, or realization. The typology is based on where the "core schema" of the framing event—for example, the Path of a Motion event—is represented. It is characteristically represented in the verb in a "verb-framed" language and in the satellite and/or adposition in a "satellite-framed" language. But a language can undergo a typological shift. Thus, while Indo-European has been satellite-framed from the earliest languages through to many present-day ones, the lineage descended from Latin shifted to being verb-framed in all the Romance languages. And the reverse typological shift has taken place in the continuum from Archaic Chinese to modern Mandarin (Li, 2018).

Comparably, some areal phenomena—linguistic patterns common across neighboring but unrelated languages and hence borrowed by some from others—seem to be realized over a longer time scale. For example, a wide swath of languages from different families, perhaps centered in northern California, have a set of "instrumental prefixes" that mainly represent the immediate cause of the event expressed by the verb root. Mithun (2007) proposes that what was borrowed was a pattern in which an open-class verb root is preceded by other open-class roots that modified it and that—over some time—codified into a closed set of prefixes.[8]

9.2 F2. Medium Time Scale

Certain types of semantic change seem to take place over a medium time scale. One type seems to be the loss of a sense from a morpheme's polysemous range (unlike the apparent swiftness of a sense gain (9.3)). A possible example is seen in the verb *mind*, whose strongest sense is 'object (to)', as in *Do you mind the smoke / if I smoke?* But another sense, 'be careful about', seems to be on the wane in the U.S. (though apparently still strong in the U.K.), so that *Mind the branches* would be likelier expressed as *Watch out for the branches*. Still, this sense remains available to U.S. hearers, who would probably settle on it in the relevant context.

Another possible medium-scale type is a change in the particular preposition associated with an open-class word, often accompanied by a shift in conceptualization. Though needing confirmation,

[7] The Atsugewi pattern is so thoroughgoing that verb roots also represent body parts and garments as moving or located. They occur within multi-affixal verbs equivalent to such English object-maneuvering sentences as *I stuck my ear against the wall* or *I took my shoes off.*

[8] An issue needing attention in such longer time scale shifts, as well as in medium scale ones, is whether the change takes place gradually over the interval or comparatively quickly at the end.

possible examples include a seeming shift from an older *immune to* to a newer *immune from*; from *ask X of Y* to *ask X to Y*; from *glad of* to *glad about*; and from (U.S.) *different from* to *different than*.

Another possible medium-scale type is grammaticalization (e.g., Bybee, 2014), in which a morpheme shifts in its categorization from open class to closed class and, through "semantic bleaching," loses some of its originally associated conceptual content. Whatever the semantic starting point, the final meaning must lie within the universally available repertory of closed-class concepts (10.3). An example is modern English *may*, which derives from an Old English fully inflected verb meaning 'have the power to' but is now a modal that, in its epistemic sense, expresses the possibility, outside the speaker's knowledge, of either the actuality or the non-actuality of a proposition, as seen in *I'll check—there may be some jam left*.

Language change can also arise through borrowing from an influencing language, and some such changes occur on a short time scale, for example the adoption of a foreign word with its original meaning. But other changes occur over a medium scale, as seen with regard to verb satellite meanings in Yiddish among Slavic languages (T2 c4). One such medium scale change is the borrowing of (most of) a polysemous range. Thus, the polysemous range of the Yiddish verb satellite *on-* came to resemble that of Slavic *na-* by losing some originally Germanic senses, gaining several Slavic senses, and retaining the senses already in common. Another such change is the adoption of a concept represented by a whole lexical category. Thus, while Yiddish verb satellites shared with their Slavic counterparts the representation of Path, Yiddish borrowed their systematic use as well for the indication of perfective aspect. And one more such change is the adoption of obligatoriness in the representation of a certain concept when present. Thus, Yiddish borrowed from its Slavic neighbors the requirement to use its satellites to mark perfectivity when present.

9.3 F3. Short Time Scale

The type of semantic change occurring over the shortest time scale may mostly consist of certain kinds of addition to a language's lexicon. One kind is the addition of a sense to the polysemous range of a morphemic shape. For example, the morphemic shape *bug*, after its 'insect' sense, added the sense 'defect' and later the sense 'concealed microphone'. A second kind is adding the use of another lexical category, as the verb *ask* has done with its recent use as a noun meaning '(a) request' (*My ask to you is to tell someone about this show*). And a third kind is a novel morphemic shape with a new sense, like *pizzazz* 'appealing dynamic flair (especially in a personality)'.

10 G. Crosslinguistic Comparison

The present category continues the last category's comparison of conceptual structures across different instantiations of language. But here the instantiations consist of a single stage within different languages or varieties of a language under a crosslinguistic comparison, rather than of different stages within a single language under a diachronic comparison.

Crosslinguistic comparison is one branch of a larger category of "language span" whose other branch is single-language analysis, that is, an analysis of any single language or variety of a language. Much of the descriptions in our discussion are in fact cast in single-language terms.

Crosslinguistic comparison can be conducted over a range of scopes from smaller to larger. It might even be extended, at the smallest scope, to within a single individual. Thus, seemingly every

individual is at least a “multi-code” speaker, able to use different contextually based variants of her language in accord with the situation—her capacity for “code switching” (Gumperz, 1976). An individual, further, can be multilingual, and a “crosslinguistic” comparison here can perform a cognitive analysis of her differing capabilities with each of her languages.

Several successive increases in scope involve comparisons across related varieties or languages. Thus, at the next larger scope, a comparison can be made across individuals who speak the same sociolect but do so with distinct idiolects—a study of individual differences. At a still larger scope is a comparison across groups of individuals that speak different sociolects of the same dialect within a single community—a study within sociolinguistics (e.g., Geeraerts, 2016). Larger yet is a comparison across different geographically separated dialects of the same language—a study within dialectology. Finally, comparisons can be made of related languages in the same language family, often involving diachrony since the differences largely result from changes in a common proto-language.

At a much larger scope are comparisons across the languages of the world regardless of their family membership. Such comparisons can uncover aspects of language that differ in their degree of commonality from total to lacking. Four such degrees are discussed next in order: absolutely universal, typological, repertorial, and indefinitely diverse (T7). All suggestions here about degree of commonality are heuristic pending extensive crosslinguistic investigation.

Each degree of crosslinguistic commonality calls for cognitive explanation. Though this is scarcely available at present, several bases can be proposed to account for those aspects of language that are universal. One basis might be that, in the lineage leading to humans, there evolved a cognitive system specifically organized for language that includes its ubiquitous properties. Another possible basis is that processes operating generally throughout cognition and the various systems in it also operate in our language capacity and alone determine universal properties there without need for specifically linguistic processes. A third basis is that those properties that are common across all languages fulfill functions that simply cannot be fulfilled any other way and so occur by necessity . Yet another possible basis is that the earliest language to appear happened to have certain characteristics, a number of which have simply remained in all its daughter languages.

And perhaps the complements of these bases can account for the non-universal aspects of language. That is, languages can and readily do diverge wherever no constraints arise from an evolved language system, from general cognitive processes, from the exigencies of internal or external circumstances, or from an original ur-language.

10.1 G1. Absolutely Universal

Absolute universals are linguistic phenomena present in all languages. Many of the linguistic phenomena already discussed in this taxonomy are in fact themselves absolute linguistic universals, and a number of these are identified next because of their significance to linguistic theory.

Thus, all languages have the three divisions of form, grammar, and meaning. All have morphemes—minimal meaning-associated constructs—that mostly associate all three divisions. All have both open-class and closed-class categories of morphemes. All have morpheme types consisting of segment combinations, intonation contours, idiomatic combinations, constituent categories, phrase structures, grammatical relations, and constructions. All have morphemes with a

polysemous/homophonous set of senses. And all have both a lexicon and expression as arenas of morpheme assembly.

All languages have speech participation by speaker and hearer. All have a system of turn taking that alternates the speaker's and hearer's processes of production and interpretation. All have speaker selection of what to express explicitly and how to express it so as to represent a larger conceptual complex. All have hearer inference of the implicit remainder of such a complex as well as hearer resolution of polysemy. All have a distinction between explicit semantics and inferential pragmatics. And all use context of the same range of types in the preceding processes.

All languages use the meanings of closed-class morphemes to structure conceptual content in a particular range of schematic systems. These systems—themselves possibly absolute universals that always include or exclude certain concepts or conceptual categories—include the configurational structure of space and time, perspective point, the distribution of attention, force dynamics (including causation), cognitive state, reality status, communicative purpose, ontology, role semantics, and quantity. And all languages pattern conceptual content in their morphemes, lexicons, and expressions. The morphemes' overall meanings are partitioned into a core meaning consisting of semantic components and an associated meaning that can include a holistic, infrastructure, collateral, disposition, or attitude sector. The lexicons have particular morpheme class sizes and inter-morphemic relations. And the expressions have particular plans by which content is arranged.

All languages combine semantic units in accord with four different patterns, ones that are additive, operational, idiomatic, and constructively discrepant. In all languages, further, their additive pattern includes a hierarchy that, from lower to higher, consists of the meanings of semantic components, morphemes, phrases, clauses, sentences, one-speaker discourses, and interchanges. And their pattern of constructive discrepancy includes all tropes, both ones based on a semantic conflict between morphemes and ones based on a semantic conflict between literal meaning and general knowledge.

Finally, all languages change, and can do so with respect to any linguistic features except their universals, with some features changing more slowly and some more quickly. And across all languages, children tend to follow the same general temporal outline in the acquisition of their native language (11.1.2).

There are also absolute negative universals—phenomena excluded from the design of language that, significantly, can help bring that design into relief. We here present a representative sample out of a perhaps indefinitely large number.

Thus, 1) no language requires that an interchange, in addition to a speaker and hearer, must include a monitor directing their utterances. A language's lexicon, even with polysemous senses counted, has entries numbering in the multiple thousands but not in the millions. 3) Seemingly no language has a closed-class form used to mark a constituent as an antecedent about to be referred back to by an anaphor. 4) In no language can a particular concept, say, that of past tense, be represented by a speaker's on-the-spot choice of a morphemic shape not otherwise in the lexicon.

Further, 5) speaking the words of a sentence in reverse order to represent a concept, say, the negation of its proposition, is not a possible type of morpheme. 6) Verb roots in a language can be lexicalized to express aspect but apparently never tense. Thus, English cannot have a verb *to went* meaning 'to go in the past' so that *I am wenting* would mean 'I was going'. 7) Monomorphemic

triggers (deictics or anaphors)—e.g., *there* ‘at that location’ *then* ‘at that time’—can target phenomena over a wide ontological range (7.1.8). But they seemingly never target many other types of phenomena such as those in ‘at that distance’ or ‘with that frequency’ (T11 s3.2). And 8) no co-speech gesture system requires a fixed indicator, say, the left thumb, pointing at the intended gesture, say, the right hand extending forward, to inform the viewer which body part to focus on (T11 s5.1.2).

10.2 G2. Typological

Consider a class of linguistic phenomena with relatively few members. Such a class can itself be absolutely universal, having to be represented in every language. But classes of this kind can differ in the universality of their members. For some classes, all the members are themselves absolutely universal. For example, for the class whose members are the two arenas of morpheme assembly, both arenas are present in all languages—no language has just a lexicon and none just expression. And for the class consisting of the four types of combination, all languages exhibit all four types—additive, operational, idiomatic, and constructively discrepant (8)—no language has just a subset of these.

But the members of some classes are only “inventorially universal.” That is, the identities of the members are fixed and form a closed set, but not all of them appear in all languages. In fact, for some of these classes, in general only one member appears in each language’s most characteristic pattern, although other members may occur less characteristically. “Characteristic” here means that the pattern is colloquial, frequent, and, where applicable, pervasive, i.e., it occurs across a range of subtypes (T2 c1). A class of this kind constitutes a typology.

Two illustrations of a semantic typology both involve the relations between a semantic tier and a syntactic tier. Here, the semantic tier is a macro-event of the Motion-situation type. The framing typology, already discussed in (7.2.2) and (9.1), selects one component of the macro-event on the semantic tier to observe where it appears on the syntactic tier. This typology has basically two members. The Path component is characteristically expressed in a language either in its verb or in a satellite/adposition system.

Complementarily, the “actuating typology” (T2 c1, T10) selects one component on the syntactic tier—the verb—to observe which components from the semantic tier appear in it. This typology has mainly three members. Most languages characteristically use the verb to express the Path, the co-event, or the Figure—as seen respectively in Spanish, English, and Atsugewi.

The alternatives within a typology often exhibit a prevalence hierarchy across languages (11.2.1). Thus, within the actuating typology, the Path verb as the characteristic system seems the commonest, the co-event verb somewhat less so, and the Figure verb is rare. Further, a typology can be conceptually extended to allow consideration of potential alternatives that in fact do not occur. Such alternatives then fall at the zero level of the prevalence hierarchy and can be added to the inventory of negative universals. In the present case, no language characteristically uses its verb to express the Ground, nor a combination of two different Motion components, nor an absence of Motion components.

10.3 G3. Repertorial

Consider next a class of linguistic phenomena with relatively many members. As above, such a class can itself be absolutely universal, represented in every language. But the members of such a class are

seemingly never all of them absolutely universal. Rather, they are more like a typology with inventorial universality. In particular, the identities of the members are largely fixed and form a relatively closed large set, but not all of them appear in all languages. Such a class is here called a "repertory." But certain differences exist between a typology and a repertory.

Each language typically selects just one member of a typological set for its characteristic use, and many languages are alike in selecting the same one. But each language selects a subset of the many members in a repertory, and each selects a different subset. This selection, further, must be representative across the repertory, at times guided by levels of organization above that of the repertory's most basic members.

In addition, much like a typology, a repertory can exhibit a prevalence hierarchy among its members down to potential members that never occur in any language. But it can also include members that occur in every language and that can accordingly be added to the set of absolute universals.

Finally, while the membership of a typology is wholly closed, that of a repertory is only preponderantly closed—the prevalence hierarchy can extend ever lower to rare members occurring in perhaps only one language.

A potential example of a repertory is the class of all possible tropes which, depending on the analysis, can number in the scores if not the hundreds (Baldrick, 2008). A coarse-grained glance that disregards any categories among them suggests that different subsets of these tropes, but never all of them, are found across different languages as spoken colloquially at any given time. Seemingly some tropes, perhaps metaphor and metonymy, occur universally. Others may be rare. An example might be that of "pretend addressee," as where, say, a mother standing alone with her son looks off to one side as if addressing someone there and says *Is he going to take out the garbage? Nooo*.

Another repertory is formed by the mechanism of closed-class semantics. As discussed (7.1), this mechanism consists of a certain number of large schematic systems that in turn are composed of conceptual categories, each of which contains a relatively small number of basic semantic components. The meanings of all the closed-class elements in the world's languages consist of particular selections from among those semantic components, arranged in particular patterns.

Actually, not only the whole mechanism but each level of it is a repertory exhibiting a prevalence hierarchy. Each level is next discussed in turn.

10.3.1 G3a. Schematic Systems within the Mechanism

At the level of schematic systems, all ten of the ones discussed in (7.1) may prove to be absolutely universal. However, if a schematic system of "status" can be posited, it may be common but it is not universal—English for one language lacks closed-class representation of it. And if "rate" can be regarded as a schematic system, it is a rare one, represented in only a few languages by verb affixes for 'fast' and 'slow'.

Further, indefinitely many candidates for schematic system status are excluded as absolute negative universals. Some candidates are excluded even though they occur in nonlinguistic cognitive systems. An example might be a seemingly absent schematic system of "sensory qualia" in that there is apparently no closed-class marking of visual phenomena like color or brightness, auditory

phenomena like loudness or pitch, or haptic phenomena like soft/hard or smooth/rough. And certainly no schematic systems exist for such conceptual sets as types of work or of food.

10.3.2 G3b. Conceptual Categories within a Schematic System

At the next level down, within a schematic system, some conceptual categories may well be absolute universals. An example within the schematic system of communicative purpose may be the category of questioning if in fact every language has some closed-class interrogative marking. But it seems possible (since English has so little of it) that, within the schematic system of cognitive state, the conceptual category of affect may be common but not universal.

And at the negative end, the schematic system of configurational structure lacks a conceptual category of absolute magnitude beside its extant category of relative magnitude, at least with respect to the spatial domain. For example, while some languages like English have different deictics that distinguish proximal from distal with respect to relative distance from the speaker, apparently none have deictics that distinguish absolute distances of, say, inches vs. parsecs. This nondiscrimination is seen in *This speck is smaller than that speck* and *This planet is smaller than that planet*, where the same morpheme *that* serves for objects regardless of their absolute distance away.

10.3.3 G3c. Semantic Components within a Conceptual Category

Finally, within conceptual categories, some semantic components may be absolutely universal. For example, in the schematic system of reality status under the category "known as unrealized," the semantic component 'negative' may well have closed-class representation in every language. But in the schematic system of quantity under the conceptual category of number, the semantic component 'trial' is not universal but in fact rare. And at the negative end, the number concepts 'odd', 'even', and 'countable' are never represented by closed-class elements.

It can be difficult to distinguish between concepts wholly excluded from closed-class representation and ones able to occur sporadically in the trailing off portion of a repertory. But English does provide an example of the latter in the conceptual category of configurational structure, specifically in the spatial domain. The use of *in* vs. *on* for location within a vehicle—as in *in a car/on a bus, in a helicopter/on a plane, in a boat/on a ship, in a caboose/on a train*—distinguishes whether the vehicle respectively lacks or has a walkway. This is an unusual concept to be represented by a closed-class form, perhaps unique to English.

10.4 G4. Indefinitely Diverse

At the lowest degree of commonality, the linguistic phenomena in some classes are indefinitely diverse. Every language has a unique realization of such classes. Seemingly most if not all of such classes involve content patterning, though unstructured aspects of it, unlike the treatment of it as a content structuring mechanism in (7.2). The diversity is present in the meanings of morphemes, their ranges of applicability, their polysemies, and their partitioning of semantic areas, discussed next in order.

10.4.1 G4a. Morphemic Meaning

A comparison of different languages' lexicons can address the class consisting of open-class morphemes and focus on their meanings. Crosslinguistically, these meanings do not belong to an absolutely universal, a typological, or even a repertorial set but rather can differ enormously.

To illustrate with one pair of languages, a complete semantic correspondence between an Atsugewi and an English morpheme is relatively uncommon. For example, the verb root *-ṕ-*, might be glossed as: 'for a planar fabric to move in a way that changes its pattern of bunching' and, when combined with different instrumental and directional affixes, can refer to straightening a dress bunched up under one while sitting, opening curtains, or putting on socks.

Or again, *-swal-*, which can be glossed as 'for a linear flexible object suspended at one end to move/be located', can occur with different affixes to refer to walking along while carrying dead rabbits strung down from one's belt, sliding a snake away by suspending it under the head with the end of a stick, pants blowing down from a clothesline, or having one's penis hang limp. These verb roots and many others clearly have little semantic correspondence to English morphemes of any lexical category.

It might be thought that certain substantive concepts would be represented by open-class morphemes across all languages on the grounds that human cognition or our encounter with the world is structured in a way that inevitably forms unitizing boundaries around particular portions of the phenomenal continuum. Still, many candidate concepts do not prove out. Thus, an action seemingly as basic as ingesting food, though represented by a single morpheme in both English *eat* and Atsugewi *am-*, has no single morpheme to represent it in Navajo, which instead divides the action into a number of types represented by distinct verb roots depending on characteristics of the food and how it is eaten (Young and Morgan, 1992).

10.4.2 G4b. Range of Applicability

Even where particular morphemes across two languages share certain aspects of their references, those references can differ in their "range of applicability." For example, the English words *friend* and *acquaintance* share much of their senses with Yiddish *fraynt* and *bakanter*. But if strength of comradeship can be conceptualized as diminishing radially outward from a center point, then the circle enclosing the meaning of English *friend* is wider than that for Yiddish *fraynt*—it has a greater range of applicability.

Range of applicability can also change from one stage of a language to another. Thus, several decades ago U.S. English *girl* could be used to refer to a female person from infancy to early middle age, but now only to the later teens.

10.4.3 G4c. Polysemous Range

Another class of linguistic phenomena is the set of polysemous/homonymous senses associated with a single morphemic shape. A crosslinguistic comparison suggests that even if all the senses of a particular morphemic shape are expressed as is in another language, they will likely fall in the polysemous ranges of different morphemic shapes there. Thus, consider the English noun *stock* whose polysemous range includes the senses 'financial instrument', 'soup base', 'certain rifle part', 'stored supplies', 'line of descendants', 'farm animals', and 'certain plant species'. It seems unlikely that all these senses would be expressed by the same morphemic shape in another language.

Another example that now combines polysemy with range of applicability demonstrates the sheer idiosyncrasy and unlikely recurrence of those linguistic classes. In the polysemous range of the English verb *arrest*, one sense can be glossed as 'legally detain to prevent freedom of movement', but it has application only to sufficiently adult live humans: *The police arrested the man/ *goat / *baby / *corpse / *getaway car*. Another sense is 'stop the body-intrinsic growth of' but applies only to unhealthy tissue: *The medical treatment arrested his tumor / *hair / *nails*. And a third sense is 'hold fixed through allure and thus prevent wandering' but applies only to a cognitive faculty prone to shifting its state: *The unusual painting arrested my attention/*interest/*observation*.

10.4.4 G4d. Partitioning of a Semantic Area

A consequence of crosslinguistic discorrespondence in the three preceding aspects of morphemic meaning is that any given semantic area is likely to be divided up in different patterns. Consider the semantic area of one person encountering and engaging another. For part of its system, English uses the verb *meet* either for 1) making someone's acquaintance for the first time (*I met the new principal*) or for 2) conducting a pre-arranged appointment (*I met my lawyer in her office*). It uses the expression *run into* for 3) a chance encounter (*I ran into an old friend downtown*). And it uses *see* either for 4) a get-together with someone already known (*I saw my uncle today—we had lunch together*) or for certain client-professional encounters (*I saw my doctor today*.).

Yiddish partitions this semantic area differently. For part of its system, it uses *bakenen zikh mit* for the first type of encounter, *trefn zikh mit* for the second and fourth type, *bagegenen* for the third, and *geyn tsu* or *zayn mit* for the fifth.

Differences between languages in their typological and repertorial selections as well as in their inventories of morpheme meanings and polysemous groupings make exact translation a near impossibility.

11 H. Quantity of Manifestation

Linguistically represented conceptual content can have a greater or lesser quantity of manifestation either in elaboratedness or in prevalence, discussed next in order. In general, the greater the quantity, the more that it engages cognition and its processes. And certain manifestations of quantity can change through time.

11.1 H1. Elaboratedness

Linguistically represented conceptual content can be more or less elaborated, that is, more or less comprehensive and granular. This category can be seen at work in four venues—in a communication system, in a language user, in a lexicon, and in expression—discussed next in order. This parameter can pertain to the entirety of an expressive capacity (as in the first two subsections below) or to a particular conceptual category or idea (as in the second two subsections).

11.1.1 H1a. In a Communication System

The conceptual content that a communication system as a whole can represent can be more or less elaborated. Specifically, it can be more or less comprehensive in the total amount of ideation that it can represent and granular in the fineness and number of the conceptual distinctions that it can make.

A lesser degree of conceptual elaboration can be seen in a number of communication systems. In very roughly increasing order, these include a plant or nonhuman animal communication system; a smaller devised limited system such as emoji; body language, facial expression, and gesture; a larger devised limited system such as Basic English; home sign; a pidgin; a heritage language; and "restricted code" (Bernstein, 1964).

Toward the top of the scale, a great degree of conceptual elaboration is seen in every spoken or signed language with a sufficiently long history.

A communication system's degree of conceptual elaboratedness can increase, as when a pidgin develops into a creole, or when the signed language originally developed by the initial group of deaf students in Nicaragua turned into the full system of the later students (Kegl et al., 1999). And it can decrease, as in "language death"—that is, where a speech community's competence with an inherited language declines as that language is gradually replaced.

11.1.2 H1b. In a Language User

Individuals can also exhibit different degrees of conceptual elaboratedness in their language. A lesser degree is seen in a language learner at any stage in acquiring an L1 or L2. It is also present due to deficit, whether developmental, as through reduced exposure or deprivation during childhood, or biological, as with congenital language disorders. By contrast, great elaboration is seen in any fully fluent speaker.

Individual conceptual elaboration increases during language acquisition, as when the language of an L1 learner moves toward an adult level (e.g., Tomasello, 2010) or that of an L2 learner moves toward a native level (e.g., Robinson and Ellis, 2008). Such increase might also be invoked where the written language of an author evolves over her career. And it can decrease, as when a speaker becomes rusty in a language once known well, or in the case of a later-onset language disorder.

11.1.3 H1c. In a Lexicon

In the lexicon of a language, a particular conceptual category can be greatly elaborated, having many members making fine distinctions, or minimally represented. This issue was already discussed in (7.2.2) for the much greater elaboration of manner verbs and Path prepositions in English than in Spanish.

For a fresh example, consider a lexicon's elaboration of the class of "expressives." These are morphemes in a sentence that in effect place a hearer vividly in the midst of a referent scene as if able to directly perceive a specific effect there. Japanese has a great elaboration of this class with its "mimetics," whereas English does so minimally with just a few instances like *lickety-split* (*The squirrel climbed lickety-split up the tree trunk*) and *kerplunk* (*A coconut from high in the tree landed kerplunk at his feet*).

11.1.4 H1d. In Expression

A speaker can represent roughly the same conceptual complex with greater or lesser elaboration, that is, she can render it more specific and precise or more general and approximate. The choice of degree is often keyed to the hearer's knowledge about the topic. For example, a speaker addressing a non-gardener might say *I used my trowel to dig a hole in the ground, place the bulb root-end down at the*

bottom, and filled the hole back up with soil. But to a fellow gardener, she might instead say *I planted the bulb*.

11.2 H2. Prevalence

Various kinds of linguistically represented conceptual content can be more or less prevalent, that is, more or less frequent in occurrence. Differences in prevalence can occur across languages or within a single language, as discussed next in order.

11.2.1 H2a. Compared across Languages

A difference in prevalence across languages was already discussed for the members of a typology or repertory (10.2, 10.3). What can be added here is that some prevalence differences seem due to particular aspects of cognition—one's involving bias, efficiency, and load, addressed next in order.

Cognitive bias can be illustrated with a language's characteristic closed-class marking of number in count nominals. A language can grammatically treat number as consisting of one, two, three, or four sets. A two-set division is seemingly always between the singular and the "2-plural"—two or more units—never, say, between one or two units and a 3-plural. And the three-set division is between singular, dual, and a 3-plural, while a four-set division is between singular, dual, trial and a 4-plural.[9]

While it is not yet clear whether languages without number marking or one's with a two-set division are more prevalent, languages with successively more divisions are successively less prevalent. This pattern accords with its further status as an "implicational universal" (Greenberg 1963—here holding, for example, that a language with trial marking must also have dual marking. This crosslinguistic prevalence pattern may reflect a particular cognitive bias—one toward locating any divisions within a scale near its low end and toward making fewer such divisions.

Another prevalence ranking across languages is seen in the actuating typology (10.2) where, it seems, the verb characteristically expresses the Path most often, the co-event next most often, the Figure rarely, and the Ground never. No cognitive basis for this ranking is yet obvious. But two excluded patterns may each have such a basis. Apparently no language characteristically uses the verb to express zero components of a Motion situation beyond 'move'—this would be a waste of an obligatory constituent perhaps reflecting a cognitive tendency against inefficiency. And seemingly no language characteristically uses the verb to express a combination of two components in addition to 'move'—this would require a prohibitive number of distinct lexical items, perhaps reflecting a tendency against an excessive cognitive load.

11.2.2 H2b. In a Single Language

Prevalence within a single language mainly pertains to the frequency with which various linguistic formations occur in expression or in the lexicon, addressed next in order.

11.2.2.1 H2b1. In Expression

[9] It is not clear how some languages' "paucal" marking for several units fits this pattern.

In the arena of expression, the assessment of frequency is made not in the production of a single expression but across expressions produced in the aggregate. Prevalence of this kind is directly addressed by the usage-based approach (Langacker 1988) and is most readily studied through corpus research.

Where certain linguistic formations have comparable semantic effect, the relative frequency with which a speaker selects among them rests in part on a certain property that the formations have in the lexicon: their different degrees of "privilege of occurrence" for a given syntactic or stylistic context. Thus in an informal context, a speaker choosing among lexical alternatives will say *start* more often than *commence* and will perhaps rank the likelihood of referring to great speed with a single morpheme in the following sequence: *fast, quick, rapid, swift, fleet.* And a speaker choosing among constructional alternatives will increase the ratio of main clauses to subordinate clauses. A language acquirer learns such formations' privilege of occurrence by noticing the different frequencies with which speakers use them across different contexts.

11.2.2.2 H2b2. In the Lexicon

In the arena of the lexicon, prevalence can be seen where closed-class forms with comparable semantic effect associate in different proportions with particular open-class forms. Thus, of the English alternatives for representing the plural of a uniplex count noun, the suffix *-s* is far more prevalent than the suffix *-en,* vowel alteration, or zero change. The degree of such a closed-class morpheme's "productivity," further, is the proportion with which a speaker chooses it for an open-class morpheme new to the lexicon, and generally accords with its prevalence in the established lexicon. Thus, *-s* is generally chosen as the pluralizer for novel nouns, as in *nerds*.

In addition, the prevalence with which a morpheme is used in a particular sense can determine whether that sense is a metaphoric extension of the morpheme's main sense or a member of its polysemous range. Thus, the use of *foot* to mean 'bottom', as in *foot of the mountain,* is sparse and thus seems metaphoric, but if it were to spread, 'bottom' would come to seem a literal sense.

Diachronic increases and decreases of prevalence in a language's lexicon are pervasive and can in fact occur hand-in-hand. Thus, consider the spread in English of the termination *-in-law,* which was suffixed to morphemes expressing a consanguineal kinship relation and represented a conceptual operation (8.2) of shift from such a relation to a corresponding affinal kinship relation. This spread correlated with the gradual loss from the lexicon of Old English monomorphemic words that directly represented the affinal relations, such as *sweor* 'father-in-law', *sweger* 'mother-in-law', and *snoru* 'daughter-in-law' (T13 s2.1). This example of frequency change has additional cognitive-semantic significance because it constitutes a switch from a direct to an operational type of conceptual representation.

12 I. Communication Systems

At its most general (T12 s1.1), communication is a process that has evolved or been devised in which one entity, the "sender," executes certain actions that have the function of inducing particular responses in a certain other entity, the "receiver." The sender's actions produce certain physical effects that the receiver can detect across the separation between them, the "medium." Where such

communication has evolved, it can occur between components of a single cell, between single-celled organisms, between cells of a multicellular organism, or between multicellular organisms.

Cognitive semantics is mostly concerned with a particular configuration within this general phenomenon. In it, one sentient multicellular organism communicates volitionally with another, intending to induce a response consisting of experiencing certain conceptual content in consciousness.

For a further distinction, the "channel" or "modality" of a communication can be characterized in terms of the actions that the sender uses to produce a signal and the corresponding sensory modality that the receiver uses to perceive it, where the medium between the two participants can support the signal's transit. Different communication systems use different communication channels.

Thus, spoken language can be said to use the "vocal-auditory" channel, since the sender's actions are vocalizations and the receiver perceives through hearing—where the medium of air supports the passage of sound. Both co-speech gesture and signed language then use the "somatic-visual" channel, since the sender's actions are visible movements of particular body parts in certain configurations (other than for vocalization), and the receiver perceives through sight—where the medium of air supports the passage of light. The same channel is used by lip reading, which differs in that the actions of the sender that the receiver attends to are limited to those of the mouth. The communication system of the deaf-blind in turn uses the "somatic-haptic" channel, especially of a manual-manual kind, where the sender's actions consist of bodily movements that the receiver perceives through the haptic senses—and where the medium of direct contact supports the transmission of physical movement. To simplify its full trajectory, writing uses a visual-visual channel whose medium includes surfaces that support its display and viewing by readers.

In further forms of communication traditionally more the purview of semiotics, what is conveyed and appears in the receiver's consciousness is less precise and ideational and more vague and affective or mood-related. Such forms include music, dance, apparel, art, and architecture.

Since this taxonomy is mostly cast in terms of spoken language in the vocal-auditory channel, as a complement the next two subsections respectively address gesture and signed language in the somatic/visual channel. Each discussed aspect of these further communication systems engages cognitive phenomena absent or rare in spoken language.

12.1 I1. Co-Speech Gesture

Gestures that accompany speech can be divided into two classes, those produced in association with a deictic and those produced otherwise—respectively "targeting" and "non-targeting" gestures.

12.1.1 I1a. Targeting Gestures

To begin with targeting gestures (T11 c5), the prototype of them is pointing, as when a speaker says *That's my horse* while aiming her straightened forefinger at the animal. This and all other types of targeting gestures share a property: the speaker's gesture is always at a different location than her target. The hearer/viewer accordingly must have a cognitive mechanism for spatially connecting the former with the latter.

One proposal for such a mechanism is that the hearer connects the gesture with the target by means of a cognitively generated "fictive chain." This is a succession of imaginal constructs—possibly from a relatively closed universal repertory—that are either schematic (largely geometric) structures or operations that affect such structures. Such a fictive chain may have three properties of a physical mechanical system: 1) It is fully connected without gaps. 2) It forms progressively from the gesture to the target, not in place all at once, nor from target to gesture. 3) It is causal: the gesture gives rise to the first fictive construct, the first construct to the second, and so on. To illustrate such a fictive chain with the present example, the pointing finger may be schematized as a straight line with a front point that coaxially emits a straight one-dimensional intangible projection that progresses quickly through space to intersect with and terminate at the horse to mark it as the intended target.

Numerous types of targeting gesture other than the prototype occur, and we select one to illustrate the fictive chain's range. Thus, in referring to two glasses standing respectively 10 and 11 feet in a straight line away from her, a speaker says *This glass is mine and that glass is yours*. She gestures by extending her arm toward the glasses with her flat hand held bent upward at the wrist, first orienting her palm and waving her fingers toward herself and then rotating her palm in the opposite direction and waving her fingers away from herself. The hearer may generate a fictive chain in which an imagined copy of the speaker's hand is first repositioned through space to a location between the two glasses. Then the first waving motion of this fictive hand constitutes a thrust that launches a fictive projection which in turn progresses through space to intersect with the closer glass to mark it as the initial target. The fictive hand then rotates in synchrony with the actual articulator to launch a fictive beam at the further glass to mark it as the second target.

12.1.2 I1b. Non-Targeting Gestures

Co-speech gesturing not associated with a deictic includes body language, facial expressions, and different types of manual gestures (e.g., Kendon, 2004). Significantly, though, a semantic characteristic prevalent among the first two gestural categories as well as some manual types is that the meaning of the gestures—the conceptual content associated with them—is approximative, vague, or murky. For example, hunching may suggest only a rough sense of self-protection, and sweeping a hand with palm turned down away from oneself only a rough sense of not wanting.

By contrast, perhaps most spoken-language morphemes, especially those with segmental form, seem to be associated with concepts experienced as precise, crisp, and clear. This is the case even where the associated concept itself pertains to vagueness, like the word *amorphous*.

However, something of the approximative semantic character of much non-targeting gesturing does seem to occur in spoken language. Thus, among segmental morphemes, it may occur in some discourse-organizing forms like the *well* used to begin a sentence. It also seems to occur in English with certain bound Greco-Latin morphemes existing beside independent forms. For example, the termination *-cracy*—as in democracy, autocracy, plutocracy, theocracy, technocracy—seems to afford an approximate sense of 'rule of the government by', yet does not equal the clarity of this phrase. Even vaguer are the concepts associated with such non-segmental morphemes as grammatical relations, like that of direct-object status, or alternatives of constituent order expressing subtly different patterns of emphasis.

Still, non-targeting gesturing may be the best arena in which to examine the cognitive phenomenon of conceptual vagueness.

12.2 I2. Signed Language

Our focus in this section is on a major system seemingly present in all signed languages, the "classifier system," which is specialized for the representation of objects moving, located, or oriented with respect to each other in space and time (Emmorey, 2003). Considered in its own right, this is an extensive communication system with several substantial differences from spoken language (T3, T12).

To illustrate this system, it can within a single expression represent an event in which a car drives quickly along a bumpy road that curves uphill closely past a tree, starting further away from the tree than it ends up. The signer's dominant hand represents the Figure, here in the classifier shape for land vehicles, while her nondominant hand represents the Ground, here in the classifier shape for trees. The "vehicle" hand, "bumping" up and down, moves quickly across the chest and then along a curved path ascending closely around the "tree" hand, stopping shortly past it.

By comparison with spoken language, the signed classifier system has a far greater 1) number of different content-conveying parameters, 2) number of concurrent parameter appearances within a single expression, and 3) quantity of iconicity, addressed next in order.

First, regarding the number of content-conveying parameters, the term "parameter" here designates any substantive aspect of a communication system that can represent conceptual content independently of other such aspects. Then spoken language has basically three such parameters—phonetic quality, pitch, and loudness. But by one count, the signed classifier system has some thirty parameters (T12). In the example, for instance, these parameters include the shape of the Figure hand, the shape of the Ground hand, the Figure hands' speed, its oscillatory movement, the contour of its path (here, curved), the angle of its path (here, half upward), the distance of its path from the Ground (here, close), and the relative lengths of its path segments before and after encounter with the Ground. all these substantive aspects of the classifier system can vary independently of each other.

Second, the number of parameters that can be realized concurrently is far greater in the classifier system than in spoken language. True, all the parameters of spoken language can be concurrent, but that number is still only three. And while all thirty or so parameters of the classifier system cannot be realized at the same time, different subsets of up to some ten of them can be concurrent.

Third, the signed classifier system exhibits far more iconicity than spoken language. In iconicity, linguistic form represents conceptual content through similarity with it. An example of its limited spoken-language occurrence is seen in *The cell phone tower is waay/waaaay/waaaaaay over there*. Here, the successive increases in the length of the vowel over the norm in *way* represent corresponding increases in the length of the tower's displacement from the speaker that simple *way* would have indicated. But of the 30 some parameters in the classifier system, all but the two for the Figure and Ground handshapes are iconic. For example, the contour of the Figure hand's path is iconic of the contour exhibited by the represented Figure's path. And the slant of the Figure hand's path, ranging from straight up to horizontal to straight down, is iconic of the same slant shown by the

Figure's path. These parameters largely reflect the gradience of what they represent, unlike the pre-established discrete values of the structure-indicating elements of spoken language.

These substantial differences across two human communication systems require an analysis of linguistic cognition far more general than that provided by extant models of it based on spoken language alone, and suggest an advance in language theory (T3 s4).

13 J. Research Characteristics

Every study on conceptual structure in language is shaped by the methodologies and other aspects of approach used in the research—two features discussed next in order.

13.1 J1. Methodology

Linguistic meaning is amenable to study through a range of methodologies, that is, one or another system of procedures used to examine it (T5). Each methodology has a different profile of capacities and limitations that accords it a particular perspective on the nature of conceptual organization in language. Together, they thus afford an array of advantages and compensate for each other's deficits. Used in conjunction with all of these is one "meta-methodology," analytic thought, which includes abstraction, comparison, correlation, classification, pattern detection, inference, and in general the systematic manipulation of ideas.

Some of the main methodologies used to research linguistic conceptual structure can be enumerated. The traditional and still most prevalent methodology in cognitive semantics is metacognition. This is the use of directed conscious attention to introspectively accessed aspects of language in one's own cognition. Metacognition plays a role at three levels of remove. At the most immediate, a linguist examines her own native language. At the second, a linguist elicits and examines reports by others using introspection on their native language, as a descriptive linguist does with native speakers. At the third level, a linguist examines written descriptions by other linguists of their work with native speakers, as a typologist does with the grammars of different languages.

Another methodology is corpus research, the largely computer-aided examination of representative and often annotated collections of portions of writing or spontaneous speech. Another is the analysis of audio- and videographic recordings of naturally occurring communication. Still others are the experimental techniques of psycholinguistics; the instrumental probes of the brain's linguistic functioning in neuroscience; and the simulations of human linguistic functions in artificial intelligence.

Some comparison of the profiles of these methodologies can suggest where they excel and where they offset each other's limitations. What metacognition seems best at is determining certain types of meaning. These are mainly the concepts associated with individual open-class segmental morphemes, idioms, and tropes, as well as whole utterances and interchanges. As a consciousness phenomenon, metacognition may in fact be the only methodology able to access meaning, another consciousness phenomenon. Metacognition also excels at determining whether an utterance is well-formed semantically and syntactically, the latter being the basis of grammaticality judgments.

At a somewhat lower level, metacognition has partial but not thoroughgoing access to cross-morphemic relations in the lexicon (D2b3). Thus, regarding access to a morpheme's polysemous range, a speaker asked to identify the various senses of the noun *stock* might come up with several,

but scarcely all, of those listed in (10.4.3). And regarding access to synonymy, if asked to think of other words with roughly the same meaning as, say, *tendency*, a respondent might come up with a couple, but probably not all, of the following: *inclination, leaning, disposition, proneness, propensity, proclivity*. Here, though, lexicography—a methodology akin to corpus research that collates dispersed occurrences of particular forms and meanings—compensates for this deficit in metacognition in the form of dictionaries and thesauruses, respectively.

Perhaps still less accessible through metacognition are the particular forms and conceptual import of certain concomitants of speech—auditory ones like vocal dynamics and intonation and visual ones like gesture, facial expression, and body language. But this introspective shortfall can be made up for through the methodology of audiovisual recording and its subsequent analysis.

And perhaps even more inaccessible to introspection are the bases, whether purely formal or also partly semantic, of certain syntactic effects. For example, if asked to consider the two sentences *Whose dog did our cat bite?* and *Whose dog bit our cat?*, an average speaker would have little direct sense for what it is about the first sentence that requires the inclusion of the word *did*, the basic form of the verb *bite*, and the positioning of this verb at the sentence's end, while the second sentence requires an absence of *did*, the past-tense form of the verb, and the positioning of the verb within the sentence. In compensation for this introspective deficiency, however, syntacticians combine their metacognitive access to whether a sentence is well- or ill-formed with the meta-methodology of analytic thought to uncover the underlying patterns.

And at the lowest level, some aspects of linguistically represented meaning are entirely inaccessible to metacognition and rely wholly on other methodologies for any understanding of them. Thus, there is no introspective access to cognitive processing of meaning that takes place in fractions of a second nor that occurs across different individuals. But the techniques of psycholinguistics, among their capabilities, can access that time scale and can compare the performances of different individuals on a particular semantic function. Metacognition can also not access which brain systems are involved in different types of semantic processing, but that lack is partly made up for by neuroscientific imaging techniques. And there can be no direct metacognitive access to methods for processing linguistically represented conceptual content other than those actually present in cognition, whereas artificial intelligence, aided by the meta-methodology of analytic thought, has developed just such methods.

13.2 J2. Other Aspects of Approach

In addition to the methodologies used, studies in cognitive semantics can differ with respect to certain structural research parameters. To briefly identify four of these, one parameter is scope, ranging from a larger swath to a more focused area under examination. Another parameter, that of granularity, tends to correlate inversely with that of scope, ranging from an analysis in broader strokes for a larger scope to one in finer detail for a smaller scope. Another parameter involves a study's balance between the theoretical and the descriptive. And yet another parameter involves a balance between the introduction of new ideas and the elaboration of familiar ideas.

14 Postscript

Together, the contributions to this Handbook are representative of the preceding four research parameters at both of their strong ends. Collectively, they present both big-picture perspectives and focus, both generalization and detail, both theory and description, and both new ideas and the development of familiar ones in the field of cognitive semantics.

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