

14 Typology

WILLIAM CROFT

1 The Diversity of Human Languages

There are approximately six thousand different languages spoken in the world today (see Comrie, chapter 2, this volume). Some of these languages are very closely related to each other; that is, the communities that spoke these languages became separated from each other relatively recently in time. Others have been spoken by communities that have been separated for millennia, and in some cases tens or perhaps hundreds of thousands of years (see Joseph, chapter 5, this volume). An obvious reflection of the differences among languages can be observed in vocabulary. An American moving to Britain will find a surprising number of different words for everyday things, but can largely understand and be understood. The same American visiting France or Germany will recognize a number of familiar words and perhaps even get the gist of signs or a newspaper headline. But the same American looking at something written in Yoruba (Niger-Kordofanian family, Nigeria), Tatar (Altaic, Russia), K'iche' (Mayan, Guatemala) or Nunggubuyu (Australian, Northern Territory) would be totally lost, even if the languages were written in the letters of the Roman script familiar to him or her. Although it may someday be proven that English is ultimately related to those distant languages, it would still be true that the vocabulary of the world's languages is incredibly diverse.

But even if our hypothetical English speaker could understand the meanings of words in these exotic languages, s/he would quickly realize that the grammar of these languages (not to mention their pronunciation) would be equally foreign to him or her. Looking at only the literal meanings of the words in a sentence or two of each of the aforementioned languages, our speaker would see something like this:

(1) *Yoruba*:

l'ákòkò tí ìwé yí ó bǎ fi tẹ ọ l'ọwọ
at'. time that letter this will meet take press you at'hand

o ó ti kúrò l'ékǒ
 you will come.from leave at.Lagos

(2) *K'iche'*:

ch-oxib q'iiǰ x-el bi rii jun chicop ch-u-chii rii mar
 at-three sun it left away the an animal at-its-mouth the sea
 pero naj-alaj juyub chik. aree k'u rii achi x-r-ilo
 but distant-very mountains now. And the man he it saw
 chi algo x-ok apan u-wach lee q'iiǰ
 that a.little it entered in.there its-face the sun

(3) *Tatar*:

jul kərǰ-ən-da mašina-da kil-üče-lär-ne kočǰǰ-ən-a
 path edge-its-at vehicle-at going-those-of embrace-its-to
 al-ǰrga
 take-in.order.to
 telä-gän-däǰ botak-lar-ən žǰǰ-ep kart imän utər-a i-de
 wished-having-as.if branches-of spreading.out old oak sitting was

(4) *Nunggubuyu*:

ni = yayajarda-ǰǰ ǰǰ wu-ǰul-wǰǰ
 he = pushed.to.bottom and.then the₁-groin-at
 wiǰǰi-yaǰǰǰǰǰ = lha-y yǰǰǰǰ wiǰǰǰǰǰ = ǰǰǰǰǰǰǰǰ-ǰ-ǰ
 she.two-with.spear.shaft = stood nearly she.two = pulled-themselves-out
 ǰǰ girǰǰǰ! aba ma-gu-ru ma = yaǰǰǰ-ǰ yamba
 and.then no! then it₂ it₂ = went-far because
 niwaǰ-ǰban = galhari-ǰ-ǰǰǰǰǰ ma = yama-ǰ-ǰǰǰǰǰ
 he.it₃-ground = pierced-which it₂ = did.that-which

Although our speaker might figure out what these sentences mean (the translations are given below), the grammar of each of these is very different from English, and moreover, all are very different from each other. The sentences in (1–4), incidentally, illustrate what the typologist must do in examining the grammar of languages s/he does not know: identify the parts of sentences and of words in the original language, represented by the first line in the examples; what their individual meanings are, represented in the line below the original language; and what is the resulting meaning of the whole, represented by the translations given below. (All non-English examples in this chapter will have this three-line format. A list of abbreviations for grammatical terms occurring in the second line of the examples is found at the end of the chapter.)

Yoruba: “By the time that this letter reaches you, you will have left Lagos.”

K'iche': “On the third day the animal came out of the sea, but the mountains were very distant now. And the man saw that the sunlight was entering a little in there.”

Tatar: “An old oak stood by the path, spreading out its branches as if it wished to take those traveling in the vehicle into its embrace.”

Nunggubuyu: “He rammed it [a Y-shaped stick] deep below the surface of the ground. The fork [“groin”] of the spear shaft was almost through them [the women]. They tried to pull themselves out but they could not. It [the spear] which was jammed into the ground had gone in deeply.”

The dramatic differences in grammar from one language to another – only a fraction of which are illustrated in the four short examples above – might strike one as rather surprising. It isn't so odd that vocabulary differs from one language to another. There is no a priori reason, after all, that a certain string of sounds should be associated with a particular concept. The pairing of sound and meaning, at least for individual words, is largely arbitrary.

Grammar should be another matter entirely, at first blush. One might think that there is one obvious way to group concepts into grammatical categories, or express combinations of concepts in sentences, based on the nature of concepts and their combination. Yet this does not appear to be the case. Languages can vary to a remarkable degree in what for English speakers, or even speakers of European languages, appears to be basic categories of grammar. For example, a plausible candidate for a pair of universal grammatical categories are the categories of *subject* and *object* of a verb:

- (5) The woman [S] didn't run.
[S = “subject”]
- (6) The snake [A] bit the man [P].
[A = “agent”] [P = “patient”]

The sentence in (5) has only a single phrase (*the woman*) referring to a participant in the event denoted by the verb (*run*). Such a sentence is called “intransitive” by grammarians, and *the woman* is the “subject”; we will refer to intransitive “subject” with the label S (mnemonic for “subject”). The transitive sentence in (6) on the other hand has two phrases referring to the two participants in the event (*bit*). It seems completely natural, indeed even necessary, that the first phrase, *the snake* (labeled A, mnemonic for “agent”) should belong to the same grammatical category as *the woman* in (5). Both *the woman* and *the snake* occur before the verb. Substitution of a pronoun for *the woman* would require the (aptly-named) subject form *she*, not *her*. The grammatical category grouping S and A would be called “subject.” The second phrase in (6), *the man* (labeled P,

mnemonic for “patient”) is grammatically different. It occurs after the verb, and substitution of a pronoun for *the man* in (6) would require the object form *him*, not *he*. The grammatical category consisting of P is generally called the “object.”

But many languages do not categorize the phrases referring to the participants in events in the same way. Compare the translations of (5) and (6) in Yuwaalaraay, an Aboriginal language of Australia:

(7) wa:l ɲama yinar -∅ banaga -ɲi
 not that woman -ABS run -NONFUT
 “The woman [S] didn’t run.”

(8) ɖuyu -gu ɲama ɖayn -∅ yi: -y
 snake -ERG that man -ABS bite -NONFUT
 “The snake [A] bit the man [P].”

Yuwaalaraay does not have subject and object in the English sense. The grammar of participants is expressed by case suffixes on the noun. In an intransitive sentence like (7), the phrase labeled S has no suffix (notated here with the zero symbol -∅). In a transitive sentence like (8) however, what an English speaker would call the “subject,” A, has a case suffix -*gu*, which is called the *ergative* case (abbreviated ERG), and the “object” phrase P has no suffix, like the “subject” S in (7). In other words, whereas English categorizes both A and S together (as subject) and distinguishes P (as object), Yuwaalaraay categorizes P and S together (called the *absolutive*) and distinguishes A (as ergative). The difference between the categories of English and Yuwaalaraay can be illustrated in the following diagram:

(9) *English*: subject ⇒

A	S
---	---

P

 ⇐ object
Yuwaalaraay: ergative ⇒

A

S	P
---	---

 ⇐ absolutive

This difference between English (and many other languages) on the one hand, and Yuwaalaraay (and many other languages) on the other, is very striking. It seems very unnatural to us to group together S and P against A – subject and object in the English sense seem to be such basic categories of grammar. This example suggests that the diversity of grammatical patterns in the world’s languages is indeed far-reaching and pervasive.

The field of linguistic typology explores the diversity of human language in an effort to understand it. The basic principle behind typology is that one must look at as wide a range of languages as possible (given limitations of time and availability of information) in order to grasp both the diversity of language and to discover its limits. Typology uses a fundamentally empirical, comparative, and inductive method in the study of language. That is, typologists examine grammatical data from a wide variety of languages, and infer generalizations about language from that data. For this reason typology depends crucially

on field linguistics (see Munro, chapter 6), and indeed many typologists have themselves done fieldwork on particular languages.

The basic discovery of typology is that there are in fact limits to linguistic diversity. Universals of grammatical structure describe constraints on how grammatical structures encode the meanings or functions they express. By comparing diverse languages and discovering universal grammatical patterns, one can attempt to disentangle what is universal about the grammars of English, K'iche' and other languages from what is peculiar to each individual language. Many explanations of typological universals take the form of interacting motivations that compete with each other and can be arbitrarily resolved in several different ways – this leads to the diversity of languages. The interacting motivations are generally explained in terms of language function – communication of meaning – or language processing – in the comprehension and production of utterances. More recently, diversity across languages has been integrated with variation and change within languages, offering a dynamic view of the forces shaping the grammatical structure of languages (and accounting for even more of the diversity of languages). The remainder of this chapter will elaborate these concepts and discoveries in describing the principal results of typological research since the emergence of the field around 1960.

2 The Nature of Language Universals: Word Order

One of the first areas of grammar where a cross-linguistic survey was undertaken and it was recognized that there are limits to grammatical diversity was the order of words. Word order is probably the most immediately salient difference in grammatical patterns from one language to the next, as can be seen in the four passages in section 1. For instance, while the word order in the Yoruba sentence is about the same as in English, the word order in the Tatar sentence is almost the mirror image of English. In particular, in Tatar the verb comes at the end of the sentence, after subject and object, while in English and Yoruba the verb comes after the subject and before the object. In K'iche' on the other hand, the verb or predicate comes before the subject in many cases (“it.left the animal” and “distant-very [the] mountains”); in Nunggubuyu there is no fixed word order of subject, object, and verb.

These observations illustrate the first steps in typological analysis. First, one must examine a sample of languages in order to infer the range of grammatical diversity and its limits. One cannot examine all of the world's languages: there are too many of them, very few of them are described and even those descriptions are often limited sketches. Hence various sampling techniques, taken from the social sciences, are used to give the highest likelihood of success. While sampling is a rather dry methodological issue, it is extremely important for assessing the validity of one's analysis (the issues are thoroughly explored

in Bell 1978, Perkins 1989, Dryer 1989, and Rijkhoff et al. 1993). The two most important types of samples are a *variety sample*, intended to maximize the likelihood of capturing the full variety of grammatical patterns, and a *proportional sample*, which attempts to capture the relative proportions of different grammatical patterns. A variety sample collects as broad a range of languages as possible from different geographical areas and different genetic groupings. Its purpose is to ensure that all possible language types are identified. A proportional sample also aims for breadth but in addition preserves the proportions of numbers of languages from different geographical areas and genetic groups. Its purpose is to make more sophisticated probabilistic analyses of the occurrence of language types. Our minimal sample of languages in (1–4) of section 1 is a variety sample: four languages from different continents (Africa, the Americas, Eurasia, and Australia / Oceania), all from different genetic families.

Second, one must be able to identify phenomena from one language to the next as comparable. The basic problem here is the great variety of grammatical structures used in the world's languages. Grammatical patterns are essentially language-specific; this is one of the major insights of structuralism in linguistics at the beginning of the century (see Campbell, chapter 4). However, this fact poses a problem for comparability across languages. The solution to this problem is due to another insight of structuralism: the basic unit of the language is the sign, a form that conventionally expresses or encodes a meaning. The basis for cross-linguistic comparison is a particular linguistic meaning; once that is identified, we may examine the different structures used to encode that meaning (see Greenberg 1966, Keenan and Comrie 1977, Croft 1990: 11–18). Unfortunately, terminology does not always make this fact clear. For example, in discussing the word order of *noun* and *adjective* across languages, these apparently grammatical terms must be understood semantically, as “object being referred to” and “property used to describe an object referred to” respectively. Likewise, in comparing subject, verb, and object order across languages, *verb* must be understood as “action predicated of something,” “subject” defined as the class of participant roles grouped together as A + S as in section 1, and “object” as the class of participant roles grouped under the label P. These semantic definitions may appear to have been chosen arbitrarily; but in fact there are good typological reasons for choosing these definitions.

Third, we must identify a range of grammatical patterns or types used to express the linguistic meaning being examined, and classify languages according to what type(s) is / are used in them. For instance, in describing word order of the sentence, the relative position of subject (S), object (O), and verb (V) are used to classify language types. This yields six possible orders: SVO, SOV, VSO, VOS, OVS, and OSV. English and Yoruba are SVO by this classification, while Tatar is SOV. The K'iche' example shows the subject sometimes preceding, sometimes following the verb. In fact, English also allows the subject to follow the verb in some utterances: *Down the alley ran the fox*. However, in both languages there are good reasons to identify one order as basic, and so K'iche' is classified as VOS. In other languages there is no basic order for the clause;

the order of subject, object, and verb is attributable to information status such as new information, focus of attention, and so on. Nunggubuyu is an example of a free or discourse-governed word order language. The classification of types that one chooses is not theory-independent: for example, Dryer 1997 argues persuasively that sentences should be classified in terms of the relative position of subject and verb (SV or VS) and of object and verb (VO or OV), leading to a four-way typological classification: SV/VO, VS/VO, SV/OV, VS/OV. But such refinements are made after the next step, the actual analysis of the cross-linguistic patterns.

The facts given in the preceding paragraph illustrate an important fact: languages vary considerably in their grammar. Objects may occur before or after the verb; so may subjects. The most widespread single pattern is for the subject to precede the object; but K'iche' and a number of other languages are VOS (there are also a very small number of OVS languages which also go against the most common pattern). The universals of language that can be inferred from these facts are more subtle, and can be seen when the order of other types of words in a language are taken into consideration.

Consider for example the relative orders of certain types of modifiers, in particular adjectives and numerals. In English both adjectives and numerals precede the noun:

- (10) a. red book b. three books
 Adj Noun Num Noun

This pattern is found in many languages. In many other languages, both adjectives and numerals follow the noun:

- (11) Kosraean (Austronesian, Caroline Islands)
 a. mwet kuh b. mwet luo
 men strong men two
 Noun Adj Noun Num

A third group of languages has adjectives following the noun while numerals precede:

- (12) Jamiltepec Mixtec (Mixtecan, Mexico)
 a. vĕhĕ lúhlu b. uvi vĕhĕ
 house little two house(s)
 Noun Adj Num Noun

On the other hand, languages with the adjective preceding and numeral following are virtually unattested (although there are a few). The pattern of attested vs. unattested (or at least extremely rare) language types can be given in the four-cell table (table 14.1):

Table 14.1 Attested vs. unattested adjective and numeral word orders

	<i>Noun-adjective order</i>	<i>Adjective-noun order</i>
Numeral-noun order	Attested (Jamiltepec Mixtec)	Attested (English)
Noun-numeral order	Attested (Kosraean)	<i>Extremely rare</i>

The generalization can itself be described in terms of an *implicational universal*:

- (13) If a language has Adjective-Noun word order, then it (almost always) has Numeral-Noun word order.

The discovery of implicational universals of word order by Greenberg (1966) demonstrated that there could be universal properties of language that do not imply that all languages are identical in some respect. The implicational universal in (13) is not by itself a description of a fact about the grammar of a particular language. In fact, one could not even identify the implicational universal without looking across a set of languages. The implicational universal captures a contingent relationship between Adjective-Noun order and Numeral-Noun order. This contingent relationship must be a part of individual speakers' knowledge of language structure and meaning.

The model of speakers' knowledge most widely adopted in typology is that of *competing motivations* for determining grammatical structure. A competing motivation model posits two or more factors that determine language structure. However, the motivations typically do not determine a single grammatical pattern because they are often in conflict. In the case of conflict, there is no single optimal grammatical pattern that satisfies all of the competing motivations, and instead one finds cross-linguistic variation over several suboptimal patterns. In this way, universal properties of the human mind (the motivations) give rise to cross-linguistic diversity.

For example, Greenberg proposed two competing motivations for implicational universals of word order. The first, *dominance*, can be thought of as simply a default preference for one order over another. For example, noun-adjective order (NA) is dominant, as is numeral-noun order (NumN) and demonstrative-noun order (DemN). The second, *harmony*, can be thought of as a dependent relation of one word order upon another. For example, AN order is harmonic with both NumN order and DemN order.

Greenberg's two motivations compete with each other, and the result is described in the following principle:

- (14) A dominant order may occur at any time, but a recessive order occurs only when a harmonic order is also present.

The principle in (14) accounts for the distribution of languages in table 14.1. The upper left cell is the language type with both dominant orders (NA and NumN), which are not harmonic with each other. The other two attested types have one recessive order, but the harmonic order is also present. The extremely rare type would have both recessive orders (AN and NNum), neither of which is dominant. That is, the extremely rare type is not motivated by either dominance or harmony, which accounts for its rarity. Note that one cannot satisfy both motivations at once, since the dominant orders are not harmonic with each other.

Further explanations have been offered for the motivations of dominance and harmony. Dominance – the default order – appears to be explainable in terms of language processing in production and comprehension. The default or preferred pattern (other things being equal) is for smaller or shorter modifiers and complements to come first, while the longer or larger ones come last (see Hawkins 1983).

Two general explanations have been proposed for harmony. The first explanation is based on language processing. The harmonic orders (AN, DemN and NumN) are parallel: all involve a modifier preceding the head noun. It has been proposed that if parallel grammatical structures have parallel word order, they would be easier to comprehend and produce. The second explanation is basically a historical one. It has also been noticed that the constructions used for harmonic word orders are often the same across categories. For example, in the K'iche' example in (2), a genitive agrees with its head noun with a prefix:

- (15) **u-wach** lee q'ijj “sunlight [lit. the face of the sun]”
its-face the sun
 AGR-Noun Genitive

And a preposition in K'iche' agrees with its complement with the same prefix set:

- (16) **ch-u-chii** rii mar “at the edge of the sea”
 at-**its-edge** the sea
 . . . -AGR-Prep Noun

The fact that K'iche' has PrepN and NGen word orders is due to the fact that the preposition construction is historically derived from the genitive construction via a semantic change (from a noun meaning “mouth” to a prepositional term meaning “edge of”). The English translations also use the same construction, and indeed genitive constructions have given rise to prepositions (e.g. *in the side of* > *inside of* > *inside*).

These two types of explanation illustrate the general perspective of typology on the nature of language structure. Language structure is determined by factors of language use, such as processing. Language structure is also determined by historical relationships among grammatical patterns, which themselves are

due to similarity in meaning. However, these factors do not uniquely determine a language structure, but compete with each other. Speech communities resolve the competing motivations in arbitrary, language-particular ways; this leads to the diversity of languages found in the world.

3 Language Universals and the Formal Encoding of Meaning

Word order universals appear to be motivated in part or perhaps entirely in terms of processing of linguistic structure in the act of producing and comprehending language. Word order is a fundamental grammatical property of sentences. Word order has generally been analyzed independently of the actual constructions used to encode the meaning of the sentence. An exception to this view is the historical explanation of word order harmony alluded to in section 2, where harmony is explained in terms of constructions shared across different categories. In this section I will describe language universals specifically pertaining to how concepts are encoded in word forms and constructions, and the model of linguistic knowledge these universals are taken to imply.

3.1 *Typological markedness and morphological representation*

Some of the earliest work in typology (also initiated by Greenberg) examined the coding of grammatical and lexical concepts in inflected word forms. The universals Greenberg and others discovered go under the name of (*typological markedness*). This term was borrowed from the Prague school of linguistic analysis (Trubetzkoy 1939/1969), but the theory was substantially altered in the process. Typological markedness represents an asymmetric pattern of the expression of meaning in grammatical categories across languages.

The category of number will serve to illustrate the general pattern. The simplest distinction that can be made in the category of number is between singular and plural. In many languages such as English and Tatar (see (17)), the singular form is expressed without any inflection (indicated by the zero symbol -Ø), while the plural is expressed by an overt inflection:

- (17) a. imän-Ø b. botak-lar
 oak (SG) branch-PL

Not all languages are the same as English and Tatar in the expression of singular and plural, however. Some languages express both singular and plural with overt inflection such as the Zulu (Bantu, South Africa) prefixes in (18):

- (18) a. umu-ntu b. aba-ntu
 SG-person PL-person

Other languages, such as Lahu (Sino-Tibetan, Burma) in (19), make no distinction, or to put it another way, express both the concepts of singular and plural without any overt inflection:

- (19) qhâ? “village / villages”

However, very few languages express the plural without an overt inflection and the singular with an overt inflection. (In the case of languages that do, the plural is designated a collective and the singular is a special singulative form, and indeed this pattern is typically associated with nouns for objects occurring in groups.) The typological pattern can again be described in terms of a table (table 14.2) and an implicational universal (see (20)).

Table 14.2 Attested and unattested singular and plural inflectional types

	<i>Overt plural inflection</i>	<i>No plural inflection</i>
No singular inflection	Attested (Tatar)	Attested (Lahu)
Overt singular inflection	Attested (Zulu)	<i>Extremely rare</i>

- (20) If a language uses an overt inflection for the singular, then it also uses an overt inflection for the plural.

It is this cross-linguistic pattern which goes under the name of typological markedness. Typological markedness has two central characteristics. First, typological markedness is a property of *conceptual categories* – e.g. singular and plural – or more precisely, how those conceptual categories are expressed in the world’s languages. For number, the singular is unmarked and the plural is marked. Second, unmarked status does not imply that the unmarked member is always left unexpressed and the marked member is always expressed by an overt morpheme. Calling the singular “unmarked” is like calling the order NA “dominant.” It does not mean that the singular is always expressed without an inflection in every language, any more than all languages have NA order. It simply means that the singular is expressed by no more morphemes than the plural is, in any particular language. Languages such as Zulu and Lahu conform to the markedness universal just as much as English and Tatar do.

The presence / absence of an overt inflection encoding a conceptual category is only one symptom of markedness, namely *structural coding*. Typological markedness is found in another aspect of the coding of concepts in words and constructions. Most words in sentences express more than one conceptual

category. Pronouns in English, for instance, can express gender as well as number:

(21)		<i>singular</i>	<i>plural</i>
	<i>masculine</i>	he	they
	<i>feminine</i>	she	they
	<i>neuter</i>	it	they

In English, neither the singular nor plural pronouns express number by a separate inflection; instead number is implicitly expressed by distinct forms such as *he* and *they*. However, the singular pronouns (in the third person) also express gender distinctions (*he / she / it*), while the plural does not (*they* is used no matter what gender the referents are). The grammatical coding of additional, cross-cutting, distinctions in the singular but not in the plural is an example of the second symptom of markedness, called *behavioral potential*. Behavioral potential is also represented by an implicational universal:

- (22) If the marked member of a category grammatically expresses a cross-cutting distinction, so does the unmarked member.

That is, alongside languages like English which express gender distinctions in only the singular, there are languages which express gender distinctions in both singular and plural, and languages which do not express gender distinctions in either the singular or plural. But the universal predicts that there are no languages that express gender distinctions in the plural but not in the singular.

A third property of typological markedness points to its underlying explanation. The unmarked member is more frequent than the marked member in language use, as revealed for example by text counts of singular vs. plural nouns. The form in which concepts are encoded is motivated by their frequency of use. Concepts that occur more frequently in language use (e.g. singular) will tend by default to be expressed by fewer morphemes than less frequently occurring concepts (e.g. plural). This explanation for how meaning is encoded in grammatical form is a processing explanation, called *economy* or *economic motivation*. Of course, we may also ask why people talk more about single objects or individuals than they talk about groups of objects or individuals. There are presumably deeper reasons for why this is true. But frequency in language use is the immediate cause of the asymmetric expression of meaning in form.

Likewise, more frequently used forms will introduce and maintain more cross-cutting distinctions than less frequently used forms. This latter explanation pertains as much to the storage of word forms and constructions in the mind as to their use in speaking and listening. Bybee (1985) has developed a model of the representation of grammatical knowledge in a speaker's mind, related to models of neural networks and connectionist networks in psychology, that accounts for typological markedness. Bybee's model also captures

Table 14.3 Analogical change from Old Church Slavonic to modern Polish

<i>Old Church Slavonic</i>		<i>Polish</i>	
jes-mǐ	“I am”	jest-em	“I am”
jes-i	“you are”	jest-eś	“you are”
jes-tŭ	“he / she / it is”	jest	“he / she is”
jes-mŭ	“we are”	jest-ešmy	“we are”
jes-te	“you (pl) are”	jest-eście	“you (pl) are”
sŏ-tŭ	“they are”	są	“they are”

other universals of the expression of meaning in form. A more frequent form is more firmly *entrenched* in the mind, independent of semantically closely related forms; while less frequent forms are less firmly entrenched, and in fact may be derived from (linked to) semantically nearby, entrenched forms. A more entrenched form can preserve cross-cutting distinctions more easily, while less entrenched forms can be derived by adding an inflection to a semantically nearby, more entrenched form.

Also, a more entrenched form can be irregular, in that it is independently stored in the mind, accounting for the fact that more frequent forms are more likely to be irregular than less frequent ones. Finally, a less frequent form may change to conform with a more frequent form in the same inflectional paradigm. For example, the third person singular is the most frequent form in a verbal paradigm: it is often the shortest, and is sometimes quite irregular. There are a number of cases in which the other forms of a verb change by being derived from the entrenched third singular form. An example of this is the Polish (Indo-European, Poland) inflection of the verb “be” compared to its Old Church Slavonic ancestor: all the Polish forms (except third person plural) have a *t*, based analogically on the third person singular *jest* (see table 14.3).

3.2 Hierarchies and conceptual spaces

In many languages, the plural inflection is found on only a subset of nouns and pronouns; other nouns or pronouns use the basic form to refer to either singular or plural number. It turns out that across languages, one finds only a small range of the possible subsets of nouns and pronouns to which the plural inflection is restricted. The attested subsets are given below:

- 1st / 2nd person pronouns (referring to speaker and hearer respectively) vs. 3rd person pronouns (referring to other people) and nouns: e.g. Guaraní (Carib, Paraguay) *né* “you [SG]” / *peẽ* “you [PL]” vs. *haʔé* “he / she / it / they.”
- Pronouns vs. nouns: e.g. Mandarin Chinese *tā* “he / she / it” / *tāmen* “they” vs. *shū* “book / books.”

- Pronouns and nouns referring to humans vs. nouns referring to nonhumans: e.g. Tiwi (Australian, Melville & Bathurst Islands) *wu.alaka* “young girl” / *wawu.alakawi* “young girls” vs. *waliwalini* “ant / ants.”
- Pronouns and nouns referring to humans and animates vs. nouns referring to inanimates: e.g. Kharia (Austroasiatic, India) *biloi* “cat” / *biloiki* “cats” vs. *soreŋ* “stone / stones.”

We can describe the cross-linguistic distribution of plural markings across classes of pronouns and nouns with a ranking, called the *animacy hierarchy*, given in (23):

- (23) 1st/2nd person pronouns < 3rd person pronouns < human nouns < animate nouns < inanimate nouns.

The hierarchy is a succinct way to capture a chain of implicational universals: if inanimate nouns have a plural marking, then animate nouns do also; if animate nouns have a plural marking, so do human nouns; and so on. Another way of describing the generalization expressed by the hierarchy is that if any class of words has a plural, then all the classes to the left (or higher) on the hierarchy have a plural (conversely, if any class of words lacks a plural, then all classes to the right or lower on the hierarchy lack a plural).

The animacy hierarchy is manifested in many different parts of the grammar of languages. Agreement of the verb with a subject is often restricted to the upper portion of the animacy hierarchy, again, with different cutoff points in different languages. Direct objects in the upper portion of the animacy hierarchy often have a special object case inflection. Most striking of all, in a number of languages, if the object is higher on the animacy hierarchy than the subject, a special verbal inflectional form is used, the *inverse* form, in contrast to the *direct* form found when the (more common) opposite state of affairs holds. In many languages (including K’iche’ for example), the passive voice cannot be used if the passive subject is lower in animacy than the agent; that is, in such languages a sentence equivalent to “The student was flunked by me” is ungrammatical.

Relatively recently, an explanation has been offered by typologists for what underlies grammatical hierarchies and related patterns. These patterns are defined over a *conceptual space*. The conceptual space describes a network of relationships among conceptual categories which is postulated to exist in the human mind and which constrains how conceptual categories are expressed in grammar. A hierarchy like the animacy hierarchy represents a simple one-dimensional conceptual space as shown in figure 14.1.

1st/2nd person – 3rd person – human noun – animate noun
– inanimate noun

Figure 14.1 One-dimensional conceptual space for animacy.

The conceptual space constrains possible grammatical groupings of words referring to various entities. Languages can group together only the conceptual categories that are linked by lines in figure 14.1. For example, the possible mappings of a plural inflection onto noun and pronoun categories are limited to the types illustrated in figure 14.2:

Guaraní:	1st/2nd prn – 3rd prn – human N – animate N – inanimate N
Mandarin:	1st/2nd prn – 3rd prn – human N – animate N – inanimate N
Tiwi:	1st/2nd prn – 3rd prn – human N – animate N – inanimate N
Kharia:	1st/2nd prn – 3rd prn – human N – animate N – inanimate N
English:	1st/2nd prn – 3rd prn – human N – animate N – inanimate N

Figure 14.2 Map of plural inflection in various languages

In contrast, one does not find languages with a plural being used for classes of entities not linked together. For example, one does not find languages with a plural being used with 3rd person pronouns and animate nouns but not with human nouns.

The conceptual space model also make predictions about grammatical change: grammatical change must follow the links in conceptual space. For instance, a plural marking spreads from left to right in the animacy space (or retreats from right to left). Evidence from historical linguistics can be used to confirm the predictions of the conceptual space model. Sometimes the evidence is available in contemporary linguistic variation. For example, the plural in Mandarin Chinese, normally found only with pronouns, sometimes can be used for nouns referring to humans, indicating that it is spreading down the animacy hierarchy. Conceptual spaces are powerful explanatory tools for language universals: they specify what grammatical category groupings are found in, and how constructions spread (or retreat) over time in their application to grammatical categories.

Another important grammatical hierarchy is the *grammatical relations hierarchy*, given in 24 (“oblique” includes various relations indicated by prepositional phrases in English):

(24) subject < direct object < oblique

If we compare absence vs. presence of *case marking* on nouns for the grammatical relations hierarchy, we find that absence of case marking occurs at the higher end of the hierarchy, and presence thereof at the lower end of the hierarchy, with the cutoff point between absence and presence varying from one language to another (see table 14.4).

Table 14.4 Distribution of absence vs. presence of subject, object and oblique case marking

	<i>Subject</i>	<i>Object</i>	<i>Oblique (dative)</i>	
Latvian	<i>ruden-s</i>	<i>ruden-i</i>	<i>ruden-im</i>	“autumn”
Hungarian	<i>ember-Ø</i>	<i>ember-t</i>	<i>ember-nek</i>	“man”
Big Nambas	<i>Ø dui</i>	<i>Ø dui</i>	<i>a dui</i>	“person”

(Latvian: Indo-European, Latvia; Hungarian: Uralic, Hungary; Big Nambas: Austronesian, Big Nambas Island.)

Source: Croft 1990: 104

The grammatical relations hierarchy also defines the distribution of *verb agreement* across languages. Languages vary as to how many noun phrases the verb agrees with: some have no agreement, others agree with one noun phrase, while still others agree with two or even three noun phrases in the clause. Verb agreement is associated with the higher end of the grammatical relations hierarchy – the ability to trigger verb agreement indicates the greater behavioral potential of the grammatical relation. As with case marking, the cutoff point for the presence or absence of agreement varies across languages:

(25) *No agreement: Mandarin Chinese*

tā néng shuō zhōngguó -huà
 3SG can speak China -speech
 “He can speak Chinese.”

(26) *Agreement with subject only: Spanish*

Los soldado -s quebr **-aron** las ventana -s
 the soldier -PL break **-3PL.SBJ.PST** the window -PL
 “The soldiers broke the windows.”

(27) *Agreement with subject and direct object: Kanuri (Nilo-Saharan, Nigeria)*

nzú- rú **-ká** -nà
 2SG.OBJ- see -1SG.SBJ -PERF
 “I saw you.”

The grammatical relations hierarchy as we have described it here does not apply to all languages, of course. In section 1, we saw that some languages have a distinct case marking for transitive subject (A), the ergative, while the transitive object (P) and intransitive subject (S) are encoded in the same way, the absolutive. However, the same kind of cross-linguistic pattern can be found as with subjects and objects. That is, we can formulate an alternative hierarchy of grammatical relations, given in (28):

(28) absolutive < ergative < oblique

The alternative hierarchy in (28) makes the same predictions about case marking and verb agreement for the languages it applies to. Absence of case marking is associated with the upper end of this hierarchy (see table 14.5).

Table 14.5 Distribution of absence / presence of absolutive and ergative case marking

	<i>Absolutive (S + P)</i>	<i>Ergative (A)</i>	
Tongan	<i>'a he talavou</i>	<i>'e ha talavou</i>	"a young man"
Yup'ik	<i>nuna-Ø</i>	<i>nuna-m</i>	"land"
Tzutujil	<i>aachi-Ø</i>	<i>aachi-Ø</i>	"man"

(Tongan: Austronesian, Polynesia; Yup'ik: Eskimo-Aleut, Alaska; Tzutujil: Mayan, Guatemala.)
Source: Croft 1990: 105

And as with the ordinary grammatical relations hierarchy, the presence of verb agreement is associated with the upper end of the alternative grammatical relations hierarchy in the languages for which it is relevant (compare (29–31) with (25–7)):

(29) *No agreement: Tongan:*

ʻE ʻomi ʻe Sione ʻa e siaine kiate au
UNS bring ERG John ABS the banana to me
"John will bring me some bananas."

(30) *Agreement with absolutive only: Chechen-Ingush (North Caucasian, Chechnya):*

bier -Ø d- ielxa [CM agrees with "child"]
child -ABS CM- cries
"The child is crying."

a:z yz kiniška -Ø d- ieš [CM agrees with "book"]
1SG.ERG this book -ABS CM- read
"I'm reading this book."

(31) *Agreement with absolutive and ergative: K'iche':*

k- at- in- tzuku:j
PRES- 2SG.ABS- 1SG.ERG- look.for
"I look for you."

There is a single underlying explanation for this pattern: *token frequency*. The subject category occurs more frequently than the object category: subjects are

found with both transitive and intransitive verbs, while objects are found with transitive verbs only. Hence the subject category is typologically less marked than the object category. The absolutive category occurs more frequently than the ergative category – for the same reason. Hence the absolutive category is less marked than the ergative category.

The two grammatical relations hierarchies illustrate an important point about typological universals. Typological universals do not presuppose the existence of any particular grammatical categories in all languages. Given a set of categories in a language, one can form generalizations about the expression of meaning in grammatical form based on the principles described in section 3.1.

The grammatical relations hierarchy, like the animacy hierarchy, is found in other parts of grammar as well. For example, one can classify relative clauses based on the grammatical relation of the head noun to the verb in the relative clause: *the book that fell* [S], *the man that stole my book* [A], *the book that I lost* [P]. Some languages form relative clauses for P (object) differently from A and S (subject), while other languages form relative clauses for A (ergative) differently from P and S (absolutive). For the former set of languages, subject is higher on the hierarchy than object, and for the latter set of languages, absolutive is higher on the hierarchy than ergative. The grammatical relations hierarchy also constrains the types of purpose clauses, such as *I went to town to buy a sofa* and coordinate sentences, such as *I went to town and bought a sofa*, found in the world's languages (Kazenin 1994; lack of space prevents us from describing these patterns here). These facts demonstrate that the two grammatical relations hierarchies in fact reflect a deeper cross-linguistic universal pattern, found in many different parts of the grammar of languages.

What is universal, in fact, is the conceptual space underlying the two alternative hierarchies of grammatical relations. In the case of grammatical relations, the conceptual space is a bit more complex than for animacy. The relevant part for the examples given above consists of S, A, and P, each of which represents a cluster of semantic roles played by participants in events. (Similar systematic patterns of cross-linguistic variation are found with objects; the direct / indirect object distinction is no more universal than the subject / object distinction.) The conceptual space is given in figure 14.3.

Languages can group together grammatical relations linked by lines in the diagram. Hence S can be paired either with A (subject) or P (absolutive); the odd one out is the object (P) or ergative (A) respectively. Languages can use a single form (usually absence of case marking or agreement) to group all three together, or have distinct forms for all three; all these possibilities are attested (see figure 14.4).

The conceptual space in figure 14.3 however predicts that no language forms a grammatical category including A and P, with a distinct grammatical category consisting solely of S; this last type is extremely rare, if it exists at all (Comrie 1978).

Typological analysis has revealed complex and subtle patterns of grammatical variation across languages, and those patterns in turn allow typologists to

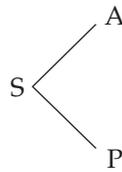


Figure 14.3 Conceptual space for semantic roles

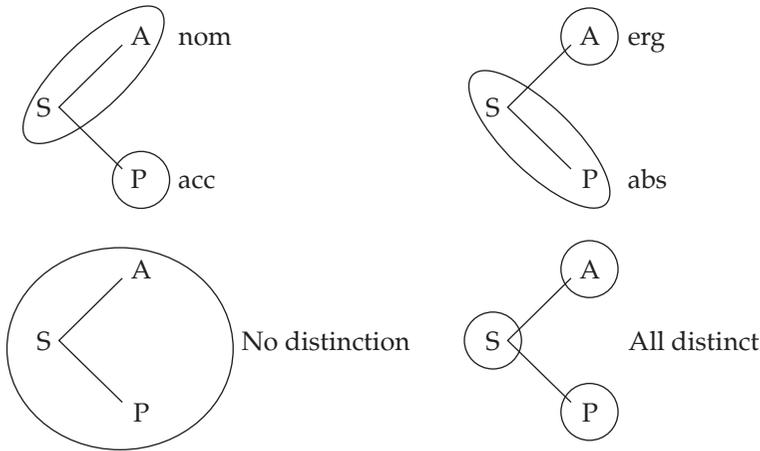


Figure 14.4 Map of attested systems of grammatical relations

construct hypotheses about the structure of conceptual space. Conceptual space is presumably a property of the human mind, and thus typology offers an important tool to uncover the structure of the mind.

3.3 Economy and iconicity

In section 3.1, we described typological markedness, which restricted the possibilities of presence vs. absence of grammatical expression of a conceptual category in languages. We introduced the concept of economic motivation: the more frequently used category is more likely to be reduced in expression or left unexpressed. However, one must still explain why languages such as Zulu, which express both singular and plural with inflections, and Mandarin Chinese, which express neither category, are also found. The Mandarin type demonstrates that some grammatical categories are simply not universal. The Zulu case demonstrates that another motivation is involved in the expression of meaning in form: *iconicity*. Iconic motivation is the preference for the structure of language to reflect the structure of concepts. In the Zulu example, each

conceptual category, both singular and plural, are overtly encoded in the word form. In this section, we will discuss the ramifications of economic and iconic motivation more widely in the grammars of human languages.

We begin with a subtype of iconicity called *isomorphism*: the correspondence between forms and meanings in a language. There are two ways in which isomorphism between meaning and form occur in human languages. The first way is in the correspondence of forms and meanings found in the combination of words and inflections in a sentence. This sort of isomorphism is called *syntagmatic isomorphism*. Typological markedness is an example of syntagmatic isomorphism. We can illustrate syntagmatic isomorphism by observing the form–meaning correspondence in the English sentence *This car runs* in figure 14.5.

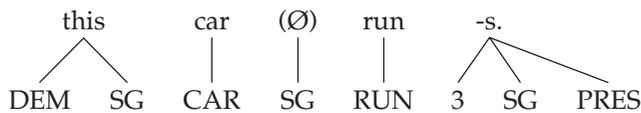


Figure 14.5 Form–meaning correspondence in “This car runs”

Economic and iconic motivation compete to produce the range of attested and unattested (or rare) correspondences between form and meaning. There are three predicted patterns (see table 14.2). Overt expression of each meaning by a single form, as with *car* and *run*, is iconically motivated: there is a one-to-one correspondence between meanings and forms. However, it is only moderately economically motivated: it is more economical than expressing a meaning with more than one word or morpheme, but less economical than not expressing the meaning at all. Non-expression of a particular meaning, such as the singular of English nouns like *car-Ø* (vs. plural *book-s*), is economically motivated but not iconically motivated: zero expression breaks the neat one-to-one correspondence between forms and meanings. The third possible option, zero marking of both singular and plural, corresponds to the absence of expression of the category, e.g. absence of the expression of number in Mandarin Chinese nouns. This option is economically motivated: either the meaning can be inferred from context, or it is not relevant to the communication.

There is another economically motivated pattern of expressing meaning in form that is commonly found in the world’s languages, in particular in European languages: the combination or *fusion* of discrete meanings in a single form. For example, the suffix *-s* in English *run-s* indicates 3rd person subject, singular subject and present tense, all in a single suffix. In other languages, inflectional categories (when expressed) are found in separate suffixes, as in Turkish (Altaic, Turkey) *gel-e-sin-iz* (come-subjunctive-2nd-plural) “you may come.” Another case of combination of meanings is found in *suppletion*, that is, the expression of root meaning and inflectional category in a single form: English *this* combines proximal (near speaker) demonstrative meaning and singular number (cf. *these*), in contrast to most English nouns which express (plural) number

in a separate suffix. The Turkish forms are iconic, but not very economic. The English fused *-s* and suppletive *this* do not express a combination of meanings iconically, but they are economically motivated, packing multiple meanings in one form, either word or affix. As with zero expression, fusion and suppletion are found in the more frequent words or inflectional categories of languages, which suggests they all have the processing explanation given in section 3.1: more frequently occurring meanings are grammatically expressed in a more compact fashion.

The real test for an explanation based on competing motivations such as iconicity and economy is the rarity or absence of patterns that are not accounted for by either motivation. For example, a form that had no meaning associated with it would be neither iconic – it doesn't express any conceptual category – nor economic – it is superfluous. The same is true of a meaning expressed through two or more forms. Such forms, called *empty morphemes*, are in fact extremely rare, and when they occur, they are historically unstable. The most common example is double marking of category, with the loss of the second form. In the historical development of French, the negative was originally indicated by a particle *ne* before the verb: *jeo ne di* "I do not say." Later, *ne* was reinforced by particles after the verb. The particles used dwindled to one, *pas*, which lost its emphatic meaning, so that in Modern standard French, negation is expressed with two fixed forms, *ne* and *pas*: *Il ne parle pas* "he isn't speaking." In colloquial French, *ne* is analyzed as meaningless and dropped: *il parle pas*. An alternative fate for empty morphemes is fusion onto the root. In French, *de l'eau* means "water": *de* indicates a partitive meaning (the water is a subpart of the general mass of water) and *l'* indicates definiteness. In Haitian Creole, derived from French, partitive and definiteness are not part of the grammar any more; but instead of dropping *de* and *l'*, Haitian Creole speakers reanalyzed them as part of the word root: *dlo* "water."

The full range of logical possibilities for expressing meaning in form in syntagmatic isomorphism, and how they are (or aren't) motivated, is given in table 14.6.

Table 14.6 Possible form-meaning correspondences in syntagmatic isomorphism

<i>Form(s)</i>	<i>Meaning(s)</i>	<i>Iconic</i>	<i>Economic</i>	
1	1	Yes	No	Classic iconic structure
0	1	No	Yes	Zero expression of category
0	0	No	Yes	Absence of category
1	>1	No	Yes	Fusion / suppletion (inflectional / lexical)
1	0	No	No	Empty morphemes

The second type of isomorphism is the correspondence between form and meaning in the inventory of words stored in the mind; this is called *paradigmatic isomorphism*. Again, the possible means of expression of meanings in words are limited by economy and iconicity.

Here we will begin with the unmotivated possibility: the existence of more than one word with the same meaning, that is, *synonymy*. It is not iconically motivated – there isn't a one-to-one match between the inventory of words and the inventory of meanings – nor is it economically motivated – the synonymy is superfluous for communication. And in fact true synonyms are extremely rare, if they exist at all: there is almost always some subtle difference in denotation, connotation, stylistic register, dialect, etc. that distinguishes two words (see Cruse, chapter 10, this volume).

A one-to-one match between a word and a meaning is called *monosemy*. It is iconically motivated but not that economically motivated: we would need very many words to express each discrete meaning. Monosemy is probably most clearly found in specialized vocabulary dealing with technical topics. *Homonymy*, the grouping of several unrelated meanings under a single form, represents the converse pattern of motivation to monosemy. Homonymy is economically motivated (there is only one word with several meanings, such as English *bank* “financial institution; edge of a river” or *flour* / *flower*, pronounced the same), but it is not iconically motivated (many unrelated meanings are expressed by a single form). Homonymy is also common, especially among frequent word forms, as would be predicted.

By far the most common state of affairs in languages, however, is *polysemy*: the grouping of related meanings under a single form. For instance, in the K'iche' sentence in section 1, there are several examples of polysemy: *q'iiij* means “day” and “sun,” *chii* means “mouth” and “edge,” and *wach* means “face” and “(sun) light,” among other things. Polysemy is both economically and iconically motivated. It is economically motivated because it subsumes several meanings under a single form, as with homonymy. It is iconically motivated, unlike homonymy, because the meanings are related. The set of related meanings correspond to a contiguous region in conceptual space. The actual iconic correspondence between meaning and form is between a single form and a single region in conceptual space. Monosemy represents a correspondence between a form and a small region (a “point”) in conceptual space. Polysemy represents a correspondence between a form and a larger region in conceptual space; the larger the region, the fewer total words necessary to cover the conceptual space, and the more economically motivated the form–meaning correspondence. The possibilities are summarized in table 14.7.

A higher degree of polysemy (i.e., a larger region in conceptual space) is found in more frequently occurring elements, in particular those expressing grammatical meanings and the most common lexical meanings; while monosemy is more likely to be found in less frequent, specialized vocabulary. Again, the economically motivated patterns (polysemy and homonymy) are found in higher-frequency forms.

Table 14.7 Possible form–meaning correspondences in paradigmatic isomorphism

<i>Form(s)</i>	<i>Meaning(s)</i>	<i>Iconic</i>	<i>Economic</i>	
>1	1	No	No	Synonymy
1	1	Yes	No	Monosemy
1	>1 (unrelated)	No	Yes	Homonymy
1	>1 (related)	Yes	Yes	Polysemy

Economy and iconicity play an important role in limiting cross-linguistic variation in the expression of individual meanings by individual forms. This is only the coarsest description of grammatical structure though. In the analysis of the grammatical structure of sentences, there is much more than just the division of the whole sentence into its parts (and the corresponding division of the meaning of the whole into its component meaningful parts). Words in sentences are organized hierarchically into phrases which themselves are put together into larger phrases and ultimately the sentence (see the chapter on syntax in this volume). Examination of the structure of phrases and sentences across languages indicates that these hierarchical structures are iconically motivated. The general principle can be formulated as the implicational universal in (32):

- (32) If a language has two near-synonymous constructions which differ structurally in linguistic distance, they will differ semantically in conceptual distance in parallel fashion (Croft 1990: 175, adapted from Haiman 1983, 1985).

Linguistic distance represents how tightly two forms are combined in a phrase, illustrated in (33) by grammatical constructions of increasing linguistic distance:

- (33) a. book-s (X + Y)
 b. red book (X # Y)
 c. John-'s book (X + A # Y)
 d. book of proverbs (X # A # Y)

The formulas next to the examples are abstract representations of linguistic distance. X and Y are the elements whose linguistic distance is being measured. Affixation (+) is linguistically closer than separate words (#) (cf. (33a–b)); and the presence of an additional affix or particle (A) grammatically linking X and Y indicates greater linguistic distance between X and Y than its absence (cf. (33c–d) vs. (33a–b)).

Conceptual distance is best illustrated by an example. The semantic relation of possession can be divided into two types. One type is called inalienable possession, roughly, those entities which are obligatorily possessed, such as one's hands or one's daughter. (Of course, a hand can be cut off from a person, and a daughter's parents may die before her, but the body part or person always originates as possessed by the person in question.) The other type is alienable possession, roughly, those entities which are not obligatorily possessed, such as artefacts and other physical possessions. Conceptually, inalienable possession represents a more intimate conceptual relationship between possessor and possessed than alienable possession does. Thus, there is less conceptual distance between possessor and possessed in inalienable possession than in alienable possession.

Many languages have two different syntactic constructions for possession, one for inalienable possession and the other for alienable possession. According to the implicational universal in (32), if a language distinguishes the two types of possession, using constructions of different syntactic structure, the linguistically closer construction is used for inalienable possession. This is indeed the case, as illustrated in table 14.8 (order of possessor and possessed does not matter here).

Table 14.8 Linguistic distance among expressions of possession

<i>Language</i>	<i>Alienable possession</i>	<i>Inalienable possession</i>
Mekeo (Austronesian)	eʔu ngaanga my canoe X # Y	aki-u brother-my X + Y
Warrgamay (Australian)	ŋulmburu-ŋu mindi woman-GEN dilly-bag X + A # Y	ŋulmburu bingany woman foot X # Y
Kpelle (Niger-Kordofanian)	ŋá pérei my house X # Y	m̄-pôlu my-back X + Y
	ʔkâloŋ ŋè pérei chief POSS house X # A # Y	ʔkâloŋ pôlu chief back X # Y

Source: Based on Croft 1990: 175

The Kpelle example is particularly interesting. One construction, the X # Y construction, is used for both alienable pronominal possession ("my house") and inalienable nominal possession ("the chief's back"). But what matters is the relative linguistic distance of the appropriate contrasting constructions:

“my back” uses a linguistically closer construction than “my house,” while “the chief’s house” uses a linguistically more distant construction than “the chief’s back.”

Linguistic distance has been shown to limit significantly the range of cross-linguistic variation found in a wide range of grammatical constructions, including possession, causative constructions (Haiman 1983), the different types of finite and nonfinite complements found with different verbs (Givón 1980), and the relative order of inflectional prefixes and suffixes on verbs (Bybee 1985). For example, the English sentence *He felled the tree* describes a more direct causal relation between agent and patient than *He made the tree fall*. The former sentence combines both “cause” and “fall” in a single word *fell*, while the latter sentence expresses “cause” and “fall” as separate words – greater linguistic distance corresponding to greater conceptual distance between agent and patient.

It has been suggested that iconic motivation accounts for the general grouping of words into phrases (*constituents*). For instance, the syntactic constituents in the following English sentence, indicated in brackets, belong together conceptually as well as linguistically:

(34) [[A tall young man [with [a red beret]]] [came in]].

The adjective *red* describes the beret not the man, the adjectives *tall* and *young* describe the man not the beret, and the particle *in* describes the direction of motion of the action of coming, not a property of the man or the beret; and these facts are reflected in the syntactic positioning and grouping of these modifiers in the sentence.

This hypothesis, which has often been put forward (it is called Behaghel’s law, after an early twentieth-century German linguist), has not been systematically investigated across languages. Supporting evidence for the hypothesis would be the existence of (constrained) variation where there are competing conceptual motivations for the grouping of words. One example is the expression of direction as in *Minnie walked into the room*. The directional word *into* is semantically associated with both the action (it indicates the direction of action) and the location (the room, since it acts as the reference point for the description of the path of movement). In fact, cross-linguistically there is variation as to whether the directional word (DIR) is associated with the verb (V) or the locational noun phrase (NP; Croft 1990: 182–3). The examples below are listed from closest association to the location NP to closest association with the verb:

(35) *Hungarian (Uralic, Hungary)*

Szabó úr kiszáll a vonat -ból
 Szabo Mr. get.out the train -out.of
 V [NP + DIR]
 “Szabo got out of the train.”

(36) *English:*

“Minnie walked into the room.”
 V [DIR # NP]

(37) *Mandarin Chinese:*

wǒ bǎ tā tuī dǎo zài shāfa shang
 I OBJ her / him push down at sofa on
 [V # DIR] NP
 “I pushed her / him down onto the sofa.”

(38) *Kinyarwanda (Niger-Kordofanian, Rwanda):*

umugóre yooherejé -ho isóko umubooyi
 woman she.sent -to market cook
 [V + DIR] NP
 “The woman sent the cook to the market.”

Economic and iconic motivation appear to be pervasive in determining many aspects of the expression of meanings and combinations of meanings in words and sentences. As in other areas of grammar, the universals defined by economic and iconic motivation constrain cross-linguistic variation without eliminating it. The existing variation is due to the competition between economy and iconicity, and between different iconically motivated pressures for the grouping and association of words in sentences.

4 The Dynamic Approach to Language Universals

English, Irish, and Hindi illustrate the most common word orders of sentences found in the world’s languages – SVO, VSO, and SOV:

(39) *English:*

Hannah doesn’t speak English.
 S V O

(40) *Irish (Indo-European, Ireland):*

labhrann Mícheál gaeilge le Cáit go minic
 speaks Mícheál Irish to Cáit often
 V S O
 “Mícheál often speaks Irish to Cáit.”

(41) *Hindi (Indo-European, India):*

Raaman hindii boltaa hai
 Raman Hindi speak AUX
 S O V
 "Raman speaks Hindi."

However, all three languages belong to a single family, Indo-European. Hence, they are all descended from a single ancestral language (see Joseph, this volume). Yet the daughter languages all have different word orders. This simple fact implies that languages can change word order type. Thus, we may explore language change from a typological perspective: what are the range of possible language changes? How and why do languages change type?

In fact, *diachronic typology* – the typological study of language change – can explain many aspects of *synchronic typology* – the typological study of current language states. Current language states are the current stages in processes of language change. An explanation of the current language state will often refer to the forces that led to its establishment and its maintenance. Indeed we have already given a dynamic spin on the typological analyses presented above: competing motivations cause languages to change type, and language change follows the paths and topography of conceptual space. Of course, the establishment and maintenance of a grammatical feature of a language is a social phenomenon to a great extent: the innovation of a grammatical feature in language use is driven by the needs of communicative interaction, its propagation through the speech community by the prestige and social identification of its users, and its persistence in that community by conformity to social convention. But independent of these social factors are certain inherent properties of grammatical patterns that lend themselves to a higher likelihood of being innovated in the first place and a higher likelihood of resisting replacement. And these properties are revealed in the cross-linguistic distribution of the grammatical patterns.

For example, the verb-initial order of Irish is not very common in the world's languages; but where it is found, it tends to be found in most members of the language family (for example, most Celtic languages are verb-initial). This cross-linguistic distribution suggests that verb-initial order is *infrequent* – it arises rarely – but is fairly *stable* – it has survived into the daughter languages of Celtic and other language families. The word orders SVO and SOV are on the other hand very frequent and also stable: they occur everywhere in the world, and tend to conform to genetic groupings. There are also examples of grammatical features which arise quite frequently but are not very stable (definite articles), and features that are extremely rare and also unstable (object-initial word orders such as OVS). Cross-linguistic distribution alone, measured with a good proportional sample, tells us quite a bit about the dynamic aspects of grammatical features of languages.

Three working assumptions are made in the study of the typology of language change. First, the ancestral languages from which our contemporary

languages are descended are assumed to conform to the typological generalizations of contemporary languages: we do not expect ancestral languages to be radically different from all contemporary ones. Historical records of ancient languages such as Sanskrit, Ancient Egyptian, Sumerian, and Ancient Chinese support this *uniformitarian* hypothesis. Second, it is assumed that any language type can change into any other language type, albeit via intermediate stages in many cases; this assumption is called *connectivity*. The fact that single language families have a wide range of grammatical variation among their daughter languages implies that all language types can be connected by processes of change. Finally, it is assumed that all language change is *gradual* in one way or another. This last hypothesis is supported by the wide range of variation found in individual languages, which demonstrates the presence of a language change in progress, and by direct historical evidence in the languages where we have it.

One can use these working assumptions to take a synchronic typological analysis and convert it into a hypothesis about universals of language change that can be tested where historical data exist or where the history of a language can be reliably reconstructed. For example, it is well known that the word order of a genitive modifier and noun is closely related to the word order of an adposition (preposition or postposition) and noun. If a language has prepositions, then it has noun-genitive order, as in Indonesian (Austronesian, Indonesia): *dari kota* [to city] “to the city” and *rumah Tomo* [house Tomo] “Tomo’s house.” If a language has postpositions, then it has genitive-noun order, as in Amele (Papuan, Papua New Guinea): *Jelso dec* [Yelso from] “from Yelso” and *dana caub caja* [man white woman] “white man’s woman.”

There are exceptions to this generalization. English is arguably one of those exceptions: it has prepositions (*to the park*), but in addition to the noun-genitive construction found in *the back of the chair*, it also has the genitive-noun construction *Nina’s car*. However, it turns out that the exceptional languages all have adjective-noun order that is harmonic with the genitive-noun order – English has adjective-noun order (*black book*) in harmony with the anomalous genitive noun order in *Nina’s car*.

One can refine the cross-linguistic generalization to include adjective-noun order in the pattern: “If a language has prepositions, then if it has genitive-noun order, it will also have adjective-noun order.” More interestingly, one can then dynamicize this relationship and hypothesize that adjective-noun order will change first, then genitive-noun order, and finally adposition order. To do so we determine which language types are permitted by the implicational universal, and then connect them so that only one word order changes at a time:

- 1 NA & NG & Prep
- 2 AN & NG & Prep
- 3 AN & GN & Prep
- 4 AN & GN & Postp

This hypothetical universal of the sequence of word order changes in language presupposes the working assumptions given above. Uniformitarianism means one should not assume that ancestral languages belong to an unattested type. Connectivity means that one can connect the possible language types in a single network of changes. Gradualness means that one need only connect language types where only one word order changes at a time.

As a matter of fact, this sequence of changes has been discovered in Ethiopian Semitic, a subfamily of Semitic whose speakers migrated to Ethiopia from Arabia many centuries ago and who left written records of earlier stages of their languages (Greenberg 1980). The classical religious language Ge'ez has NA, NG, and Prep orders, although there are some instances of AN and a special genitive construction with a prefix on the genitive occurs in either NG or GN order. The next phase is found in modern Tigre, where AN and NA order are approximately equal in status. In Tigrinya, NA order is disappearing. In fourteenth-century Amharic, AN order is the only one found, and the old genitive construction with NG order only is lost. Also, postpositions are found in combination with prepositions, the latter sometimes reduced to a general particle *?ə* or nothing at all. In modern Amharic, the newer genitive construction occurs in only GN order. Old Harari is essentially like modern Amharic, but modern Harari has only postpositions. A similar process took place in the Iranian language family.

The evolution of Ethiopian Semitic and Iranian not only confirms the dynamic interpretation of the word order universal. It also shows that there is a seamless connection between variation within a language and variation across languages. Most of the Ethiopian Semitic languages do not display a uniform word order for adjectives, genitives, and adpositions. Thus, technically, none of them belong to the types 1–4, and none totally conform to the word order universal. But the reason for this apparent problem with the word order universal is that languages are always in the middle of changes over time, and the contemporary grammar is often caught in the middle of the process. The process, however, is the true universal generalization: adjectives shift order first, then genitives, then adpositions. In this way, diachronic typology shifts the center of gravity away from language states and towards processes of language change, in explaining those very language states. Indeed, it may be that the languages which provide nagging exceptions to typological universals are merely unstable intermediate stages in universal processes of language change.

The example of Ethiopian Semitic describes only the demise of prepositions. It is hypothesized that the reverse process takes place as well: a language of type 4 in the table will change first its adjective order, then its genitive order, and finally its preposition order to return to type 1:

- 5 NA & GN & **Postp**
- 6 NA & NG & **Postp**
- 1 NA & NG & Prep

Each change is *unidirectional*, and the overall pattern constitutes a *cycle* of changes that returns to the original state. In this way, any language type can change to any other language type, gradually, even though language change is unidirectional. Unidirectionality is the final working hypothesis of diachronic typology. It is hypothesized that even when it appears that language type A changes to type B and vice versa, closer examination of the intermediate stages in the two processes ($A > B$ and $B > A$) will demonstrate that there is in fact a cyclic pattern of unidirectional changes.

The most widespread (and best studied) set of unidirectional, cyclic changes found in languages are found in *grammaticalization*. Grammaticalization is the process by which grammar is created: grammar arises through the exploitation of ordinary words in constructions for grammatical expression. A simple English example is the use of the phrase *going to* for future tense. *Go to* originally referred to spatial motion towards a destination (and still does): *I'm going to the store*. It then came to be used to indicate motion to carry out a future action: *I'm going to buy a pizza*. Finally, it is now used to indicate a future action that does not necessarily involve motion: *I'm going to finish this letter by lunchtime*. In the process, the actual form of the verb plus *to* has been reduced and modified to *gonna*.

This process illustrates grammaticalization in a nutshell. Grammaticalization involves three synchronized processes of change: *phonological*, *grammatical*, and *functional*. In this example, the form of *go to* is reduced to *gonna* (phonological change); it is also reduced in status, from a main verb to a sort of auxiliary (grammatical change); and its meaning shifts from lexical content – motion towards – to a “grammatical” meaning – future tense (functional change). Moreover, the change of a verb of motion to a future tense marker is found in language after language; in one recent cross-linguistic survey, 20 out of 44 examples of future inflections are derived from “come” or “go” (Bybee et al. 1994). Hence, this change is a universal of language change, not just a quirk of the history of English.

The changes in linguistic form in grammaticalization – phonological and grammatical – represent a cycle (see Keller 1994, Lüdtke 1985). A new, periphrastic means to express a function such as future tense is chosen by speakers, possibly to express the concept more clearly or more precisely. The new means becomes conventionalized in its function and it becomes a fixed complex unit of expression. This unit is then ultimately reduced to a single unanalyzable form (*gonna* in the example). Ultimately, it may become affixed to the verb and disappear; but often by this time, the cycle is started again with a new construction. (After all, English *gonna* has not yet replaced the older future auxiliary *will*.)

The shift from lexical meaning to “grammatical” meaning is unidirectional, and represents a path in the relevant region of conceptual space (cf. section 3.2). The relevant part of conceptual space for the motion-to-future path of grammaticalization is shown in figure 14.6.

motion to a location – motion to a location then [future] action –
future action only

Figure 14.6 Conceptual space for grammaticalization path from motion to future action

A variety of explanations have been offered as to why forms spread in only one direction in grammaticalization. One hypothesis is that “grammatical” meanings are those that structure our conceptualization of the experience being expressed, so grammaticalization represents the shift from a word denoting the content of experience to a grammatical inflection structuring our experience. Another hypothesis is that “grammatical” meanings express the more situational or interactional aspects of the experience being expressed, so grammaticalization shifts words from a more “objective” to a more “subjective” meaning. Whatever the explanation, it is clear that most grammatical constructions arise from periphrastic expressions with ordinary words, and there are only a limited number of paths of grammaticalization for each grammatical category that are used by languages. An understanding of grammaticalization is a prerequisite for understanding the nature of grammar.

5 Conclusions

Typology, the exploration of the diversity of languages and the limits on that diversity, reveals new and important aspects of the nature of grammar and meaning. In order to compare the grammars of diverse languages, typologists have used equivalent functions to investigate variation in how meaning is expressed across languages. Typologists have also developed descriptions of grammatical form that can abstract away from the myriad language-specific categories and constructions, such as presence vs. absence of encoding of concepts, the presence vs. absence of cross-cutting distinctions, the mapping of meaning components into morphemes, and linguistic distance. The exploration of how grammatical form expresses communicated meaning across languages has led to the discovery of conceptual spaces which reflect commonalities in the structure of the human mind. The variation across languages reflects competing means of expressing form and competing forces in the production and comprehension of utterances. The grammar of a language at any given moment is a system balancing competing motivations as to how best to express communicative function in linguistic form. The balance is constantly shifting, giving rise to language changes, the most important of which are those processes that constantly renew the grammar of languages by the grammaticalization of new constructions.

APPENDIX 14 ABBREVIATIONS FOUND IN EXAMPLES

1, 2, 3: first person (I, we), second person (you), third person (he, she, it, they)	IMPF: imperfective verbal aspect
ABS: absolutive, a case marking used to indicate intransitive subjects (S) or transitive objects (P)	NOM: nominative, a case marking used to indicate transitive subjects (A) and intransitive subjects (S)
ACC: accusative, a case marking used to indicate transitive objects only (P)	NONFUT: nonfuture tense
AOR: aorist tense inflection	OBJ: object (P)
AUX: auxiliary verb	PERF: perfective verbal aspect
CM: noun class agreement marker	PL: plural
ERG: ergative, a case marking used to indicate transitive subjects (A)	PRES: present tense
GEN, POSS: genitive / possessive marker	SBJ: subject (A + S)
	SG: singular
	UNS: unspecified verbal tense-aspect-mood