# 2

# LANGUAGE TYPOLOGY

## 2.1 TYPOLOGY AND UNIVERSALS

At first sight, the study of language universals and the study of language typology might seem to be opposites, even in conflict with one another: language universals research is concerned with finding those properties that are common to all human languages, whereas in order to typologize languages, i.e. to assign them to different types, it is necessary that there should be differences among languages. The contrast can thus be summed up as one between the study of similarities across languages and the study of differences among languages. Yet, in practice, the two studies proceed in parallel: typically, linguists who are interested in language universals from the viewpoint of work on a wide range of languages are also interested in language typology, and it is very often difficult to classify a given piece of work in this area as being specifically on language universals as opposed to language typology or vice versa: book and article titles including *typology* or *universals* often seem arbitrary, though the arbitrariness is sometimes removed, as in the title of the present book, by including both.

The discussion of the preceding chapter should, however, point the way towards recognizing that there is in fact no such conflict between universals research and typological research, rather these are just different facets of a single research endeavour. In the present section, we shall demonstrate this more thoroughly. In chapter 1, we argued that a theory of language universals must make a three-way division among logically possible properties of a human language. It must specify which properties are necessary to a human language; which properties are impossible for a human language; and, residually, which properties are contingently possible, but not necessary, for a human language. (The rigid division into three classes would, of course, have to be weakened slightly to take into account tendencies as well as absolute universals.) We can thus say that, over all, the study of language universals





aims to establish limits on variation within human language. Typology is concerned directly with the study of this variation, and this makes it clearer why the two studies run so close together, since both are concerned with variation across languages, the only difference being that language universals research is concerned primarily with limits on this variation, whereas typological research is concerned more directly with possible variation. However, neither conceptually nor methodologically is it possible to isolate the one study from the other.

In terms of methodology, this shows perhaps most clearly in the interaction between language typology and implicational universals, whether absolute or tendencies. In carrying out a typology of languages on some parameter, one establishes a certain number of logically possible types, and then assigns each language of the sample to one or other of these types. If all the logical possibilities have actual representatives, and there is no marked skewing of membership among the various types, then this result, though perhaps of typological interest, is not particularly interesting from the viewpoint of universals: it demonstrates that there are no restrictions on language variation with respect to the chosen parameter. Where, however, some of the logical possibilities are not represented, or are represented by a statistically significant low or high number of representatives, then the typological result does become of importance for the statement of language universals. We may illustrate this by returning to one of the examples discussed in chapter 1, namely Greenberg's universal that languages with VSO basic word order have prepositions. As discussed in section 1.2.2, there are four logical possibilities: VSO and prepositions; VSO without prepositions; non-VSO with prepositions; non-VSO without prepositions. When we assign languages to these four logically possible types, we find a large number of languages falling into the first, third, and fourth categories, but none falling into the second. Thus what originally started out as a typological endeavour, namely the cross-classification of languages in terms of basic word order (VSO versus non-VSO) and the presence versus absence of prepositions, turns out to lead to the establishment of a language universal.

Implicational universals are a particularly clear case of the interaction between universals and typology, given the interpretation of the universal as a set of four logical possibilities only three of which are actually represented. However, in principle any typological parameter may be of significance for language universals research if it turns out that some of the logical possibilities are unrepresented or have a statistically significant low level of representation. This can again be illustrated with one of Greenberg's universals, this time a word order tendency mentioned in section 1.2.3, namely that in basic word order the subject tends to precede the object. If we work, like Greenberg, in terms of the three clause constituents S, O, and V, then there

are six logical possibilities for arranging these linearly: (a) SOV, (b) SVO, (c) VSO, (d) VOS, (e) OVS, (f) OSV. Types (a)–(c) are all consistent with the universal just stated, and indeed the vast majority of the world's languages belong to one or other of these three types (at least to the extent that they have a basic word order – see further chapter 4). Type (d) has only a very small number of representatives, type (e) even fewer and more geographically restricted, while we are still awaiting a detailed description of any language with OSV basic word order, although preliminary indications suggest that some languages of the Amazon region do have OSV as their basic word order. Thus typologizing languages in terms of the six logically possible permutations of S, O, and V leads to the recognition of a universal tendency for subjects to precede objects in unmarked word order.

An even more straightforward example of typology leading to the establishment of a universal would be the universal mentioned in section 1.2.2 that all languages have vowels. If one were to typologize languages into those that have vowels and those that do not, then all languages would fall into the first class. Typologically, the result is, perhaps, trivial (all languages belong to one type), but in terms of universals it is a valid empirical generalization, once again illustrating the complementarity, rather than antagonism, between typology and universals.

There is another sense in which universals and typology go hand in hand. In order to do language typology, it is necessary to establish certain parameters along which one is going to typologize the languages of the world. Now, the selection of any parameter as a valid parameter for cross-language typological comparison assumes that this parameter is indeed valid in the analysis of any language. Thus carrying out any piece of language typology involves making certain assumptions about language universals. We can illustrate this once again by considering Greenberg's seminal work on word order universals, in particular basic order of S, V, and O within the clause. In order to typologize languages according to their basic word orders, the following presuppositions are made: (a) all languages have a basic word order; (b) in the syntactic structure of a clause in any language, the categories subject, object, and verb are relevant. Neither of these assumptions is logically necessary, and, as we will see in more detail in chapter 4, there is good reason for assuming that neither of them is in fact an absolute language universal. Thus, there seem to be some languages that do not have a basic word order, or at least not a basic word order defined in terms of S, O, and V (so-called free word order languages). There seem to be some languages where either there is no category subject, or where the various properties of subject are distributed across more than one noun phrase (see chapter 5), so that in either case it is not possible to point to a given noun phrase as being unequivocally the subject of a clause, and therefore not possible to determine the linear order of the subject relative to other constituents.



It is important to realize that the caveats expressed in the previous paragraph do not invalidate the kinds of word order universals that Greenberg talks about, although they do restrict somewhat their scope. All that is required is that we should establish further language types, say by making an initial typological dichotomy between languages that have a basic word order statable in terms of S, O, and V, and languages that do not; the first of these types will then divide into six logically possible subtypes, and we can proceed as before, except that our six types will now cover only a subset of the world's languages, i.e. the universal is of more restricted application. In fact, this kind of procedure is widespread in the study of typology or universals. If, for instance, one wants to study typological properties of tone languages, and perhaps come up with universals of tone, then the fact that many languages are non-tonal simply means that those languages are irrelevant to the project at hand, and this is not taken to invalidate the internal study and typologization of tone languages. Likewise, in studying the typology of case systems, or passive constructions, languages that lack case systems, or have no passive construction, are irrelevant to the endeavour at hand, rather than being counterexamples to it.

Implicit in the above discussion is another way in which typology and universals research interrelate, namely that the possibility of arriving at significant universals is very closely bound up with the typological parameters that one uses, implicitly or explicitly, in describing variation among the languages of the sample. A particularly clear example is provided here by the history of research into colour systems across the languages of the world. In very general terms, colour perception involves three parameters: hue (correlating with wave-length), brightness, and saturation, of which the first two are most important for present purposes. Traditional study of colour terms in different languages has emphasized the different physical ranges that are covered by individual colour terms in different languages, i.e. on the fact that different languages have a different number of colour terms and have different boundaries between adjacent colour terms. Thus in Hanunoo, a Philippine language, there are four basic colour terms: *(ma)lagtiʔ* covers English *white*, but also all other light tints, irrespective of the colour to which they would be assigned in English; likewise, *(ma)biru* covers *black*, but also dark tints of other colours; *(ma)rараʔ* covers approximately the range of English *red*, *orange*, and *maroon*; while *(ma)latuy* covers approximately the range of English *yellow*, and lighter tints of *green* and *brown*. As long as one looks at boundaries between adjacent colour terms on the colour chart, it seems that all one can say is that English and Hanunoo are radically different: Hanunoo has nothing corresponding to the boundary between English *yellow* and *green*, while conversely English has no clear boundary where Hanunoo discriminates between *(ma)biru* and *(ma)rараʔ*.

With hindsight, we can perhaps recognize that this was an undesirable way

to classify colour systems, given that even within a single language, say English, native speakers often disagree among one another, or with themselves on different occasions, as to the precise boundary lines between adjacent colours, although they are much more likely to agree on assigning colour names to colours that are more central to the range of a given colour term. Criticism of the traditional, cultural-relativistic view of colour terms came not, however, so much from aprioristic qualms of this kind, but rather from the typological research of Berlin and Kay on colour systems of a wide range of languages (over a hundred in the initial publication). Instead of asking about boundaries between different colour terms in a language, Berlin and Kay ask rather about the focus of a colour term, i.e. the colour that native speakers consider the most typical referent of that colour term. In the answers to this question, Berlin and Kay noticed a clear pattern emerging. First, even where colour term boundaries are very different across languages, there is agreement as to foci: thus the focus of Hanunoo *(ma)lagtiʔ* is the same as that for English *white*; the foci are the same for *(ma)biru* and *black*; the same for *(ma)rараʔ* and *red*; the same for *(ma)latuy* and *green*. Moreover, if one looks at the number and location of foci across a range of languages, a hierarchy, or series of implicational universals, emerges: all languages have foci for 'black' and 'white'; if a language has three basic colour terms, then the third has the focus of 'red'; if a language has five basic colour terms, then the foci of 'green' and 'yellow' are those added to this list (but if there are four terms, the fourth may be either 'green' or 'yellow', with no hierarchical preference among these two); six-term colour systems add 'blue'; seven-term systems add 'brown'. This is diagrammed below:

white / black > red > green / yellow > blue > brown

The above statement as a hierarchy is readily turned into a series of implicational universals, of the following form: if a language has a colour term with focus 'blue', then necessarily it has colour terms with foci 'white', 'black', 'red', 'green', 'yellow'. More generally: if a language has a colour term with focus $x$, then it also has a colour term for each focus to the left of $x$ in the diagram.

The main illustrative point in the above example is that, by slightly changing the questions asked, i.e. by changing the basis of typological comparison, it was possible to come up with a universal where previously it had been assumed that all one could do was typologize among all the logically possible types. In fact, Berlin and Kay's work also has more far-reaching implications for work on language universals and typology and even for descriptive linguistics, some of which will emerge in the



discussion of later chapters. For instance, there is evidence that the hierarchy of foci given above can be correlated with colour perception, thus providing one example of a psychological explanation of a linguistic universal (cf. section 1.3.2). Secondly, it indicates that some, at least, of human categorization is not in terms of sharp boundaries between adjacent concepts, as assumed in much work on semantic structure, but rather in terms of well-defined foci with hazy (fuzzy) boundaries, i.e. in terms of prototypes rather than in terms of necessary and sufficient conditions.

## 2.2 TYPOLOGICAL PARAMETERS

In principle, one could choose any linguistically relevant parameter along which to typologize languages. If one makes the distinction between language universals and language typology, then the range of relevant parameters is restricted somewhat, namely to those parameters along which languages do in fact vary. Thus, once it is established that all languages have vowels, the parameter presence versus absence of vowels is no longer of interest for the study of variation across languages, and this generalization passes exclusively into the domain of language universals.

However, it is clear that some typological parameters turn out to be more significant, more interesting than others. In section 2.1 we illustrated this with reference to colour terms: of the two typological parameters appealed to in that discussion, it turned out that classification of colour terms according to their boundaries provided little significant insight into cross-language variation, since the range of logical possibilities and the range of attested systems are more or less the same; whereas classifying colour systems according to the foci of colour terms turned out to be of immense importance in typologizing colour systems and in coming up with language universals, since given the universal implied by the hierarchy of foci, the task of typologizing can be simplified by and large to specifying the cut-off point on the hierarchy for each language in question. Another lesson of this particular example is that there is no a priori way of knowing which particular parameter or set of parameters will turn out to be significant for research into typology and universals, rather the selection of parameters advances hand in hand with typological study as a whole. As a result of typological studies to date, we do have some idea of what parameters are most likely to be significant, and several of these are illustrated and discussed in subsequent chapters. However, there are undoubtedly many significant parameters whose significance has not yet been recognized, so that the illustrations given in the present book can be no more than illustrations.

Perhaps the best way to illustrate what is meant by the difference between significant and insignificant typological parameters is by means of illustrations of some non-significant parameters, some particularly clear examples being provided by phonological systems. Thus, in principle one could typologize the languages of the world into two classes: those with a palatal nasal phoneme and those without; the first group would include such languages as French, Spanish, Hungarian, Malay, while the second would include such languages as English, German, Turkish, and Hawaiian. Likewise, in principle one could typologize languages into those that have front rounded vowel phonemes, such as French, Hungarian, German, and Turkish in the above list, versus those that do not, i.e. Spanish, Malay, English, and Hawaiian from this list. (Reference is to the standard language in each case.) However, having once carried out these classifications, there is then little further one can do with these typologies in terms of the over-all typological structure of the languages in question. If one attempted to correlate these two phonological features with one another then, with the given eight-language sample as illustrative material, we would find no correlations: there are four logically possible classes, and each is represented within the sample: French and Hungarian have both a palatal nasal and front rounded vowels; Spanish and Malay have a palatal nasal, but no front rounded vowels; German and Turkish have no palatal nasal, but do have front rounded vowels; while English and Hawaiian have neither a palatal nasal nor front rounded vowels. Not only do these two phonological parameters not correlate with one another, but equally they do not correlate with any non-phonological parameters, i.e. our choice of typological parameters turned out to be arbitrary, of no significance beyond the fact that we can divide languages up into classes on the basis of these parameters.

With these non-significant parameters we might contrast many of the word order parameters used by Greenberg in his study of word order universals, for instance the order of S, O, and V in the clause, the order of relative clauses with respect to their head noun, the order of adpositions relative to their noun (i.e. whether the language has prepositions before the noun or postpositions after it), etc. Although these parameters are all logically independent of one another, it turns out that there is a high degree of correlation among them, leading in some instances to the statement of absolute implicational univerals, as is discussed in greater detail in chapter 4. Thus, the fact that using these parameters enables us to come up with implicational statements of the type 'if VSO, then prepositional', or 'if SOV, then usually postpositional', implies that we have not just selected arbitrary parameters, but rather that our choice of parameters tells us something significant about the structure of the languages concerned, and



about cross-language typology in general. This also illustrates another way in which typology and universals research are intimately related: if we have a set of significant parameters whose values none the less show a high degree of correlation, then the network of relations among these parameter values can equally be expressed in the form of a network of implicational universals (absolute or tendencies).

Clearly, the more widespread the net of logically independent parameters that can be linked in this way, the more significant is the typological base being used. At the opposite extreme from non-significant, individual typological parameters like the presence versus absence of a palatal nasal phoneme, one might imagine a holistic typology, i.e. some set of typological parameters that are logically independent but in practice correlate so highly with one another that they enable us to typologize the whole, or at least a large part, of the structure of an arbitrary language. This is, for instance, what is done in biological classification, where typologizing an animal as a mammal subsumes a significant correlation among a number of logically independent criteria (e.g. viviparous, being covered with fur, having external ears, suckling its young). Over the history of linguistic typology, a number of attempts have been made to provide such holistic typologies of languages. One of these, morphological typology, with its classification of languages into isolating, agglutinating, fusional, sometimes with the addition of polysynthetic, will be discussed in section 2.3. More recently, on the basis of generalizations of Greenberg's work on word order typology, some linguists have suggested that word order types (such as VO versus OV) likewise define holistic types, a question to which we return in chapter 4.

The discussion in the relevant parts of the present book is rather critical of claims about holistic typologies, arguing that the empirical bases for the claims about holistic types are usually weak or lacking, so that while it is not logically impossible that there may be holistic types corresponding to mammal in biological classification, experience to date is rather against this possibility: while we can state often wide-ranging correlations among logically independent parameters, these correlations are not sufficiently strong or sufficiently wide-ranging to give holistic types rather than cross-classification of languages on different parameters.

However, it does sometimes remain the case that a given language makes much greater use of some property than does the average natural language, so that we can argue that use of this property, though not defining the holistic type of the language in question, does nonetheless permeate a significant part of its structure. Obvious examples would be the classification of a language as being a case language, or as being tonal. Tonal languages differ very much from one another on other parameters: some,

like Vietnamese, are isolating, each word consisting of just a single morpheme, while others, such as most Bantu languages, have complex morphologies, mainly of an agglutinating type; some tonal languages are verb-final, like Burmese, whereas others are SVO, like Vietnamese. But the fact that lexical and/or morphological distinctions can be carried by tone does represent an important general characteristic common to all such languages, and there are many properties common to the phonological processes that are found across tone languages but which have no immediate counterpart in non-tonal languages.

As a different example of the same kind of phenomenon, we might refer to the role of animacy in Yidiny. Many languages have structural reflections of degrees of animacy (e.g. the distinction between living and non-living entities, within the former between human and animals, and within animals between higher and lower animals), as will be discussed in more detail in chapter 9, but Yidiny happens to have a particularly large number of logically independent reflections of animacy in its structure. In Yidiny, animacy is basically a question of degree, rather than of absolute cut-off points, so that where a given structural feature correlates with animate rather than inanimate, this usually means that it is more likely to be used with a noun phrase whose referent is higher on the animacy hierarchy, rather than that it will necessarily be used with noun phrases with referents above a certain point on the hierarchy, and never used with those below that cut-off point, although in certain instances there are cut-off points. One reflection of animacy is in the choice of demonstrative pronouns, where for instance 'that' is more likely to appear as *ŋunʸdʸu-* with noun phrases higher in animacy, and is obligatory in this form with human noun phrases, but as *ŋuŋgu-* with noun phrases lower in animacy. Of two possessive constructions, one placing the possessor in the genitive (e.g. *ŋadʸin dungu* 'my head') and the other simply placing the possessor in apposition to (in the same case as) the head noun phrase (e.g. *ŋayu dungu* 'my head', literally 'I head'), either can in principle be used with any kind of possessor noun phrase, but in fact the genitive is more likely the higher in animacy the possessor is. The case of the patient in a derived intransitive construction called the antipassive (see section 5.3) can be in either the dative or the locative: here, as with the demonstratives, there is, in part, a cut-off point, in that noun phrases with human reference must stand in the dative case, but otherwise either the dative or locative is possible, preference for the dative correlating with degree of animacy, as in *bunʸa wagudʸanda* (DATIVE) *wawa:dʸinʸu* 'the woman saw the man' (literally 'woman man saw'); *ŋayu balmbi:nʸdʸa* (LOCATIVE)/*balmbi:nda* (DATIVE) *wawa:dʸinʸu* 'I saw the locust'; *ŋayu walba:* (LOCATIVE) (less commonly, *walba:nda* (DATIVE)) *wawa:dʸinʸu* 'I saw the stone'. The constructions



where animacy is relevant are very different from one another: form of the demonstrative, case marking of a patient which is not a direct object, choice of possessive construction; therefore the fact that animacy is relevant to each of these constructions provides our basis for saying that animacy in Yidiny is more significant in the typological characterization of this language than in the characterization of most languages. We can thus say that high relevance of animacy is a language-specific typological feature of Yidiny. It does not serve as a significant parameter in more general typology, in particular in that the set of languages where animacy is not particularly relevant does not form a natural class. Nor is it the basis for a holistic typologization of Yidiny, since in most of Yidiny structure animacy is not relevant. Other examples of language, language-group, or language-area specific typological parameters will occur at various points in subsequent chapters.

## 2.3 MORPHOLOGICAL TYPOLOGY

Although a number of bases for holistic typologies have been suggested over the history of typological studies, there are two which are particularly important, at least from a historical point of view. The first of these, morphological typology, was predominant in the nineteenth and early twentieth centuries, although it also retains an established place in textbooks of general linguistics; this is the subject of the present section. The second, word order typology, is discussed in chapter 4. Although the view expressed in the present book is that neither of these does in fact provide the basis for a holistic typology, each of them can serve to provide typologization of a significant part of language structure.

Although morphological typology has a long history, going back at least to the beginning of the nineteenth century, there has been a tendency for some of the tenets of this typology to become ossified, and in the present section we aim not only to give an account of the traditional lore concerning morphological typology, but also to look at some improvements that can and must be made if the fullest advantage possible is to be drawn from this way of typologizing languages. But first, we will examine the traditional classification.

Morphological typology usually recognizes three canonical types of language: isolating, agglutinating, and fusional, to which is sometimes added a fourth: polysynthetic (or incorporating). An isolating language is one which has no morphology, i.e. at least ideally, a language where there is one-to-one correspondence between words and morphemes. An example of a language which comes close to the isolating type is Vietnamese, as can be illustrated by the following sentence:

*Khi tôi đến nhà bạn tôi, chúng tôi bắt dầu làm bài.*
when I come house friend I PLURAL I begin do lesson
'When I came to my friend's house, we began to do lessons.'

Each of the words in this sentence is invariable, there being no morphological variation for, for instance, tense (cf. English *come/came, begin/began*) or case (note that Vietnamese has *tôi* for both 'I' and 'my'); perhaps even more strikingly, plurality is indicated, in the case of pronouns, by the addition of a separate word rather than by morphological means, so that the plural of *tôi* 'I' is *chúng tôi* 'we'. Moreover, it is in general true that each word consists of just a single morpheme, with the possible exception of *bắt dầu* 'begin', which is arguably a word on some criteria, e.g. unity of meaning, although it can be segmented, at least etymologically, into two morphemes: *bắt* 'seize' and *dầu* 'head'; we shall return below to some problems in establishing whether or not one has in fact one-to-one correspondence between words and morphemes.

In some discussions of morphological typology, one comes across the term monosyllabic language, in addition to or in place of isolating language. Although there is a certain correlation between isolating and monosyllabic languages, the two parameters are in principle distinct, and for purposes of morphological typology it is isolating structure that is relevant. Thus one could imagine a language where there is no morphology but where each word (=morpheme) may consist of any number of syllables. Conversely, one could imagine a language with some morphology but where the morphology was restricted to changes in consonants and tone, without affecting the monosyllabic nature of the word. We therefore retain the term isolating here.

In an agglutinating language, a word may consist of more than one morpheme, but the boundaries between morphemes in the word are always clear-cut; moreover, a given morpheme has at least a reasonably invariant shape, so that the identification of morphemes in terms of their phonetic shape is also straightforward. As an example, Turkish will serve, the illustration being from the declension of nouns. In Turkish, nouns vary for both number and case (and also other parameters not treated here, e.g. possessor), with a system of two numbers (singular, plural) and six cases (nominative, accusative, genitive, dative, locative, ablative). However, for a given noun form it is always possible to segment clearly into lexical stem, number affix (zero in the singular, *-lar* in the plural), and case affix (zero in the nominative, *-ı* in the accusative, *-ın* in the genitive, *-a* in the dative, *-da* in the locative, *-dan* in the ablative), as in the following paradigm of the word *adam* 'man':



| | Singular | Plural |
|---|---|---|
| Nominative | *adam* | *adam-lar* |
| Accusative | *adam-ı* | *adam-lar-ı* |
| Genitive | *adam-ın* | *adam-lar-ın* |
| Dative | *adam-a* | *adam-lar-a* |
| Locative | *adam-da* | *adam-lar-da* |
| Ablative | *adam-dan* | *adam-lar-dan* |

(Note that the plural affix always precedes the case affix.) As is suggested by the term agglutinating (cf. Latin *gluten* 'glue'), it is as if the various affixes were just glued on one after the other (or one before the other, with prefixes).

In a fusional language, however, there is no such clear-cut boundary between morphemes, the characteristic of a fusional language being that the expression of different categories within the same word is fused together to give a single, unsegmentable morph. This can be illustrated by Russian declension: Russian has a two-way number distinction (singular, plural), and a six-way case distinction (nominative, accusative, genitive, dative, instrumental, prepositional). In Russian, moreover, even the fused affixes do not have invariant shape, since in different declension classes different affixes are used. This is illustrated below with declensional forms of the noun *stol* 'table' (declension Ia) and *lipa* 'lime-tree' (declension II):

| | Ia | | II | |
|---|---|---|---|---|
| | Singular | Plural | Singular | Plural |
| Nominative | *stol* | *stol-y* | *lip-a* | *lip-y* |
| Accusative | *stol* | *stol-y* | *lip-u* | *lip-y* |
| Genitive | *stol-a* | *stol-ov* | *lip-y* | *lip* |
| Dative | *stol-u* | *stol-am* | *lip-e* | *lip-am* |
| Instrumental | *stol-om* | *stol-ami* | *lip-oj* | *lip-ami* |
| Prepositional | *stol-e* | *stol-ax* | *lip-e* | *lip-ax* |

Clearly, there is no way in which a form like genitive plural *stol-ov* 'of tables' can be segmented into an affix for number and an affix for case, rather the whole affix *-ov* is a single affix combining expression of both case and number (a portmanteau morph). And even knowing that *-ov* is the genitive plural affix in declension Ia, we have no way of predicting the genitive plural affix in declension II, which happens to be zero.

In place of the term fusional, one sometimes finds the term flectional, or even inflectional, used in the same sense. This is not done in the present work

to avoid a potential terminological confusion: both agglutinating and fusional languages, as opposed to isolating languages, have inflections, and it is therefore misleading to use a term based on *(in)flection* to refer to one only of these two types. The availability of the alternative term fusional neatly solves the terminological dilemma.

The fourth morphological type, which is sometimes, though by no means always, included, is polysynthetic or incorporating. Although these two terms are sometimes used interchangeably, it is possible and advisable to make a distinction between them. Incorporation refers to the possibility of taking a number of lexical morphemes and combining them together into a single word. In a limited way, this is possible in English with various processes of compounding, as when the lexical morphemes *swim* and *suit* are compounded together to give *swimsuit*. In some languages, however, this process is extremely productive, giving rise to extremely long words with a large number of incorporated lexical morphemes, often translating whole sentences of English, as in Chukchi *tə-meyŋə-levtə-pəyt-ərkən* 'I have a fierce head-ache', which contains three lexical morphemes: *meyŋ-* 'great, big', *levt-* 'head', and *pəyt-* 'ache', in addition to grammatical morphemes *t-* (first person singular subject) and *-rkən* (imperfect aspect).

Polysynthesis, however, refers simply to the fact that, in a language of this type, it is possible to combine a large number of morphemes, be they lexical or grammatical, into a single word, often corresponding to a whole sentence of English, as in Eskimo (Siberian Yupik) *angya-ghlla-ng-yug-tuq* 'he wants to acquire a big boat', literally 'boat-AUGMENTATIVE-ACQUIRE-DESIDERATIVE-3SINGULAR'. In Eskimo, in contrast to Chukchi, a given word contains only one lexical morpheme, all the others being grammatical, i.e. Eskimo is polysynthetic, but not incorporating. We thus see that incorporation is a special case of polysynthesis, namely where lexical morphemes can be combined together into a single polysynthetic complex, and we shall therefore use polysynthetic as a cover-term for this type as a whole.

One of the reasons for the omission of polysynthetic from many lists of morphological types is that its inclusion destroys the homogeneity of the over-all morphological typology. Although we classified the Chukchi and Eskimo examples given above as instances of polysynthesis, they are also clearly instances of agglutination: in the Chukchi example, we can segment off the individual lexical and grammatical morphemes, and these are moreover largely invariable (the major exception being the, largely predictable, occurrence of the vowel *ə* to break up consonant clusters, especially at morpheme boundaries); likewise, in the Eskimo example, we can readily segment off the individual grammatical suffixes, and these are again constant in form. (In a more thorough study of both Chukchi and Eskimo, it would become apparent that both languages also have a certain amount of fusion, although



this does not interact with polysynthesis.) Thus agglutination and polysynthesis represent different parameters, which can operate independently, rather than different values of the same parameter.

However, to exclude polysynthesis from morphological typology for this reason is not necessarily justified, in particular because polysynthetic languages do, in a very real sense, provide the counterpoint to isolating languages in terms of the number of morphemes per word: in isolating languages, each word consists of just one morpheme, whereas in a polysynthetic language, or rather in an ideal polysynthetic language, each sentence consists of just one word, this word in turn consisting of as many morphemes as are necessary to express the intended meaning. Over all, this suggests abandoning morphological typology in terms of a single parameter that is designed to cover all morphological types, and rather to operate with two parameters. One of these parameters will be the number of morphemes per word, and its two extremes will be isolating and polysynthetic. The other parameter will be the extent to which morphemes within the word are readily segmentable, its two extremes being agglutination (where segmentation is straightforward) and fusion (where there is no segmentability). We may refer to these two parameters as the index of synthesis and the index of fusion. Note that the index of fusion is, by definition, irrelevant in dealing with isolating languages. Otherwise, what are traditionally called polysynthetic languages become languages with a high index of synthesis (in addition, they may or may not also have a high index of fusion, though for reasons discussed below it is inevitable that a language with a very high index of synthesis will also have a low index of fusion, even though the two parameters are logically independent). The traditional class of agglutinating languages corresponds to those with a low index of fusion (and, in terms of the traditional fourfold classification, an intermediate index of synthesis, i.e. neither isolating nor polysynthetic). Finally, the traditional class of fusional languages corresponds to those with a high index of fusion (bearing in mind that isolating languages have neither a high nor a low index of fusion: this index simply does not apply to them).

The preceding discussion has surreptitiously introduced another aspect of morphological typology. At the outset of our discussion we assumed, very simplistically, that the typology would consist of three or four ideal types, among which we could distribute the languages of the world. In fact, however, although we can establish these ideal types, the majority (perhaps all) of the world's languages do not correspond exactly to one or other of these types, but rather fall between the two extremes on each of the indices of synthesis and fusion. Thus instead of providing a discrete typology, morphological typology provides us with a continuous typology, i.e. for a given language we can assign that language a place along the continua defined by

the index of synthesis and the index of fusion. We shall illustrate this, and some of the other attendant problems, in the following paragraphs, starting with the index of synthesis.

In terms of the synthetic–analytic dimension, there are clearly some languages that at least approach the analytic end of the spectrum, i.e. where there is almost one-to-one correspondence between words and morphemes; Vietnamese, cited above, is a good example. However, there is probably no language that even approaches the opposite end of the spectrum, i.e. there is no language where it is obligatory to combine as many morphemes as possible into a single word, i.e. where there would be absolute identity between the word and the sentence. Although in Eskimo, for instance, it is easy to find sentences consisting of just a single word that consists in turn of a large number of morphemes, it is just as easy to find sentences consisting of more than one word, and there are many instances where it is not possible to combine morphemes together into a single word: as noted above, Eskimo has no way of combining lexical morphemes together, so that if a given lexical morpheme has no semantically equivalent grammatical morpheme, then there is no way in which that lexical morpheme can be combined together with any other lexical morpheme into a single word. Even in Chukchi, which does have the possibility of combining lexical morphemes together, there are severe constraints limiting the possibilities of doing so: for instance, there is no way of incorporating a transitive subject or most intransitive subjects into the verb, so that while a sentence of three words like *tumγe kupren nantəvatən* 'the friends set the net' (literally 'friends net set') can be reduced to two by incorporating the direct object, giving *tumγət koprantəvatγʔat*, there is no way in which the subject 'friends' can in turn be incorporated to give a one-word sentence containing the three lexical morphemes. The index of synthesis is thus best viewed as an index of the degree of deviation from the ideal analytic type in the direction of synthesis.

But even in trying to apply the index of synthesis in practical terms, for instance by dividing the number of morphemes by the number of words, certain practical problems arise which indicate that still further attention must be paid to the theoretical bases of morphological typology. Perhaps the most obvious, and the most widely discussed in the literature, is the question of establishing word boundaries, and thence the number of words in a sentence: even in Vietnamese, we noticed this problem with the expression (one word or two?) *bắt đầu* 'begin'. While the canonical definition of the word as a 'minimal free form' gives a lot of mileage, and is particularly useful in dealing with languages rich in polysynthesis, where the individual morphemes are frequently clearly not minimal free forms, problems can arise in much more mundane cases, e.g. with the English definite article in *the man*, or the French unstressed pronouns in *je le vois* 'I see him' (literally 'I him see'),



where, despite the orthographic conventions, there is little reason for assuming that *the*, *je*, or *le* is a free form, i.e. pronounceable in isolation (other than by linguists). But whether *je le vois* is counted as one word or three can make a significant difference to the index of synthesis for French.

Another problem for the index of synthesis arises when one tries to count morphemes, in languages with either zero morphs or portmanteau morphs. In English, the plural *cat-s* is clearly two morphemes, but less clear is the number of morphemes in the singular *cat*: just one morpheme, or a lexical morpheme *cat* plus a grammatical zero morpheme? In terms of cross-language comparison, a decision one way or the other can again be of extreme importance for the statistics involved, since if English *cat* consists of just one morpheme, then English will be reduced in degree of synthesis relative to Russian, where the singular *košk-a* has an affix just as much as does the plural *košk-i*. In analysing a Spanish verb form like *cantas* 'you sing', should this be analysed as two morphemes (stem *cant-* or *canta-* and affix *-s* or *-as*), or should one rather factor out all the categories which are fused together in that ending (second person, singular, present tense, indicative mood, first conjugation), giving, together with the lexical morpheme, as many as six morphemes? While a consistent decision can be made, at least arbitrarily, the precise decision made will radically alter the comparison between a language like Spanish, with widespread occurrence of portmanteau morphs (especially in the verb system), and an agglutinating language like Turkish, where there is little or no controversy surrounding the number of morphemes in a word (except, perhaps, for the counting of zero morphs).

Turning now to the index of fusion, we should recall the two components of agglutination that were mentioned above: segmentability of morphemes, and invariance of morphemes, of which the former is perhaps more important in previous treatments of agglutination, although the second should also not be left out of account, especially in comparing agglutination with fusion – which is, after all, what the index of fusion does. Here, we can take agglutination as the norm: clearly segmentable and invariant morphemes, and define the index of fusion as deviation from this norm. The extreme deviation from this norm would thus be suppletion, where there is absolutely no segmentability and no invariance, as with English *went* as the past tense of *go*. Thus a language which represented the ideal fusional type would have all of its morphology in terms of suppletion; if it also had an ideally high index of synthesis, then each sentence would simply be totally and unsegmentably distinct from every other sentence of the language. Given that a language consists of an infinite number of sentences, this is clearly a practical impossibility, which means in practice that as the index of synthesis gets higher, the ratio of agglutination to

fusion must also increase; more radically stated, there can be no such thing as an ideal fusional polysynthetic language. This demonstrates the advantage of taking isolating structure and agglutinating structure as the bases from which deviations are calculated by the two indexes.

We may now look at problems internal to the index of fusion, starting with segmentability and then turning to invariance. The problem with segmentability is that it is not itself an all-or-none categorization, but rather involves degree of segmentability. In the Turkish declension given above, segmentation was clear-cut in every instance. If we look at declension in Hungarian, however, the situation is not quite so straightforward, as can be seen in the following forms, singular and plural, nominative and accusative, of *ház* 'house', *asztal* 'table', and *folyó* 'river'.

| | | | |
|---|---|---|---|
| Nominative singular | *ház* | *asztal* | *folyó* |
| Accusative singular | *házat* | *asztalt* | *folyót* |
| Nominative plural | *házak* | *asztalok* | *folyók* |
| Accusative plural | *házakat* | *asztalokat* | *folyókat* |

It is clear that there are lexical morphemes consisting of at least *ház*, *asztal*, and *folyó*, that there is an accusative suffix consisting of at least *-t*, and a plural suffix consisting of at least *-k*. It is thus equally clear that the accusative plural forms consist of three morphemes. What is not clear, however, is where exactly the morpheme boundary should be drawn in those instances where the accusative or plural consonant is preceded by a vowel that is not there in the corresponding nominative or singular form, e.g. is *házat* to be segmented *ház-at* or *háza-t*, is *asztalokat* to be segmented *asztal-ok-at* or *asztalo-ka-t*, or conceivably *asztalo-k-at*? Reasons can be advanced for both logical possibilities, i.e. both for including the vowel as part of the stem and for not doing so, and at present the segmentation problem seems irresolvable. This case thus differs from the Turkish case, where segmentation was straightforward. However, it differs at least as much from the Russian case illustrated above, since in Hungarian it is clear that each of the morphemes involved does have some segmental content (e.g. accusative *-t*, plural *-k*), whereas in Russian there is no way in which any of the segments in the suffixes can be identified as exclusively indicating either case or number. Somehow, we want to indicate a degree intermediate between ready segmentability and impossibility of segmentation.

If invariance is included as a further characteristic of agglutinative morphology, then the problem of intermediate cases is even worse. First, we should illustrate that segmentability and invariance are indeed distinct from one another. In Turkish, in general morphemes are both readily segmentable and invariant, but there are some exceptions: in particular,



the first person plural suffix on verbs is readily segmentable, but has two radically different forms, *-ız* and *-k*, which occur in different tense-aspect-mood forms, cf. aorist *yap-ar-ız* 'we make', conditional *yap-sa-k* 'if we make'. Although there is clear lack of invariance, there is no problem of segmentability, i.e. the situation just illustrated is more agglutinative than Russian declension (where there is neither segmentability nor invariance), but less agglutinative than Turkish noun inflection (where there is both segmentability and invariance).

In some instances, variability of morpheme shape is completely predictable in terms of general phonological rules of the language in question. In Turkish, for instance, rules of vowel harmony account for the different shapes of the plural morpheme in *adam-lar* 'men' versus *ev-ler* 'houses' (*-lar* after back vowels, *-ler* after front vowels, since vowel harmony precludes the presence of both front and back vowels in the same word). Such instances, presumably, should not be considered violations of invariance, since the variability of the morpheme is an inevitable consequence of other rules of the language. Elsewhere, however, variability in the shape of a morpheme represents a continuum reaching its extreme with suppletion, but going through a range of intermediate values in terms of the degree of variation and the degree of its predictability: thus the alternations of the stressed vowels in English *divine–divinity* and *strong–strength* are comparable in terms of the phonetic distance between alternants, but whereas the former alternation is essentially predictable in morphological terms, the latter is idiosyncratic.

A good illustration of the problems that arise in practice when one tries to calculate the index of fusion can be seen by comparing noun declension in Finnish and Estonian, two genetically very closely related languages. First, consider the Finnish forms, for *jalka* 'leg' and *lippu* 'flag':

| | | |
|---|---|---|
| Nominative singular | *jalka* | *lippu* |
| Genitive singular | *jala-n* | *lipu-n* |
| Partitive singular | *jalka-a* | *lippu-a* |
| Partitive plural | *jalko-j-a* | *lippu-j-a* |

With the limited data given here, segmentability is no problem: the plural suffix is *-j*, the genitive suffix *-n*, and the partitive suffix *-a*; likewise, there is little variability in morpheme shape: the consonant alternations *k* – *Ø* and *pp* – *p* are largely (though not quite) accountable for in terms of syllable structure (the second member of each pair occurs in a closed syllable), and the appearance of *o* in *jalkoja* is accountable for morphologically (though not phonetically). The situation is very different in Estonian, however:

| | | |
|---|---|---|
| Nominative singular | *jalg* | *lipp* |
| Genitive singular | *jala* | *lipu* |
| Partitive singular | *jalga* | *lippu* |
| Partitive plural | *jalgu* | *lippe* |

Although these forms can all be derived diachronically from proto-forms close to the actual Finnish forms given above, there is no longer any ready segmentability or invariance. Etymologically, all the forms are different allomorphs of the stem, i.e. each is non-segmentable and the alternation among the four forms of each word is completely unpredictable in phonetic terms. If one adopts the alternative analysis of segmenting off the final vowels as case or case–number suffixes, then the degree of variation in the stem is reduced, but variation is introduced into the suffixes, e.g. 'partitive singular' is *-a* after *jalg*, but *-u* after *lipp-*. This example serves to illustrate not only the problems involved in assigning an index of fusion to a morphological system like that of Estonian, where there are weak traces rather than clear indications of segmentation, but also the more general point that a relatively short time-span can serve to alter a language's morphological typology from a fairly clear-cut agglutinating structure to one that is much more strongly characterized by fusion.

We may summarize this rather detailed discussion of morphological typology by saying that there are two major indices, independent of one another, that are needed in morphological typology: the index of synthesis, measuring the number of morphemes per word (low in isolating languages, high in polysynthetic languages), and the index of fusion (measuring the difference between agglutination and fusion). There are numerous problems in practice in quantifying these indices; in particular, the index of fusion actually refers in turn to two logically independent parameters, segmentability and invariance of morphemes. Despite the long history of morphological typology studies, it is clear that many quite basic problems of definition have still not really been faced, which is why such immense practical problems arise as soon as one actually tries to do, rather than just talk about, morphological typology.

Although morphological typology does serve the useful purpose of presenting an overview of the morphological structure type of a language, it remains unclear whether it can be considered a significant typological parameter (or set of parameters) in the sense of correlating with other parameters outside morphology. Of course, there are some few parameters with which morphological types correlate by definition. In chapter 8, for instance, one of the types of causative construction with which we will be concerned is the morphological causative, whereby a causative is related to its non-



causative equivalent morphologically, each being a single word, e.g. Turkish *öl-dür* 'cause to die, kill', in relation to *öl* 'die'. Clearly, such a causative construction can only exist in a language that is not isolating, but this follows logically from the definition of the isolating type as having no morphology, and does not represent a correlation among logically independent parameters. Our over-all conclusion is, thus, that morphological typology has a secure, but restricted, place in language typology, and it is to be hoped that general linguistic textbooks will not continue indefinitely to give the impression that this is the only, or most insightful, way of classifying languages typologically.

## NOTES AND REFERENCES

For a general survey of approaches to language typology, including references to more detailed historical studies of language typology, see Greenberg (1974). My own thinking on the relation between universals and typology has been influenced and clarified by Keenan (1978).

The universal that subject usually precedes object in basic word order is number 1 in Greenberg (1966b, 110). The preliminary material referred to on object-final languages is to be found in Derbyshire & Pullum (1981).

The information on Hanunoo colour terms is from Conklin (1955). The initial publication on universals of colour foci is Berlin & Kay (1969). This work has been subject to considerable refinement and criticism, though its results seem to stand up at least as universal tendencies. The explanation in terms of perception is to be found in Kay & McDaniel (1978), which also includes more recent references on colour terminology and on perceptual and linguistic theories utilizing prototypes and fuzzy sets.

Universals of tone rules, though with an explicit areal bias to West Africa, are discussed by Hyman & Schuh (1974). Dixon (1977, 110–12) discusses the widespread relevance of animacy in Yidiny.

The major classical work on morphological typology, building on earlier work by the Schlegel brothers, is Humboldt (1836); it was Humboldt who established the fourfold typology by including polysynthetic. The Chukchi example is from Skorik (1961, 102), and the Siberian Yupik Eskimo example from Jacobson (1977, 2–3).

The approach to morphological typology adopted here owes much to Sapir (1921), chapter 6; in particular, Sapir introduces the parameters of synthesis and technique (the latter approximating to index of fusion). The quantification of indices of synthesis and fusion is introduced by Greenberg (1960). Various possibilities for measuring the indices of synthesis and fusion are discussed by Altmann & Lehfeldt (1973, 108–12); despite