Inflection, Derivation, and Compounding

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Introduction

The prototypical morphological operation adds some formal material (some phonemes) to a base and, in doing so, creates a new word with a different meaning:

(1)	a.	drink	(2)	a.	truck
	b.	drinker		b.	trucker

The kind of operation is called DERIVATION. But other morphology is different. In some cases, the operation does not create a new word (but only creates a form of the word that fits a particular grammatical context). For example, the word DOG may be either *dog* (singular) or *dogs* (plural). This is called INFLECTION. In still other cases, rather than adding an affix to a base, a new word is formed by concatenating two words or stems, as in *catfish* or *dishwasher*. This is called COMPOUNDING. Derivation and compounding, together, are called word-formation.

Stems, as we will learn, are roots plus zero or more derivational affixes.

It is useful to understand these three categories, and why they have been so important historically. It is also important to know that they exist on continua.

The distinction between derivation and inflection

A prototypical derivational operation behaves rather like a function that operates on a graph (or some other mathematical representation), where the graph represents the meaning and part-of-speech of the word. The domain of this function could vary greatly (the operation cannot apply to all bases) and so can the change brought about by the operation. Consider the suffix *-ism*: it can apply only to certain kinds of adjectives and nouns (*social*, *capital*, *federal*, *Lenin*, etc.). It has a very specific meaning (to the extent that we expect most languages will not have equivalent morphology).

Contrast this with a prototypical inflectional operation, which acts like a function that flips a bit in a value associated with the word. There are a finite number of bits in the inflectional value, each corresponding to one of the finite sets of properties like case, gender, number, voice, tense, aspect, and modality [1] that can easily be expressed as "on" or "off" (or as multi-valued features).

[1] We'll illustrate these later in the lecture

Table 1 lists some differences between prototypical derivation and prototypical inflection. A similar table is found in Haspelmath and Sims[2]. In general, a prototypical derivational operation changes meaning and part of

[2] Martin Haspelmath and Andrea Sims. *Understanding Morphology*. Hodder Education, London, 2nd edition, 2010

PROTOTYPICAL DERIVATION	PROTOTYPICAL INFLECTION
changes concept	does not change concept
changes part of speech	does not change part of speech
not directly relevant to syntax	directly relevant to syntax
extrinsically ordered	intrinsically ordered
non-paradigmatic	paradigmatic

Table 1: Prototypical derivation versus prototypical inflection

speech in a way that is transparent to the syntax. That is to say, a words that becomes a noun through one derivational processes (e.g., adding *-ness*) behaves the same way in the broader grammar as a word that becomes a noun through another derivational process (e.g., additing *-ity*). The order of a prototypical derivational operation is based on principles of scope (just like mathematical operations) and different ordering of operations can result in different meanings but the order of prototypical inflectional operations is fixed and follows from general principles. Finally, proto-typical derivation does not produce PARADIGMS. In the sections on derivation and inflection, we will look at these differences in more detail.

Paradigms are multidimensional arrays of word forms where each row or column corresponds to a particular value for a particular feature. A feature, in this sense, can be something like NUMBER, which might take values—as in Old English—of SINGULAR, DUAL, and PLURAL.

The distinction between derivation and compounding

Derivation differs from compounding solely in that compounding combines words/stems while derivation involves an operation on a base (like suffixation). This may seem very simple. However, derivation often arises historically from compounding.

Compounding

Endocentric versus exocentric compounds

An important term when speaking of compounds is HEAD. Heads determine the basic semantics and part of speech of a compound. For example, *blackboard* is a noun like *board* (not an adjective like *black*) and is a kind of board, not a kind of black. Therefore, we say that *board* is the head of BLACKBOARD and that this word is head-final. One way of verifying the head of a compound is via implication: if being a blackboard entails being a board then *board* is the head of *blackboard*. Likewise, being a bathroom entails being a room (but not a bath), so we say that the head of *bathroom* is *room*. This test is not definitive in the case of *blackboard*, though, since being a blackboard also entails being black. The issue is settled, in that case, by the part-of-speech criterion.

In most compounds, one of the words is the head (*room* or *board*). These are called ENDOCENTRIC compounds. Examples from include *cable car*,

gunmetal, *wallpaper*, and *football*.   However, there are other compounds where neither of the words is a head. It is as if the head sits outside of the compound. Examples include *greybeard*, *redhead*, and *spendthrift*. Consider, also, these famous examples from Italian:

Note that English compound words are sometimes written with no delimiter (as in *football*), sometimes with hyphens (as in *single-minded*) and sometimes with a space between the components (as in *ice cream*. This is an orthographic difference rather than a grammatical one.

(3)   a.   porta + bagagli
           carry + luggage
           'trunk'

      b.   lava   + piatti
           wash + dishes
           'dishwasher'

      c.   asciuga + capelli
           dry   + hairs
           'hair dryer'

The signified, in these compounds, is predictable from the signifier. However, they are not exactly compositional. Rather, the involve a construction that combines a transitive verb V and a noun N that serves as the semantic PA-TIENT of the verb. The meaning of the whole is an kind of object that V's Ns. They are, expressly, not kinds of Ns or kinds of Ving.

transitive verb is one that takes an object as well as a subject. *Die* is an intransitive verb and *kill* is a transitive verb
A patient is a participant in an event to which or to whom the event happens.

Exocentric compounds are good examples of non-compositional constructions.

Subordinate versus coordinate compounds

A compound may have a single semantic and syntactic head (an endocentric or *tatpuruṣa* compound). It may also not have a semantic head (an exocentric or *bahuvīhi* compound). But a compound may also have two heads. These compounds are called coordinate compounds or *dvandva* compounds. For example, the word meaning 'parents' in many languages is 'mother-father' or 'father-mother' (compare Chinese 父母 *fumu* 'father-mother'). In this kind of dvandva compound, the referent of the whole is the UNION (or event superset of the union) of the referents of the parts. There is another kind of dvandva compound, common in English, in which the referent of the whole is the INTERSECTION of the referents of the parts. Consider *singer-songwriter*, *fighter-bomber*, and *scientist-supervillain-entrepeneur*.

In both of these types of compounds, none of the words modifies any of the others (or serves as an exclusive head). It is as if all of them are heads equally.

Compounding and affixation

Consider the following examples from Hmong All of these words were originally compounds, and the word at the left was the HEAD of the compound, meaning that it was the part of the compound that contributed the basic

Hmong is a minority language of China, Vietnam, Laos, and Thailand. As far as linguistics can determine, it is not related to any major languages.

FORM	MEANING (AS COMPOUND)	TRANSLATION
kev-noj	way-eat	'eating'
kev-haus	way-drink	'drinking'
kev-kaaj	way-bright	'brightness'
kev-zoo	way-good	'goodness'
kev-phem	way-bad	'evil'
kev-kawm	way-study	'studying'
tub-txib	boy-send	'messenger'
tub-khaiv	boy-send	'servant'
tub-nyag	boy-steal	'thief'
tub-ncig	boy-be_around	'funeral helpers'

Table 2: The derivational prefixes *kev-* and *tub-* developed from compounds where the heads were 'way' and 'boy', respectively.

meaning of the compound. Originally, *kev-phem* meant 'bad way' and *tub-ngag* meant 'steal(ing) boy'. However, as the number of constructions like this grew, the meanings of *kev* and *tub* became more general (until *kev* was similar to the English suffix *-ness* and *tub* was similar to the English suffix *-er* as in *help-er*. At some point, *kev* and *tub* have stopped being independent words (when they occur in this construction) and have become derivational prefixes. However, it is impossible to pinpoint the exact point in time at which this threshold was crossed.

Similarly, there is a large body of word-forming morphology in English that could either be understood as compounding or derivation. So-called neoclassical compounds, which are widely used in scientific and technical terminology, consist of morphemes borrowed from Greek and Latin. Take for example *hypnopaedia* 'learning through sleep' which consists of the two morphemes *hypno-* 'sleep' and *-paedia* 'learning'. *hypno-* looks, in some ways, like a prefix—it cannot really occur by itself (at least in formal speech) and is always preposed to a base. However, it has a concrete meaning rather than an abstract one, and affixes typically have abstract meanings.

Compounds and Productivity

While not all compounding constructions are highly productive, compounds tend to be among the most productive of word-formation processes. Consider Figure 1, depicting the occurrence of various words in pejorative compounds scraped from Reddit. The color in each cell indicates the absolute frequency of the corresponding subordinate compound (modifiers in rows, heads in columns). Note that some of the compounds are much more common than others (e.g., *dumbass*) but that almost all of the possible combinations occur.
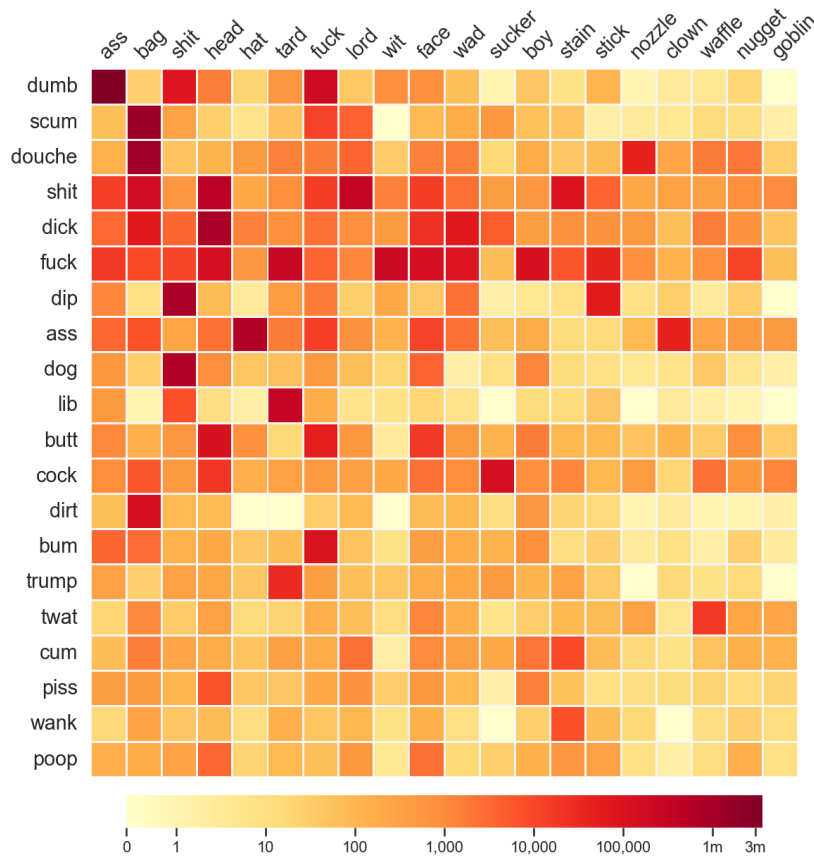
Figure 1: Pejorative compounds from Reddit posts (`https://colinmorris.github.io/blog/compound-curse-words`).

Exceptions include *dipgoblin* and *scumwit.* These are easily ruled out on semantic grounds, suggesting that—from a grammatical point of view—this kind of compounding is exceptionally productive in English.

Derivation

Derivation is also a common word-formation strategy. As mentioned above, it's hallmarks are changing meaning (the concept), changing part-of-speech, and governing scopes. The last of these deserves some explanation. In mathematics, $(1 + 2) \times 3$ has a different value than $1 + (2 \times 3)$ even though the numbers and operations because in the first case 3 has scope over $1 + 2$ and in the second case, 1 has scope over 2×3.

Now consider the following examples from the Bantu language Bemba:

(4)   a. Na- a- mon -an -y -a Mwape na Mutumba
           1SG- PAST- see -REC -CAUS -FV 1.Mwape and 1.Mutumba
           'I made Mwape and Mutumba see each other.'

b. Mwape　　na　　Chilufya ba-　　a-　　mon -eshy -an -a
2SG.MASC- PAST- see　　-CAUS -REC -FV

'Mwape and Chilufya made each other see Mutumba.'

To unpack things a bit, see Table 3.

In V-REC-CAUS, where CAUS has scope over REC, the meaning is 'cause to V each other' but V-CAUS-REC means 'cause each other to V.' This kind of effect, in which you can obtain different meanings by changing the sequence of two morphemes, is very common in derivation but is not common in inflection (in which the ordering of morphemes is typically fixed following general principles). We will discuss more about scope and affix ordering in the next lecture.

1SG	first-person singular subject
2SG.MASC	second person singular masculine subject
PAST	past tense
REC	reciprocal (X each other)
CAUS	causitive (cause X to happen)
FV	final vowel (suffix with complex grammar)

Table 3: Explanation of glosses from Bemba examples.

Deriving Nouns

The most common and diverse set of derivational operations convert words into nouns (especially verbs, adjectives. and other nouns). Some illustrative examples are presented in Table 4.

DEVERBAL NOUN	English	drink		drinker	
	Arabic	ħamala	'carry'	ħammaal	'carrier'
	English	invite		invitee	
	Spanish	picar	'mince'	picadora	'meat grinder'
	Russian	otkryt	'discover'	otkrytie	'discovery'
DEADJECTIVAL NOUNS	Japanese	atarasii	'new'	aratasisa	'newness'
	Russian	umnyj	'clever'	umnik	'clever guy'
DENOMINAL NOUNS	Spanish	gato	'cat'	gatito	'little cat'
	Russian	boroda	'beard'	borodišča	'huge beard'
	English	child		childhood	
	Arabic	Miṣr	'Egypt'	miṣriyyu	'Egyptian'
	German	König	'king'	Königin	'queen'

Table 4: Derived nouns (adapted from Haspelmath and Sims (2010).

Deriving Verbs

Derivational operations that covert words into verbs are also quite common (but are less common and less diverse than those that derive nouns):

One special class of morphological operations is exemplified by Swedish *öppnas* 'open' (as in 'the door opened'). This kind of morphology, called VA-LENCY CHANGING morphology, changes the number of ARGUMENTS that a verb can take. In the Swedish case, it derives an intransitive verb (which takes only a subject) from a transitive verb (which takes a subject and an object). We saw some other instances in the Bemba example at the beginning

DEVERBAL VERBS	Korean	*cwuk*	'die'	*cwuki*	'kill'
	German	*laden*	'load'	*beladen*	'load onto'
	Swedish	*öppna*	'open (tr.)'	*öppnas*	'open (intr.)'
	Greenlandic	*sini-*	'sleep'	*sinikkuma-*	'want to sleep'
	English	*write*		*rewrite*	
	Swahili	*choma*	'stick in'	*chomoa*	'pull out'
DENOMINAL VERBS	Spanish	*pirata*	'pirate'	*piratear*	'pirate (verb)'
	English	*bottle$_N$*		*bottle$_V$*	
	Russian	*sol*	'salt'	*solit*	'salt (verb)'
DEADJECTIVAL VERBS	Russian	*černyj*	'black'	*černit*	'make black'
	Spanish	*verde*	'green'	*verdear*	'become green'

Table 5: Derived verbs (adapted from Haspelmath and Sims (2010).

of this session: CAUSATIVES and RECIPROCALS. However, there are a number of other such categories. The best know valency reducing operation is the PASSIVE (familiar because busybodies criticize you for using it in English prose). Other examples, covered in Chapter 11 of Haspelmath and Sims include ANTICAUSATIVE, ANTIPASSIVE, and APPLICATIVES.

Deriving Adjectives and Adverbs

DEVERBAL ADJECTIVES	Basque	*jan*	'eat'	*jangarri*	'edible'
	Spanish	*hablar*	'talk'	*hablador*	'talkative'
DENOMINAL ADJECTIVES	Russian	*korolj*	'king'	*korolevskij*	'royal'
	Ponapean	*pihl*	'water'	*pilen*	'watery'
	Russian	*voda*	'water'	*bezvodnyj*	'waterless'
	German	*Kupfer*	'copper'	*kupfern*	'made of copper'
DEADJECTIVE ADJECTIVES	Tzutujil	*kaq*	'red'	*kaqkoj*	'reddish'
	Turkish	*yeni*	'new'	*yepyeni*	'brand new'
	German	*schön*	'beautiful'	*unschön*	'ugly'

Table 6: Derived adjectives (adapted from Haspelmath and Sims (2010).

Inflection

Case

Number

Gender

Tense, Aspect, and Modality

Voice

Implications

(5) **Revised Optimal Slicing Hypothesis**

    a. An optimal tokenization segments inflectional morphemes from bases but not derivational morphemes

    b. Optimal tokenization segments compounded words/stems

References

Martin Haspelmath and Andrea Sims. *Understanding Morphology*. Hodder Education, London, 2nd edition, 2010.