

Part II

External and internal sources of morphosyntactic change

6

Feature economy in the Linguistic Cycle

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6.1 Introduction

It has long been recognized that language change is cyclical, e.g. by Bopp (1816), von Humboldt (1822), and more recently Tauli (1958) and Hodge (1970). The most well-known case is that of the Negative Cycle, where in Old English the *ne* negative is reinforced by a negative DP *na wiht* ‘no creature’ which then takes over from *ne* in grammaticalized form, i.e. as *not*. Grammaticalization is a factor in the linguistic cycle, but not the only one. Language-external factors, such as prescriptivism, also play a role and can be seen as a ‘chance’ factor, as Lightfoot (1979: 405) puts it. In this chapter, however, I focus mainly on the internal changes by using Minimalist Economy Principles, mainly the Principle of Feature Economy. In my framework, most language change is determined by the interaction of the grammar-constructing principles of the learner and the language s/he encounters, not through a changing input, or cues.¹

The outline is as follows. In Section 6.2, I provide some examples of a cycle. In Section 6.3, Minimalist Economy Principles are discussed and in Section 6.4, I show how these principles account for certain cases of grammaticalization. In Section 6.5, the Economy Principles are reformulated in terms of features.

6.2 The Linguistic Cycle: negation and agreement

As mentioned, Hodge (1970) chronicles some full cycles in the history of Egyptian going from a stage with little morphology to one with a great deal and then back again. Unidirectional grammaticalization followed by renewal is

¹ This particular formulation is due to an anonymous referee.

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TABLE 6.1 The English Negative Cycle

a.	no/ne		early Old English
b.	ne	(na wiht/not)	Old English, especially Southern
c.	(ne)	not	Middle English, especially Southern
d.	not		late Middle English
e.	n't	(no thing)	many varieties

of course the major aspect of this change. The existence of such cyclical change has also been denied, e.g. by Jespersen (1922: ch. 21) and more recently by Newmeyer (1998). Jespersen's claim is that languages always 'progress' towards more analytic stages and Newmeyer is sceptical about grammaticalization. In fact, the present situation where research into the cycle is concerned is not much better than in 1972, when Lakoff writes regarding cycles that:

there is no mechanism within the present theory of transformational grammar that would allow an explanation. But the historical syntactician should be aware that such things exist, and that it is the duty of his field to search for an explanation. (Lakoff 1971: 173–4)

In this section, I'll give a few instances of cyclical change before going into their explanation in Section 6.3. I'll first briefly present the basic facts for the already mentioned Negative Cycle in English and then go on to provide examples of partial cycles from Sami and Athabaskan. Then, I discuss typical effects of the subject-to-agreement cycle. I discuss the history of French but many such cycles are known.

In the history of English, the negative has gone through the stages of Table 6.1. This is a rough picture. See e.g. van Kemenade (2000) and Ingham (2005, 2006) for more in-depth work.

In the earliest English we have available, stage (a), there is either an initial adverb (*no*, *na*, *næfre*) or a head *n(e)*, as in (1) and (2), to indicate negation. This head can be a clitic on the verb as in (2):²

- (1) Men **ne** cunnon secgan to soðe...hwa
 Man not could tell to truth...who
 'No man can tell for certain ... who' (Beowulf 50–2)
- (2) **nis** þæt seldguma wæpnum geweorðad
 not-is that hall-man with-weapons adorned
 'That is not an (ordinary) hall-man, adorned with weapons'
 (Beowulf 249–50)

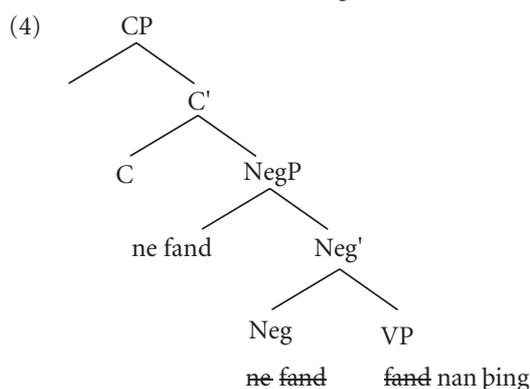
² The sentences that I have found using the *OED* will just be given with their year of appearance. For the other sentences, see the list of Primary Sources.

In late Old English, i.e. stage (b), it may be that the negative *ne* is weakened in some way and a negative nominal in argument position is used to strengthen the negative meaning, as (3) shows, with a tree as in (4). In earlier stages, the negative nominal would have been a positive *sum þing* ‘a thing’:

- (3) *ne* fand þær *nan* þing buton ealde weallas &
 not found there no thing except old walls and
 wilde wuda
 wild woods

‘He found there nothing but old walls and wild woods’

(*Peterborough Chronicle*, addition to year 963, Thorpe 220)



Stages (c) and (d) reanalyse the object argument *nan thing* as a negative adverbial *not* and stage (e) has *not* starting to contract with the auxiliary in late Middle English, just in the same way that *ne* did in Old English (4). This calls for reinforcement by a negative argument, as in *I didn't see nobody*, but is stopped in most varieties by prescriptive grammar. Instead, *never* is used to avoid this problem, i.e. is a renewal strategy (see e.g. Anderwald 2002).

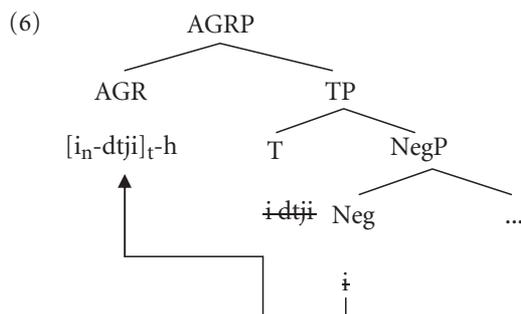
Many Indo-European languages have witnessed a Negative Cycle. Jäger (2008; this volume) discusses the history of German. Cowgill (1960) shows that the Greek negative *ou* derives from a reconstructed **ne oiū k^wid* [not life anything] ‘not ever/not on your life’. It first loses *ne* and becomes *oiukid*, and then further weakens to *ouki* and *ou(k)*. I’ll now turn to lesser known languages. Even though Dahl (1979: 88) suggests that the universality of the Negative Cycle cannot be verified due to ‘lack of information about the earlier stages of non-European languages’, we can use different branches of language families and stages of cycles. Regarding negation, there is evidence from Finnic and Sami, Athabaskan (see below), Eyak, Tlingit, Haida (van Gelderen 2008), Salish (Déchaine and Wiltschko 2003), Iroquoian (Mithun 1994), Afro-Asiatic (Fischer 1982), and Chinese (Wu 2005).

Most Uralic languages, Finnish and Sami among them, have a negative auxiliary which indicates negation and may mark person, number, tense (past and present), and very infrequently mood. Tauli (1966: 172–8) and Payne (1985: 215ff.) provide very good overviews of negation in Uralic. Tauli provides examples of how the negative auxiliaries in these languages are tending towards becoming uninflected particles, based on the third-person singular form. For instance, (North) Estonian *ei* is invariant. None of these works focus on renewal. I will just look at Sami and Finnish and focus on the cyclical aspect of the changes.

Sami, a group of languages spoken in Northern Scandinavia, has an inflected negative, as in (5ab):

- (5) a. **Ih** guarkah Southern Sami
 NEG-PRES-2SG understand
 ‘You don’t understand’
- b. **Idtjih** guarkah Southern Sami
 NEG-PAST-2SG understand
 ‘You didn’t understand’ (from Bergsland 1994: 44)

These sentences show that the Negation is a head *-i*, moving to T and AGR, as in (6), and possibly to C (the latter movement not indicated in (6)):



As is worked out in van Gelderen (2008) in more detail, due to syncretism of the features, one might expect a reinforcement of the negative by another negative element in the Specifier of the NegP, and this is definitely true in Northern Sami, as (7) shows:

- (7) In leat **goassege** dahkan dan Northern Sami
 NEG-1SG be never do-PART it-ACC
 ‘I have never done that’ (Trosterud p.c.)

Athabaskan, an otherwise very uniform family, displays amazing variety where negation is concerned. Many languages of this family have a discon-

tinuous negation of one element outside the verbal domain or one (or two) inside or both. An example from the Alaskan Athabaskan language Ahtna is given in (8a) where ‘*ele*’ derives from the verb ‘not to be’ (Leer 2000) and the negative suffix is probably an older incorporated form. Sentence (8b) from Bearlake shows just the negative auxiliary *yile*, related to ‘*ele*’:

- (8) a. ‘*ele*’ k’est’aaze Ahtna
 NEG it-NEG-cut-NEG
 ‘He isn’t cutting it’ (Kari 1990: 123)
- b. *bebí nedá yile* Bearlake
 baby 3-heavy NEG
 ‘The baby is light’ (Rice 1989: 1101)

To see how very closely related languages differ, compare Lower Tanana (9), an Alaskan Athabaskan language, where for convenience all morphemes are marked,³ and (10), from the neighbouring Upper Tanana:

- (9) *tendhghaaghetltenęę* Lower Tanana
 t + n + dh + gh + gh + es + l + ten + ęę
 FUT QUA NEG QUA QUA 1SG CAUSE ICE NEG
 ‘I won’t freeze it solid’ (from Kari 1993: 55)
- (10) *k’aa tinaktän* Upper Tanana
 NEG I-freeze-it-solid
 ‘I won’t freeze it solid’ (from Kari 1993: 55)

In the more innovative Upper Tanana (10), the inner negative and suffix head are lost and the outside negative shows reinforcement through *k’a(a)*. The *k’a* could be a mix of an emphatic and verb similar to Ahtna ‘*ele*’ according to Kari (1990). In this chapter, it is impossible to give all the details of negation in all these languages (see van Gelderen 2008) but the evidence for a Negative Cycle is manifold:

(a) The variability of the negative that precedes the verbal complex indicates that it is of more recent origin, e.g. *k’aa* in (10) but *do(o)* in many Eastern and Southern Athabaskan languages.

(b) The loss of the suffix head (*-dh-*) is typical for the cycle. This occurs in Upper Tanana and is accompanied by the use of a new specifier *k’aa*.

I’ll now turn to the Agreement Cycle. This involves an emphatic topic pronoun being reanalysed as a regular subject pronoun and then as a clitic

³ QUA stands for ‘Qualifier’.

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TABLE 6.2 Changes in French first and second person singular pronouns (from Harris 1978: 117 and Schwan 1925: 179–80)

	Old French Emphatic	Regular	>	Modern French Emphatic	Regular
Subject	je/tu	zero		moi/toi	je/tu
Oblique	moi/toi	me/te		moi/toi	me/te

and affix and then being lost. The history of French shows all the stages. Old French has a special set for emphatic and non-emphatic pronouns. Non-emphatic subjects are null pronouns and first- and second-person emphatic nominatives are *je* ‘I’ and *tu* ‘you’. The Old French oblique emphatics are *moi* ‘me’ and *toi* ‘you’. After the loss of pro-drop, the emphatic nominatives *je* and *tu* become the regular subject pronouns and *moi* and *toi* become the emphatic for both nominative and oblique. The two stages are represented in Table 6.2.

As is well-known, in modern colloquial French, the first- and second-person pronouns *je* and *tu* are clitic pronouns, not separable from the verb and in some varieties the third-person pronouns are as well. The emphatics, e.g. *moi* in (11) and *lui* in (12), are becoming obligatory:

- (11) **Moi**, j’ai pas vu ça. Colloquial French
 ‘I, I haven’t seen that’
- (12) et on voit que **lui** il n’apprécie Colloquial French
 And one sees that him he not-appreciates
 pas tellement la politique
 not so the politics
 ‘and it can be seen that he doesn’t appreciate politics that way’ (LTSN corpus, p. 15–466)

However, this usage is ‘frowned on’ by prescriptive grammarians and not taught in schools or used in formal writing.

Apart from the negative and agreement cycles, other cycles are frequent. I will just list them here briefly. Relative pronouns are often renewed as are other complementizers after having undergone grammaticalization. Some examples of this are given in Section 6.3. Aspectual distinctions undergo cyclical change from adverb to verbal affix to loss. Copulas and articles are also frequent parts of cycles (see e.g. Lyons 1999; van Gelderen 2007). The main ingredients to these cycles are:

- (a) lexical elements that are base-generated early on are reanalysed as functional categories and merged later in the derivation;

(b) full phrases are reanalysed as heads. I'll now formulate a way to account for the cycles within a Minimalist framework.

6.3 Economy in Minimalism

As a syntactic approach, I assume a recent Minimalist framework, namely Chomsky (2004, 2006). A basic derivation selects items from a lexicon, merges these items, moves them (= Internal Merge), and has Agree. The latter is triggered by uninterpretable features on probes. There are two levels, namely SEM and PHON, that interact with the Conceptual-Intentional and Sensory-Motor Interfaces. Within early Minimalism, there are Economy Principles such as 'Last Resort', 'Least Effort', and also 'Merge as Late as Possible' (e.g. Chomsky 1995; Zwart 1996; and Collins 1997*a*). Economy Principles guide the language learner in constructing his or her internal grammar.

One of the problems with some economy principles is that derivations have to be compared for optimal economy and that this itself is not economical (see Reinhart 2006: 2–5). The Economy Principles I advocate here are general cognitive ones, in keeping with current thinking to keep innate principles special to language as small as possible: '[h]ow little can be attributed to UG while still accounting for the variety of I-languages attained, relying on third factor principles?' (Chomsky 2006: 3) I assume two preference principles (both from van Gelderen 2004*a*). In a later section, I will rephrase these in terms of Feature Economy:

(13) **Head Preference Principle (HPP):**

Be a head, rather than a phrase.

(14) **Late Merge Principle (LMP):**

Merge as late as possible.

In accordance with the HPP, a learner's internalized grammar analyses a pronoun as a head rather than a specifier, if given an ambiguous triggering experience. We have seen in the previous section that emphatic pronouns (XPs since they can be modified and coordinated) in the history of French become heads, after which they are renewed by other emphatic specifiers.

Another example of the HPP is the preference in many languages to use a complementizer head in a relative, rather than a relative pronoun in specifier position. For instance, many varieties of French use an invariable *que* 'that' in a head position, as in (15a), rather than a variable *qui/que* that would be in the specifier position and Persian *ke* 'that' has an indeclinable head, shown in (15b), identical to the complementizer:

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- (15) a. Les enfants **que** jouent là Colloquial French
 the children who play there
 ‘The children who are playing there’
- b. mardi **ke** didam Persian
 man that saw-1SG
 ‘The man that I saw’

In English, the same tendency is obvious in the use of relative *that* over *who/whom/whose/which*. In fact, there was an interesting change between Old and Middle English of the relative pronoun system where the relative in the specifier position was internalized as a head. In Old English, many kinds of relatives occur, for instance, relatives that are demonstratives with a complementizer *that/the*, as in (16a), or with just the demonstrative, as in (16b), or just the complementizer, as in (16c), or marked through a prepositional phrase, as in (16d):

- (16) a. And Æðelnoð munuc, se þe wæs decanus æt Cristes cyrcan, wearð
 ... to biscope (*Peterborough Chronicle*, year1020.6)
 ‘And monk Athenod, who (that) was dean at Christ’s Church
 became... bishop’
- b. ðonne cymeð se man se þæt swiftoste hors hafað (*Orosius*, 17.22)
 ‘Then comes the man who has the fastest horse’
- c. Ic geseah þa englas þe eower gymdon (*Aelfric, Homilies I* 66.35)
 ‘I saw the angles who took care of you’
- d. þæt is seo lufe embe þæt he wite... (*Alfred, Soliloquiorum* 341: 32)
 ‘that is the love he knows’

By Middle English, the specifier options have disappeared, i.e. (16a,b,d), due to the HPP. Then, there is a renewal for external reasons and from external sources. This can be seen from the types of texts it first appears in, namely those influenced by French and Latin. This resulted in the *wh*-relative now used in formal/written English. The renewal first happens in letter-closings in the early part of the fifteenth century only in the use exemplified in (17), but is extended in the second part of that century:

- (17) be the grace of **God, who** haue yow in kepyng
 ‘by the grace of God, who keeps you’ (*Paston Letters* 410, Davis p. 655).

In Modern English, estimates are that the use of the *wh*-relative is very low in spoken but not in written English. English speakers prefer a *that*-complementizer over a *wh*-pronoun in relative clauses, by at least a 4 to 1 ratio

(e.g. Montgomery and Bailey 1991; van Gelderen 2004a, etc.), an indication of the existence of prescriptive rules favouring specifiers and hence the occurrence in formal styles.

As to language acquisition, relatives are also acquired according to the Economy Principles. For instance, children use a *wh*-relative very infrequently. Diessel (2004: 137) shows, on the basis of four children, that when these children start to produce relative pronouns, they produce 165/297 cases of *that*, 6/297 of *who* (all by one child), and 126/297 of zero. This shows children avoid phrases completely (even the 6 instances of *who* are heads). The percentages are 56 per cent *that*, 42 per cent zero, and 2 per cent *who*. In the CHILDES- Kuczaj corpus, Abe, age 4–5 produces 82 per cent *that*, as in (18a), and 18 per cent *wh*-, as in (18b). There is, however, no evidence that the *wh* is not a head since *whom/to who* do not occur:

- (18) a. **a dragon that** was this little (Abe, 4;0.16)
 b. You know **the round part where** they dig (Abe 4; 1.5)

The second Economy Principle, the LMP, Late Merge, or Move over Merge can be formulated as follows, ‘all else being equal, wait to merge’. For instance, it is suggested by Chomsky (1995: 348) that Late Merge accounts for the presence of expletive subjects over raising; the principle is used by Fox (2002) to account for Antecedent Contained Deletion and by Bhatt and Pancheva (2004) for the scope of degree clauses. Both Roberts and Roussou (2003) and van Gelderen (2004a) use it to account for grammaticalization. The former suggest a change from F^*_{move} to F^*_{merge} (which is parametric) and the latter suggests that, if a lexical item is not relevant to theta-theory, it can merge late.

Later Minimalism (e.g. Chomsky 2004) assumes that, due to the Inclusiveness Condition, movement cannot introduce new elements. Traces are therefore abandoned in favour of a copy and delete system and Move is replaced by Internal Merge (or remerge) and not seen as uneconomical. In this chapter, I show that there are real Late Merge effects in language change and acquisition and I will argue that the effects of the Late Merge Principle can be realized using the idea (present since Borer 1984) that cross-linguistic variation is in the lexicon and that syntax is inert. If so, all variation is in the lexicon and the difference between a preposition and a complementizer and between a verb and an auxiliary can be seen in terms of features. Feature loss, I argue in Section 6.5, can then be responsible for certain grammaticalizations. One could think of feature loss as happening in the numeration, as a ‘Numeration Sloppiness’, or in the lexicon. I will suggest the latter.

Examples of Late Merge in language history are extremely numerous. The English negative nominal object that is reanalysed as a negative adverb in

NegP in (3) above is one example. Below, I will give an example of a PP adverbial that is reanalysed as a sentence connective. Initially, sentences with an initial PP headed by *after* are main clauses and the PP can be seen to be topicalized since it is a VP-adverbial. This topicalization makes a connection to the previous sentence. Many of the Old English (written) records are more paratactic than Modern English, but these topicalizations allow a reanalysis of the VP adverbial as a sentence connective and of the clause they belong to as an embedded clause.

The preposition (and adverb) *after* has always been in the English language. As part of a preposition phrase, it functions as a VP-adverbial of time inside the VP, as in (19):

- (19) Fand þa ðær inn æþelinga gedriht swefan æfter symble
 found then there in noble company sleeping after feast
 ‘He found therein a company of nobles sleeping after their feast’
 (*Beowulf* 118–19)

The way the use of *after* as a complementizer developed is that first the PP headed by *after* was fronted, as in (20), and the object of the preposition became a ‘bland’ demonstrative, as in (21):

- (20) a. Her Leo se æþela papa & se halga forþferde, & æfter him Stephanus
 feng to rice.
 ‘In this year, Leo the noble and holy pope died and after him,
 Stephen started to rule’ (*Chronicle A*, year 814 [816])
 b. & þær wearþ Heahmund biseþ ofslægen, & fela godra monna; &
 æfter þissum gefeohte cuom micel sumorlida.
 ‘And there was Bishop H. killed and many good men, and after
 this fight came many summer troops’ (*Chronicle A*, year 871)
- (21) a. Her forðferde Wulfstan diacon on Cilda mæssedæge
 7 æfter þon forðferde Gyric mæsse preost.
 ‘In this year died Wulfstan . . . and after that died Gyric the priest.’
 (*Chronicle A*, year 963)
 b. [Æfter þysan] com Thomas to Cantwarebyri
 ‘After this, Thomas came to Canterbury’
 (*Chronicle A*, year 1070)

After this fronting, the PP could be reanalysed as a clause linker and the clause to which it belonged as an embedded adverbial clause.

The gradual change towards higher base generation of the PP can be shown by comparing the parts of the *Anglo-Saxon Chronicle* done by different

TABLE 6.3 Percentages of PP fronting and of demonstrative objects (Dem) with *after* in *Chronicle A*

	before the year 892	after 893
Fronting	7/26 = 27%	12/22 = 55%
Dem	2/26 = 8%	17/22 = 77%

TABLE 6.4 Grammaticalization of *after*

a.	PP	PP	900 (<i>Chronicle A</i>) - present
b.	PP (<i>that</i>)		950 (<i>Lindisfarne</i>) - 1600 (<i>OED</i> 1587)
c.	P <i>that</i>		1220 (<i>Lambeth</i>) - 1600 (<i>OED</i> 1611)
d.	C		1360 (<i>Wycliff</i>) - present

scribes in different time periods. The percentages of fronting (which sets the stage for Late Merge) in two different stages, are given in Table 6.3; the numbers of nondescript prepositional objects is also given.⁴

There is a period where *after that* conjoins clauses, as in (22), but after 1360, *after* is a complementizer on its own, as in (23ab), reanalysed as a head:

- (22) **After that** Raleigh had Intelligence that Cobham had accused him, he endeavour'd to have Intelligence from Cobham (*The Trial of Sir Walter Raleigh*, I 208)
- (23) a. **Aftir** he hadde take þe hooli Goost (c.1360 Wyclif, from the *OED*)
 b. **After** thei han slayn them (1366 *Mandeville*, from the *OED*)

The stages from VP-adverbial, to topicalized adverbial, to reanalysed higher adverbial, to complementizer are represented in Table 6.4.

What is the status of the Economy Principles? I argue that they are part of the cognitive system and help learners construct a grammar. Similar to principles such as c-command, they remain active in the internalized grammar and therefore also aid speakers in constructing sentences. They aren't absolute: if there is evidence for a pronoun to be both a phrase and a head, the child/adult will analyse it initially as a head unless there is also evidence in the grammar (e.g. from coordination) that pronouns also function as full DPs. Preposition Stranding, for instance, can be seen as due to a 'Move as little as possible' Economy Principle, but it isn't absolute. Even in spoken English, there is an occasional preposition that has moved along. Some

⁴ The *Anglo Saxon Chronicle* describes the years from Julius Caesar's invasion to the years around and after the Norman Invasion of 1066. *Chronicle A* goes to 1070 and is written by one scribe 'Hand I' up to 892. After 892, there is a variety of hands.

estimate (Montgomery and Bailey 1991: 156) that in formal spoken English 14 per cent of prepositions are not stranded in relative clauses. The reason that the ultimate change is slow is that there are prescriptive factors that favour phrases over heads, e.g. prohibition against stranding prepositions, the rule of using relative *who/m* over the head *that*.

Having introduced two principles that account for internal change, I now show how part of the linguistic cycle is accounted for by them.

6.4 Grammaticalization as economy and the cycle as economy and renewal

Grammaticalization is a process whereby lexical items generally lose phonological weight and semantic specificity and gain grammatical functions. This can be seen in the case of relative *that* which in Old English is grammaticalized from a neuter demonstrative (see van Gelderen 2004a for more detail). As demonstratives, the relatives are originally in the specifier position but by Middle English, they are reanalysed as heads. Renewal comes from an external source through *who*.

So, the two principles just mentioned account for grammaticalization e.g. from specifier to head. How are they responsible for cyclical change? Let's see what happens when we combine the effects of the HPP and the LMP. In Fig. 6.1, a Spec(ifier) can be reanalysed as an X head (HPP) and the Specifier position can be filled by a phrase from a lower domain (LMP):

This scenario works perfectly for changes where a negative object such as Old English *na wiht* 'no creature' becomes a Spec (LMP) and subsequently a head *not* of a NegP (HPP).

A stage not yet accounted for is the shift to zero, as in the case of negative heads, e.g. Old English and Modern French *ne* and *n't* currently in many varieties of Modern English, the Modern English relative *that*, and Old English aspectual prefixes. The main reason for head deletion is that head movement of other heads, e.g. the auxiliary moving via the Neg(ative) head

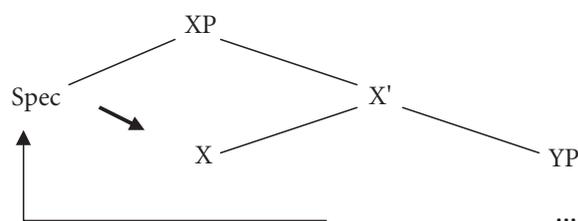


FIGURE 6.1 The linguistic cycle

to C, may lead to Feature Syncretism (where one word has two functions). Words such as *won't* and Old English *nis* 'not-is' tend to be reanalysed as expressing only one feature. See Faarlund (2008) who argues for a principle as given in (24), which I will refer to as Iconicity:

(24) **Null hypothesis of language acquisition**

A string is a word with lexical content.

Faarlund explains that '[i]n terms of acquisition and reanalysis, this means that the child misses some of the boundary cues, and interprets the input string as having a weaker boundary (fewer slashes, stronger coherence) at a certain point':

- (25) $/// > // > /$
 halli///hino > hall//inn > *hall/en Stages of Norwegian
 stone this stone the

These three principles are not sufficient to account for the entire cycle. For instance, there are a number of changes where a new element comes from outside of the sentence, for pragmatic reasons, e.g. a demonstrative *that* being incorporated into the CP to indicate subordination, as happened in the history of Germanic, and an emphatic topic pronoun becoming the subject (in Spec TP), as happened in the history of French. Therefore, I will argue that there is a principle that incorporates (innovative) topics and adverbials in the syntactic tree:

(26) **Specifier Incorporation (SIP)**

When possible, be a specifier if you are a phrase.

In conclusion, I have discussed four Economy Principles that account for the different linguistic cycles. The linguistic cycle most extensively discussed is that of the preposition *after*, reanalysed in accordance with LMP and HPP. I will now show how these principles can be reformulated in terms of Feature Economy.

6.5 Feature Economy

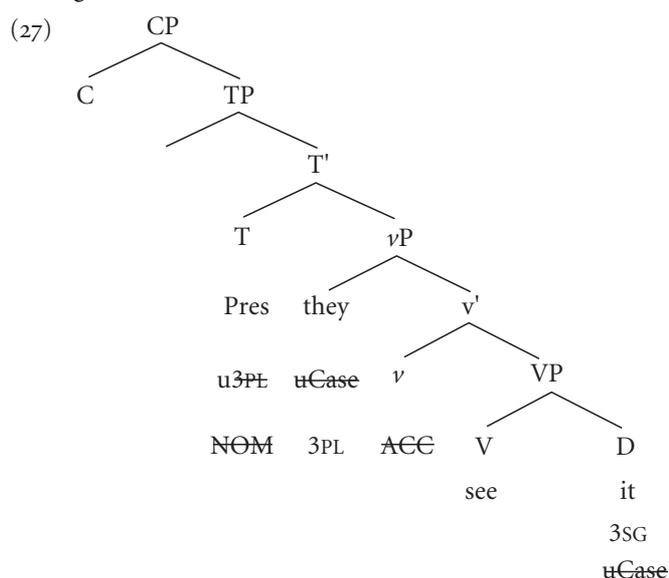
In this section, I'll rephrase the Economy Principles in terms of Feature Economy. Since the Principle of Late Merge is quite theory-dependent and emphasizes the derivation rather than the lexicon, I will rephrase it and the HPP in terms of Feature Economy.

Three kinds of features are seen as relevant, namely uninterpretable phi-features on the Probe, uninterpretable structural Case on the Goal, and EPP/OCC on the Probe (see Chomsky 2004: 116). Each language learner decides

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on the basis of the language *s/he* hears which features to include. Using these features, a derivation proceeds as follows. Lexical items are selected (as a lexical array) from the lexicon to be accessed in the derivation. Merge then takes two items and puts them together, initially through External Merge (the *vP* shell).

After probes such as *T* and *v* are merged, these probes examine their *c*-command domains, and agree with the closest DP. This operation values these probes' unvalued *phi*-features, and in turn values the uninterpretable Case on the DP, as in the simplified (27). This valuation is indicated by 'strike through':⁵



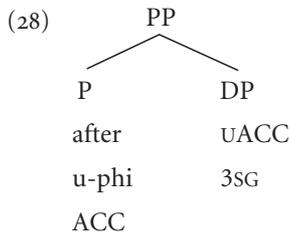
The EPP/OCC feature ensures Internal Merge to certain positions, but is not relevant to this chapter and hence, it is not indicated in (27). I am assuming the case on the probe is interpretable.

Having given some background on features, we can now proceed to reformulate the HPP, LMP, and Iconicity in terms of feature loss. I will start with the LMP and discuss the changes involving *after* as Feature Economy.

A preposition such as *after* has semantic features (e.g. [time, order, past]) and phonological ones (two syllables, etc), not accessible during the derivation, as well as formal features, accessible during the computation. In

⁵ u stands for 'uninterpretable'.

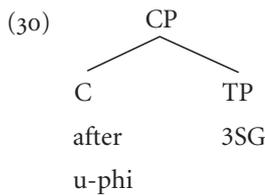
Chomsky (1995: 230–2), the formal features include categorial, Case, and phi-features. In later work, following Marantz (1997), lexical items are seen as not specified for category but as roots that are nominalized or verbalized through Merge. I assume that prepositions are probes and this means they have unvalued phi-features and value the Case of the DP in their domain:



Thus, there is a formal uninterpretable and unvalued feature that makes prepositions into probes. This is the feature that is relevant for the derivation; other features are in fact a burden on the computational system. Language learners and users thus use (29) to eliminate [ACC] from the lexical item:

- (29) **Economy of Features** (to be generalized)
 Minimize the interpretable features in the derivation.

With the interpretable feature removed, the structure will be as in (30), and the same for *like* and *for* (and a number of other prepositions). The uninterpretable, unvalued features of C will probe into the clause they c-command, and find a goal in the lower TP to value its phi-features. It is well known that CPs (as subjects) trigger third-person singular agreement on the verb. This is expected if the complementizer has phi-features (and these are overt in many languages):



So far, (29) accounts for grammaticalizations of prepositions to complementizers, i.e. the LMP. Let's now add the HPP and Iconicity. The change in French (Section 6.2) from emphatic to pronoun to agreement marker can be seen as a change from an emphatic adjunct with semantic features (similar to full nouns) to uninterpretable phi-features on T probing for another element with interpretable features:

(31) **Feature Economy (FE):**

- a. Adjunct > Spec > Head > zero
 b. semantic > interpretable > uninterpretable

The classical Negative Cycle in English (Section 6.2) is one where semantic negative features present in the negative DP are reanalysed, i.e. internalized by the language learner, as interpretable on the Specifier, and this is what the uninterpretable features on the Neg(ative) head check with. When the Specifier is reanalysed as a head, this means its features are uF, probing for other more semantic features. The other two instances of the Negative Cycle work similarly. Since an exact analysis of English relative pronouns in terms of features has not been made, I'll refrain from formulating the Relative Cycle (Section 6.3) in terms of features.

6.6 Conclusion

In this chapter, I have suggested that the grammaticalizations formerly seen as cases of Late Merge, e.g. in van Gelderen (2004a), and of Head Preference can be reformulated focusing on lexical rather than derivational characteristics. This results in a Feature Economy Principle that accounts readily for the grammaticalization from preposition to complementizer and from pronoun to agreement marker.

Chomsky (2004, 2006: 2–3) argues that we need to attribute as little as possible to UG and instead rely as much as possible on principles not specific to the faculty of language. Many Economy Principles, (31) included, fall into this latter category in that they reduce the computational burden.

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