Aspect, tense and modality: theory, typology, acquisition
Boland, J.H.G.

Citation for published version (APA):
Chapter 5

Implications of the Scope Hierarchy

5.1 Introduction

In section 2.5 it was argued that operators with wider scope modify more complex semantic units that are conceptually more abstract, and that operators with wider scope are communicatively less motivated than operators with narrower scope. I expect that semantic complexity, conceptual abstractness and communicative motivation play an important part in the limits on language variation. What is conceptually more abstract, communicatively less needed and semantically more complex occurs probably less frequently in human language systems. From the viewpoint of FG, operators with wider scope are more marked than operators with narrower scope. It is thus assumed that there is an implicational hierarchy as in (1):

\( \pi_1 \text{-operator} \subset \pi_2 \text{-operator} \subset \pi_3 \text{-operator}, \)

in which ‘\( \subset \)’ means ‘is implied by’ or ‘is less marked than’. Consequently, it is to be expected that operators with wider scope behave differently from operators with narrower scope both in languages of the world and in stages of child language. Which differences may be expected will be discussed in this chapter.

Each category of operators in (1) represents specific domains of TMA. In Chapters 3 and 4 I discussed the analysis of different TMA domains with respect to their scope. A summary of these findings is presented in Table 5-1, which unites Table 3-2 and Table 4-6. This table shows to which class of operators the different TMA domains belong. It should be stressed that \( \pi_1 \)-operators with scope over the predicate, i.e., aspect, property quantification and participant-oriented modality, are considered to serve a similar communicative function in the utterance, namely modification of the predicate. Therefore, they are conceived of as a single category of modifiers. The same holds for different expressions of tense, event-oriented modality, event quantification and irrealis that all function as \( \pi_2 \)-operators that modify the predication and for different expressions of proposition-oriented modality and evidentiality that all function
Table 5-1. Classification of TMA domains according to scope

<table>
<thead>
<tr>
<th>TMA Domain</th>
<th>Scope over</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspect</td>
<td></td>
<td>π1</td>
</tr>
<tr>
<td>Property quantification</td>
<td>Predicate</td>
<td>π1</td>
</tr>
<tr>
<td>Participant-oriented modality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tense</td>
<td>Predication</td>
<td>π2</td>
</tr>
<tr>
<td>Event quantification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Event-oriented modality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrealis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proposition-oriented modality</td>
<td>Proposition</td>
<td>π3</td>
</tr>
<tr>
<td>Evidentiality</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

as π3-operators that modify the proposition. A specification of (1) is presented in (2):

\[
\{\text{aspect, property quantification, participant-oriented modality}\} \subset \{\text{tense, event quantification, event-oriented modality, irrealis}\} \subset \{\text{proposition-oriented modality, evidentiality}\}
\]

The implicational hierarchy is assumed to have reflections in adult and child language. This chapter will discuss the specific linguistic implications of the Scope Hierarchy. As this research is about grammatical markers of TMA, first a closer look is needed into the evolution of grammatical markers in language, i.e. into grammaticalization processes. This will lead to specific hypotheses about diachronic development, frequency, synchronic configurations, and morphology and syntax of TMA expressions. It will also lead to the formulation of a specific hypothesis about the order of acquisition of TMA expressions in first language development.

5.2 Grammaticalization

In many theoretical models of language, including FG, a sharp distinction is made between lexical and grammatical items, or, similarly, between content words and function words. Sapir (1921: 25) spoke of ‘material content’ (or lexical meaning) and ‘relational content’ (or grammatical meaning). Although languages universally distinguish between the two types of elements 'a given
Table 5-2. Characteristics of lexical and grammatical items (Bybee et al. 1994: 5-8)

<table>
<thead>
<tr>
<th>Lexical item</th>
<th>Grammatical item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific meaning</td>
<td>General / abstract meaning</td>
</tr>
<tr>
<td>Selection restrictions</td>
<td>No selection restrictions</td>
</tr>
<tr>
<td>Optionally used</td>
<td>Systematically/obligatorily used</td>
</tr>
<tr>
<td>Relatively infrequent</td>
<td>Relatively frequent</td>
</tr>
<tr>
<td>Flexible syntactic position</td>
<td>Rigid syntactic position</td>
</tr>
<tr>
<td>Phonologically rich</td>
<td>Phonologically reduced</td>
</tr>
<tr>
<td>Member of large open class</td>
<td>Member of small closed class</td>
</tr>
</tbody>
</table>

concept may in one language be treated as though it were material, while in another language the same concept appears as relational’ (Givón 1984: 48). Lexical elements are independent entities, whereas grammatical elements are dependent entities; they relate lexical elements with one another, or modify their connotation. In general, the differences between a typical lexical and typical grammatical element can be described as in Table 5-2. Haspelmath (1999: 1056) adds that there is also a correlation with modes of mental processing: lexical items are processed deliberately and consciously, whereas grammatical items are processed automatically and unconsciously.

Although most theoretical models suggest otherwise, the distinction between the lexical and grammatical extremes is not sharp, but rather continuous. Diachronically, ‘grammatical morphemes develop gradually out of lexical morphemes or combinations of lexical morphemes with lexical or grammatical morphemes.’ (Bybee et al. 1994: 4) This process is referred to as grammaticalization (or grammaticization). Grammatical items or grams (after Bybee et al.) evolve from lexical items and during this process they will increasingly take on the characteristics in the right column in Table 5-2. It is, however, hard to define necessary and sufficient characteristics, so that it is difficult to say at which point exactly an item should be defined as grammatical. There are many elements in a language that show some, but not all of the properties of either the lexical or the grammatical pole. For example, prepositions show characteristics of both sides and periphrastic constructions are also notoriously difficult to classify (Muysken 2006; Olbertz 1996).

---

Categories of lexical and grammatical items are thus imprecise; it is impossible to define the categories in such a way that ‘for every member $x$ of its domain (that is, the set of things to which the category can be meaningfully applied), the definition determines a truth-value to the statement that $x$ belongs to the category in question’ (Dahl 1985: 3). Section 6.2.1 discusses the impreciseness of grammatical elements in this thesis.

In order to predict what the influence of scope may be on TMA systems, it is important to understand the processes by which grammatical TMA expressions arise in languages. Grammaticalization results from semantic or functional change, morphosyntactic processes, and phonetic reduction. Firstly, the meaning of an item becomes more general and abstract and correspondingly, the range of contexts in which it can be used becomes wider. This process is referred to as desemanticization (Heine 1993), semantic generalization (Bybee & Pagliuca 1985), bleaching (Givón 1975) or erosion (Lehmann 1995). Because of the increasing generality of meaning and loss of specificity, the selection restrictions on the arguments or type of main predicate with which the item can combine are loosened. For example, lexical verbs that are on their way towards becoming an auxiliary, typically change from combining only with a human agentive subject, to combining with all kinds of subjects, and from combining with a complement that expresses a concrete object or location to a complement that expresses a dynamic situation (Heine 1993: 54). For example, a common semantic change is that of a lexical verb meaning want changing to a morpheme denoting future tense. Verbs of wanting typically combine with two arguments: an animate subject and a concrete object as for the Dutch wil ‘want’ in ik wil een koekje ‘I want a cookie’. In a next stage, the verb may come to combine with verbal complements ik wil lezen ‘I want to read’ or with an inanimate being de auto wil niet starten ‘the car does not want to start’. When it further develops into a future meaning, the selection restrictions on the arguments gradually disappear completely, as has happened with will in English: any subject is allowed and any type of complement, as can be seen in examples such as the stone will fall or economy will rise.

As the applicability of an item increases, it will become much more frequent in discourse: there are far more contexts in which it may be used. In a next stage, the use of the item is no longer restricted to contexts where it adds semantic content. It may now be used when the semantics are in fact redundant, whenever it is compatible with the context. This may lead to a stage in which it becomes meaningful not to express the item: the absence of item X comes to denote ‘not X’. For example, the absence of a past tense marker may come to mean ‘non-past tense’, so that a past tense marker becomes obligatory in every context that concerns the past tense, which again, results in an increase in frequency. Grammatical items may develop this systematic, obligatory use in
contrast to lexical items: it is never the case that the absence of a lexical item Y means ‘not Y’, for example, it is not the case that every sentence without the adverb *yesterday* means ‘not yesterday’. Note, however, that not every grammatical marker is obligatorily used.

Secondly, grammaticalization is characterized by morphosyntactic change. A grammaticalizing morpheme or construction becomes phonologically and semantically more dependent on surrounding material, which leads to an increasing rigidification of the syntactic position of the morpheme (Bybee et al. 1994: 7). Its syntactic position is less and less free. Furthermore, decategorialization of the source item takes place (Heine, Claudi, & Hünnemeyer 1991a): it loses the characteristics of a typical verb, noun, adjective or adverb. For example a verb on its way to becoming an auxiliary loses verbal properties, such as the ability to form imperatives, to be nominalized, to have an infinitival form, to passivize, or to be negated separately. It may no longer have a noun as its complement nucleus, but instead a (nominalized or nonfinite) verb.

Thirdly, grammaticalization is characterized by phonological reduction. There is quantitative reduction: forms become shorter, because phonemes erode or fuse with other phonemes or because the articulation is compressed so that the temporal duration of the item is decreased. There is also qualitative reduction: phonological segments stem more and more from the unmarked set of phonemes of the specific language. (Hopper & Traugott 1993: 145), (Bybee et al. 1994: 6). Heine (1993: 56) mentions that a verb loses its ability to carry distinctive tone or stress.

During grammaticalization there is a stage in which a single item is used both in contexts where it shows mainly lexical characteristics and in contexts where it shows mainly grammatical characteristics. The ‘grammatical’ use is at first often restricted to a specific construction and it is this specific construction that forms the input for the grammaticalization process. In the process of grammaticalization the grammatical use gradually becomes more frequent, possibly, but not necessarily, at the cost of the lexical use. In sum, the more grammaticalized an item is:

- the more it loses in semantic complexity, functional significance and/or expressive value
- the more it loses in pragmatic and gains in syntactic significance
- the more reduced is the number of members belonging to the same morphosyntactic paradigm
- the more its syntactic variability decreases, the more its position within the clause becomes fixed
- the more its use becomes obligatory in certain contexts and ungrammatical in others
the more it coalesces semantically, morphosyntactically, and phonetically with other units
• the more it loses in phonetic substance (Heine, Claudi, & Hünnemeyer 1991b: 15-16)

When an item is grammaticalized, the development does not stop: the item tends to generalize further in meaning and to reduce further in size. A common development is that several items generalize in meaning and these generalized meanings come to overlap. For example, there may be different items, for example a prospective, a volition and an obligation marker, that all develop towards the more general meaning of future tense. This leads to diachronic competition between the different elements and one or more of them may become extinct.

The remarkable thing about grammaticalization is not so much that it exists, but rather that many analogous developments are attested in unrelated languages. Just to mention a few, sources for functional items originate over and over again in general terms for movement, postures, locations and body parts (Bybee 2003a: 151-52); The word for ‘say’ developed into a marker of direct quotation in several languages, among others Khmer, Buru, Saramaccan and Twi (Heine & Kuteva 2002: 267-68); A completive or perfect marker has developed from a lexical verb meaning finish in e.g. Bantu languages, Cantonese, Tok Pisin, Lao, Engenni, Tucano, and American Sign Language, (Bybee 2003a: 149). Heine & Kuteva (2002) collected several hundred universal grammaticalization paths, universal in the sense that they have independently occurred in unrelated languages. The actual goal of linguistics, however, is not only to collect universals but rather to understand why they exist. We want to know what are the ‘true universals’, the ‘mechanisms of change that propel grams along these paths of development.’ (Bybee et al. 1994: 302). These mechanisms that create the changes should be understood ‘in terms of more basic cognitive and interactive processes.’ (Bybee 2003a: 151). What are the universal cognitive and communicative mechanisms that underlie grammaticalization?

5.3 COGNITIVE MECHANISMS AND COMMUNICATIVE NEEDS

5.3.1 Pragmatic inference

When we want to understand universal patterns, a closer look is needed into the cognitive processes involved in grammaticalization. Particularly the process of semantic change needs some elaboration. The change in meaning that morphemes undergo in the process of grammaticalization is not arbitrary or random. Sweetser (1990: 9) states that ‘(…) new senses are acquired by
cognitive structuring’ and that ‘multiple synchronic senses of a given word will normally be related to each other in a motivated fashion.’ What exactly is this motivated relation between different senses?

5.3.1.1 Metaphor and metonymy

There are two important mechanisms or motivations that may play a part in semantic change: metaphor and metonymy. Metaphor is a figure of speech whereby a certain (abstract) concept is understood as if it were another (concrete) concept. Both concepts are related in the mind of the speaker by analogy or iconicity. Sweetser claims that the most important mechanism of semantic change is **metaphorical transfer**. She states that:

> we model linguistic expression itself not only (a) as a description (a model of the world), but also (b) as action (an act in the world being described), and even (c) as an epistemic or logical entity (a premise or a conclusion in our world of reasoning). (1990: 21).

Human beings understand epistemic or logical entities in terms of real-world entities. They transfer concepts and vocabulary from the more accessible external sociophysical world to the less accessible abstract internal world of reasoning (1990: 31). As discussed in 4.2.2, Sweetser claims that the basic sense of modal auxiliaries is by metaphorical extension applied to the internal mental world. Logical necessity is ‘the mental analogue of sociophysical force, while logical possibility is the mental (or epistemic) analogue of permission or ability in the real world.’ (1990: 30). The same metaphor is used in other areas of the linguistic system, such as with verbs of sensory perception (see, grasp) are used for mental perception (meaning ‘know’, ‘understand’). Metaphorical transfer thus involves the application of a certain grammatical element or gram to a more abstract world, while the sense of the gram is maintained. A serious problem with the metaphor model is that it involves ‘a discrete “jump” from one domain to another’ (Heine 1993: 97), whereas the process of grammaticalization supposes a gradual change.

A second mechanism of semantic change is **metonymy**, also referred to as **pragmatic or context-induced inference**, or **conventionalization of implicature** (see e.g. Bybee 1988; Bybee 2003a; Heine et al. 1991b; Hopper & Traugott 1993; Traugott 1989, 1996). It is defined as:

> a figure of speech whereby the name of one entity e1 is used to refer to another entity e2 which is contiguous to e1. (…) The essence of metonymy resides in the possibility of establishing connections between entities which co-occur within a given conceptual structure. (J. R. Taylor 1989: 122-24)

---

2 Notice the similarity in formulation with the layers in FG that function to describe, to refer and to transfer propositional content.
Pragmatic inference is a basic principle of communication. Speakers make inferences when they encode the intention they want to communicate and addressees make inferences when they want to decode the communicated intention. They both use their knowledge of the preceding context, the current speech situation and their general knowledge of the world as they infer what the pragmatic information of the interlocutor is. Speakers anticipate on the interpretation of addressees by estimating the pragmatic information of the addressee and encode their intention in such a way that addressees are probably capable of reconstructing their intention by inference. Addressees make an estimation of the pragmatic information of the speaker when they try to infer what the speaker has tried to communicate by the linguistic forms he or she has chosen to use. The utterance in itself does not establish the relation between the intention of the speaker and the interpretation of the addressee but rather mediates it and in this sense communication is purely a matter of pragmatic inference.

Pragmatic inference plays an important role in semantic change. Within a certain context, a specific expression may have certain implicatures about related senses, for example, when someone says *I need to go now*, it only encodes that it is somehow necessary for the speaker to go, but it is also very probable that the speaker will indeed leave soon. If an expression occurs frequently in a context in which these implicatures are present, then the expression becomes frequently associated with the inference and language users come to ‘assume that the inference is a necessary part of the meaning of the form’ (Bybee et al. 1994: 197). The implicature may become conventionalized and form part of the meaning: the item has now acquired a secondary sense, besides its primary sense. After this, the use of the item may become restricted to contexts in which the new meaning is appropriate: the secondary sense becomes the primary sense, whereas the original meaning becomes the secondary sense. Eventually, the original meaning may disappear completely. For example, a perfect aspect marker, which selects the post-state of an event (see 3.3.3), implies that an event has taken place, although this implicature may in most cases be irrelevant to the conversation. If however, the perfect is often used in contexts where not only the post-state of the event is relevant, but also the fact that the event has taken place, or in contexts where the post-state is even less relevant than the fact that the event has taken place, then the implicature of the past tense is highlighted and gradually becomes part of the meaning. The perfect construction may at first develop a past tense use besides its perfect aspect use and gradually lose its perfect aspect use.

Metaphor and metonymy are not necessarily mutually exclusive mechanisms. Both Goossens (1995) and Heine et al. (1991b) argue that they complement one another and this position is now widely accepted. Although metaphorical
transfer involves discrete, discontinuous steps from one cognitive domain to another, there is also a gradual change: there is a continuous extension from using the item in linguistic contexts where only the ‘concrete’ meaning is appropriate, to contexts where there is ambiguity between the concrete and more abstract reading, and from there, to contexts where only the more abstract reading is appropriate. The metaphorical interpretation is in fact an implicature within a certain context. This may be illustrated with an example from Traugott & König (1991) for the modal auxiliary *must*.

\[ \text{Must} \] in the epistemic sense of ‘I conclude that’ [is] derived from the obligative sense of ‘ought to’ by strengthening of conversational inferences and subjectification. If I say *She must be married* in the obligation sense, I invite the inference that she will indeed get married. This inference is of course epistemic, pertaining to a state of affairs that is anticipated to be true at some later time. (p.209)

### 5.3.1.2 Polysemy and ambiguity

Within the process of semantic change, ambiguity or polysemy of a specific morpheme is a common (and maybe even necessary) phase: there is a stage in which the morpheme is used with different interpretations. Coates (1983: 15-17) distinguishes between two kinds of ‘overlapping’ senses (polysemy): ambiguity and merger. Ambiguity yields an ‘either/or’ interpretation: either sense A or sense B is a possible interpretation, but the two interpretations are mutually exclusive. Consider (3):

(3) He must understand that we mean business.

*Must* in (3) expresses either ‘surely he understands that we mean business’ or ‘it is essential that he understands that we mean business’ (Coates 1983: 16). The second type of polysemy is merger, which yields a ‘both/and’ interpretation: both sense A and sense B are possible interpretations and both interpretations are mutually compatible. Consider (4):

(4) Rutherford suggested to Marsden that he should follow this up.

*Should* in (4) gets the interpretation of weak obligation, but also of a quasi-subjunctive. (Coates 1983: 17).

---

3 According to Sweetser, ‘no historical shift of meaning can take place without an intervening stage of polysemy’ (1990: 9).
Schematically, semantic change can be represented as in (5) in which the sense in between brackets is the less common interpretation. The secondary sense, B, can arise through metaphor or metonymy:

(5) Ambiguity: $A \rightarrow \{A \text{ (or B)}\} \rightarrow \{A \text{ or B}\} \rightarrow \{B \text{ (or A)}\} \rightarrow B$

Merger: $A \rightarrow \{A \text{ (and B)}\} \rightarrow \{A \text{ and B}\} \rightarrow \{(A \text{ and) B}\} \rightarrow B$

The semantic change of a linguistic item can result in an extra sense which is in general more abstract, referred to as specialization of meaning ($A \rightarrow AB$), or it can result in the loss of a sense, called generalization of meaning or bleaching ($AB \rightarrow B$). The more specialized and the more generalized interpretation may be used at the same time in a synchronic stage of language, in which case we speak of polysemy.

It should be stressed that different types of semantic change are possible and that the above representations may be too simplistic. For example, a specific item could trigger different implicatures in different contexts. As a result, the item may develop more than one secondary sense, yielding a ‘split’ in the semantic development, as represented in (6):

(6) $A \rightarrow AB \rightarrow B$

\[\downarrow\]

$AC \rightarrow C$

Other scenario’s are conceivable: two senses may be involved, the first sense may remain present for a long time, secondary or third senses may become primary senses, etcetera. Bear in mind that an earlier interpretation does not have to disappear immediately when a new interpretation gets conventionalized: different interpretations may co-exist in a single stage of language.

5.3.2 Automaticity

For the different processes of grammaticalization (semantic change, morphosyntactic rigidification and phonological reduction), frequency of use is an essential factor. It is, however, impossible to tell the cause from the result. On the one hand, frequent use is a necessary condition for grammaticalization to take place; on the other hand, the process of grammaticalization induces frequent use. Frequent repetition of a linguistic construction leads to greater ease of processing, that is, automatization of cognitive processes. When a single task is executed repeatedly, one needs less time and effort to execute it. The duration of distinct sequential acts within this task decreases and several acts come to overlap or even fuse into one. Automatization is a driving force in grammaticalization. Only if an item is used frequently in a context that triggers a specific implicature, this implicature may become conventionalized as part of
the meaning. Furthermore, repetition of an item causes semantic bleaching through the cognitive process of habituation: if a stimulus is repeated frequently, the level of response of an organism tends to decrease (Bybee & Hopper 2001a: 13; Haiman 1994). Linguistic elements that are used frequently, gradually lose their original strength and their contribution to the information value of the utterance decreases. This leads to ‘inflation’ of meaning (Dahl 2001). Grams add less specific information to the discourse than lexical elements. Automatization also plays a part in syntactic rigidification. If two or more elements co-occur frequently in sequence, the accessibility for this specific string improves and pronunciation takes less time. The construction will become tighter and a string of morphemes may even fuse into one single morpheme (Bybee & Scheibman 1999). Automatization, then, also underlies phonological reduction, as the magnitude of articulatory gestures is reduced and distinct articulatory acts come to overlap (Bybee & Hopper 2001a: 11).

5.3.3 Communicative needs

Why does grammaticalization occur at all? Bybee et al. (1994: 298) argue that grammaticalization cannot be explained simply in terms of communicative need. There are several reasons why it cannot be maintained that languages need a specific grammatical item: no single gram type is universal, two or more markers may express the same function, inflectional markers are often redundant and some grams create rather than solve ambiguity. Discourse is structured and organized, but regularities and structures also coincidentally result from discourse. At first, in the stage where speakers regularly, but not yet consistently, make pragmatic inferences, these inferences are not yet part of the meaning, and ‘conceptual manipulation is still largely provisional, unstable, “epiphenomenal”.’ (Heine et al. 1991b: 77) In the next phase, when inferences of a certain construction become adopted in the meaning, the amount of morphological and syntactic repetition increases, there are recurrent strategies for building discourses, and there are emergent grammatical regularities. This is the phase where grammatical concepts are stabilized, or conventionalized, and develop into distinct ‘senses’. (Heine et al. 1991b: 77)

Grammar, then, would be mechanistic or emergent (Bybee et al. 1994: 298, 300; Hopper 1987, 1998) rather than functional or goal-directed. That grammar emerges does not imply that grammar has no function: it is just not created for a specific purpose. When grammar has emerged, it allows speakers to organize and present information without foregrounding it, as lexical expression does (Bybee et al. 1994: 299). Besides that, grammar facilitates production through automatization. Because morphemes and word order are supplied automatically, the speaker’s attention can be fully directed to the propositional
content. ‘The advantages of automation can explain why categories or structures become obligatory despite the fact that they are not always strictly necessary for communication’ (Bybee et al. 1994: 300).

Although I agree to a certain extent with the view that grammar is emergent and not goal-directed, I have strong objections to Hopper’s claim that grammar is continuously created on the spot, in discourse. In my view, a construction that is conventionalized forms quite a stable instrument in the repertoire of speakers for encoding their communicative intentions. I furthermore disagree with the strong rejection of the role of communicative need in the development of a gram. Although it is beyond doubt that speakers do not consciously innovate a construction for the purpose of creating an extra gram, the context in which a new gram develops is in language use; the grammaticalizing construction is continuously used for fulfilling a certain communicative need, with a certain communicative intention. It is true that no single gram type is universal and that every language has its own set of grammatical expressions, but the total set of grammaticizable notions is restricted. Aspect, tense and modality are typically grammaticalized in languages of the world, but for example the color, material or symmetry of a participant or geometric concepts are never grammatically expressed (Talmy 1985, 1988b). Certain concepts are and others are not grammatically expressed in languages and certain lexical elements do and others do not function as the source for grams. This means that ‘certain meanings of linguistic units are universally much more basic to speaking than others (e.g. ‘possession’, ‘instrument’ are more basic than ‘bicycle’ or ‘moon’ in this sense)’ (Hauspalm 1999: 1055-56). Only general meanings, meanings that are needed in many contexts, will be used so frequently that they may enter the grammaticalization path.4 In my view, communicative need is a driving force in grammaticalization: not in the sense that language users need new grams but in the sense that communicative need of a construction determines whether that construction may enter the grammaticalization path.

Communicative need is closely related to general rules of communication. Hauspalm (1999), based on Keller (1994), presents five ‘Maxims of action’ that play a part in communication. Compared to Grice (1975), Hauspalm shifts the accent to sociological processes:5

---

4 In Hauspalm’s words: ‘It is difficult to prove that grammatical items are so frequent because their meanings are needed more often than those of other items, but it seems plausible to me’ (1999: 1056).

5 Cf. also Enfield (2003) for an elaborate exposition on the role of sociolinguistic factors on language change and language contact.
The five maxims are often competing. Speakers may use an innovative construction when they want to be noticed (fifth maxim), but this maxim goes against the fourth maxim and perhaps also against the third and second. Other speakers may adopt this innovation according to the Maxim of Conformity, first only in contexts where they want their utterance to be noticed (Maxim of Extravagance). Whether a new construction spreads or not depends on the social influence of the primary and secondary innovators and on whether the meaning of the construction is basic to communication. When the innovation is used frequently and ever more speakers incorporate the new construction in their repertoire, the ‘extravagancy’ of the new construction weakens (inflation) and it now spreads throughout the linguistic community only because of the maxim of conformity. If the construction is used frequently, it will become more predictable for the addressee and its processing will become more automatized. This may cause phonological reduction (Maxim of Economy) without violating the Maxim of Clarity.

What may be added to this picture is that different individuals within one linguistic community may independently invent the same construction, which probably increases the speed of grammaticalization, or they may invent different constructions for a similar communicative intention, which results in competition of constructions. The fact that there may be two or more markers to express the same function is easily understood if grammaticalization is viewed as a process (unconsciously) instigated by individual language users who continuously seek new ways to make themselves noticed.

5.4 QUESTIONS AND HYPOTHESES

Operators are the result of grammaticalization. In what way is the scope of operators related to grammaticalization? How is the Scope Hierarchy in fact reflected in linguistic domains? In this section specific hypotheses will be derived with respect to the diachronic development of TMA expressions (5.4.1), their crosslinguistic and language internal frequency (5.4.2), their possible synchronic configurations (5.4.3), their expression form (5.4.4) and expression order (5.4.5). From the hypotheses on synchronic configurations further hypotheses follow concerning the acquisition order of TMA expressions (5.4.6).
5.4.1 Diachronic development

The first domain in which the scope of TMA may be reflected is in diachronic development. TMA expressions develop through grammaticalization which is a primarily unidirectional process: linguistic elements develop towards the grammatical pole, but not towards the lexical pole (Givón 1975; Haspelmath 1999). Although the semantics of a specific item may become more or less specified, the combination of semantic generalization and morphosyntactic and phonological changes describes a one-way-direction, an in general irreversible process. Some counterexamples are attested, but they are very scarce (Campbell 1991; Joseph & Janda 1988; Newmeyer 1998; P. Ramat 1992). It should be noted that a cyclic development is not in contradiction to unidirectionality: a grammatical item may re-enter the grammaticalization process in a new construction, on a new path.

In Figure 5-1 a possible, unidirectional, semantic path for a single linguistic item is represented. In this path, Meaning 3 develops into two different meanings, Meaning 4 and Meaning D, which in turn develop further into Meaning 5 and Meaning E, respectively.

![Figure 5-1. Representation of a semantic or grammaticalization path](image)

How do the meanings on the left and on the right end of the path differ? The process of grammaticalization is regarded as a development from less to more abstract meanings (e.g. Bybee et al. 1994; Heine et al. 1991b; Sweetser 1982), from referential to interpersonal functions (Heine et al. 1991b; Traugott 1982) and from specific to general meanings. Meaning 1 will thus be most concrete and specific and the meanings 5 and E will be most abstract, general and interpersonal.

Regarding TMA expressions in FG, the wider their scope is, the more abstract, general, and interpersonal their meanings are. Predicate operators help in building up a proper description: they specify the action or property ascribed to the first argument, designated by a verbal or non-verbal predicate. These operators serve a fairly concrete and specific function and they may apply selection restrictions on the arguments, since not every argument combines with every modification of a property or relation. Predication operators help
locating the event in time and actuality. They play a part in relating the event to
the real world or an imaginary world and they probably do not or less often
apply selection restrictions on the arguments or predicate. Proposition
operators have the most abstract, interpersonal and general function in that
they express the speaker’s attitude or belief with respect to the propositional
content. They modify the abstract function of the ‘presentation of the content’.
TMA expressions with narrow scope (π₁) have the least abstract and most
specific meanings and are thus more to the left side on the grammaticalization
path, whereas TMA expressions with wide scope (π₃) have the most abstract
and general meanings and are on the right side of the path. TMA expressions
with medial scope (π₂) are in between those two.

Metaphor and metonymy are the driving mechanisms in semantic change of
TMA expressions. A gram that has narrow scope could get used in contexts
where a wider scope interpretation is a possible inference, for example, from a
perfect aspect expression past tense reference may be inferred. By the process
of metaphor our minds make sense of a wider scope interpretation. The core
sense of the gram, at first only used to modify the property or relation, is used
metaphorically to modify the event or the propositional content. If the context
in which the wider scope interpretation is possible occurs frequently, this
interpretation can get conventionalized and the gram can become polysemous
and come to function as two different operators. Both the mechanism of
metaphor and the mechanism of metonymy are relevant to a change in scope.
It is, however, also possible that the sense of an operator changes without a
change in scope. In that case metaphor is not a relevant mechanism: it is only
the conventionalization of implicature that can account for specialization or
generalization of meaning.

It is to be expected that the semantics of a morpheme only change towards
generality and towards abstractness and not the other way around. TMA
expressions should therefore diachronically develop from π₁-operator to π₂-
operator to π₃-operator and not in the other direction. FG, then, predicts that
Note that this hypothesis concerns semantic scope, not structural scope.
Lehmann (1995) has claimed that structural scope decreases in
grammaticalization whereas Tabor & Traugott (1998) have presented evidence
that structural scope increases.

The research question and hypothesis on the influence of the Scope
Hierarchy on diachrony of TMA expressions is formulated in Q1 and H1:

Q1: What is the diachronic development of TMA expressions?
H1: Diachronically, operators show an increase in scope, and develop in
the direction from π₁-operator to π₂-operator to π₃-operator.
5.4.2 Frequency and variation

A second area in which the Scope Hierarchy is probably reflected is in the frequency of operators. There are different types of frequency: token frequency of language-specific TMA expressions, the number of expressions that belong to a specific class of operators and crosslinguistic incidence of operators.

The predictions about the frequency of operators are primarily based on two factors that both play a part in grammaticalization: diachronic competition and communicative motivation. These notions have to be explained first. Diachronic competition occurs when different grams generalize in meaning and come to cover (partially) overlapping semantic spaces. So, at later stages of development, different diachronic paths converge to more general meanings. This leads to competition between the different grams with the result that only one or a few of the grams involved prevails for the more abstract function while the others gradually disappear (Bybee et al. 1994: 8, 15). Furthermore, grams may lose phonetic saliency in the course of time and their meaning may inflate and newer, more salient grams, may gradually replace the older grams (Dahl 2001). Thus, although the course of development of a gram runs from less to most abstract and general meanings, grams may also completely die out and never reach the most abstract level. As was argued in 5.4.1, \( \pi_1 \)-operators are expected to be earlier on grammaticalization paths than \( \pi_2 \)-operators, and \( \pi_2 \)-operators are in turn earlier on these paths than \( \pi_3 \)-operators. This means that developmental paths of different grams with narrow scope converge when scope increases, and that in the course of time younger grams may replace older grams in a bottom-up direction. What this means for the different types of frequency will be discussed below.

A second factor that plays a role in frequency is the communicative motivation of the function of an operator. Dahl argues that the communicative motivation of items decreases when they grammaticalize further:

> Both semantic bleaching and the diminished reliance on relevance considerations lead to a general decrease in communicative motivation of an item. Thus, when an item is grammaticalized, its content becomes less significant to the communication. (...) The communicative motivation for a tense morpheme marking past time reference is arguably less the more early the time reference is derivable from the context (Dahl 2000: 9).

The communicative motivation of TMA expressions depends, in other words, on their predictability or specificity in meaning. In FG, the function of operators with wider scope is communicatively least motivated. Most motivated is the function of predicate operators (\( \pi_1 \)) with narrow scope. These operators specify the description of the event, which takes place in nearly every utterance. The modifications that predicate operators make involve such specific changes in this description that this information has to be expressed linguistically. It is
impossible to predict or infer from context, and it is impossible to deduce this 
information from intonation or non-verbal clues. Predication operators (π₂) are 
communicatively less motivated than predicate operators. Predication operators 
help to situate the event in the real or imagined world: here, the context often 
helps the addressee to establish the referential point, sometimes by inference, 
sometimes by adverbial markers, so that operators involved with tense, event 
quantification or actuality, more often than predicate operators present 
information that is to a certain extent redundant. Finally, proposition operators 
(π₃) seem to be communicatively least relevant of fundamental. The 
commitment of the speaker to the propositional content is irrelevant in most 
utterances, since speakers are by default committed to the truth of the 
propositional content. Furthermore, both intonation and facial expression may 
indicate the speaker’s attitude or commitment, or the commitment may be 
inferred from predication operators for actuality. In sum, it is assumed that if 
the scope is wider, the operator has a less fundamental role in communication.

Diachronic competition and communicative motivation influence the 
different types of frequency. With respect to token frequency, it is in general 
stated that an item in the process of grammaticalization shows a dramatic 
increase in use (Bybee 2003b; Bybee et al. 1994: 8; Krug 2000: 74). When its 
semantics become more general, the gram is applicable in more contexts. It 
comes to be used redundantly and eventually obligatorily, so that the discourse 
frequency keeps increasing long after grammatical status has been reached. This 
sketch of development is, however, too simplistic, since it applies only to a 
certain stage in the development and only to certain grams. The token-
frequency of a lexical element will indeed increase dramatically when it becomes 
grammatical, but once fully part of the grammar, many expressions gradually 
die out because of diachronic competition. Those grams that do survive the 
sorting out, however, are not necessarily used more frequently either because 
their communicative motivation may decrease. It all depends on the obligation 
of expression: certain grams may be obligatorily expressed in a specific language 
and these grams will in fact be used very generally and frequently, like tense in 
English. Other grammatical expressions, however, remain optionally expressed 
and this scenario seems to take place more frequently. These non-obligatory 
expressions are in continuous competition with lexical expressions, for example 
the grammatical expression for uncertainty in English might competes with the 
lexical construction I suppose that. Depending on whether an expression 
becomes obligatory, the discourse frequency of a gram may either continuously 
increase until it is used in every sentence with which its meaning is compatible, 
or its frequency may remain stable, or even slowly decrease so that the gram 
dies out. The token frequency of grams in discourse, then, is in general not 
expected to increase when they are further on the grammaticalization path.
Because many grams die out, it may be expected that after their first stage as a “real” grammatical element, the frequency of grams on average becomes lower.

In terms of the Scope Hierarchy, it is expected that those expressions that are more at the beginning of a grammaticalization path, with narrower scope, are on average more frequently used than those that are at the end of a grammaticalization path, with wider scope. This is partly due to a decrease in communicative motivation, and partly due to diachronic competition. These factors will reduce the token frequency of operators with wider scope, if they have not become obligatory. This hypothesis is in line with Bybee’s claim (1985: 23) that the relative frequency of inflectional markers depends partly on relevance, that is, the more relevant a marker is with respect to the verb, the more frequently it is expressed.

Not only the token frequency of language-specific grams, but also the number of expressions that belongs to a specific class of operators is expected to correlate with scope. The disappearance of grams because of converging semantic paths probably leads to a reduction in the number of different grams upon the grammaticalization cline; since \( \pi_1 \)-operators are assumed to be located at the starting point of grammaticalization, it is to be expected that this group has most members; there is not much overlap in meaning as the meanings are still rather specific. When items further generalize in meaning and become \( \pi_2 \)- or \( \pi_3 \)-operators, there is more overlap in meaning and more competition with other expressions so that fewer expressions remain. Secondly, a decrease in communicative motivation leads to a reduction in variation for wider scope operators. The information added by \( \pi_1 \)-operators is most specific, hence, the number of expressions needed for the different modifications of the description of the event should be largest. The information added by \( \pi_2 \)-operators is more general and hence, the number of expressions needed for the different modifications of location of the event is probably lower. Finally, the information added by \( \pi_3 \)-operators is most general and the number of expressions needed for the different modifications of the content is probably lowest. The classes of grams with wider scope, that express more general meanings, are thus expected to be smaller than the classes of grams with narrower scope, that express more specific meanings.

Finally, it may be expected that the crosslinguistic occurrence of operators correlates with scope. Since the function of \( \pi_1 \)-operators is communicatively most motivated, most languages will have grammatical expressions that fulfil this function, whereas grammatical expression of the less motivated functions of \( \pi_2 \)- or \( \pi_3 \)-operators should be less widespread.

In sum, the research questions and hypotheses on frequency are:
IMPLICATIONS OF THE SCOPE HIERARCHY

Q2a: What is the token frequency of TMA expressions?
H2a: The token frequency of π₁-operators is higher than or equal to the frequency of π₂-operators and the frequency of π₂-operators is higher than or equal to the frequency of π₃-operators.

Q2b: What is the size of operator classes?
H2b: The class of π₁-operators has more members than or an equal number of members as the class of π₂-operators and this class has more members than or an equal number of members as the class of π₃-operators.

Q2c: What is the crosslinguistic incidence of operator types?
H2c: The crosslinguistic incidence of π₁-operators is larger than or equal to the incidence of π₂-operators, which in turn is larger than or equal to the incidence of π₃-operators.

5.4.3 Synchronic configurations
What are the possible synchronic configurations of operators? First, a general hypothesis can be formulated with respect to possible variation in TMA systems. A basic assumption in this thesis is that π₃-operators are more marked than π₂-operators and π₂-operators are more marked than π₁-operators because the function of operators with wider scope is communicatively less motivated and more complex. For many linguistic features, it is the case that languages only have more marked features if they also have the unmarked features. With respect to operators, this leads to the expectation that modification with more abstract meaning and wider scope can only be expressed grammatically in a language as long as modification with less abstract meaning and narrower scope can also be expressed by grammatical means. For the synchronic inventory of operators within a single language this implies that a language does not allow grammatical modification of the proposition if it does not also allow grammatical modification of the predication and this is in turn not allowed if the language does not also allow grammatical modification of the predicate. In other words, there will be π₃-operators only if there are also π₂-operators, and π₂-operators only if there are also π₁-operators. This implication does not hold the other way around. This results in hypothesis 3a:

Q3: What are possible synchronic configurations for TMA expressions?
H3a: The presence of operators with wider scope depends on the presence of operators with narrower scope according to the hierarchy: π₁-operator ⊂ π₂-operator ⊂ π₃-operator.
Second, a hypothesis may be formulated that is restricted to single linguistic elements. As already stated in section 5.2, similar developments in grammaticalization are reported crosslinguistically. Human beings that speak different languages make similar inferences; they relate new meanings to earlier meanings in similar ways. Apparently, there are universals in what human beings consider contiguous senses.

The claim is that the abstract meanings of grammatical constructions arise from common patterns of inference. The types of meanings that arise in this way suggest that hearers are commonly working to infer as much as possible about the relations of narrated descriptions to the current speech situation and to the speaker’s subjective evaluation of it. (Bybee 2003a: 156)

This leads to the prediction that certain semantic changes should be possible or probable, while others will not occur. In order to clarify relations between senses, universal semantic or conceptual spaces are described (see 1.2):

A semantic map is a geometric representation of meanings or, if one likes, uses, and of the relations between them. Meanings/uses and their connections thus constitute a semantic space. As employed in linguistic typology, the map describes and constrains languages that venture their grammars and/or lexicons into this space, both with respect to diachrony and synchrony (Van der Auwera & Plungian 1998: 86).

I assume that the semantic development of a gram is determined by conceptual continua. It is language-specific which categories are expressed by the same item, but the division is not arbitrary: conceptual spaces are universal. I adopt the hypothesis of Van der Auwera & Plungian (1998: 113) that if a single gram expresses more than one meaning, it may only express adjacent meanings or fields on a single developmental path. This is illustrated in Figure 5-2, where two possible synchronic configurations are presented. The bold meanings are the interpretations that are currently used in the language. The dotted meanings on the left side have died out; the dotted meanings on the right side have not (yet) emerged. It is predicted that meanings to the right of a single path can only develop out of their adjacent meanings on the left. Furthermore, a meaning will not die out if its adjacent meanings on the right and on the left side are still in use.

Both configurations in Figure 5-2 are expected to occur: In the top configuration, one expression covers the adjacent meanings 2, 3, 4, and 5 that are on a single path. In the bottom configuration, meaning 4 and 5 are on different grammaticalization paths than meaning D and E. So here as well one expression only covers adjacent meanings on single paths. Meaning 3 has died out.
Figure 5-2. POSSIBLE synchronous configurations of polysemy (adapted from Figure 20, 21, Van der Auwera & Plungian 1998)

Figure 5-3. IMPOSSIBLE synchronous configurations of polysemy (adapted from Figure 22, Van der Auwera & Plungian 1998)

Figure 5-3 presents two configurations that are expected to be impossible. In the first configuration, the absence of Meaning 4 is disallowed: there is a gap in
the path from Meaning 2 to Meaning 3 to Meaning 4 to Meaning 5. In the second configuration, the presence of Meaning 1 in combination with the absence of Meaning 2 and 3 is disallowed. There is no continuous line of adjacent meanings.

What does the adjacency hypothesis imply with respect to the scope of operators? The hierarchical structure of the clause and the location of operators in the FG model are supposed to play a role in the semantic or conceptual continua that relate to TMA. Expressions for adjacent notions on a semantic path will have similar scope or show a minimal difference in scope. Single TMA expressions will only express multiple semantic notions that are adjacent on a path and as semantic paths probably show a gradual increase in scope, there will be no single gram that can modify the predicate and the proposition but not the predication. This prediction not only holds for polysemous items, but also for portmanteau expressions: two forms will only fuse into a single form expressing multiple meanings if they co-occur very frequently. It is assumed that the categories with adjacent scope (π1- and π2-operators or π2- and π3-operators) are conceptually stronger related than categories with non-adjacent scope (π1- and π3-operators); categories with adjacent scope will, therefore, more often co-occur than categories with non-adjacent scope and, as a consequence, have more chance to fuse.

In sum, this leads to a second hypothesis with respect to synchronic configurations:

Q3: What are possible synchronic configurations for TMA expressions?

H3b: A single expression can only cover adjacent regions in semantic space. As a result, a polysemous or portmanteau expression will only have semantic functions with similar or adjacent scopes.

5.4.4 Expression form

The Scope Hierarchy may also be reflected in the morphology of TMA expressions. It was discussed in section 5.2 that grammaticalizing items undergo various morphosyntactic and phonological changes. They tend to become phonologically reduced (in length and in phonological contrasts), to lose properties of the original lexical category (verb, noun etcetera, ‘decategorialization’) and to get a more fixed position with respect to other items or even fuse with other items (rigidification). It may be hypothesized that an item further on a grammaticalization path exhibits an equal or higher degree of formal grammaticalization than an item earlier on this same path (cf. Van der Auwera & Plungian 1998: 115-16).

The most common grammatical expression forms are periphrases, auxiliaries, particles, inflection, stem-or tone changes and reduplication. How are these
IMPLICATIONS OF THE SCOPE HIERARCHY

expression forms related to the degree of formal grammaticalization? Although it is claimed that more grammaticalized items are more fused (Bybee et al. 1994: 40), the general language type, whether it is isolating on the one hand or fusional or agglutinative on the other hand, may be of great influence on the highest possible degree of formal grammaticalization. It may be expected that within isolating languages the major development runs from periphrasis or auxiliary to particle, whereas in fusional or agglutinative languages, the major development is from periphrasis or auxiliary to inflection, the latter types being more reduced, having a more rigid position and showing least lexical properties.

The above hypothesis cannot straightforwardly be translated in terms of scope. Although the diachronic development of operators is expected to run from narrow to wide scope and not the other way around, not every grammaticalization path necessarily runs from $\pi_1$-operator up to $\pi_3$-operator. There is thus no one-to-one relationship between age and scope of grams. First, when lexical elements become grammatical they may be used as $\pi_2$- or $\pi_3$-operator immediately, without going through a stage in which they function as $\pi_1$-operator. Furthermore, grammatical elements may be very stable in a language: for example, past en present tense markers in English are among the oldest grams, and they have been used to encode tense for centuries. In this function, they have medial scope and as the diachronic paths in Chapter 7 will show, these markers are not expected to develop senses with wide scope. It is also not the case that an increase in generality of meaning necessarily correlates with scope, since the meaning of an item may generalize while the scope remains the same. For example, a progressive marker may develop into an imperfective marker, which is more general in meaning (it also includes continuous interpretation) but has the same scope. In spite of these objections, I pose as a working hypothesis that wider scope correlates with a higher degree of formal grammaticalization. By formal grammaticalization I understand a more rigid syntactic position, less lexical properties and phonologically more reduced items.

To conclude, this leads to question and hypothesis 4:

Q4: What is the expression form of TMA expressions?
H4: Operators with wider scope show a higher or equal degree of formal grammaticalization than operators with narrower scope.

5.4.5 Expression order

A final domain in adult languages in which the scope of operators may be reflected is the syntactic order of TMA expressions. In FG it is supposed that constituent ordering adheres to certain universal and potentially competing
principles. The first general principle that is relevant here is the Principle of Iconic Ordering (cf. Haiman 1983, 1985):

Constituents conform to [the Principle of Iconic Ordering] when their ordering in one way or another iconically reflects the semantic content of the expression in which they occur. (Dik 1997a: 399)

A second principle relevant to TMA expressions is the Principle of Centripetal Orientation:

Constituents conform to [the Principle of Centripetal Orientation] when their ordering is determined by their relative distance from the head, which may lead to “mirror-image” ordering around the head. (Dik 1997a: 401)

The constituents x, y, and z comply with this principle if they are expressed with respect to a Head constituent as for example zyxH, zyHx, zHxy or Hxyz. Both ordering principles predict that the hierarchical relations of operators will be represented in their relative ordering with respect to the predicate, as follows: \( \pi_3 \pi_2 \pi_1 \) Predicate \( \pi_1 \pi_2 \pi_3 \) (cf. Hengeveld 1989: 141). This hypothesis is a refinement of prediction II in Bybee (1985: 24): ‘If linguistic expression is iconic, then we would predict that the categories that are more relevant to the verb will occur closer to the stem than those that are less relevant.’

Q5: What is the expression order of TMA expressions?

H5: The expression order of TMA expressions iconically reflects the scope relations as follows: \( \pi_3 \pi_2 \pi_1 \) Predicate \( \pi_1 \pi_2 \pi_3 \)

5.4.6 Language acquisition

Hypothesis 3a and 3b lead to specific expectations with respect to language acquisition. The general question to be investigated in this thesis is whether the limits on possible synchronic configurations of linguistic properties in languages also hold for stages of child language. It is expected that this is in fact the case, since there are similar underlying “true” universals, that is, universal cognitive and communicative factors. As was already argued in 1.3, only if the acquisition of linguistic elements follows the order of a markedness scale, from least marked to more marked, the language system of a child is in each stage in accordance with the predicted limits on synchronic variation. With respect to TMA, this leads to Q6 and H6:

Q6: What is the acquisition order of TMA expressions?

H6: The acquisition order of TMA operators follows the order of the Scope Hierarchy, \( \pi_1 \)-operator \( \subset \pi_2 \)-operator \( \subset \pi_3 \)-operator. Because of increasing complexity and decreasing communicative need, the
acquisition order of TMA expressions is $\pi_1$-operators before $\pi_2$-operators, and $\pi_2$-operators before $\pi_3$-operators.

Furthermore, as argued in 5.4.3, it is assumed that there are universal conceptual spaces that lead to similar diachronic paths in unrelated languages. For adult languages, it is expected that single linguistic items can only simultaneously express those meanings that are adjacent on such a path, so that at all times, the semantic relatedness is reflected in a synchronic stage of language. It may be expected that stages in child language will show the same picture, since conceptual maps are universal. This implies that also in child language, single items may only express meanings that are adjacent on a path. With respect to the acquisition order of the different meanings of polysemous items, this implies that children will acquire meanings in an order that reflects the semantic relatedness. In sum, this is formulated as:

Q7:  In what order are the different functions of polysemous items acquired?

H7:  At any stage in language acquisition, a single expression can only cover adjacent regions in semantic space. As a result, a polysemous or portmanteau expression will only have semantic functions with similar or adjacent scopes.

5.5 Conclusion

The main question of this thesis is: are the limits on variation in adult languages of the world identical to the limits on variation in stages of language acquisition? It is expected that markedness scales or implicational hierarchies are reflected both in adult language and in stages of child language. Whether this is indeed the case will be tested in the domain of TMA and a markedness scale based on scope is expected to have reflections in language variation. Thus, the more specific question in this thesis is: does the hierarchy $\pi_1$-operator $\subset \pi_2$-operators $\subset \pi_3$-operator in the domain of TMA account for the limits on variation in adult languages and in stages of child language? In this chapter, several hypotheses were derived, mainly on the basis of grammaticalization theory, with respect to the kind of linguistic reflections that may be expected. Questions 1 to 5 will be examined in one particular language, English, and in a crosslinguistic survey of 76 unrelated languages in Chapter 6 and Chapter 7, respectively. Questions 6 and 7 will be investigated in detail in English (Chapters 8 and 9) and in a more general crosslinguistic study on the acquisition of TMA expressions in 24 different languages (Chapter 10).