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Michael Tomasello

*Max Planck Institute for Evolutionary Anthropology
Leipzig, Germany*



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Cognitive Processes in Grammaticalization

Joan Bybee
University of New Mexico

All of linguistic theory is concerned with the enterprise of elucidating the nature of the grammar of human languages. But along with asking the question “What is the nature of grammar?”, we can also ask “How do languages acquire grammar?” In the last 20 years, researchers interested in the latter question have elaborated a theory of grammaticalization, the process by which grammar is created, and in doing so have also come up with some interesting new perspectives on the former question.¹ Four main findings of this research are listed here:

Grammar is not a static, closed, or self-contained system, but is highly susceptible to change and highly affected by language use. The loss of grammar is generally acknowledged and often lamented by prescriptive grammarians, who mourn the loss of the distinction between *who* and *whom* but fail to rejoice in the creation of new grammar, such as the new future tense signaled by *gonna*. In fact, the creation of new grammatical morphemes and structures is as common as the loss of old ones.

Once underway, the course of grammaticalization is unidirectional and thus, in principle, predictable. Nouns and verbs lose their categorical status and become prepositions, auxiliaries, and other grammatical forms. Free elements become more restricted and fuse with other elements. Loosely conjoined main clauses fuse to become a main plus subordinate clause. The reverse directions are rarely attested.

¹The terms *grammaticalization* and *grammatization* are used interchangeably.

Both the general trends in grammaticalization and many of the very specific developments are not restricted to individual languages, but are common across genetically and geographically unrelated languages. This widespread distribution, which is illustrated later, provides a new view of language universals. Because patterns of change cannot in themselves exist in speakers' minds, the more basic universals must be the mechanisms that create the changes that are so similar across languages.

Many of the very basic mechanisms that constitute the process of grammaticalization are cognitive processes that are not necessarily restricted to language. By better understanding these cognitive processes and how they function in communicative situations, we will eventually learn the answers to the most fundamental questions that linguists ask.

GRAMMATICALIZATION

Grammaticalization is usually defined as the process by which a lexical item or a sequence of items becomes a grammatical morpheme, changing its distribution and function in the process (Heine, Claudi, & Hünnemeyer, 1991a, 1991b; Heine & Reh, 1984; Hopper & Traugott, 1993; Lehmann, 1982; Meillet, 1912). Thus English *going to* (with a finite form of *be*) becomes the intention/future marker *gonna*. However, more recently it has been observed that it is important to add that grammaticalization of lexical items takes place within *particular constructions* and further that grammaticalization is the creation of new constructions (Bybee, in press; Traugott, in press). Thus *going to* does not grammaticalize in the construction exemplified by *I'm going to the store* but only in the construction in which a verb follows *to*, as in *I'm going to help you*. If grammaticalization is the creation of new constructions (and their further development), then it also can include cases of change that do not involve specific morphemes, such as the creation of word order patterns.

For illustration let us consider the canonical type of grammaticalization, that in which a lexical item becomes a grammatical morpheme within a particular construction. Examining the details will help us understand what cognitive mechanisms are involved in the process. Some characteristics of the grammaticalization process are the following:

1. Words and phrases undergoing grammaticalization are phonetically reduced, with reductions, assimilations, and deletions of consonants and vowels producing sequences that require less muscular effort (Browman & Goldstein, 1992; Mowrey & Pagliuca, 1995). For example, *going to* [gɔɪŋtʰuw] becomes *gonna* [gəna] and even reduces further in some contexts to [ənə] as in *I'm (g)onna [aimənə]*.

2. Specific, concrete meanings entering into the process become generalized and more abstract, and as a result, become appropriate in a growing range of contexts, as, for example, the uses of *be going to* in sentences (1) through (3). The literal meaning in (1) was the only possible interpretation in Shakespeare's English, but now uses such as those shown in (2) and (3) are common.

(1) movement: *We are going to Windsor to see the King.*

(2) intention: *We are going to get married in June.*

(3) future: *These trees are going to lose their leaves.*

3. A grammaticalizing construction's frequency of use increases dramatically as it develops. One source of the increased frequency is an increase in the types of contexts in which the new construction is possible. Thus when *be going to* had only its literal meaning, as in (1), it could only be used in contexts where movement was to take place, with subjects that were volitional and mobile. Now it can be used even in (3), where no movement in space on the part of the subject is implied, or indeed possible. As the *gonna* construction becomes appropriate with more types of subjects and verbs, it occurs more frequently in texts.

4. Changes in grammaticalization take place very gradually and are accompanied by much variation in both form and function. I have already illustrated the variation in form with *be going to* and *gonna*. Variation in function can be seen in the three examples above, of "movement," "intention" and "future," all of which are still possible uses in Modern English.

The mechanisms underlying these changes is the main focus of this chapter, but before examining them in greater detail, it is important to document the fact that grammaticalization occurs spontaneously and in the same form at all documented time periods and in all languages.

GENERAL PATTERNS OF GRAMMATICALIZATION

Let us first list some changes that have occurred in the English language over the last millennium. Since English began to appear in writing some 1,200 years ago, we can document the development of the definite article, *the*, out of the demonstrative, *that*, and the development of the indefinite article *a/an* out of the numeral *one*. The function of articles such as *the* and *a* is to distinguish between nouns that the hearer can identify as already known in the discourse or conversational context and those that are being

introduced for the first time. (For example, *I met a man at the bank* . . . where this is the first mention of a man vs. *The man I met at the bank* . . . which refers back to some previous mention.) Old English (as documented in manuscripts from about A.D. 800–1100) did not use articles, but rather could change the position of nouns to show which were new and which were previously mentioned.

Similarly, the English modal auxiliaries, which express grammatical distinctions within the categories of tense (future *will*) and modalities such as possibility (*can* and *may*), all developed from verbs. *Will*, which now indicates future tense, developed from a verb, *willan*, which meant “to want”; *can* came from a verb, *cunnan*, meaning “to be acquainted with or to know how to”; *may* came from a verb, *magan*, meaning “to be able to, to have the power.” *Could* and *might* developed from the past tense forms of *cunnan* and *magan* respectively. We have already mentioned the more complex phrase *be going to*, which in Shakespeare’s English still described actual movement in space, fuses into *gonna* and comes to be used for future time reference.

Even affixes derive from full words. For instance, the English suffix *-ly* derived from a noun, which in Old English was *lic*, meaning “body.” The compound *mann-lic* originally meant “having the body or appearance of a man” whence it generalized to “having the characteristics of a man,” the modern sense of *manly*.

These facts of English are interesting enough as isolated facts about one language, but they develop a profound importance with the discovery that all around the world, in languages that are not related genetically or geographically, we find analogous examples: definite articles developing from demonstratives, indefinite articles from the numeral “one,” future tenses from verbs meaning “want” or “go to,” and auxiliaries indicating possibility and permission from verbs meaning “know” and “be able.”

For instance, in many European languages, an indefinite article has developed out of the numeral “one”: English *a/an*, German *ein*, French *un/une*, Spanish *un/una*, and Modern Greek *ena*. Whereas these are all Indo-European languages, in each case this development occurred after these languages had differentiated from one another and speakers were no longer in contact. Furthermore, the numeral “one” is used as an indefinite article in Moré, a Gur language of the Burkina Faso (Heine et al., 1993), in colloquial Hebrew (Semitic) and in the Dravidian languages Tamil and Kannada (Heine, 1997). Examples of demonstratives becoming definite articles are also common: Latin *ille, illa* “that” became French definite articles *le, la* and Spanish *el, la*; in Vai (a Mande language of Liberia and Sierra Leone) the demonstrative *mē* “this” becomes a suffixed definite article (Heine et al., 1993).

Parallel to English *will*, a verb meaning “want” becomes a future marker in Bulgarian, Rumanian, and Serbo-Croatian, as well as in the Bantu lan-

guages of Africa—Mabina, Omyene, and Swahili (Bybee & Pagliuca, 1987; Heine et al., 1993). Parallel to English *can* from “to know,” Baluchi (Indo-Iranian), Danish (Germanic), Motu (Papua Austronesian), Mwera (Bantu), and Nung (Tibeto-Burman) use a verb meaning “know” for the expression of ability (Bybee, Perkins, & Pagliuca, 1994). Tok Pisin, a creole language of New Guinea, uses *kem* (from English *can*) for ability and also *savv* from the Portuguese *saber* “he knows” for ability. Latin **potere* or *possum* “to be able” gives French *pourvoir* and Spanish *poder*, both meaning “can” as auxiliaries and “power” as nouns. These words parallel English *may* (and past tense *might*), which earlier meant “have the physical power to do something.” Verbs or phrases indicating movement toward a goal (comparable to English *be going to*) frequently become future markers around the world, as found in languages such as French and Spanish but also in languages spoken in Africa, the Americas, Asia, and the Pacific (Bybee & Pagliuca, 1987; Bybee et al., 1994).

Of course, not all grammaticalization paths can be illustrated with English examples. There are also common developments that do not happen to occur in English. For instance, a completive or perfect marker (meaning “have [just] done”) develops from a verb meaning “finish” in Bantu languages, as well as in languages as diverse as Cocama and Tucano (both Andean-Equatorial), Koho (Mon-Khmer), Buli (Malayo-Polynesian), Tem and Engemi (both Niger-Congo), Lao (Kam-Tai), Haka and Lahu (Tibeto-Burman), and Cantonese and Tok Pisin (Bybee et al., 1994; Heine & Reh, 1984). In addition, the same development from the verb “finish” has been recorded for American Sign Language, showing that grammaticalization takes place in signed languages the same way as it does in spoken languages (Janzen, 1995).

For several of these developments I have cited the creole language, Tok Pisin, a variety of Melanesian Pidgin English, which is now the official language of Papua New Guinea. Pidgin languages are originally trade or plantation languages that develop in situations where speakers of several different languages must interact, though they share no common language. At first, pidgins have no grammatical constructions or categories, but as they are used in wider contexts and by more people more often, they begin to develop grammar. Once such languages come to be used by children as their first language, and thus are designated as creole languages, the development of grammar flowers even more. The fact that the grammars of pidgin and creole languages are very similar in form, even among pidgins that have been taken by Bickerton (1981) to be strong evidence for innate language universals. However, studies of the way in which grammar develops in such languages reveals that the process is the same as the grammaticalization process in more established languages (Romaine, 1995; Sankoff, 1990).

PATHS OF CHANGE AND SYNCHRONIC PATTERNS

The picture that emerges from the examination of these and the numerous other documented cases of grammaticalization is that there are several highly constrained and specifiable *grammaticalization paths* that lead to the development of new grammatical constructions. Such paths are universal in the sense that development along them occurs independently in unrelated languages. For instance, the two most common paths for the development of future tense morphemes in the languages of the world are the following:

- (4) The Movement Path
 movement toward a goal → intention → future
- (5) The Volition Path
 volition or desire → intention → future

The first path is exemplified by the development of *be going to* and the second by *will*.

New developments along such paths may begin at any time in a language's history. In any language we look at, we find old constructions that are near the end of such a path, as well as new constructions that are just beginning their evolution and constructions midway along. Grammar is constantly being created and lost along such specifiable and universal trajectories.

Development along the Movement Path begins when a verb or phrase meaning "movement toward a goal" comes to be used with a verb, as in *They are going to Windsor to see the King*. At first, the meaning is primarily spatial, but a strong inference of intention is also present. (*Why are they going to Windsor? To see the King*.) The intention meaning can become primary, and from that, one can infer future actions: *He's going to (gonna) buy a house* can state an intention or make a prediction about future actions.

Such developments are slow and gradual, and a grammaticizing construction on such a path will span a portion of it at any given time. Thus, English *be going to* in Shakespeare's time could express both the "change of location" sense and the "intention" sense. In Modern English, the intention sense is still present, but the future sense is also possible, with no intention or movement implied (*That tree is going to lose its leaves*). As a result of the gradualness of change, and the fact that in any particular language a future morpheme might be anywhere on one of these paths, there is considerable cross-linguistic variation in the meaning and range of use of a future morpheme at any particular synchronic period.

Considering just synchronic states, then, it is extremely difficult to formulate universals of tense, or even to give a universal meaning to "future"

that would be valid across all languages. Indeed in the 1950s and 1960s it was common for linguists to exclaim that any attempt to find universals of grammatical meaning would be futile and ethnocentric (Chomsky, 1957; Weinreich, 1963). Now there are attempts to formulate the innate universals of tense and aspect (Smith, 1991), but it is very difficult to find a small set of features that accommodate all the cross-linguistic variation in the area of tense and aspect.

Comparing grammatical categories across languages from only a synchronic perspective is something like comparing an acorn to an oak tree: They appear to have distinct and unrelated properties. Only when we observe these entities across the temporal dimension do we see the relationship between them. Similarly with grammatical categories and constructions: New relationships are observable when we take into account where particular grammatical constructions and categories come from and where they are going.

The examination of the grammaticalization process across many grammatical domains and many different languages makes it clear that the true language universals are universals of change. At one level, these universals can be stated as paths of change, such as those in (4) and (5). To understand grammar more fully, however, we must look behind these paths of change to the actual mechanisms that cause change and then seek to understand these mechanisms in terms of more basic cognitive and interactive processes. If we are successful, we will begin to understand how human language acquires grammar.

CONCEPTUAL SOURCES FOR GRAMMATICAL MATERIAL

The examples discussed in the preceding sections showed lexical items entering into the grammaticalization process. One of the major cross-linguistic similarities noted in the previous section is that the same or very similar lexical meanings tend to grammaticalize in unrelated languages. Of all the tens of thousands of words in a language, only a small set are candidates for participation in the grammaticalization process. Are there any generalizations that could be made concerning the members of this set?

Researchers in this area have made some interesting observations about the lexical items that are candidates for grammaticalization. Heine et al. (1991b) have observed that the terms in this set are largely culturally independent, that is, universal to human experience. Furthermore, they represent concrete and basic aspects of human relations with the environment, with a strong emphasis on the spatial environment, including parts of the human body. Thus we find terms for movement in space, such as "come"

and "go" in future constructions, postures such as "sit," "stand" and "lie" in progressive constructions. The relationship in space between one object and another is frequently expressed in terms of a human body part's relation to the rest of the body. Thus the noun for "head" evolves into a preposition meaning "on top of," "top," or "on." "Back" is used for "in back of" (English provides an example of this derivation), "Face" for "in front of," "buttock" or "anus" for "under," and "belly" or "stomach" for "in" (Heine et al., 1991b, pp. 126-131). In a survey of such relational terms in 125 African languages, Heine et al. found that more than three quarters of the terms whose etymology was known were derived from human body parts. Sworou (1993), using a sample representative of all the language families of the world, also found human body parts to be the most frequent sources of relational terms.² Less concrete, but nonetheless basic and culturally independent notions such as volition, obligation, and having knowledge or power also enter into the grammaticalization process.

The relation between locational terms and abstract grammatical concepts has been recognized for several decades. Anderson (1971) proposed a theory of grammatical cases (nominative, accusative, dative, etc.) based on spatial relations. Thus a relational term meaning "toward" further develops to mean "to" whence it can become a dative marker (*I gave the book to John*) or can even further develop into an accusative (as in Spanish: *Vi a Juan* "I saw John"). Or, with a verb, "to" can signal purpose and eventually generalize to an infinitive marker (Haspelmath, 1989; see the section entitled "The Grammaticalization of Subordinate Clauses"). Thus even the most abstract of grammatical notions can be traced back to a very concrete, often physical or locational concept involving the movement and orientation of the human body in space.

Another important observation about the lexical items found in grammaticalizing constructions is that they are themselves already highly generalized in meaning. Thus among motion verbs, "go" and "come" are the most general in meaning; incorporating only movement and directionality and not manner (i.e., the more specific "saunter," "waddle" or "run" do not grammaticalize, though in some cases the most basic form of human locomotion "walk" does grammaticalize). Among stative verbs, it is "be" and "have" that grammaticalize, and for active verbs, the most generalized, "do" (Bybee et al., 1994).

The claim here is not that the abstract concepts are forever linked to the more concrete, only that they have their diachronic source in the very concrete physical experience. Grammatical constructions and the concepts they represent become emancipated from the concrete (see section titled

"Emancipation") and come to express purely abstract notions, such as tense, case relations, definiteness, and so on. It is important to note, however, that the sources for grammar are concepts and words drawn from the most concrete and basic aspects of human experience.

GRAMMATICALIZATION AS AUTOMATIZATION

Some recent studies of grammaticalization have emphasized the point that grammaticalization is the process of automatization of frequently occurring sequences of linguistic elements (Boylard, 1996; Bybee, in press; Haiman, 1994). Boyland (1996) pointed out that the changes in form that occur in the grammaticalization process closely resemble changes that occur as non-linguistic skills are practiced and become automatized. With repetition, sequences of units that were previously independent come to be processed as a single unit or chunk. This repackaging has two consequences: The identity of the component units is gradually lost, and the whole chunk begins to reduce in form. These basic principles of automatization apply to all kinds of motor activities: playing a musical instrument, playing a sport, stirring pancake batter. They also apply to grammaticalization. A phrase such as (*I'm going to* (VERB), which has been frequently used over the last couple of centuries, has been repackaged as a single processing unit. The identity of the component parts is lost (children are often surprised to see that *gonna* is actually spelled *going to*), and the form is substantially reduced. The same applies to all cases of grammaticalization.³

It follows then that grammatical constructions of all types are automatized motor routines and subroutines that can be strung together or embedded in one another to produce fluent speech. This conclusion, arrived at from the study of linguistic data, is similar to the proposal of Kimura (1979, 1993), who argued on the basis of neuropsychological data for a strong association between grammar and motor skill (see also Lieberman, 1984). However, grammar is not just motor activity, but motor activity appropriate to, and meaningful in, specific contexts. Thus it is important to pursue the question of how motor activities and meaning associate to make grammar.

Haiman (1994, 1998) noted that the chunking and reduction features of the grammaticalization process bear a resemblance to non-linguistic ritualized behavior, citing rituals in both human and non-human species that show chunking and reduction in form. In addition, Haiman cited two

²The other frequent sources for relational terms are the body parts of livestock and landmarks.

³Bybee, Pagliuca, and Perkins (1991) and Bybee et al. (1994) demonstrated for a large cross-linguistic sample that a significant relationship between degree of grammaticalization in semantic terms and formal reduction obtains.

other characteristics of ritualized behavior that apply to grammaticalization. First, repeated practices lead to *habituation*, the process by which an organism ceases to respond at the same level to a repeated stimulus. A repeated word or phrase tends to lose much of its semantic force (consider the loss of the power of the *f*-word when it is used very frequently). Thus habituation helps to bring about the generalization or bleaching of semantic content that occurs in grammaticalization. Second, repeated practices can also change their function, through the process of *emancipation*, by which the original instrumental function of the practice takes on a symbolic function inferred from the context in which it occurs. These two processes and other related processes are crucial to the understanding of how grammatical meaning develops.

EMANCIPATION AND HABITUATION IN THE CREATION OF GRAMMATICAL MEANING

The phrase "grammatical meaning" refers to the type of meaning conveyed by grammatical morphemes and grammatical constructions. This type of meaning is often contrasted with "lexical meaning," which is the meaning of nouns, verbs, and adjectives. The study of grammaticalization makes it clear that there is no discrete cut-off point between the two types of meaning, but rather a continuum from one to the other. However, we can still note the properties of the polar types. Lexical meaning is specific and concrete, with nouns referring to physical entities and their parts, and abstract notions of cultural import. The lexical meaning of verbs describes perceived events and relations among entities, events that often have concrete physical results. The specificity of lexical meaning is shown by the large number of contrasts that can be made, that is, in the number of names for species of trees (*oak, elm, fir, pine, willow, etc.*) or the number of designations for ways to move through space (*walk, swim, climb, run, hop, trot, etc.*). The more specific the meaning of a lexical item, the more stable it remains across differing contexts.

Grammatical meaning, on the other hand, is typically abstract, referring to large, abstract domains such as time or modality, or referring to abstract grammatical relations such as "subject of the verb," or abstract relations among clauses, such as "although." It is also highly general, being applicable to a large number of contexts. For instance, every English sentence has a grammatical designation of tense, showing that tense is general enough to apply to any verb in the language. It is this type of meaning, so typical of human language, that is responsible for the great versatility of language.

making it applicable to any human communicative context. It is also this type of meaning that is the most difficult to describe or explain.

Another important difference between lexical and grammatical meaning concerns the extent to which language users have conscious access to the meaning of units. Speakers can often report directly and accurately on the meanings of nouns, verbs, and adjectives, much as they can report pieces of propositional or declarative knowledge (such as "Washington, DC is the capital of the United States"). However, grammatical meaning is much less accessible, and if speakers can report on uses of grammatical constructions, they often seem aware only of the most concrete of these uses. In this way, grammatical knowledge resembles procedural knowledge or skilled ability (Boyland, 1996), providing further evidence that grammatical constructions are automated procedures.

The approach that studies the way grammatical meaning evolves out of lexical meaning has a great deal to contribute to the general understanding of grammar and its meaning. Some of the mechanisms for semantic change in grammaticalization have been identified and are discussed briefly here.

Emancipation

Emancipation in ritualistic language is extremely common. Polite expressions of concern about a person's well-being in mutual greetings, such as *how are you*, reduce to simple greetings that require no substantive response, such as *hi*. In some varieties of Black English *his* is still answered with *fine*, reflecting its source in a question, but in most dialects it is answered with *hi*. A string of words that originally had literal meaning or instrumental function has lost its instrumental function and become a symbol for the situation itself due to repetition in a particular context—in this case the greeting situation.

The change from a lexical to a grammatical function in grammaticalization involves a process that is quite parallel and could also be considered emancipation. As I mentioned earlier, in Shakespeare's English *be going to* had its literal meaning of movement in space toward some goal. However, given an apparent interest by human beings in goals and purposes, even in Shakespeare's English, the information value of *be going to* was less about movement in space and more about purpose. Consider Example (6):

(6) *Duke*: Sir Valentine, whither away so fast?

Val.: Please it your grace, there is a messenger

That stays in to bear my letters to my friends,

And I am going to deliver them.

(Shakespeare, *Two Gentlemen of Verona*, III.i.51, from Hopper & Traugott, 1993)

Note that even though the Duke asks about movement ("Where are you going so fast?"), what he really wants to know is Valentine's intention or purpose. Note also that although Valentine answers in terms of movement, he also includes the appropriate information about his intention.

The frequent association of *be going to* with contexts in which the intentions of the subject are also being revealed leads to its gradual emancipation from the earlier meaning of movement in space. The new function of expressing a goal or intention also gradually becomes the main function of the construction.

Pragmatic Inference

In the grammaticalization literature, the mechanism of change in this example has been called *pragmatic inference* (Hopper & Traugott, 1993; Traugott, 1989). It is widely accepted that an important feature of the communication process is the ability to make inferences: The speaker must be able to judge which details the hearer can supply and formulate his or her utterances accordingly, and the hearer must fill in details not supplied by the speaker. Thus, the hearer is constantly asking "why is he or she asking me or telling me this?" In the example, Valentine knew that the Duke's question was not just about movement in space but also about intention and he answered appropriately. When the same pattern of inferences occurs frequently with a particular grammatical construction, those inferences can become part of the meaning of the construction. If *be going to* is frequently used to talk about intentions, it begins to have intention as part of its meaning. The literature on grammaticalization is full of such instances (Bybee et al., 1994; Traugott, 1989).

Traugott (1989, 1995) has identified several important patterns of inferring that create semantic change in grammaticalization and lead to the expression of more abstract grammatical meaning. She argued that more concrete propositional (lexical) meaning, describing external situations, such as spatial movement or location, is regularly inferred to have meanings that describe internal (evaluative, perceptual, or cognitive) situations, such as intention. A second trend that she posited is that both external and internal meanings can be reinterpreted as having meanings based in the textual situation, such as meanings that place the described situation in time before or after the moment of speech, that is, tense. A third trend infers the speaker's subjective beliefs or attitudes from the other two types of meaning. 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. The content of grammar, then, is directly related to, and arises from, the very act of communication. It is not autonomous from the meanings it conveys or the purposes it serves.

Note further that common paths of change, such as those shown in (4) and (5), would not be attested across languages unless users of these languages made very similar inferences under similar conditions. That is, the repetition across languages of the change in meaning from "movement toward a goal" to "intention" is evidence that speakers in different cultures tend to infer intentions; similarly, changes from temporal sequence (as English *since*, originally meaning "after the time that") to causation indicate that language users are prone to infer causation.

Generalization or Bleaching as Habituation

Another important mechanism of change in grammaticalization is related to habituation. The earliest discussion of grammaticalization recognized that grammatical morphemes lose components of their original lexical meaning and become much more general and abstract. For instance, *will* loses the volitional aspect of its meaning and *be going to* loses the spatial movement components. This process has been called *bleaching* or *generalization of meaning*. The latter term is especially appropriate because the loss of specificities of meaning makes a morpheme applicable in a more general range of contexts. For example, if *will* does not signal volition, it can be used with a wider range of subjects, including inanimate objects.

Repetition itself diminishes the force of a word, phrase or construction. Examples are legion. *Iterate* doesn't seem to mean "repeat" quite strongly enough, so we tend to add *re*; with repetition the strength of that fades and we have to say *reiterate again*. *You guys* generalizes to include females and the word *guy* now can be used in colloquial speech even for inanimate objects. In grammaticalization, the generalization or bleaching of the meaning of a construction is caused by frequency, but it also contributes to additional frequency, as a generalized construction can be used in more contexts, leading to an almost inexorable movement along a grammaticalization path.

Constructions that have been bleached of their more specific lexical meaning are more likely to pick up inferential meaning from the context, that is, grammatical meaning (Bybee et al., 1994). The French negative phrase *ne (VERB) pas* originally contained both a negative element *ne* and the noun *pas* meaning "step" and was used only with motion verbs, with the sense "not (go) a step." Now *pas* has lost all of its independent meaning in the construction and has absorbed the negative meaning from the con-

struction. As *ne* is gradually being deleted, *pas* becomes the sole negative marker.

Categorization

An important feature of generalization is the expansion of contexts in which a construction can occur. For instance, the French construction *ne (VERB) pas* was originally restricted to use with motion verbs. The verb slot in this construction gradually expanded to include all verbs. The *be going to* construction in English originally required human subjects and active, agentive verbs, but now its use has expanded to all types of subjects and verbs.

Constructions always contain a variable slot (otherwise we consider them set phrases), and the variable slot is restricted to items of a certain category. These categories are usually defined semantically, with terms such as "human," "volitional," "change of state," and so on. Some constructions require quite specific categories. For instance, the construction typified by the phrase *to wind one's way* allows a verb of motion, or a verb construable as describing movement or the creation of a path (*swiggled his way, made our way, cut their way*). The position after the verb requires a pronoun that is coreferential with the subject.

The various positions in a construction, then, require categorization. These categories are based on the experience one has with the construction, just as the categories we create for classifying cultural and natural objects are based on our experience with the world (Lakoff, 1987; Rosch, 1978). Linguistic categories, both those based on form and those based on meaning, have a prototype structure. They cannot be defined adequately as a series of necessary and sufficient conditions, but rather must be characterized in terms of more central and more peripheral members (see Taylor, 1998). The possibility of adding new peripheral members to a category allows productivity and change. New items can be used in a construction if they are perceived as similar in some way to existing members. Accumulated change in membership will lead to change in what is considered central and what is considered peripheral.

The productive use of constructions, or automated subroutines, is what allows speakers to generate new utterances, as speech consists of these routines concatenated and embedded in one another. Through practice one's fluency in manipulating and stringing together constructions increases. Linguistic categorization determines the appropriateness of particular combinations of constructions and takes the same form as categorization for non-linguistic percepts. Note that all the component processes that lead to the development of new grammatical constructions come out of lan-

guage use in context and they involve cognitive skills and strategies that are also used in non-linguistic tasks.

THE GRAMMATICALIZATION OF SUBORDINATE CLAUSES

Grammatical markers that are highly associated with the syntax also develop in the same way as other grammatical morphemes. For instance, English *to* that marks an infinitive has developed within the documented period between Old English and the present. The resemblance between the preposition *to* and the infinitive marker is no accident. Haspelmath (1989) demonstrated that it is extremely frequent cross-linguistically for a preposition meaning "to, toward" to develop into an infinitive marker. In Old and Middle English *to* could be used with an infinitive (marked with a suffix) to indicate purpose, and optionally after verbs such as "begin," "cease" or "teach" but was otherwise not used with verbs (Sweet, 1882). In Middle English *to* was used in purpose clauses but it had also expanded to clauses with main verbs of desiring or ordering (Mossé, 1952). Note that the infinitive suffix *-en* still appeared on the verb:

- (7) *thanne wolde he maken hem to drynken*
 "then he wanted to make them drink"

The use of *to* before an infinitive continued to expand to a variety of contexts as the infinitive suffix was lost. The result is the loss of much of the prepositional meaning of *to* in this context and the development of a new form of the verb for use in a variety of subordinate clauses. (See Haspelmath, 1989, for more details about this development in German and other languages.)

Certain constructions in English use the infinitive without *to*, in particular the modal auxiliaries (*will, shall, may, can, would, could, etc.*). The difference between constructions such as *will go* without *to* before the infinitive and *want to go* with the *to* infinitive can be partly explained in terms of the period in which the constructions developed and began grammaticalizing. Already in Old English, the modern modal auxiliaries were used with infinitives, which at that time were marked with a suffix. During the Middle English period such constructions increased in frequency and became entrenched. The new infinitive marker *to* was also gradually expanding during the same period, but because the [MODAL AUXILIARY + VERB] construction was already formed and entrenched without *to*, the new marker has not affected these constructions. In contrast, the construction of [*want*

+ INFINITIVE] developed much later and so uses the infinitive marker that was current when it developed. Other conservative features of the modal auxiliary construction are discussed in Bybee (in press).

Other types of subordinate clauses develop out of main clauses. Givón (1979) noted that over time loosely joined structures or clauses tend to become more tightly fused, resulting at times in new subordinate clauses. This can be seen in the development of the English complementizer *that*, which derives from the demonstrative pronoun *that*. Hopper and Traugott (1993, pp. 185–189) presented examples from Old English where the complementizer *that* still shows some characteristics of being a pronoun and the structures it occurs in are more loosely connected (more hypotactic) than today. Consider the use in (8) where a fronted demonstrative pronoun corresponds to the complementizer later in the sentence:

- (8) *Thæt gefremede Diulius hiora consul, thæt thæt angin
DEM arranged Diulius their consul, COMP DEM beginning
wealth tidlice thurhtogen.
was in-time achieved*

The loose or hypotactic structure of this sentence is reflected in my translation in (9). Today, a subordinate structure, such as (10), would be used.

- (9) "That, their consul Diulius arranged, that the beginning was on time."
(10) "Their consul Diulius arranged (it) that it was started on time."

Another example of a loose, hypotactic structure becoming a tighter subordinate structure is the development of a complementizer and complement clauses in some related West African languages, as studied by Lord (1976) (see also Heine et al., 1991a, Hopper & Traugott, 1993).

In Ewe, with the main verb *bé* "to say," two clauses can be loosely joined as in (11):

- (11) *me-bé me-wɔ-e*
I-say I-do-it
"I said, 'I did it' / I said that I did it"

With other verbs of saying, however, *bé* occurs without the pronominal prefix and functions more like a complementizer:

- (12) *me-gbɔ bé me-wɔ-e*
I-say say I-do-it
"I said that I did it"

From uses such as (12), *bé* has been extended, and it can be used as a complementizer with many different main verbs, including verbs of cognition (*nyá* "know"), perception (*kpa* "see") and verbs of desire, as in (13):

- (13) *me-di bé nɔ́ple awua deɔvi*
I-want say I-SUBJUNCT-buy dress some
"I want to buy some dresses"

Not only has *bé* lost its original meaning of "say" and taken on an abstract grammatical function, it has also produced a tighter syntactic structure, as it introduces a subordinate clause.

GRAMMATICAL CHANGE IN GRAMMATICALIZATION

The recent surge in research on grammaticalization has made it clear that the same set of processes and mechanisms are responsible for all aspects of grammar. All grammatical morphemes have developed out of lexical morphemes, principally nouns and verbs, and all grammatical structures have developed out of more loosely organized constituents. In this section, the processes of decategorialization and reduction of constituent structure is illustrated.

Decategorialization

Decategorialization is the term applied to the set of processes by which a noun or verb loses its morphosyntactic properties in the process of becoming a grammatical element (Heine et al., 1991a; Hopper, 1991). In some cases, the lexical item from which a grammatical morpheme arose will remain in the language (*go* retains many lexical uses, despite the grammaticalization of *be going to*), and in other cases, the lexical item disappears and only the grammatical element remains (*can* is grammaticalized, and the main verb from which it developed, *cunnan* "to know," has disappeared). In both cases the grammaticalizing element ceases to behave like a regular noun or verb.

Verbs lose canonical verbal properties when they become auxiliaries. Consider the auxiliary *can*, which derives from the Old English main verb *cunnan* "to know." In Old English, *cunnan* could be used with a noun phrase object, but today *can* occurs only with a verb complement: **I can that* and **I can her* are ungrammatical. The English modal auxiliaries have lost all their inflected or derived forms and are invariable. There is no infinitive **to can*, no progressive or gerund form **canning*, and the past form of *can*, which is *could*, is developing non-past uses (*I could do it tomorrow*) and will perhaps lose its function as the past of *can*, just as *should* no longer expresses

the past of *shall*. The auxiliaries rarely modify one another. Whereas the use of *shall can* was possible in Middle English, such constructions have disappeared from Modern English. In other words, *can* has no main verb uses.

An example of a noun that has lost much of its categoriality is the conjunction *while*, which was previously a noun meaning a length of time. Today it is very limited in its use as a noun. When it is clause-initial and functioning as a conjunction, it has no noun properties. Thus it does not take articles nor can it be modified as in (14).

- (14) *I was there the same while you were.

In other contexts, its use as a noun is restricted to set phrases such as *all the while*, *a long while*. It cannot be freely used as a noun; thus (15) through (17) are unacceptable:

- (15) *I've been there many whiles.
 (16) *I waited a boring while.
 (17) *The while was very long.

Loss of Constituent Structure

The elements in constructions that are grammaticalizing become more tightly fused together and the internal constituent structure of the construction tends to reduce. Thus two clauses become one, two verb phrases become one, and so on. A few illustrative examples follow.

Heine et al. (1991a) reported that in Teso (a Nilo-Saharan language of western Kenya and eastern Uganda) the negative construction (18) derived from a construction with a main clause and subordinate clause, as in (19):

- (18) *mam petero e-koto akiyok*
 not Peter 3SG-want dog
 "Peter does not want a dog"
 (19) *e-mam petero e-koto akiyok*
 3SG is not Peter (who) 3SG-want dog
 "It is not Peter who wants a dog"

The sentence in (19) consists of the main verb -*mam*, which originally meant "not to be," with Peter as its object, and a relative clause modifying Peter. In the current construction as in (18), the verb is grammaticalized to a negative particle and negative sentence consisting of one clause rather than two.

The English main plus complement clause construction exemplified in (20) is undergoing grammaticalization, which results in the loss of the main clause status for the phrase *I think* (Thompson & Malac, 1991).

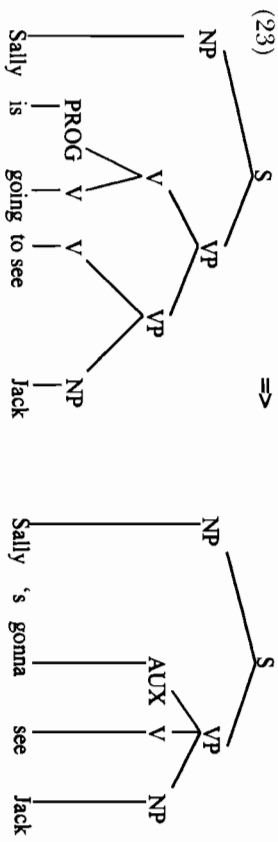
- (20) I think that we're definitely moving towards being more technological.

Common uses of *I think (that)* and *I guess (that)* show that the actual assertion in utterances like (20) is contained in the complement clause and the introductory "main clause" just gives an epistemic evaluation of how much confidence the speaker has in the truth of the assertion. It is with these two erst-while main verbs that the omission of *that* occurs most frequently, as in (21). Also these phrases can be used parenthetically, in which case the former complement clause is the main clause in every respect, as in (22). (Examples from Thompson & Malac, 1991).

- (21) I think exercise is really beneficial, to anybody.
 (22) It's just your point of view, you know, what you like to do in your spare time, I think.

Thus a complex clause consisting of a main verb and a complement clause has become a single main clause modified by an epistemic expression.

In other cases in which verbs grammaticalize the result is the reduction of two verb phrases to one. Consider the case of a verb becoming an auxiliary. As illustrated in (23), as the original main verb becomes an auxiliary, the embedded verb takes on main verb status. The result is a single VP where formerly there were two.



Another interesting case of the reduction of two VPs to one occurs in languages that allow serial verb constructions. The following example from Yoruba illustrates this nicely (Givón, 1975; Heine & Reh, 1984; Stahlke, 1970). In (24) there are two verbs that each have direct objects and approximately equal status:

- (24) *mo fi* *adé* *gé* *igi*
 I took machete cut tree^o

This can either be interpreted as "I took the machete and cut the tree" or, because *fi* is grammaticalizing as an instrumental preposition, it is more likely to be interpreted as "I cut the tree with the machete." The fact that the serial verb construction has become a single VP with the grammaticalization of *fi* is underscored by examples such as (25):

- (25) *mo fi* *qgbq* *gé* *igi*
 I took/with cleverness cut tree
 "I cut the tree cleverly"

Almost every case of grammaticalization involves such a change in constituent structure. When viewed in terms of a structural analysis of the successive synchronic states, it is tempting to say that a reanalysis has taken place. For example, in the two cases just examined, what was a verb is reanalyzed as an auxiliary in one case and a preposition in the other. But it is important to note that even these reanalyses take place gradually, which means that when grammaticalization is occurring, it may not be possible to uniquely assign elements to particular grammatical categories or structures. Heine (1993) argued that the reason there is so much controversy surrounding the category of auxiliary verb, in that some linguists argue that they are verbs and others argue that they are a separate category, is that auxiliaries derive gradually from verbs and have not always lost all their verbal properties even though they have become grammaticalized.

IMPLICATIONS OF GRAMMATICALIZATION

Now that the researchers mentioned in this chapter (and others working on this topic) have studied the grammaticalization process and its outcome from a cross-linguistic perspective as well as in language-specific detail, we have a much clearer picture of the nature of grammar. We have seen that grammatical constructions arise through frequent repetition and their meanings change through processes of generalization and pragmatic inferring. Grammatical constructions are automated, conventionalized units, which I claim are also processing units. The meanings and functions of constructions are not fixed and categorical, but allow variation that leads to gradual change over time. An essential factor in the development of grammatical constructions is language use.

Because all grammatical categories and constructions are derivable from experience with language, there is no reason to suppose that they are innate. In fact, the notion of innate grammatical rules is incompatible with

the gradual, usage-driven nature of grammatical change. Innate rules and categories would be unchangeable over time and over generations, or if change occurred, an abrupt shift from one discrete category to another would be required.⁴

Strong universals of grammaticalization give rise to similarities among languages. Underlying these universals of change are cognitive and communicative universals. The cognitive processes in grammaticalization discussed in this chapter are:

1. the ability to automate neuromotor sequences through repetition
2. the ability to categorize recurrent linguistic elements
3. the tendency to infer more than is actually said
4. the tendency to habituate to repeated stimuli

Other mechanisms operative in the process of the creation of grammar may be identified by further research, perhaps by experimental means, or by the further examination of grammatical change in progress.

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⁴See Lightfoot's (1979) account of the development of the English modal auxiliaries, and Plank's (1984) response.

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