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Grammaticalization and automation

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Grammaticalization and automation

Christian Lehmann

Abstract

Every human activity including language is part of a teleonomic hierarchy, where subordinate processes serve superordinate goals. The goals are pursued consciously; the processes run automatically. A teleonomic hierarchy is, at the same time, a scale between the poles of control and automation. Automation is the downgrading of an action to the level of an uncontrolled process. Regain of control over a process that has been automatized is hard or impossible.

Language activity, too, is controlled or automatic in different aspects and to different degrees. The speaker's freedom is realized at two logical levels:

1. At the lower level, his use of grammatical operations and formatives is not free, but determined by rules of the linguistic system.
2. At the higher level, he can choose the components of his activity which he wants to control, leaving the rest to automatisms of the system.

Grammaticalization subjects operations and items to constraints of the system. This creates a uniform relation between conditioning factor and construction formed. This relation, together with frequency of use, is responsible for the automation of grammar. Since processes once automated are withdrawn from control, degrammaticalization is all but impossible.

1 Introduction

The purpose of this contribution is to connect the concept of grammaticalization with a transition from controlled to automatic processing. No psycholinguistic research has been undertaken to empirically back or falsify such a thesis. The proposal will be made on a purely theoretical basis and on a general linguistic background. While the concept of grammaticalization is by now firmly established in general linguistics, it has not, with a couple of exceptions, been taken up by psycho- and neurolinguists. This may or may not be due to the misunderstanding that grammaticalization is a "purely diachronic process", spread by some linguists. It is a process operative in linguistic activity. The idea of associating grammaticalization with automation is all but new in general linguistics. The association was postulated, *inter alia*, in Givón 1989, ch. 7, Haiman 1994, Bybee 2007, ch. 16.

Grammaticalization is a change in the grammatical part of the language system. The language system exists in two incarnations. As a structure of the human mind, it is the product of entrenchment; as a norm valid in the speech community, it is the product of conventionalization (Schmid 2015). Automation is a psychological concept, thus related to entrenchment rather than to conventionalization. The latter aspect of grammaticalization will be briefly touched upon in §6; but in essence, the paper is devoted to its psychological aspect.

Human beings are involved in two kinds of situations, the kind that they control and the kind they don't control. The distinction matters at many levels of life and to many disciplines, from philosophy, anthropology and psychology to linguistic semantics. The terms which are commonly used to mark the distinction are 'action' and 'process': an **action** is a controlled situation. For the present treatment, we stipulate that a **process** is by definition not controlled. Control implies power and is typically associated with consciousness and intention.

There is much work in psychology and psycholinguistics which dispenses with this distinction and conceives of all situations in which human beings are involved as processes. The literature is full of "processes" of cognition and communication. Such talk appears to presuppose that the motive factors behind speaking and understanding are uniform. Moreover, it cannot account for a distinction made in many language systems: the distinction between active and inactive, or agentive and stative, verbal constructions, including sentences. This will briefly be taken up in §2. The ensuing two sections characterize control and automation in humans in a general way and then apply the distinction to language activity. Sections 5 and 6 define grammaticalization within the framework so far developed and discuss its manifestation in the individual mind, esp. its connection with automation. The final section suggests some methods to falsify the theorems proposed.

2 Prelude: control in grammar

One of the fundamental parameters by which human beings conceptualize a situation is by the control cline: One of the participants in a situation has most control, the others have less or no control over it and over the other participants. This asymmetry is clearest in situations with two participants. This is represented in Diagram 1.

Diagram 1 Control cline

control	full	none
role	agent	patient

Likewise, in coding a situation with two participants, almost all languages distinguish them by the criterion of control. Depending on the alignment of primary syntactic relations, the **agent** is coded as subject, ergative or active actant, while the **patient** is coded as object, absolutive or inactive actant. In most languages, a syntactic distinction along these lines is made in transitive clauses, as in E1a. The active and inactive role in intransitive clauses, as in E2a vs b, are seldom overtly marked differently. Moreover, the formal schema of the transitive clause is grammaticalized in most languages and may then mislead one as to the control cline, as in E1b.

E1 a. Linda broke the twig.

b. Linda suffered a stroke.

E2 a. Linda worked.

b. Linda fell down the stairs.

However, in all these cases, tests are applicable which yield a clear semantic difference. One relatively reliable test frame is embedding the clause in question below a control verb, as in E3, where the subject of the clause to be tested is inserted in the position marked by X and the rest is embedded under the matrix verb.

E3 a. X tried to ___ .

b. X refused to ___ .

Embedding the #a sentences of E1 and E2 in the contexts of either E3a or #b (e.g. *Linda tried to break the twig*) is fine, while embedding the #b sentences in the same contexts (e.g. *Linda refused to fall down the stairs*) yields questionable results. By this criterion, the subject of the #a sentences of E1 and E2 has control, i.e. it is an agent, while the subject of the #b sentences has no control and is a patient. By the same token, the #a sentences designate **actions** or acts, while the #b sentences designate **processes** or events.

There are also tests on intentionality of the subject. One of them is the frame shown in E4, where the subject of the clause to be tested is replaced by *you* and the rest follows at the end of the frame.

E4 What for did you ___ ?

Again, the result is fine with the #a sentences (e.g. *What for did you work?*), while it is weird with the #b sentences (e.g. *What for did you suffer a stroke?*). Since control involves intentionality, this again produces the same distinction among the sentences of E1 and E2.

Most languages have productive processes that mark or change control relations in a clause. The most common construction that marks a participant as having highest control in a situation is the **causative construction**. German once had a causative derivation by root vowel modification, some of whose remnants are shown in E5 – E7.

E5 a. Ernas Daumen sinkt.
‘Linda’s thumb sinks.’

b. Erna senkt den Daumen.
‘Linda turns down her thumb.’

E6 a. Das Vieh trinkt.
‘The cattle drinks.’

b. Erna tränkt das Vieh.
‘Linda waters the cattle.’

E7 a. Der Waisenknabe saugt.
‘The orphan sucks.’

b. Die Amme säugt den Waisenknaben.
‘The nurse suckles the orphan.’

The mirror image of causativization is **deagentivization** alias anticausativization, illustrated by the conversion operation of E8f.

E8 a. Linda broke the twig.

b. The twig broke.

E9 a. Speakers do not passivize this verb.

b. This verb does not passivize.

The #b examples suppress the actant which otherwise would have control in the situation, thus conveying a situation that happens by itself. The above set of examples alludes to shelves of literature which show that control and its absence are a chief structuring factor of the verbal grammar in languages all over the globe. One is entitled to conclude that the concepts transported by these linguistic structures play an important role in human cognition and communication about situations.

3 Control and automation

3.1 Fundamental concepts

For a participant to **control** a situation means that he[1] has the power to start, continue and stop the situation. As said above, the possibility of control is, in the first place, a definitional feature of a type of situation, viz. of an act or action. On the part of the participant in question, conditions for control are fuzzier. While the prototypical controller is a human being, nothing prevents, in principle, an animal, a machine or even a celestial body from controlling a situation.

Actions are goal-directed. In the case of situations of cognition and communication, the goal is generally the solution of a problem. Goal-directedness presupposes intention; and intention presupposes consciousness. Consequently, in addition to the definitional power mentioned, prototypical control involves the following set of relational features:

- Intentionality: the controller intends to let the situation happen.
- Consciousness: the controller is aware of the situation.
- Monitoring: the controller observes the situation in its course.

The criterion of intentionality is the basis of the test frames used in E3 above. *Consciousness* is a polysemous word; what is susceptible of a definition is one of its senses: ‘x is conscious of y’ means that y is the object of x’s thinking in the same way as it would be if x was speaking about y. This implies that we are conscious of what we are speaking about. This

[1] or *it*; see the following. I report that an anonymous reviewer considers my language sexist.

is so because communication and cognition are problem-solving activities; and the solution of a problem requires thinking.

On the other hand, human beings undergo processes in which nobody or nothing but themselves are involved. For instance, they sneeze or slide. Some of these are not amenable to control, for instance purely physiological occurrences like heartbeat, digestion and dreaming. Others are amenable to control, but normally proceed without control, for instance, breathing. Uncontrolled processes happen **automatically**. What happens in the inanimate world are primarily processes; only if we impute control to an inanimate participant are they conceived as its actions.

Control is in many respects a gradual notion. If x forces y to act, x exerts a higher degree of control than if he asks y to act. Also, x may have the alternative of either doing z or causing y to do z. In either case, x has the highest control of z; but in the second case, his control is mediate. If x does a certain action z to achieve some goal, then he controls z. However, doing z involves subordinate steps. For instance, I want to enter a certain room. Having pressed down the handle, I pull the door towards me. In doing this, I take a step back in order to get into an appropriate position against the now open door. This latter step is, in principle, controllable; but normally it will run automatically. In the sense here relevant, it is controlled mediately. Suppose that you are standing behind me and in opening the door in the way described, I step on your foot. Although nobody assumes that I did it willfully, I am nevertheless expected to apologize, which implies I am held responsible for the event. Thus, in doing a certain action, I trigger a chain of subordinate processes which I do not monitor and which I trust will work automatically. Thus, "the contrast between conscious and automated processing is not a single discrete division, but rather a hierarchic, multi-level, scale." (Givón 1989:258)

The two types of processing have been investigated and been established as a "dual processing theory" in psychology for a long time (s. the brief research history in Schneider & Chein 2003, §1). The literature on pedagogic psychology tends to see a dichotomy between controlled and automatic processes, where the latter are not controlled by intentions, strategies and plans. This is too simple. Processes occupy an inferior position in a hierarchy. Neumann 1984:256 characterizes thus a more adequate theory: "It conceives automatic processing not as lacking control, but as being controlled at levels below the level of conscious awareness."

3.2 Teleonomic hierarchy

Suppose that, on some morning, I intend to get to the university. This is my immediate purpose. However, it is subordinate to some higher goal, for instance to teach some seminar. The seminar, in turn, is not an ultimate goal, either; instead, its purpose is to transmit the true linguistic theory to the next generation. This, in turn – and skipping one or another intermediate level –, is an essential prerequisite for the highest goal in my life, which is to attain eternal bliss. This shows that acts and actions have a position in a hierarchy where each but the highest is subordinate to a higher one.

This hierarchy continues downwards, too. Just as I am free to choose among various activities that lead me to eternal bliss, so now I can choose among various means that get me to the university. I choose going by bicycle. As I am riding it, I have to pedal. To do this, I press my front foot down while releasing my back foot. In order to press the front foot down, I have to contract certain muscles. In order to contract them, I have to send them a certain neural signal. At the bottom, this ends in certain elementary electrochemical processes.

This gives us a hierarchy in which a given action is a means for a superordinate action which is its purpose, and simultaneously functions as the goal for a subordinate action or process which serves it as a means. Such a means-end hierarchy is a **teleonomic hierarchy**.[2] A section of it comprising levels n-1 to n+1 takes the form shown in Diagram 2.

Diagram 2 Teleonomic hierarchy

purpose	act/process of level n+1	
↑		
means	act/process of level n	**purpose**
		↑
	act/process of level n-1	**means**

At the bottom of the hierarchy there are processes developing automatically and not directly controllable. At its top, there are goals which are set freely and consciously. Between the top and the bottom, there is a transition of several levels whose nature is shown in Table 3.1.

Table 3.1. Levels of a teleonomic hierarchy

features / **level**	**complexity**	**control**	**automation**
higher	higher	higher	lower
lower	lower	lower	higher

At any given level of a complex action, choice of an act obeys two conditions:

- its fitness as a means to achieve the purpose set at the next higher level
- the framing conditions under which the entire action develops.

Illustrating with the above example:

- The bike is fit for the goal, but the tramway or a walk would be fit, too.
- Choice of the bike depends on factors such as its current readiness, weather conditions, timing etc.

Thus, typically there are at each level **isofunctional** strategies which fulfill the given function in similar ways and, in principle, equally well.

In addition, a given strategy is often polyvalent (or **multifunctional**) because it can also be used for other purposes. For instance, both bicycle riding and walking, but not taking the tramway are suitable for physical training. Therefore, if I want to achieve more than one goal at a time, choice of a suitable means is also determined by which of them serves more than one of my goals at the same time.

It is not the case that a certain degree of control was assigned, once for all, to a certain level of a teleonomic hierarchy or to a certain action or process. Instead, within certain limits, the degree of control with which a given action or process is executed is variable. This does not include the very top and the very bottom of the hierarchy. Thus, on the one hand, there is no known automatism which would directly attain the goal of eternal bliss. And on the other hand, no method is known by which a person could control directly – i.e., without the intercalation of aids like medicine – his digestion. However, at intermediate levels, control is shiftable. For instance, in biking, I generally do not control consciously my pedaling. How-

[2] "Teleonomic" rather than "teleological" because it matters that at least the lower levels do **not** involve human or divine intention.

ever, if am instructed by my biking coach to change my pedaling habits, I can control it. Again, this possibility is narrowly limited, as will be seen shortly.

3.3 Automation

The opposite shift, viz. the downgrading of a controlled action to an automatic process, is **automation**.[3] It is much more frequent and important in human life than the gain of control over an automatic process, since it is essentially involved in the learning of a skill. Consider such examples as riding a bicycle, driving a car, reading, writing and, on top of the latter, type-writing. All of these and many other skills are learnt by repeated practice. In the beginning, the learner is aware not only of the task, but also of each component operation that he needs to execute, controlling every single step. By and by, he coordinates component processes into complex schemata which he acquires as wholes. He integrates the single steps into programs which run by themselves, so that they no longer require individual attention. In the course, monitoring decreases, less and less intellectual effort needs to be summoned, performance becomes faster and errors fewer (Schneider 1985:475f).

For example, riding a bicycle involves the simultaneous execution of many different operations and processes. One has to pedal and, at the same time, keep one's balance. For the incipient learner, these are two different operations which he has to control. Automating them not only implies mastering each of them, but also combining them into one complex action: one keeps the balance by pedaling. Automation is, thus, the choice method to achieve parallel processing.

Automation of some action depends on two conditions: First, it presupposes (Schneider 1999:63) that "there is a consistent mapping ... between the stimuli and responses at some stage of processing." In other words, if a given kind of problem is reliably amenable to a uniform solution, the solution can be automated; otherwise, it will always require attentive processing. Second, there must be sufficiently frequent occasion to practice the problem-solution pair. It is important to note that neither of these two conditions is in itself sufficient; it is their combination which leads to automation.

Usage-based approaches to language have imported the concept of **entrenchment** to linguistics in order to account for the gradual fixing of a feature of the language system in the mind of the speaker.[4] This concept is neutral both to the kind of entity entrenched – it may be a linguistic unit (typically, a more or less schematic representation) or an operation – and to the nature and place in life of the learning process, viz. to primary language acquisition or linguistic change. On the account sketched in Schmid 2015, §4.2, entrenchment properly includes routinization (besides association and schematization). Here, routinization is the same as automation.

The top half and the bottom half of a teleonomic hierarchy as visualized in Diagram 2 can thus be assigned to two different modes of processing information, controlled vs. automatic

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[3] The words *automation* and *automaticization* are commonly used as synonyms. The English wikipedia (12/06/2016) ignores the word *automaticization*. It does know many uses of the word *automation*, but ignores the sense relevant in the present context.

[4] E.g. Tomasello 2003:300: "Entrenchment simply refers to the fact that when an organism does something in the same way successfully enough times, that way of doing it becomes habitual and it is very difficult for another way of doing that same thing to enter into the picture." Some of the aspects mentioned recur in Table 3.2.

processing. These differ in many respects, and in all of these they differ gradually. The two modes are confronted in Table 3.2.[5]

Table 3.2. Controlled and automatic processing

processing / **features**	**controlled**	**automatic**
mode of control	intentional	non-intentional
monitoring	monitored by analytic awareness	not monitored
memory imprint of single performance	stronger → is easily remembered	weaker → is easily forgotten
burden on attention capacity	occupies processing center and attention capacity	does not occupy attention capacity → this is freed for parallel processing
dependency of execution on working memory	limited by working-memory capacity	not limited to working-memory capacity
composition	complex action is composed of individual acts	complex process is holistic
mode of operation	occurs serially in one mode	parallel processing in several modes/channels (multitasking)
shielding against simultaneous actions	liable to interference	little interference
modality specificity	relatively independent of specific modalities	involves specialized and modality-specific subsystems
stimulus dependency	depends on external stimuli (context and feedback)	depends on internal (proprioceptive) stimuli
efficiency of performance	low: effortful, slow, error-prone	high: effortless, fast, error-free, robust, reliable
variability of occurrences	high variance	relatively invariant
flexibility	flexible: action is easy to change	rigid: process is hard to change or even to inhibit
aptitude	for unfamiliar problems	for routine, conventional problems
processable information	novel and inconsistent	predictable

[5] These properties of controlled vs. automatic processing have been ascertained in psychological research reported on in Schneider 1985, Levelt 1989 ch. 1.4 and Schneider & Chein 2003. The contrast between the two modes is summarized thus in Schneider & Chein 2003:554f: "Automaticity leads to fast, parallel, robust, low effort performance, but requires extended training, is difficult to control, and shows little memory modification. In contrast, controlled processing is slow, serial, effortful and brittle, but it allows rule-based processing to be rapidly acquired, can deal with variable bindings, can rapidly alter processing, can partially counter automatic processes, and speeds the development of automatic processing." The set of properties was brought into a tabular form like Table 3.2 in Givón 1989, ch. 7, esp. 256f.

processing features	controlled	automatic
structure of representations	can process and categorize continua	rigid discrete categories and schemata trigger and control processing
accessibility to reflection	accessible	inaccessible
communication on execution	possible	impossible
neural basis	cortical areas (frontal, cingulate, parietal)	deeper brain areas (e.g. cerebellum)

In general, declarative knowledge is processed consciously, while procedural knowledge is processed automatically.[6] Consequently, the acquisition of procedural knowledge involves automation, while the acquisition of declarative knowledge involves **reflection**.

Maybe the most far-reaching conclusion to be drawn from this is the following: Increasing automation and increasing formation of consciousness are the same evolutive process (Givón 1989:260): Processing of what is up to a point the highest level of the teleonomic hierarchy is automated at the next evolutionary step, and at the same time, consciousness is freed to reflect on this level from a meta-level.

4 Speaking and understanding between action and process

Grammaticalization is a process profoundly affecting and changing the linguistic system. Most linguistic investigations of grammaticalization have analyzed its manifestations in the language system, rather than in **linguistic activity**. Nevertheless, the linguistic system is just the systematic aspect of the linguistic activity of a speech community (Coseriu 1958:271f). As W. von Humboldt (1836: 418) put it:

> Die Sprache, in ihrem wirklichen Wesen aufgefaßt, ist etwas beständig und in jedem Augenblicke Vorübergehendes. ... Sie selbst ist kein Werk (Ergon), sondern eine Tätigkeit (Energeia). Ihre wahre Definition kann daher nur eine genetische sein. Sie ist nämlich die sich ewig wiederholende Arbeit des Geistes, den artikulierten Laut zum Ausdruck des Gedankens fähig zu machen. Unmittelbar und streng genommen, ist dies die Definition des jedesmaligen Sprechens; aber im wahren und wesentlichen Sinne kann man auch nur gleichsam die Totalität dieses Sprechens als die Sprache ansehen.

Linguistic activity, i.e. speaking and understanding, is composed of many acts, operations and processes. From a linguistic point of view, all of them share two fundamental aspects, viz. the **selection** and **combination** of units (Jakobson 1956:242f): Every linguistic unit is selected from a set of units that could take its position, and is combined with other units of the same level into a larger unit. This happens at all linguistic levels regardless of whether the speaker is taking an analytic-compositional or a holistic approach. In other words, a unit of a certain

[6] Levelt 1989:236 implies that not only semantic, but also grammatical information associated with lexemes is declarative knowledge. This is not so; such grammatical information is exhausted by the procedural knowledge (l.c.) involved in their processing.

level may be composed of units of the next lower level. At the same time, however, the higher level unit is chosen from among a set of units of its own level.

The operations of selection and combination are freer at higher levels of linguistic structure and more constrained at lower levels. The constraints relevant here are ones of the specific language system. They are frozen conventions of the speech community regarding use of its language. The diminished freedom of the speaker in selecting and combining lower-level units is mirrored in the diminished **autonomy** of these units. Disregarding the subsystem of distinctive units, selection and combination of low-level significative units are conditioned by rules of grammar. For example, most allomorphy is entirely conditioned by its immediate context.

All of this means that what is commonly called 'linguistic activity' is not only composed of controlled actions and acts, but also of automatic processes. In short, linguistic activity develops in a teleonomic hierarchy as explained in §3.2: At the highest level, the speaker freely determines his cognitive and communicative goals; at the lowest level, the constraints of his internalized grammar determine linguistic structure. Recall that the fact that we are conscious of what we are speaking about was taken in §3.1 as a definitional feature of consciousness.

The aspects and components of the activity of speaking and understanding can therefore be arranged on a continuum between the poles of maximum consciousness and total subconsciousness. Each of these components has the two fundamental aspects of any linguistic activity, selection and combination of units. In this sense, it is the selection and combination of linguistic units which is conscious to different degrees. Some of these are shown in Diagram 3 (cf. Levelt 1989:21f and Knobloch 1994:215f).

Diagram 3 Consciousness in linguistic activity

consciousness	**aspect**
high	the current communication problem: illocutionary force and content of the speech act
↕	information structure, high-level constructions, lexemes
	mid-level constructions, free grammatical formatives
	low-level constructions, bound grammatical formatives
low	articulation and audition; neural co-activation of syntagmatically and paradigmatically related units

This conception must be protected against some possible misunderstandings. First of all, we are here focusing on the speaker's consciousness w h i l e executing the operations of selection and combination. Once these are executed, their products leave a trace in his short-term memory and hit his ear; and he is now free to apply any degree of control and consciousness to their analysis (cf. Levelt 1989, ch. 12 and Knobloch 1994:214). This latter feedback process, though important to linguistic activity, is not what is analyzed in Diagram 3.

Second, the consciousness levels of Diagram 3 are related to a standard situation of speaking. Many speech situations are not standard in this sense: a phonetician demonstrating some aspect of speech sounds, a cabaret artist imitating the way of speaking of a politician, speaking a foreign language, speaking under the influence of alcohol etc. Even in standard situations, the level of consciousness of component processes varies, e.g. when we say something that we habitually say in this kind of situation or when we have problems of phras-

ing and wording. Within certain limits, the level of consciousness of certain low-level processes can be raised willfully. However, the lower the level is on which processing is by default automatic, the more difficult its raising to consciousness gets. The lowest-level aspects of speaking are in principle inaccessible to consciousness.

Actually, the speaker's freedom concerning use of linguistic units is realized at two logical levels: On the one hand, at the lower levels of linguistic structure, he forfeits his freedom to manipulate linguistic units, and instead the language system dictates him what he can, must and cannot do. It is necessary that linguistic activity have these totally automatic, uncontrolled aspects because, as was seen in §3, any complex problem-solving activity must be partially automatized if it is to be executed with a minimum of efficiency. On the other hand, for any given semantic act and unit, the speaker is free to choose the level of control with which he wants to execute and manipulate it. It is not the case that there was a certain inferior layer of cognitive and communicative functions that was in principle inaccessible to free control. Instead, for every meaningful operation and unit, the speaker first chooses the degree of freedom with which he wants to execute and manipulate it. What is currently not at stake may be relegated to inferior levels and may safely be left to the rules of the linguistic system and, thus, to automatisms. Leaving it there unburdens linguistic activity, so the speaker's capacity to achieve maximum effect for those aspects of his activity which matter to him is increased.

This brings us back to the capacity of the human being, already mentioned at the end of §3.2, to subject to conscious control almost any aspect of the actions and processes that he is involved in. If there is a human skill of some importance, then there is an intellectual activity which reflects on it. Full mastery of some skill therefore comprises two levels of competence, **procedural and reflexive competence**, where the latter is declarative knowledge of the skill. In the case of language, this leads to the distinction between proficiency in a language and metalinguistic knowledge of a language (Lehmann 2007). Linguistics is, of course, at best metalinguistic knowledge of language at the highest level.

The character of linguistic activity as a teleonomic hierarchy and the position of linguistics at the level of reflexive competence also has consequences for **linguistic analysis**. Every element of linguistic structure has a function. However, for lower-level elements, this function typically abides within the linguistic system. In other words, a functional analysis is not a mapping of every bit of linguistic structure onto some cognitive or communicative function. Quite on the contrary, a functional analysis has to move the entire teleonomic hierarchy upwards without skipping a step. A clear example of how sound linguistic method proceeds is Kaznelson's (1974:35; cf. p. 93) analysis of agreement:

> Die Wechselbeziehungen zwischen Form und Inhalt bei der Kongruenz haben also mehrere Schichten und Ebenen. Was auf der einen Ebene als Inhalt erscheint, erweist sich auf einer anderen, höheren Ebene als Form eines neuen Inhalts.

For instance, the feminine desinence of an adjectival attribute signifies feminine gender. However, feminine gender has no direct interpretation as a feature of an adjective. Instead, its function lies in the agreement of the adjective with its head noun, which, in turn, serves attribution.

5 Grammaticalization

Grammaticalization is a process in which operations of linguistic activity are subjected to rules of grammar. Instead of having free play at the level of discourse, where meaningful units are selected and combined into larger units in conformity with cognitive and communicative

intentions, operations become dependent on factors of linguistic structure and finally on contextual conditions. A good example of this is the role of agreement in phoric relations (Corbett 2006). The syntagmatic scope of this relation is bracketed in E10.

E10 a. [Da erschien das Weib wieder. Sie war wirklich abscheulich.]

b. Da erschien wieder das [abscheuliche Weib, das uns gestern über den Weg gelaufen war].

c. Da erschien plötzlich ein [abscheuliches Weib].

In E10a, the personal pronoun has a regular anaphoric relation to its antecedent across a sentence boundary. In this context, semantic agreement (in feminine gender) is normal, although grammatical agreement (in neutral gender) would be possible. In #b, the relative pronoun is in the same NP as its antecedent, thus, in a relation of syntactic phora. Here, grammatical agreement is standard, although semantic agreement would occasionally be found. In #c, the adjective is an attribute of the noun which determines the gender; here, only grammatical agreement is found. Thus, at the highest level of linguistic structure, the speaker chooses the gender which corresponds to his message, while at the lowest level of this series, the grammar dictates the gender to use; in other words, agreement inside the nominal group is fully grammaticalized.[7]

Grammaticalization has often been described as a process of expansion of some linguistic unit and, thus, of increased frequency. This is, however, an automatic side-effect of increasing obligatoriness. As semantic restrictions on the appropriateness of a certain formative drop, the factors conditioning its occurrence are strengthened. However, only if these conditioning factors belong to the language system may they lead to grammaticalization. In other words, conditioning extralinguistic context may lead to the generalization of a fashionable expression; but this does not thereby become grammatical. To give just two examples: For the past 25 years, teenage slang has vocalized positive evaluation by *cool*; and many young and adult speakers have been expressing surprise at their own slip by *oops*. In the confines of certain styles, these words have seen an expansion of use from total absence to omnipresence within a few decades. However, the factors conditioning or triggering their use are not part of the linguistic system; and therefore this is a purely lexical change and has nothing to do with grammaticalization.

E10 also reminds us that grammaticalization is a process that proceeds along a scale of degrees. A given linguistic operation, construction or formative is not either grammatical or non-grammatical (outside the reach of grammar); instead it is grammaticalized to a certain degree. Grammaticalization is variation along a scale. On the synchronic axis, it manifests itself in the coexistence of variants of a unit which are in a relation of polysemy or polyfunctionality and one of which is more subject to grammatical constraints than the other. On the diachronic axis, the later variant is the one which is more subject to grammatical constraints than the other.

While criteria to determine the direction of some variation on the synchronic plane remain a desideratum of linguistic methodology, grammaticalization on the diachronic axis has been found to be uniform in the sense just formulated across many languages and areas of grammar. The inverse diachronic process which converts an item or a construction into a less

[7] If agreement trigger and target occur in this order, linear distance between them also correlates with an increase of semantic over grammatical agreement (s. Köpcke & Zubin 2009, §5 for a few statistical data). This is, at the same time, a piece of evidence for the memory imprint difference between semantic and grammatical information shown in Table 3.2.

grammatical one can be defined in theory and be dubbed ‘degrammaticalization’. However, very few cogent examples of such a process have been found. It is an empirical generalization that grammaticalization appears to be irreversible.[8] In other words, while there is an oriented variation that transforms linguistic operations and units into more grammatical ones, a kind of variation which transforms them into less grammatical ones has no systematic place in linguistic activity. If this is so, then it would be of scientific interest to have an explanation for it.

6 Psychological aspects of grammaticalization

The analogy between Diagram 2 and Diagram 3 makes us expect that grammaticalization pushes linguistic acts and operations down the teleonomic hierarchy, thus converting them into automatic processes. Grammaticalization would then be another instance of the many processes of automation that characterize complex human activities.

Spelling out the analogy, we note that the diachronic relation between less and more grammaticalized constructions corresponds with the diachronic relation of more controlled and more automatic execution in learning a skill. As was seen at the end of §3.3, automation is also routinization by frequent practice. Now grammatical formatives are, on the whole, more frequent than lexemes. They are practiced so often that, given invariant conditioning, their automation in the course of language acquisition is almost inevitable.

Before we strive for more precision here, let us note the role that such a direct link between grammaticalization and automation would play in linguistic theory: It may provide the sought explanation of the irreversibility of grammaticalization. Recall from Table 3.2 that one of the differences between controlled and automatic behavior lies in the fact that the former can produce variant output, is flexible and may be adapted to environmental conditions, while the latter generates invariant output, is rigid and decreasingly amenable to willful change. Regaining control over something one does automatically is hard or impossible (Schneider & Chein 2003, §3). To take two linguistic examples: Controlling the tongue position for vowels of a given height takes a phonetician; all others will either just be able to imitate two vowels that only differ in frontness, or they will never learn this tongue movement. And it takes a linguist to willfully supply the wrong plural allomorph to a noun, producing e.g. German *Tischer* instead of *Tische* as the plural of *Tisch* ‘table’; all the others will simply always produce the correct form. The linguist’s caprice would, in fact, be an example of degrammaticalization: What is actually totally conditioned by the morphological context would develop a new kind of variation. The explanation for the all-but-inexistence of degrammaticalization in everyday language activity is therefore simply that grammaticalization is a case of automation, and automation is irreversible for reasons having to do with human neurology.[9]

Although the basic idea behind this account appears to be correct, some weaknesses and possible misunderstandings must be dispelled. First of all, grammaticalization is something happening at the level of the language system used by a speech community; to the extent that it changes the conventions of the society it is a case of ‘sociogenesis’ (Feilke et al. 2001:2). Automation is a process happening at the level of the individual mind and physis; to the extent that it changes an individual during his lifetime, it is an ingredient of ontogenesis. The

[8] Of the huge literature on degrammaticalization, Lehmann 2004 and Norde 2009 may be mentioned here.

[9] Levelt (1989:22) speaks of “cognitive impenetrability” of low-level processes in speech production.

two concepts are, consequently, on clearly different levels of analysis.[10] The similarity discerned between them is, first of all, an analogy. Explaining properties of grammaticalization by properties of automation appears to presuppose that the former concept may legitimately be subsumed under the latter. The question is therefore what the bridge is between the individual mind and the conventions of the society. Putting it bluntly: If the language system in use in a speech community changes over time, does the linguistic competence of its members likewise change over time? And if so, does it happen at the same pace? The received doctrine is that linguistic change generally proceeds very slowly and that a given diachronic process may take generations or centuries to change a language system. If so, it would be hard for a linguistic change to correspond to some process going on in the individual mind.

Diachronic change has often been compared with first **language acquisition**. However, the evolution of grammar in primary language acquisition is not simply a kind of grammaticalization.[11] As far as generalizations over grammar acquisition are warranted, the following seems to hold: In the first stages of language acquisition, the child takes the holistic approach to chunks he is confronted with. The analytic approach is gradually introduced and stepwise complements the holistic approach. As a consequence, complex forms which first were learnt as unanalyzed wholes later become amenable to analysis. Once this is achieved, other complex constructions may be formed on analogy with the former, and thus a rule of grammar is acquired (cf. Tomasello 2003, ch. 8). This is an important aspect of the acquisition of grammar; and it has nothing to do with grammaticalization. Quite in general, children are not the motor of linguistic change (s. Bybee 2010, ch. 6.6 among many others). At least in occidental societies, the initial phases of a grammaticalization process, the recruitment of a lexical construction and its metaphorical use in new contexts, are a privilege of educated adult speakers (s. Lehmann 1991 for data from contemporary German).

Since grammaticalization is a kind of variation in a language, its instantiation in individual language use is the same variation produced by the individual. As usual, one speaker innovates in using a certain construction under relaxed semantic conditions. The variant diffuses through the speech community to the extent it is taken up by other members of the same social group.[12] Now the new variant of the operation, construction or formative in question may be more grammaticalized, i.e. more grammatical than its source according to the parameters of grammaticalization. Its functions then have less to do with the content of the message to be conveyed and are more related to the system underlying the construction of the message. This produces uniformity of the conditions of use of the variant, more precisely, uniformity of the relation between the cognitive-communicative problem and its solution under given contextual conditions. The more a speaker hears the new variant by others and uses it himself under like linguistic conditions, the more psychological conditions for its automation in his mind are fulfilled. The speed with which this happens depends on the frequency and uniformity of the new variant and is roughly comparable to the speed with which someone acquires a new non-linguistic habit. Depending on lots of individual and societal factors, this may take

[10] Cp. the brief discussion of the similarities and differences between entrenchment and conventionalization in Schmid 2015:10f.

[11] Feilke et al. 2001:11f offer a list of aspects in which primary language acquisition is not analogous to language change. Bybee (2010, ch. 6.6), too, examines similarities and, more importantly, differences between the too.

[12] The *locus* where diffusion starts is the communicative event, where one interlocutor takes up a linguistic feature used by the other one (Schmid 2015, §5.1). Given the difference in memory imprint (Table 3.2), this works more easily for lexical than for grammatical constructions. In the case of the latter, only immediate repetition, as is typical of first-language acquisition, would forestall oblivion.

between a few weeks and many years. New linguistic variants are acquired in this way at all linguistic levels. However, it is the specific systematic uniformity of the conditions of use of the new variant which leads to the consequence that, among all the changes affecting a language in a speech community, this kind of change leads to automation of its product in speakers. However, in the initial phase of a grammaticalization process, the degree of automation is low.

The new variant may turn out to be an ephemeral fashion. For instance, in the 1980s, it became fashionable both in spoken and written German to use the discontinuous adposition *von* X *her* 'from X' in a limitative function, as in E11 (Lehmann 1991, §2.4).

E11 … kann ich nur sagen, daß wir von der Zielrichtung her einer Auffassung sind.
GERMAN '… I can only say that, with respect to goals envisaged, we are of one opinion.'

At the time, the construction was clearly being grammaticalized. Among the symptoms was the reduction of the discontinuous preposition to its initial component and the broadening of its function to topicalization without any specific semantic role of its complement. At the time where the fashion was observed, it was impossible to predict whether it would gain a foothold in the system. To judge from today, this has apparently not happened. Instead, from the 1990s on, the fashion has been loosing ground, and today only some remnants are occasionally heard.

As made explicit in Table 3.2, automatic processes are hard to vary. The only changes that may easily apply to them are increasing automation and loss. Here a distinction may be made between loss of a formative in a construction and loss of a construction. The former, as exemplified by the loss of the first component of the discontinuous French negation *ne … pas* or by the loss of several conjugation desinences in the same language, is the logical endpoint of the reduction process that grammaticalization is. Loss of a construction, as exemplified by loss of the Latin gerundive construction of the obligative type *nunc est bibendum* 'now one must drink' in French, is an instance of a habit becoming obsolete. Automated skills are forgotten just like controlled skills unless they are regularly used. In other words, automation in the use by members of the speech community does not protect a grammaticalized unit against loss.

Alternatively, a certain change may survive the period of a mere fashion and take firm hold in the speech community. Then the feature in question will be transmitted to the next generation. From the point of view of a child learning the language, it constitutes an integral part of the language system. It will then be learnt just like any established feature of the language system and will be automated in correspondence with its degree of obligatoriness (cf. Feilke et al. 2001:6-8, Tomasello 2003, ch. 8.2 and Bybee 2007, ch. 7). Given that the grammaticalized item has by now lost its original emphasis and extravagance, the next generations may proceed in its grammaticalization, which will lead to increasing automation. It is, thus, the adult member of a speech community who first automates the use of a grammaticalized variant; but it is the language-learning child who assigns it a stable place in the language system.

Once the item is strongly grammaticalized, its use is highly automatic. It may be so to an extent that it is no longer accessible to control. This entails that its automaticity can no longer be relaxed. Here we have, indeed, a causal explanation of why grammaticalization is, in general, irreversible.

7 Methodological aspects

The above account is an empirical hypothesis about certain psychological correlates of grammaticalization. It does not subsume grammaticalization under automation, but constructs an indirect relation between the two processes. The general hypothesis is that grammatical operations are processed in the individual mind with a higher degree of automaticity and a lesser degree of consciousness than lexical and discourse operations. This hypothesis should be testable by methods of cognitive psychology and psycholinguistics. Three of the observable correlates of automatic (as opposed to controlled) behavior enumerated in Table 3.2 may be taken out here and proposed as test criteria. For each of the three tests, two variants are proposed. Hypothesis #a concerns the processing of grammatical as opposed to lexical material, but does not directly relate to grammaticalization. This, in turn, is afforded by hypothesis #b.

Given that the purpose of the present paper is to put forward the hypothesis of the correlation between grammaticalization and automation and to motivate it on theoretical grounds, it should be understood that the types of experiment suggested here to test it can only be sketched. Their purpose is to show that the hypothesis is falsifiable. Before any of the tests can actually be executed, the variables involved have to be firmly controlled. Needless to say, the degree of grammaticalization of linguistic units is determined on purely linguistic grounds (most reliably, by the parameters proposed in Lehmann 2015), thus, in complete independence from their production.

7.1 Speech errors

Automatic behavior is freer of errors than controlled behavior. One test therefore involves counting the speech errors (slips of the tongue) in a corpus of connected speech. The hypothesis is then the following:

a) Generic: There will be relatively less errors in selection and combination of grammatical units than in selection and combination of lexical units.

b) Specific: For any given linguistic unit which has a more and a less grammatical use in the language, the more grammatical occurrences will be affected by lesser speech errors.

A common method of heightening the number of speech errors in some stretch of speech in order to widen the basis for statistics is to distract the speaker. Now one of the claimed correlates of automatic processing is precisely its relative insusceptibility to interference from simultaneous tasks. Therefore, this method is directly applicable to the present test:

Have subjects perform some unrelated task, e.g. potato peeling, while they produce speech. Again, predictions #a and b# should be born out.

One thing to be kept in mind while implementing these tests is that grammatical items differ much from lexical items in their token frequency in running text. One will therefore have to count the number of errors per 100 lexical items and the number of errors per 100 grammatical items, or alternatively the number of errors in the total of occurrences of an item.

7.2 Production speed

Another empirical claim associated with automatic as opposed to controlled behavior is that its runs faster. Thus, hesitation pauses preceding grammatical units should be shorter than pauses preceding lexical units. However, this expectation must be modified because a speech pause does not necessarily come immediately before a problematic word, but often before the

constituent containing a problematic word. The relevant hypothesis should therefore be based on measuring, in a corpus of connected speech, the length of pauses immediately preceding the last word of a constituent. The hypothesis will then run as follows:

a) Generic: The pauses preceding grammatical units will be shorter, on average, than the pauses preceding lexical units.[13]

b) Specific: For any given linguistic unit which has a more and a less grammatical use in the language, length of speech pauses preceding the former will be shorter, on average, than length of the latter.

A variant of this test counts hesitation interjections instead of speech pauses.

7.3 Memory of speech production

Yet another empirical claim about automatic behavior is that its memory imprint is weaker than for controlled behavior. This may be tested as follows: Have subjects engage in a conversation. Afterwards, check their memory of what they said.[14]

a) For instance:
Did you say *war* or *conflict*?
Did you say *this war* or *that war*?

b) For instance:
Did you say *I have a car* or *I possess a car*?
Did you say *I have gone to Boston* or *I went to Boston*?

The relevant hypothesis is the following: Recall of the subject's choice in the first of the paired alternatives of #a and #b will be better than recall of choice in the second alternative.

8 Conclusion

Human activities have their place in a teleonomic hierarchy in which automatic processes serve functions in higher-level actions which, in their turn, are consciously controlled. This contrast between control and absence of control is also basic to the human conception of situations as it is mirrored in the grammatical structure of languages. In linguistic activity, the teleonomic hierarchy manifests itself in the differential processing of units of different levels: at discourse level, operations and units are chosen and combined freely, while at the morphological and phonological levels, selection and combination of units are determined by the language system.

Automation of an action assigns it a low level in a teleonomic hierarchy. Grammaticalization of a linguistic operation or item moves it down to a lower level of structure, where conditions for the use of items are more uniform. The mechanical conditioning of the use of a grammaticalized item distinguishes grammaticalization from other expansive changes. It leads to automation. Automation, in turn, is essentially unidirectional. The automation of grammaticalized material therefore explains the sporadic nature of degrammaticalization.

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[13] Levelt (1989:203) reports on empirical evidence confirming this hypothesis.

[14] Givón (2002, ch. 7.4) reports on an experiment in which subjects were asked to report on a conversation they just had. They remembered well the shifting speaker-hearer roles, the shifting intended speech acts and the explicitly stated shifting epistemic modalities associated with the recalled information. They did not recall any content associated exclusively with grammatical structure.

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