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# Language change from a psycholinguistic perspective: The long-term effects of frequency on language processing

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## ABSTRACT

This paper demonstrates how psycholinguistics is, or can be, relevant for historical linguistics, giving center stage to frequency in dialogic uses of language as a key factor in language change. Frequency of co-occurrence of linguistic forms in linear strings leads to linguistic 'compression', a cognitive process by which the forms involved undergo an increase in the degree of their mutual association and come to be processed under a new, holistic meaning and thus by fewer bits of information than the originally compositional sequence. As a result, pieces of syntax over time lose their compositional character and come to develop meanings and uses that are not fully derivable from the meanings and uses of the components parts. The process of linguistic compression is exemplified with data from the development of the general extender *and stuff* in the history of English and shown to be an example of how frequency affects mental representation and leads to the development of new processing routines that manifest themselves in structural changes.

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## 1. Introduction

This paper contributes to ongoing research on language change induced by frequency effects that affect mental representation and eventually result in structural changes. It is situated in the field of usage- or experience-based theories of language cognition, following a conceptualization of language as a probabilistic system of gradient structures—a view that is still relatively uncommon in studies of language change. I will follow the argument that frequency and thus experience with language have effects on the cognitive representation of language (e.g. [Stefanowitsch and Gries, 2003](#); [Bybee, 2006, 2010](#); [Wiechmann, 2008](#); [Kapatsinski 2010](#); [Schneider, 2014](#); [Ellis, 2015](#)), and show that these effects can play a central role in language change. The present study thus links historical linguistics systematically to ideas and research findings from cognitive psychology, psycholinguistics, and usage-based approaches to language ([Pawley and Syder, 1983](#); [Sinclair, 1991](#); [Baddeley, 2003](#); [Kapatsinski and Radicke, 2009](#); [Arnon and Snider, 2010](#)). Under these approaches, language is not seen as an autonomous cognitive system, but as deeply grounded in and being as much part of human cognition as other cognitive capacities; its description can thus not be reduced to an economical set of categories and rules of 'core grammar', but must encompass the full set of possible representation forms of language, ranging from those forms that are derivable by general principles to those that are based on conventionalization, habituation, and frequency and that reflect the gradient nature of categories and the probabilistic nature of linguistic knowledge. In particular, I will focus on a kind of structural change that I call 'linguistic compression', which denotes a process by which a sequence of frequently co-occurring forms comes, over time, not to be processed by the individual properties of the single forms, but increasingly under a more holistic, typically

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*procedural meaning* in the sense of Blakemore (2002), which is not derivable from the meaning of the components alone. Using the development of the general extender *and stuff* as an example, it will be shown how during *compression* the transitional probabilities between two originally free, consecutive forms increase over time, which leads to a progressive weakening of the formal and semantic properties of the single forms involved and an increase of the associative strength or “sequential link” (Bybee, 2010) between them, and which triggers the development of a more holistic meaning and new communicative functions. The qualitative and quantitative study of the changes that have affected the components of the sequence *and stuff* and that have given rise to the development of the general extender provides further evidence for the assumption that language is not processed as unstructured input; rather, the human mind responds to concrete experience deriving from processing regularities and transitional probabilities in linear structures (Corrigan et al., 2009; Ellis and Simpson-Vlach, 2009).

This article is structured as follows. Section 2 provides a discussion of the cognitive principles underlying the process of *compression*, Section 3 discusses the role of frequency for and the types of frequency (token, type frequency) involved in *compression*. Section 4 presents a case study on *compression*, based on the development of the general extender *and stuff* in the history of English. General observations on the frequency-driven changes documented in Section 4 are discussed in Section 5, the conclusions are presented in Section 6.

## 2. Linguistic compression

Structure in language is, in its most basic form, based on the linearity of linguistic signs, which is a fundamentally de Saussure (1916) thought: speakers select lexical units from their mental lexicon and align them in linear strings (*syntagmas*) in which these units enter into meaningful relations. In speech, strings of words are usually ephemeral in that they are created for an individual discursive context within which they express an idea the speaker wishes to convey and after which the relations between single words usually dissolve. However, linguistic signs are not always combined as individual items into linear sequences ‘from scratch’: sequences of words exist beyond an individual discourse context when the words involved have developed a more or less stable mutual association in the speakers’ mind. An example for such stable mental associations is the occurrence of so-called ‘prefabricated’ or ‘multi-word’ units in language, which are based on continuous strings of frequently co-occurring lexical items and which have been variably referred to as *lexical bundles* (Biber et al., 1999), *pre-fabs* (Erman and Warren, 2000), *chunks* (Beckner and Bybee, 2009; Bybee and Moder, 2017; Ellis, 2017), *collostructions* (Hilpert, 2012), *fragments* (Hopper, 1998, 2011), or *formulaic language* (Wray, 2002). The existence of such units casts doubt on the still relatively widespread idea that a speaker’s representation of language is reduced to a minimally complex lexicon consisting of isolated (though networked) lexical entries and some rules on their combination (‘grammar’). Rather, it can be assumed that a speaker’s linguistic knowledge consists of information on lexemes and the probabilistic nature of their distribution, and is based on a huge store of previously experienced patterns from which speakers acquire implicit knowledge or intuitions on frequencies of use and co-occurrence patterns (Bybee, 2006, 2010; Ellis, 2015).

Thus, while the linearity of the linguistic sign and linguistic creativity allow speakers to create “brand new” sequences of forms, in reality many transitions from one lexical unit to another occur with higher frequencies than others and thus become cognitively ‘entrenched’, that is, routinized as part of a speaker’s experience with language. Frequent co-occurrence of forms can be purely coincidental and an epiphenomenon of linearity, as with sequences such as *and the*, which have a relatively high frequency of occurrence in corpora, but no unified meaning or function, or intentional when speakers are more or less explicitly aware of a relatively stable meaningful association between forms. Over time, the co-occurrence of forms is then not based on mere linearity, but on linear-associative relations (de Saussure, 1916: 120). Such relations may, in principle, involve a syntagmatic structure of any kind and size. Thus, larger pieces of syntax that were formed according to syntactic principles at a given occasion may, over time, aggregate into tighter lumps through repeated processing and come to be mentally represented not in terms of their individual forms, but gradually develop new associative relations, acquiring meanings and usage conditions that are no longer derivable from the components alone. Examples for strings of words whose forms have developed strong mutual associations and meanings that are not solely based on compositionality are given in (1).

- |        |                    |  |
|--------|--------------------|--|
| (1) a. | Comment clauses    | <i>you know what I mean?</i>   |
| b.     | General extenders  | <i>and stuff/stuff like that/and stuff like that, or something (like that), and everything</i> |
| c.     | If-segments        | <i>if you want, if you like, if I may say so</i>   |
| d.     | Projecting phrases | <i>the thing is (that), what I mean is (that)</i>  |

The expressions in (1) are all conventionalized, relatively formulaic units of language on a continuum from unique patterns to more loosely connected forms. In this sense, they are not exclusively describable as fully-fledged “chunks” (Bybee and Moder, 2017; Ellis, 2017), such as *in spite of* or pragmatic uses of *I don’t know* as they are not fixed, but formally variant to a certain extent, allowing either for variant realizations of the entire unit (e.g. *and stuff, stuff like that*) or for some lexical variability of one of the components (e.g. *the thing/point/problem/...is (that)*). However, in spite of their variability, the forms involved in such units have strong mutual associations and are, as components of a linearized sequence that reoccurs in different discursive contexts, associated with a new holistic meaning, which is more than the sum of the meaning of the components and typically more procedural than lexical-conceptual in meaning in the sense that the units provide processing

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