Corela
Cognition, représentation, langage

7-1 | 2009
Vol. 7, n° 1

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Éditeur
Cercle linguistique du Centre et de l'Ouest - CerLICO

Édition électronique
URL : http://corela.revues.org/137
DOI : 10.4000/corela.137
ISSN : 1638-573X

Référence électronique
Riitta Välimaa-Blum, « Phonotactic constraints in cognitive phonology », *Corela* [En ligne], 7-1 | 2009, mis en ligne le 26 juin 2009, consulté le 30 septembre 2016. URL : http://corela.revues.org/137 ; DOI : 10.4000/corela.137

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1. Introduction

1.1. Cognitive linguistics

1 Cognitive linguistics assumes that language forms an integral part of the general cognitive faculties of the human being and that its functioning is governed by the same principles that govern the rest of our cognitive operations (Fillmore 1976, 1982, 1985; Fillmore, Kay and O'Connor 1988; Kay 1997; Lakoff 1987; Langacker 1987; Talmy 1988, 2000; Taylor 2002; Wierzbicka 1988). Languages are also taken to be *emergent*, that is, they arise in the minds of the speakers as the result of their frequent use, not necessitating any innate, language-specific faculty (Hopper 1987, 1988, 1998; Bybee 2000, 2001; Kemmer and Barlow 2000; Langacker 1987, 2000; Lindblom, MacNeilage and Studdert-Kennedy 1984; Lindblom 1990; Taylor 2002).

2 Another basic assumption in cognitive linguistics is that the way we humans conceptualize the world largely depends on our own experiences with it, that is, our conceptual categories are *embodied*. This means that they are not just based on the characteristics of the phenomena themselves, but we categorize the world on the basis of the way we interact with it (Johnson 1987; Lakoff, 1987; Lakoff and Johnson, 1980). The principle of embodiment applies to both physical and psychological experiences and thus includes language as well (Lakoff 1987: xvi). And finally, in their essence, languages are seen as *symbolic systems* in that all the units of language converge in the realization of this one goal of expressing meaning (Croft 2001; Fillmore, Kay and O'Connor 1988; Goldberg 1995, 2006; Kay 1997; Lakoff 1987; Langacker 1987; Taylor 2002; Talmy 1988, 2000; Wierzbicka 1988). Not just the lexicon but also grammar expresse meaning by

semantically structuring the lexical content, and the meanings of the two in fact match and reinforce one another (Goldberg 1995, 2006).

3 To form and understand complex expressions, the smallest meaningful units, morphemes and word-formation schemas, are conceptually integrated or 'blended' with other meaningful constructions, metaphorical domains, general conceptual schemas, etc. Blending is thus a matter of conceptually integrating the inputs from several distinct mental spaces into one, the blended space (Fauconnier, 2004, 2009; Fauconnier and Turner, 1994, 1996). A blend is a new structure, it is not simply a unification of the input spaces, but " [T]he 'whole' that we find in the blend is...both greater and smaller than the sum of the 'parts', "thus allowing new concepts and understandings to emerge (Fauconnier and Turner, 1994: 16).

4 Research in the framework of the Neural Theory of Meaning suggests that understanding language involves mental simulation of the meaning (Feldman, 2006), which means, among other things, that language in general and blending in particular is not simply a question of manipulating abstract, disembodied symbols. Let us take the action verb *walk* to illustrate what the Neural Theory means by the mental simulation of meaning. When we walk, the parts of the brain that control this motor movement must obviously be activated. When we watch someone else walk, the same parts of the brain are again activated. And what is more, when we hear the word *walk*, the same parts of the brain are yet again activated. This shows that, indeed, at least certain aspects of language understanding involve actual mental simulation the meaning. It, of course, also shows that language is embodied.

1.2. Cognitive phonology

5 If we accept the claim by cognitive linguistics that languages are fundamentally symbolic systems, this view must also be reflected in our conception of phonology. Now, if languages are symbolic systems, then it follows that what speakers learn in the course of language acquisition are symbolic systems, and I have proposed that in such systems, the phonemes have no status independent of the meaningful units (Välimaa-Blum, in press, 2009, 2005). It is not unequivocally established that linguistically untrained speakers even have spontaneously emerging awareness of meaningless entities like the phonemes (Liberman *et al.,* 1980; Read *et al.,* 1986; Lotto and Holt, 2000; Port and Leary, 2005). Breaking up words into sequences of discrete phonemes, is basically no more than an academic exercise, largely inspired by alphabetic writing (Tomasello, 2003; Port and Leary, 2005). Knowing how to write is part of modern life, and as such it belongs to the knowledge base that speakers must have of their language(s), but it can be argued that this knowledge is largely metalinguistic in that it has been learned in educational settings (Välimaa-Blum, in press, 2009). This claim is inherent in the following citation: "[I]n normal language use, the focus of attention is the meaning of an utterance. Subordinate levels become the focus of attention only under special circumstances," such as linguistic experimentation (McNeill and Lindig 1973: 430). This statement highlights the important fact that speakers express meaning and listeners try to seek out that meaning. Speech sounds are obviously indispensable in spoken language, but they are entirely subservient to meaning.

6 *Exemplar theory* proposes that human beings categorize and memorize their experiences in terms of so-called exemplar clouds, which are large clusters of remembered episodes of

individual experiences (Goldinger 1998; Johnson 1997; 2005a, 2005b; Nosofsky 1998; Pierrehumbert 1994, 2001b, 2002; Pierrehumbert, Beckman and Ladd 2000; Goldberg 2006). In phonology, this means that speakers do not form abstractions of words in terms of their formal features, but remember the individual occurrences of the words as they were perceived. These episodic tokens give rise to a mental lexicon containing highly detailed information of both the predictable and non-predictable properties of the sounds, and even data relating to individual speakers, speaking styles and dialects are conserved. The conception of the mental lexicon in terms of exemplar memories actually eradicates the traditional difference between the phonemic and phonetic levels, for exemplar memories of words are no different from the actually observed episodes of them.

7 The traditional generative phonology takes the phoneme to be an underspecified, abstract entity (Archangeli, 1988a, 1988b), and in certain cognitive approaches, the phoneme is schematic, that is, also underspecified (Langacker, 1987; Taylor 2002; Mompeán-González, 2004). Nathan, largely in the framework of Natural Phonology (Donegan & Stampe, 1969; Stampe, 1969, 1979, 1987), suggests that the phoneme is an 'over-specified' mental percept "fully specified for all possible features" (Nathan, 2007: 94). These views go against experimental evidence indicating that even the predictable phonetic detail is in the mental dictionary, in other words, the mental lexicon is not underspecified (Miller 1994; Fougeron and Steriade 1997; Bybee 2000; Pierrehumbert, Beckman and Ladd 2000; Ohala and Ohala 1995).

8 If the phoneme were a schematic or otherwise underspecified entity, this would necessitate some kind of derivation or modification of the mental representation of the lexical entries to achieve the actual, fully-specified articulations in speech. However, exemplar memories with a fully-specified lexicon remove the need for any modification as there is no difference between the phonological and phonetic forms. With exemplar-type memories of words, phonology is as continuous as phonetics. Also, Coleman argues that lexical entries are stored in terms of an auditory, not articulatory sound shape, which also entails that there is no derivation, but, as we speak, the articulatory commands are created 'on-the-fly' (Coleman, 1998).

9 The schematic representation is sometimes proposed to be the prototypical member of the phoneme (Langacker, 1987; Taylor, 2002; Mompeán-González, 2004), which would mean that the prototypes of phonemes are never instantiated as such. I have argued myself that the hyperspeech forms establish the prototypes of words, and that there are no prototypes of individual phonemes, but only of symbolic units. Even if we accepted that each individual phoneme had a prototype, it would be impossible to settle the issue as to which occurrences would be the best exemplars (Välimaa-Blum, 2009). By definition, an isolated phoneme contains no co-articulatory information while any contextual one does, so the decision would have to be between isolated and contextual sounds. However, in natural language use, sounds do not normally occur alone, so the prototype would have to be a contextual token. But since different phonemes affect the adjacent sounds differently (Potter, Kopp and Kopp, 1966), a contextual sound could not be the prototype either. But if we accept that there are no prototypes of individual phonemes, and that the best exemplars of words are their hyperticulated variants (Lindblom, 1990), then we escape spurious solutions in the search of prototypes for phonemes. I will next discuss the status of phonotactics in cognitive phonology, and the discussion above forms the backdrop for the following sections.

1.3. Phonotactics

10 In no language can the phonemes occur in just any order, but the permissible sequences obey precise principles. The positive phonotactic constraints identify the sequences that are permitted in the language and the negative ones those, which are not. The allowable combinations cover not only that which actually occurs, but also those sequences that might occur. Consequently, for example, the following two nonce words, i.e., words invented for specific purposes, *blague* and **bnague* have a different status. The former conforms to the positive constraints whereas the latter violates them. Hence, no new word coming into English today would begin with the sequence /bn/ whereas *blague* may well be a future word. There is thus a negative constraint in English excluding word initial /bn/, in the form, say, *#[stop][nasal]. The question arises now as to the status of phonotactic constraints in cognitive phonology in general and that of the negative ones in particular.

11 As noted above, cognitive linguistics and usage-based grammars do not postulate any innate, language-specific aptitude to humans, but a speaker's knowledge of his language emerges on the basis of the general human perceptual-cognitive-bodily capacities and the actual language use (Hopper 1987, 1988, 1998; Bybee 2000, 2001; Bybee and Hopper 2001; Kemmer and Barlow 2000; Lakoff 1987; Langacker 1987, 2000; Talmy, 1988, 2000; Taylor 2002). Thus, all knowledge of a language derives from the positive instances of it that have been observed and/or produced. If this is indeed so, then all abstract principles for that which cannot be said are excluded. Furthermore, given that languages are fundamentally symbolic systems, there is no motivation for speakers even to form independent memory structures of the speech sounds per se, but they have episodic memories of the meaningful units only (Välimaa-Blum 2005, 2009, in press). Phonemes thus exist in the long-term memory exclusively as components of the symbolic entities, and all knowledge of individual phonemes is metalinguistic. In principle then, it follows from the absence of memory structures of phonemes that abstract phonotactic constraints are excluded as well, be they positive or negative.

12 If the speech sounds have no independent status in the minds of speakers, what is the nature in a speaker's grammar of the positive constraints, which govern the distributional patterns of these meaningless entities? And particularly, what is the position of the negative constraints, which exclusively pertain to something that cannot occur in the language? Consider Taylor's assessment of this situation:

> Within a usage-based model ... there is no place for negative phonotactic statements. To claim that a particular form is 'ungrammatical' is tantamount to saying that the form has never been encountered and that there is no schema which can sanction it. The grammar of a language comprises only 'positive statements' about what does occur, there is no need for 'negative statements' of what does not occur (Taylor 2002: 250-251).

13 However, children's productions like *holded* and *breaked* demonstrate that speakers can very well say what they have neither heard nor said before. This is so because the human mind is creative and imaginative and thus able to conceive abstract patterns of what is grammatically well formed, in this case, the schema for the regular past tense. Of course, there is no strict guarantee that a given child has never heard the tokens *holded* or *breaked* , but I do maintain that children do create words like these on their own, even without ever encountering them. There are countless examples analogous to these in the corpus

of any child's acquisition data. In theory, *holded* and *breaked* 'should' be perfectly grammatical in English, but in practice, they form exceptions to the general principle. However, knowing that *holded* and *breaked* are ill formed, ungrammatical, depends on knowing *held* and *broke*. In other words, positively knowing what something *is* (i.e., *held, broke*) entails also knowing what counts as not being that something (*holded, breaked*). I claim that the same holds for negative phonotactics. If one knows what is phonotactically well-formed one is also able to recognize that which is not.

14 I will argue that the positive constraints correspond to (i) procedural knowledge of the actually occurring, well-formed sound sequences, and (ii) Gestalt-like knowledge of what constitutes a well-formed word in the language. Neither of these requires autonomous memory structures of the individual speech sounds. Gestalt-like knowledge is something that is schematic, not detailed, and the whole is more than the sum of its parts. For example, Figure 1 can easily be seen as the human face even in the absence of most detail. The mind adds the missing parts and forms a whole out of the schematic shape called Gestalt.

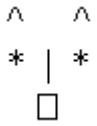

Figure 1.

15 However, if speakers have no independent exemplar or other memories of phonemes, how is it that they can distinguish phonotactically well-formed nonce words from those that are ill-formed (Schatzman and Kager 2007)? I propose that this ability arises from the interplay of the two kinds of knowledge of the positive constraints and an auditorily represented mental lexicon (Coleman 1998), based on exemplars. It emerges from this that knowing the actually occurring sound sequences, i.e., the positive phonotactic patterns, entails knowing the negative ones as well, but without any explicit constraints.

2. Coarse-grained and gradient versus pure abstract constraints

16 There are essentially two different views of the phonotactic constraints, one grounded on exemplars and usage, the other proposing abstract categorical rules. Pierrehumbert (2001a), more in the first camp, notes that while phonological theory makes it possible to state even very fine-grained phonotactic constraints with elaborate segmental-featural and structural patterns, linguistic and psycholinguistic evidence support the idea that these constraints are actually much simpler and coarse-grained. As to the reason for this, Pierrehumbert suggests that phonotactic constraints cannot be highly detailed largely because of the great variability observed across individual speakers' vocabularies, that is, not all speakers know the same words (Pierrehumbert 2001a: 691–692).

17 Speaking of English in particular, Bybee proposes that acceptable phonotactic patterns are gradient, "built up on the basis of naturally occurring words of English, not on the basis of abstract categorical rules extracted from these words" (Bybee 2001: 91). The actual contents of the mental lexicon are hence reflected in the knowledge of what is phonotactically well formed. She emphasizes that the "judgments of acceptability of well-

formedness are based on the experience of the language user. More familiar strings are viewed as more acceptable" (Bybee, 2001: 93). Bybee thus explicitly argues against abstract categorical rules in phonotactics.

18 If speakers were in possession of abstract categorical phonotactic constraints, these would presumably apply uniformly across the entire lexicon and to nonce words as well, but this does not seem to be the case. Evidence rather indicates that judgments of acceptable patterns are influenced by factors such as word frequency, existing morphological material combined with nonce words, and formal similarity in general with existing words (Coleman and Pierrehumbert, 1997; Pierrehumbert 1994). Taken together, these data effectively point to the direction that judgments of phonotactic well-formedness are gradient and that knowledge of well-formedness is coarse-grained. I interpret these suggestions to mean that phonotactic constraints are schematic possible-word templates, for both coarse-grained and gradient suggest lack of a definite, rigid shape in the constraints.

19 In contrast to these views, Shatzman and Kager (2007) claim that speakers are in possession of abstract constraints. In a recent experiment, they made Dutch listeners hear non-word stimuli that either violated or did not violate Dutch phonotactics, and the listeners had to report whether what they heard was a Dutch word or not. Independently of lexical factors, the listeners were faster at rejecting those non-words that violated phonotactics than the ones conforming to them. The authors suggest that, to their knowledge, this is "the first demonstration of the involvement of pure abstract phonotactic constraints in on-line speech perception" (Shatzman and Kager, 2007: 1409). Presumably both positive and negative constraints were concerned. This would thus indicate that speakers do possess independent knowledge of the meaningless speech sounds and their tactic patterns.

20 However, these findings do not yet mean that speakers must have 'pure abstract phonotactic constraints.' I will now argue that the ability to separate well-formed and ill-formed sequences from one another follows from the nature of the positive constraints and an exemplar-based lexicon. I will make a case for the positive constraints corresponding to two different kinds of knowledge: procedural knowledge of the actually occurring, well-formed sound sequences and schematic, Gestalt knowledge of what constitutes a possible word, i.e., one that meets the well-formedness constraints for words in the language. The ability to separate well-formed nonce words from ill-formed ones follows from this knowledge and the auditorily stored, exemplar-based lexicon, without abstract categorical phonotactic constraints.

3. What do speakers know of their language?

3.1. Different kinds of knowledge

21 In learning a language, speakers come to possess several different kinds of knowledge of it, among them procedural, highly detailed, schematic, episodic and in certain domains declarative knowledge. The first of them involves a very high degree of automaticity in speech production. When a language is used frequently, it becomes solidly entrenched in the mind and the motor routines involved in speech production become so highly practiced that, e.g., saying words in a foreign language becomes actually awkward. This automaticity is called *procedural* knowledge (Anderson 1983, 1993; Boyland 1996; Bybee

1998, 2001), and it pertains to all domains of human motor performance, not just speaking. The native articulation of the sound sequences of a language means that the speaker knows the positive phonotactic constraints of that language at the procedural level. This knowledge, as procedural knowledge in general, is subconscious, not easily accessible to declarative statements, i.e., it is difficult for linguistically non-trained speakers to explain how they produce the sound sequences of their language.

22 We saw above that exemplar theory proposes that speakers conserve in their long-term memory exemplar clouds of memorized tokens of actually observed words. This signifies that the mental lexicon is fully specified. Coleman's (1998) view that the phonological side of the mental lexicon is auditorily, not articulatorily based is in full agreement with exemplar theory. Speakers have very fine-tuned perceptual capacities which makes it possible for them to detect and conserve in memory the smallest phonetic and even non-linguistic detail in the auditory language input. It is this subconscious *observation memory* (Johnson, 2005a: 297) that makes it possible for speakers to store highly detailed episodic memories of speech.

23 However, possessing highly detailed memories of the sound shapes of words does not exclude also possessing schematic knowledge about them. Just as speakers acquire schematic knowledge of grammatical constructions that transcends the lexical content, as the examples *holded* and *breaked* demonstrate, they also form Gestalt-knowledge of phonotactically well-formed word templates that transcends the actual segmental content.

24 The knowledge of what a well-formed word is must be Gestalt-like, not detailed, for it to cover the whole range of dialectal, stylistic and speaker dependent variability. And, as Pierrehumbert (2001a) notes, since the vocabularies of different speakers are not identical, phonotactic constraints must be such that they encompass this variability as well, although it seems that the non-overlapping vocabulary items of different speakers would have to tally with the phonotactics of the shared vocabularies. In any case, it is the schematic knowledge of what constitutes a possible word in the language that enables a listener to rise above the individual tokens and accept the phonotactically well-formed and reject the ill-formed nonce words. The proposal now is that the positive phonotactic constraints consist of both detailed and elastic procedural knowledge of the allowed sound sequences and schematic knowledge of possible-word Gestalts.

3.2. Phonotactics and the pronunciation of loans

25 The significance of positive phonotactics becomes strikingly apparent in the case of loan words. These represent words not encountered before and they are automatically adapted to the phonotactics and sound inventory of the adopting language. Let us take an example from Finnish. Native Finnish phonotactics (i) exclude all word-initial and word-final consonant clusters, and (ii) any word-final consonant must be dental; (iii) also, segmental duration is contrastive, and (iv) except for /d/, there are no voiced stops; (v) Finnish has vowel harmony so that, within a word, apart from the 'promiscuous' neutral vowels /i/ and /e/, only vowels from the same harmonic set can co-occur; finally, (vi) lse Lehiste (p.c.) suggests that the basic rhythmic unit in Finnish is the disyllabic trochaic foot. Equipped with this knowledge, we understand the alterations in (1) of two words borrowed from English.

26 (1) a. (British) English blurb /bl3b/ => Finnish /'løøppi/

27 (1) b. English web /wɛb/ => Finnish /'veppi/

28 Both of these adaptations are based on schematic knowledge of well-formed words in Finnish and procedural knowledge of speech production. The procedural knowledge produces the closest Finnish matches to the non-native sounds. Thus /ɜ/ becomes /øø/, which is long due to the relatively long duration of tense vowels in English. The vowel /ɛ/ becomes the 'nearby' Finnish /e/, and /w/ becomes /v/. Both schematic and procedural knowledge of well-formed words give rise to the second syllable with a neutral vowel by thus forming a disyllabic foot. The stress pattern as well follows the schematicity of possible words by assigning primary stress on the initial syllable, hence matching the new words with the prosodic pattern of the rest of the vocabulary and their basic trochaic rhythm. The schematic knowledge of a phonotactically well-formed word simplifies the consonant cluster of *blurb* by retaining the more sonorous /l/. A monolingual Finnish speaker may not consciously realize that /blɜb/ versus /'løøppi/ and /wɛb/ versus /'veppi/ are not the same, whereas an English speaker would not even understand that they 'are.'

29 Both the procedural phonotactic knowledge and the possible-word Gestalts of the native language give rise to substitutions and other 'distortions' in loans, which can thus move the borrowed words even far away from their original phonological model. However, now the loans neatly fit the native lexicon in terms of both segmental and prosodic patterns, and this is all due to the speakers' mastery of the procedural and schematic knowledge of the phonotactics of their native language. We may note at this point that, strictly speaking, when Taylor talks about speakers not knowing negative phonotactic constraints in usage-based grammars because they only know that which has been said before (Taylor, 2002: 250–251), the question is not so much of absence of a constraint as it is of absence of positive procedural knowledge.

4. Schematic and exemplar memories versus 'pure, abstract constraints'

30 Assuming that speakers' knowledge of phonotactics is at the same time both detailed and schematic, the former in the form of procedural knowledge and the latter in being Gestalt-like, what can we say about the claim of Shatzman and Kager (2007) that speech perception involves the use of "pure abstract phonotactic constraints?" Their experiment used nonce words, that is, also words that had neither been heard nor said before. Experimental evidence in general indicates that speech perception makes simultaneous use of both bottom-up and top-down knowledge sources and that the latter may well be mediated by exemplar-type, episodic memories (Goldinger and Azuma, 2003: 317). If the mental lexicon is based on auditory episodes, as Coleman (1998) suggests, and if speech perception indeed simultaneously uses both top-down and bottom-up knowledge sources, this explains Shatzman and Kager's findings in the cognitive framework.

31 Speech perception is surely as fast as speech production, up to 300 words per minute (Levelt, 1989), so that when a listener has to make out whether what he heard is an existing word or not, he is able to make an extremely rapid search in his mental lexicon for matches. In this process, a phonotactically well-formed sequence immediately finds a match with a possible-word template whereas an ill-formed one does not. When no match is found, the ill-formed sequence can be rejected outright, without further processing. If,

however, a match *is* found with a possible-word schema, the listener must also come up with a meaning before he can confirm whether what he heard is a real word or not, for pronounceability alone does not confer meaning to a sound sequence. He thus has to search his memory not only for a match with well-formedness Gestalts but also for a meaning in the lexicon.

32 The exemplar memories, which have an auditory character, can be quickly scanned for meaning because the sound shapes of words are intimately linked with their meaning and grammar in the long-term memory, as it is assumed in cognitive linguistics and Construction Grammar (Croft 2001; Fillmore, Kay and O'Connor 1988; Goldberg 1995, 2006; Kay 1997; Lakoff 1987; Langacker 1987). It is only when no meaning can be ascertained that the listener can definitively say that the word is not an existing word, and this lexical search takes more time than the immediate rejection of a sequence that finds no match with a schematic possible-word template. Thus, when listeners are able to reject phonotactically ill-formed nonce words faster than the well-formed ones, they make use of both word Gestalts and the mental lexicon.

5. Discussion

33 Even if knowledge of a language stems from its actual use, as it is assumed in cognitive linguistics, this does not mean, of course, that speakers refrain from making abstract generalizations. Speakers learn to master the procedural commands needed in the production of phonologically and grammatically well-formed language, but they also extract Gestalt knowledge of it in the form of schemas of both meaningful grammatical constructions and meaningless possible-word templates. In the mental lexicon speakers conserve phonetically fully specified exemplar clouds of words, which simultaneously conform to and define the phonotactically well-formed patterns. The positive procedural and schematic knowledge plus the detailed exemplar-based lexicon entail also knowing that which is not well formed. These different kinds of knowledge do not force speakers into a narrow groove of what *is*, but they also allow them to identify what *is not*. In other words, knowledge of positive phonotactics entails also knowing that which is ill formed without, however, possessing any abstract phonotactic constraints or distributional patterns of individual sounds per se.

34 The Motor Theory suggested that we perceive speech in terms of the motor movements that are used to produce it (Liberman et al. 1967). The Neural Theory of Language (Feldman 2006) proposes that understanding language is a matter of mental simulation of meaning. We may understand experiments like that by Shatzman and Kager (2007) in light of these theories. The schematic knowledge of a possible word functions as a cognitive template to pronounceability à la Motor Theory. If the stimulus is not pronounceable, it cannot be a possible word in the language, and it can be discarded outright. But if it *is* pronounceable, that is, if it conforms to a possible-word template, it might be meaningful as well, and for this the listener must find a further match with meaning in his long-term memory.

35 Since the listeners in this experiment had to identify whether or not what they heard was an existing, meaningful entity, the task was different from that in ordinary speech perception, where words occur in a context and we assume at the outset that they have meaning. In the experiment, there was thus an additional step, i.e., two decisions about meaningfulness. I argue that in this kind of situation, (i) the listeners first decide whether

the stimulus is pronounceable, and only if it is, (ii) do they attempt the mental simulation of the meaning. The first step concerning pronounceability is almost instantaneous, but the subsequent decisions, first (i) about meaningfulness in general and then (ii) finding the actual meaning, require more time. Of course, in the experiment there was no actual meaning found, for only nonce words were used. But in any case, all this can be performed without pure abstract phonotactic constraints.

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NOTES

1. This paper is based on posters presented at the conference on *Language, Communication and Cognition* at University of Brighton in August 2008 and at *The Sixth Old World Conference in Phonology* at Edinburgh University in January 2009. I am grateful to the participants for their helpful comments, but all responsibility for the content of this paper is, of course, mine alone.

RÉSUMÉS

Les contraintes phonotactiques positives correspondent aux séquences de phonèmes autorisées dans une langue et les contraintes négatives, à celles qui leur sont interdites. Cet article tente de préciser le statut de ces contraintes dans la phonologie cognitive. La linguistique cognitive présuppose que les langues sont des systèmes symboliques. Dans ce cadre, il n'est pas évident que les locuteurs disposentdes structures mnésiques des unités non-sémantiques telles que les phonèmes ou la phonotactique (Liberman *et al.* 1980; Read *et al.* 1986; Lotto et Holt, 2000; Port et Leary 2005; Välimaa-Blum 2009, sous presse). Aussi, les cognitivistes se fondent sur l'idée que les langues émergent en fonction de leur utilisation. En conséquence, les contraintes pour ce qui ne se dit pas n'ont pas de place dans la linguistique cognitive (Taylor 2002). Néanmoins, Schatzman et Kager (2007) ont démontré que dans des conditions expérimentales, les sujets sont capables, parmi une serie de mots inventés, de rejeter plus rapidement ceux qui vont à l'encontre des contraintes phonotactiques que ceux qui sont en conformité avec eux. Je vais proposer ici que cette capacité est le résultat de l'interaction (i) des connaissances procédurales et schématiques des séquences permises et (ii) d'un lexique auditif (Coleman 1998). Si un locuteur connait les contraintes positives, il connait aussi les contraintes négatives, toutes les deux sans contraintes abstraites.

Phonotactics is a central concern in phonology. However, the status of these constraints in cognitive linguistics is different from that in the traditional generative approaches. In cognitive linguistics, meaningfulness is the essential characteristic of language and it may be that speakers do not even spontaneously form autonomous memory structures of meaningless units like the speech sounds, but only of the symbolic ones (Liberman *et al.* 1980; Read *et al.* 1986; Lotto and Holt, 2000; Port and Leary 2005; Välimaa-Blum 2005, 2009, in press). Consequently, phonotactic constraints, which pertain to meaningless units, would constitute no independent knowledge base either. Also, languages are learned in function of their actual use, and negative phonotactic constraints, characterizing something that cannot be said, must be excluded on these grounds as well from a speaker's grammar since it would be difficult to learn them in the absence of positive data (Taylor 2002). However, it has been shown that listeners are able to distinguish phonotactically well-formed nonce words from those that are ill formed (Schatzman and Kager 2007). I will now argue that this does not yet mean that speakers must have independent knowledge of the phonemes or phonotactic principles. The ability to separate what is phonotactically well formed from the ill formed is the result of the interplay of (i) two kinds of knowledge of the positive constraints, i.e., procedural and schematic, and (ii) an auditorily

represented mental lexicon (Coleman 1998). Knowing the positive constraints entails knowing the negative ones as well, but without any pure abstract phonotactic constraints.

INDEX

Mots-clés : contraintes phonotactiques, phonologie cognitive
Keywords : cognitive phonology, phonotactic constraints

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