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Modelling speech production – evidence from Swedish blends

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1   Introduction[1]

This paper is concerned with a type of speech errors called blends and what they may tell us about speech processing. A blend is a contamination of elements from two different lexical items. Sometime during the process of retrieving a lexical item for output, two functionally synonymous items that compete for the same slot are fused and realised as one separate word or nonce word (Levelt 1989: 215). Blends are interesting for linguistic research since they may reveal important facts about the way we as speakers process language from the first conceptual fragment to articulated speech. (1) and (2) are examples of blends taken from Fromkin (1973:260).

(1)   I saw a *herrible* film on TV last night.
(2)   Did you hear what *shromkin* said?

In (1), the two words *horrible* and *terrible* are realised simultaneously and fused into one single word, *herrible*. Similarly, (2) involves the fusion of the words *she* and *Fromkin*, realised as the blend *shromkin*. These blends are of two different kind; *phonologically overlapping* and *phonologically non-overlapping* blends. (1) is overlapping, since the two fused words, *horrible* and *terrible,* have the phonological elements /r/, /i/, /b/ and /l/ in common, whereas there are no shared elements in *she* and *Fromkin* in (2).

The present study investigates how the distinction between overlapping and non-overlapping blends can be informative in modelling speech processing from idea to actual speech. Speech processing is assumed to be a uni-directional process through a number of distinct linguistic modules that are responsible for semantic, syntactic and phonological processing respectively. The non-overlapping blends are assumed to be a result of contamination early on in the process, at the lemma level, while the overlapping blends are assumed to be formed later in the process, at the lexeme level. We make no claims about the appropriateness of this model on linguistic grounds. The modular model is used for methodological reasons, since such a model has the advantage of being capable of disproving hypotheses about speech processing. Another more practical reason for assuming a modular model is that this study replicates experiments on English blends carried out by Laubstein (2002) within a modular framework, where she argues for a serial directional model, which involves distinct linguistic levels within the language process.

1.1   Aim and scope

The purpose of the present study is to investigate a corpus of Swedish blends from a phonological and semantic point of view and compare the results with Laubstein's (2002) English data in order to see if the Swedish data confirm her results in support of a serial feed-forward-only model of speech processing or if we should allow for speech material to move not only in one direction but also back to previous levels. In pursuit of such evidence a similarity judgment experiment with native Swedish subjects was carried out. The scope of inquiry is covered by three questions:

(i)   Are the target words in the phonologically non-overlapping blends semantically more similar than the target words in the phonologically overlapping blends?

(ii)   What are the effects of frequency in blending?

(iii)   What syllabic parts are vulnerable to blending?

1.2   The data

Blends are by definition functional synonyms. Functional synonymy includes a range of different types of meaning similarities. In the data, there are instances of near-synonymy such as *fullt-helt* (*fully-completely)* or *brallor-byxor* (*pants-trousers*), but there are also pairs which are more different, such as *godkännande-samtycke* (*approval-consent*), *förödande-förrädiskt* (*devastating-treacherous*) as well as instances of co-hyponymy, e.g. *romaner-noveller* (*novels-short stories*), *Drott-Saab* (two Swedish handball teams). No instances of antonymic pairs were found in the material.[2] There are also cases of functional synonyms that rely on the situational frame in which the blend came about (blend in bold):

(3)   *Akta håret/ljuset –* **huset**
         Be careful with your hair/the candle – **huset**

(4)   *Jag skulle aldrig klara av terapi/en remiss –* **teramiss**
         I would never be able to cope with therapy/a referral – **teramiss**

Like Laubstein we excluded phrasal blends, such as (5), which involve the fusion of lexical units larger than the single word.

(5)   *Kan du minnas tillbaka på när du var barn?*
         Can you remember back on when you where a child? (Blending of the expressions *remember* and *think back on*).

2   Speech processing and lexical access

This section gives an overview of the speech process from conceptual fragments or ideas to articulated speech. Special emphasis is given to Levelt's (1989) model of speech processing and lexical access, since it provides the theoretical foundation of the present study, but other models are also brought to the fore (Jackendoff 2002; Barsalou 1992).

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[2] In substitution errors for instance, antonyms together with co-hyponyms and hyponymy appear to be far more common than synonymy (Levelt 1989:218-219; Murphy (forthcoming).

2.1   The serial model: Levelt

Speech starts out as communicative intentions. The speaker wishes to convey a message to an addressee. This is the stage of *macroplanning*. When the initial stage of macroplanning is in hand, *microplanning* is initiated. The speaker now decides how to structure and distribute the intended message. The message must be structured and distributed. At this stage we are still moving outside any actual *processing of lexical material*, e.g. what is the topic and focus of the message? Here the message receives some of its more concrete shape as a first step towards a material ready to be processed. Macroplanning and microplanning take place in the *conceptualiser* and are considered to work in tandem and interchange information continuously (Levelt 1989: 108-110).

When speakers have decided on the message they want to convey, the relevant concepts are activated, and this information is passed on to the *formulator* with a tag "This is the message – process it!" (See Fig 1. below). It is now up to the conceptualiser and parts of the conceptual structure to find a lexical item that matches each of the parts of the message.
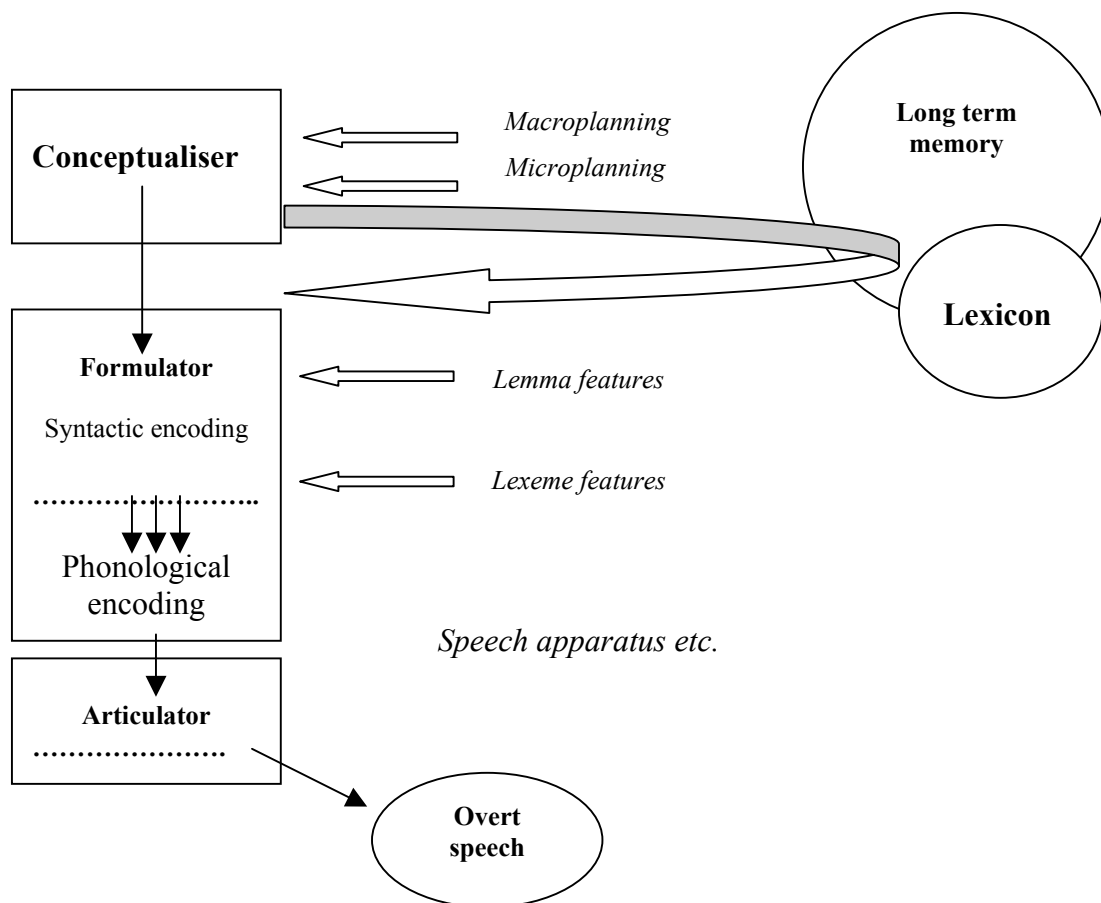
Figure.1. A modified version of the processing components based on Levelt's (1989: 9) "blueprint" of the speaker.

As Figure 1 shows, the *lemma* level holds features that are of a semantic nature (from the conceptualiser/lexicon) and of a syntactic nature (from the formulator) (Levelt 1989: 187-189). The actual processing of a message runs as follows: When the conceptualiser has found an item in the lexicon whose semantic make-up corresponds to that of the intended message,

the lemma of this item is activated. The message has entered the formulator of the processor that initiates the grammatical encoding. Thus, in addition to the conceptual structure involving meaning, the lemma also contains syntactic information, e.g. the argument structure of a certain verb. When the lemmas of the message have been encoded they proceed to the next level within the formulator, namely that of morphological and phonological encoding, which concern affixation, syllable structure and accent. [3] These are the lexeme features. When they have been accessed, phonological encoding is concluded and the message is equipped with a phonetic plan that is sent to the articulator.[4] We have now reached the final stage of speech production – the articulation of the message in the speech apparatus and Levelt (1989: 13) concludes "[the] product of articulation is *overt speech"*.

Before we proceed, a few additional remarks with regard to this model need to be made. Firstly, what is not accounted for in this model are the complex routes and the processing within conceptual structure, i.e. how concepts are evoked and interact before entering the stage of macroplanning and microplanning. Secondly, given the extreme speed at which conceptual structure is transformed into a message proper, we must allow some kind of interim check-points where the structure produced so far is monitored before it is sent on to the next level. Levelt (1989:12) proposes a system of buffers that account for the fact that the message undergoes modularised parallel processing, i.e. several simultaneous level-processes where one part of the message can "wait" for the rest of the structure. It is obviously not the case that the whole of the message has to undergo, for instance, syntactic processing, before it can move on to the next level.

Finally, we have to assume that Levelt's model implicitly allows for the existence of even lower levels within each processing compartment; levels which further modify and structure the message so that the internal structure and transition of message fragments within the different domains display as complex processing as the larger structures. In this respect Levelt's model is similar to both Barsalou (1992) and Jackendoff (2002) discussed in Section 2.2.

2.2   Interactive levels of processing

Within his own framework, Jackendoff (2002) argues for a model with many similarities to Levelt (1989). However, he brings forward some key issues concerning the links between the different levels in the processor – links that allow for interaction between the linguistic steps in speech production. In his terminology, these links are *sets of interface constraints* or *interface processes*, governing the transition from one level to the next.

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[3] Here, Levelt (1989:12) makes an effort to offer an informative account of the actual process of accessing the lexeme. He says "Apart from the lemma information, an item in the lexicon contains information about its morphology and its phonology […] several phonological procedures will modify, or further specify, the form information that is retrieved". He continues: " Are an item's lemma and form properties retrieved *simultaneously* or *successively* during the phase of lexical access […] we do not know.*"* (ibid. 231) Now, one could argue that this extra "detour" back to the lexicon seems uncalled for, and many do (see for instance Jackendoff below). In addition it is difficult to tell exactly when the extra call to the lexicon is made, but it probably follows naturally as soon as the lemma properties are retrieved. There exist, however, some evidence in support of a two-stage phase in so-called "tip-of-the-tongue-states where the lemma information is accessed, but the lexeme information is blocked for some reason. (ibid. 231-232). However, it seems correct to assume that TOT-states could possibly be accounted for also in terms of inadequate phonological feedback.
[4] In Levelt's model (1989:ch 9) phonological encoding is a three-stage process constituting a *morphological/ metrical spellout, segmental spellout* and a *phonetic spellout*.
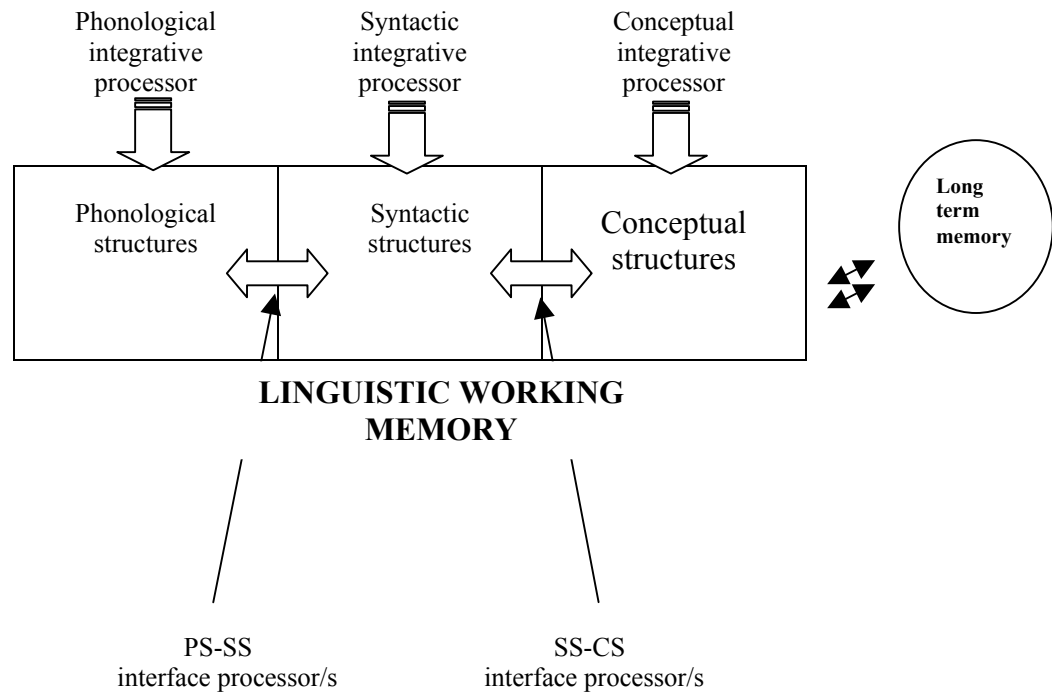
Fig. 2. Processing compartments, based on Jackendoff's model of language processing (2002: 199)

According to Jackendoff, a communicative intention starts the building process of a linguistic structure at the conceptual level of the processor. A lexical item matching the intended meaning of the message is retrieved from long term memory and sent into the conceptual working memory.[5] In the conceptual compartment an *integrative processor* combines and compares the item with the broad contextual constraints of the message. The retrieval of the semantic meaning also activates the syntax and formal properties of the lexical item. By becoming activated at this early stage, the syntax and phonology compartments prepare for the arrival of the message by building partial structures from the information available at that stage. When the item has been processed in the conceptual compartment, that product is used by the interface processor to pass on vital information to the syntax compartment whose integrative processor transforms the input into a syntactic structure. The partial structures already in the syntactic compartment thus receive additional refined information from the interface processor and can build a more complete syntactic structure.[6] When the message enters the phonology compartment, the process is repeated via the phonological interface

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[5] The difference between the *lexicon* and *long term memory* is not clear. In this paper the latter term will be used to include and encompass the specifications in the lexicon. Note, however, that Levelt makes a distinction between lexicon and long term memory. Working memory can in Jackendoffian terms be seen either as a separate domain consisting of three different compartments corresponding to the levels in Levelt(1989) (i.e. the conceptualiser, and the formulator divided into syntax and phonology), or as three "functionally separate working memories"(Jackendoff 2002:200).

[6] A justified question is how this process differs from Levelt (1989) where he claims that the output from one level is used as input for the next level. Jackendoff (2002:222-223) explains this by virtue of the actual work performed within the different compartments. Conceptual structure deals solely with the *meaning* of the items in a structure and how these items are interrelated. When this information is sent to the syntactic compartment, a compartment solely concerned with syntactic categories such as DPs, PPs, case and movement in tree structures, the interface processor maps the conceptual interrelationships onto a syntactic structure which is subsequently refined in the integrative process.

processor and the integrative processor with, for instance, further specification of tense and agreement markers (Jackendoff 2002: 211-213).[7]

Like Jackendoff, Barsalou (1992) assumes co-operating levels in the processor but distinguishes between seven levels of processing. He make claims such as "recent work has demonstrated important interactions between these levels. For example, the phonological representation of a word at Level 4 may affect the retrieval of semantic representations at Level 2" (1992: 267).[8] Barsalou's model allows for bi-directionality of the processing of linguistic material. This may be regarded as a drawback, since it presupposes multiple calls to long term memory – calls which may still be justified on linguistic grounds but are methodologically cumbersome. Levelt (1989:12) and Jackendoff (2002: 202) emphasise parallel processing as a powerful, non-sequential device in the speeding up of language processing. Any piece of a conceptual structure that has been processed can be sent on and further refine the syntactic structure. There is no need to await the completion of the entire message. In this respect Barsalou concurs with both Levelt and Jackendoff but makes an important addition and again raises the crucial question of the directionality of material in the language processor. "[T]hese levels do not necessarily occur one after another, with each level waiting until the prior levels complete. Instead, multiple levels often proceed simultaneously, with complex interactions occurring between them" (Barsalou 1992: 267).

Laubstein (2002: 429) describes the difference between a serial model and an interactive model as follows.

> In both interactive and serial models, selection at the lemma level activates items at the lexeme level. The difference in the two types of models lies in whether the lexeme level can add to the activation of the lemma level items. In an interactive model the phonological lexeme level can boost the activation levels of the semantic/syntactic lemma level, whereas in a serial model the activation on the lexeme level can have no effect on the activation on the lemma level. In other words, in an interactive model, once a lemma has activated its lexeme, that lexeme can reactivate (or boost the activation level) of the lemma that activated it in the first place. This cannot occur in a serial model.

2.3   A closer look at lexical access – the origin of blends

When an intended message activates a region of a conceptual structure, a signal corresponding to that message is sent to long term memory. When the signal reaches long term memory a number of potential candidates compete for the place in working memory. The final decision on which item is chosen depends on many different factors.

This part of the process is accounted for by *logogen theory.*[9] All lexical items are mentally represented by so-called logogens. Levelt (1989: 202) says that "[l]ogogens are devices that collect evidence for the appropriateness of a word. They are sensitive to information [from the conceptualiser and the cognitive system] that may indicate the appropriateness of "their" word". Each logogen is sensitive to stimulus by having what Levelt calls a "threshold". As

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[7] It should be noted that this model as it is depicted here, like the one Levelt proposes, has been simplified. We disregard the internal specification of structure of each of the compartments. They may very well be dealing with similar integrative and interface processes domain internally even at the lower levels.

[8] Barsalou's levels 4-7 correspond almost directly to Levelt's division (1989:ch 9.2) of the phonological encoder into *morphological/metrical spellout, segmental spellout* and *phonetic spellout.* A similar description is also found in Jackendoff (2002:212-213) and all of Barsalou's levels may be integrated as sub-levels in the linguistic working memory in Fig.2. above.

[9] Originally developed by Morton (1969).

soon as the logogen has received enough information from the conceptualiser, and as soon as the logogen senses that it corresponds to the demanded concept, the logogen fires and is selected and retrieved. This will inevitably mean that several logogens are very close to firing, since the concept associated with them may be close to the one actually selected.

If a logogen is *appropriate,* selection proper is based on semantic meaning as well as syntactic and formal aspects. There seems to be a need for a more complex and versatile device than what the label "item" communicates within traditional theories of language processing, and hence logogens have come to represent this nuanced and sensitive device that is part of the selection process. Levelt says that "logogens originate from the so-called Cognitive System, which is the repository of all conceptual, syntactic and higher order functions" (1989: 202). In other words, these items are treated as static devices resident in long term memory, whereas logogens operate dynamically at a higher level in encompassing both long term memory and aspects of conceptual structure.

Three factors are brought forward as contributing to a "low" threshold in a logogen, i.e. a logogen that fires more easily; the *frequency* with which the logogen is selected, the *predictability* with regard to the environment in which it is to be situated and finally *contextual information* from the conceptualiser, i.e. how some logogens appear to be more suitable in one context that in another (Levelt 1989: 202-203).[10]

Apart from logogen theory, several different models of lexical access have been proposed in the literature. The one receiving least notable attention in Levelt (1989) is the *spreading activation* account where a collection of activated nodes with varying degrees of activation constitutes the concept(s) associated with lexical items. The problem with this account, according to Levelt (1989: 211), is that it does not satisfactorily describe how the lemma-level nodes are activated. Another model discussed by Levelt (ibid.205) is lexical access via *discrimination nets* which means that a series of predicates or features are compared to the intended message. Depending on their evaluation and choice of a true or false response, a route to the correct lexical item is found and the item is selected.

The critical moment in the speech process with regard to blending is undoubtedly the stage of lexical access, since blending involves the fusion of two functionally synonymous lexical items. If *two* words are fused into *one* we must be dealing with competing structures in some way during the process of selecting and retrieving the correct lexical item. Levelt (1989: 214) discusses two different types of intrusion – *conceptual intrusion* and *associative intrusion*.

Conceptual intrusion corresponds to the event where one or more additional concepts are simultaneously activated in competition with the proper concept. For some reason, the intruding concept is also selected and processed parallel to the intended concept all the way into the articulator and the subsequent output of overt speech.[11] In associative intrusion it is not the concept but rather the lemma as a whole that is affected by interfering associations

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[10] Frequency and predictability more or less speak for themselves. Contextual concerns are intimately connected to predictability but differ in so far as more subtle aspects of the larger conceptual structure of which the item is a part are taken into consideration. For instance, a lexical item may be predicted to fill the appropriate slot in the message, but for some reason the speaker wishes to employ another more suitable item, such as a synonym or a hyponym or explore other lexical relations. It should be pointed out that the three factors proposed here are not prerequisites in selecting a lexical item, but they merely contribute to a low threshold.

[11] We should be careful in assigning the label *intrusion* to this event. Conceptual and associative *competition* might be a more appropriate label given the definition and character of the blend as a fusion of functionally synonymous concepts. In many cases it is impossible to tell which was the intended concept of the two realised because they fit the context equally well and may pass unnoticed to both the speaker and the interlocutor. Likewise, Bierwisch (1982:593)) notes that "the right lexical item is not displaced by a wrong one […] two equally correct but incompatible selections are made" and also "the selection is not wrong but insufficiently precise" (ibid. 596). It should, however, be noted that attempts at deciding the difference between a target and an intruder have been proposed in the literature. For an account of this, see Laubstein (1999:138-142) and section 4 below.

between lemmas, i.e. what Levelt calls *word* associations.[12] Both lemmas are simultaneously processed and realised as a blend. In either type of intrusion, the blended words may be related in meaning but that is not always a prerequisite of a blend.

Other cases of blends involve so-called *distractions*, intrusion from what appears to be some completely unrelated concept, often called Freudian blends. However, given our limited knowledge of the intricate conceptual networks involved, we would say that it is impossible to claim with any certainty that these concepts are in fact unrelated and we can only hypothesise about how meanings interact. It is assumed in this paper that that there is indeed some relation in all cases of competition[13] (Levelt 1989: 214-216; Jackendoff 2002: 212). Both Levelt and Jackendoff are in agreement that a word blend originates in the selection of a lexical item and is intimately connected to the conceptual domain of the item. That blends are also affected by syntax is due to the fact that they are *functionally* synonymous.

In this first part of the paper we have seen how lexical access operates and how speech is formed according to two different models. The next part of the paper investigates empirical data and structural aspects of Swedish blends in order to establish which of these models is indeed the more plausible representation of the speech production process.

3 The similarity judgment experiment

This section presents Laubstein's experiment of English blends as well as our experiment of Swedish blends. The Swedish experiment is identical with Laubstein's (2002) experiment of English blends with respect to design and procedure.

3.1 The similarity judgment experiment of English blends

Laubstein carried out a similarity judgment experiment with English speaking subjects who were asked to judge the semantic similarity between the two words fused in a blend. Pairs of words were divided into three distinct groups, *phonologically overlapping target words*, *non-phonologically overlapping target words* and a filler category.[14] Overlapping blends involved words that had at least one phoneme in common. Non-overlapping blends involved words that had no segments in common, i.e. none of the phonemes found in one word could be found in the other (see example (1) and (2)). The purpose of Laubstein's experiment was to confirm or disconfirm the hypothesis of *a serial feed-forward-only model* of speech production. A serial model is capable of predicting the outcome of a similarity judgment experiment. Lexical items that share many semantic features but no phonological features take the higher semantic activation as a prerequisite to reach the level of activation needed for actual selection of two conflicting lexical items. If, on the other hand, the lexical items share phonological features they can be selected simultaneously on the basis of phonological activation rather than the semantic features they have in common.

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[12] *Word* association may come across as a strange label since we are dealing with lemmas – the semantic and syntactic make-up of a word in Levelt's theory.
[13] The difference between conceptual and associative "intrusion" may seem subtle and so it is. What Levelt emphasises is, however, instances of antonym blends where the core meanings are mutually exclusive and thus conceptually but not necessarily lexically related. We find it hard to agree with him, especially since antonym blends are paradigmatically related through a binary connection of opposition. If antonyms are conceptually related, they should also be lexically related (Paradis 2003).
[14] Laubstein's experiment involved 57 informants. The experiment included 41 overlapping blends, 39 non-overlapping blends and 25 fillers.

An interactive model, however, does not predict the outcome of such an experiment, since the activation level required can be reached via the additional lexeme activation "helping" the lemma level.

The result of Laubstein's study was that subjects judged the set of non-overlapping pairs of words to be more closely related semantically than the overlapping sets of words. Her results were significant both in terms of average difference in ratings between the overlapping and the non-overlapping groups (t(56) = 6.03, p < .001), and in terms of the number of subjects who indicated elevated ratings for the non-overlapping group (Z = -4.87, p < .001). Laubstein claims that the result of the experiment supports a serial feed-forward-only model of speech production (2002: 428-431).

3.2 The similarity judgment experiment of Swedish blends

A similarity judgment experiment designed within the same frames as Laubstein (2002) has been used to test the semantic relatedness of the target words in Swedish blends.

3.2.1 Method and material of the Swedish study

In this experiment, 50 native Swedish subjects were asked to judge the degree of similarity in meaning between the fused words in 70 Swedish blends in context. [15] The experiment included 30 overlapping sets, 30 non-overlapping and 9 fillers in random order.[16]

(6)   *Det är ett billigt sätt att LÅNA / LÄSA böcker.*   [overlapping]
(loː.na/læ.sa borrow + read: *låsa* loːsɑ)

(7)   Jag väntar på ert GODKÄNNANDE/SAMTYCKE.   [non-overlapping]
(**guːd**.çɛnɑnde / **sam**.tyke: approval + consent: *godtycke (goːd.ty.ke)*)

(8)   Vad ger du för BILEN/TAVLAN?   [filler category]

In the overlapping example (6), the two target words share the phoneme /l/ in the first syllable. In (7), there are no shared phonemes, i.e. no phoneme from the first target word is found in the second one. (8) is a filler and thus phoneme distribution is irrelevant.

The instructions to the experiment were read out aloud to the subjects, undergraduate students, before they started (see Appendix I). The subjects were informed that although the sets appeared in a certain context, the extent to which the words fitted that particular context should be disregarded. The task of the informants, who were all native speakers of Swedish, was only to indicate the degree of relatedness on a scale directly following each example sentence. The scale was graded from 1 to 5, where 1 represents no similarity at all, or very little similarity, in meaning, whereas 5 represents a high degree of similarity. Two example sentences were given in the instructions and subjects were allowed to ask questions with regard to these examples. There was no time limit. All informants finished the experiment within 20 minutes.

Compared with Laubstein's study, a different approach to the categorisation of the two groups had to be adopted. The reason is that the Swedish blends were different from the English blends. The strong criterion for non-overlapping blends used by Laubstein (2002) was

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[15] The corpus of blends used by us in the experiment is a compilation from various sources. Blends collected particularly for this paper have been used together with Professor Per Linell's corpus of blends.
[16] After the experiment was concluded we discovered that one member of the filler category was actually an extra overlapping blend which had been categorised as a filler by mistake. Before we evaluated the experiment one member of the overlapping group was randomly eliminated from the test sheet. This left us with only 9 fillers but 30 pairs of overlapping and non-overlapping blends respectively.

not possible to use for the Swedish data, since that would have left us with only five sets in the non-overlapping group. Overlapping pairs are instead defined as a set where the two words share some phoneme in the main stressed syllable (this syllable is indicated in bold in example (6)-(8)). In non-overlapping blends, the target words do not share any phonemes in that syllable. The motivation is that phonemes and segments in that syllable are assumed to be more salient than phonemes that happen to appear in any other syllable of the word. There was a small number of blends (5 occurrences) in our corpus in which the two targets shared no phonemes in the main stressed syllable. They were of course included in the non-overlapping group. This change in the basic categorisation has to be kept in mind when we compare our results with Laubstein's results.

Our *salience-of-main-stress-effect* receives some support also elsewhere in the literature. Levelt (1989: 184) says that "Entries connect on the basis of shared word-initial consonants, but a shared first-syllable-final consonant is probably irrelevant". Now, it should be noted that Levelt apparently considers word-initial consonants as important in the lexical entry, but we do not know whether this applies only to words with stress on the first syllable. He offers no further comments to clarify his claim. He also says that "both experimental results and the spontaneous error-data show, however, that constituents of stressed syllables are particularly error prone" (ibid. 342). Another source of support is found in Freud (reprinted in Fromkin 1973: 47) where Freud quotes Meringer who claims that "The question has therefore to be decided which sounds in a word have the highest valency [...]. [S]ounds which are of high valency are the initial sound in the root syllable, and the initial sound of the word, and the accentuated vowel or vowels". Non-overlapping pairs are defined as pairs where the two words share no phoneme in the main stressed syllable.

3.2.2   Results

On the scale of semantic similarity from 1 to 5, the overlapping group received an average score of 3.27, the non-overlapping group 2.89 and the filler category 1.1. Furthermore the overlapping group received an average score above 4 in nine sets out of the 30 in the experiment (30%). In the non-overlapping sets there were only five instances over 4 (17%), which indicates that the informants less frequently judged the non-overlapping sets as being very closely related semantically even in individual cases. The reverse situation appears in the overlapping group that was rated lower than 2 in three cases (10%) compared to the seven cases (23%) in the non-overlapping group.[17]

Blend group	Average score	Rated ≥ 4	Rated ≤ 2
Overlapping blends	3.27	30%	10%
Non-overlapping blends	2.89	17%	23%
Filler category	1.1	0%	90%

Table 1. The degree of similarity on the scale of relatedness (1-5) for the blend groups in the experiment

The examples to receive the highest average score were (9), (10) and (11), where the first one is non-overlapping and the two latter are overlapping. [18]

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[17] For each individual average score, see Appendix I.

[18] The letter *r* in *färdig* is not pronounced in most Swedish dialects. The following *d* is a supradental in this context.

(9)   Är du inte FÄRDIG / KLAR?
       Are you not READY / DONE?   NO (4.84)

            1   2   3   4   5

(10)   Du bör kunna FINNA / HITTA svaret här
       You should be able to FIND / FIND the answer here[19]   O (4.88)
            1   2   3   4   5

(11)   Jag gillar mina nya BRALLOR / BYXOR
        I like my new PANTS / TROUSERS   O (4.9)

            1   2   3   4   5

The examples to receive an average score in the lowest range between 1 and 2, as in (12), (13) and (14), were different from (9), (10) and (11) in terms of semantic relatedness. They were functional synonyms in a particular situational frame.

(12)   Akta HÅRET / LJUSET
       Be careful with your HAIR / THE CANDLE   NO (1.1)

            1   2   3   4   5

(13)   Barnet ville inte RAPA / GAPA
       The child did not want to BURP / OPEN HIS MOUTH O (1.24)

            1   2   3   4   5

(14)   Det är ett billigt sätt att LÅNA / LÄSA böcker
       It is a cheap way to BORROW / READ books   O (1.28)

            1   2   3   4   5

3.2.3   Discussion

Contrary to our hypothesis of the outcome of the semantic judgment experiment and contrary to Laubstein's results, overlapping pairs are judged to be slightly closer related in meaning than the non-overlapping sets of words. There was a difference of 0.38. This state of affairs invites further investigation as to what may be the reason for such an outcome. In the discussion of her results, Laubstein (2002: 427) claims that the "non-overlapping pairs were judged to be significantly more closely related semantically than the overlapping set of pairs". Before discussing any evidence in support of an alternative model, let us first look at the

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[19] There exist only one potential English candidate, *find*, corresponding to the Swedish set of targets.

direct consequences of the result for the present study in relation to Laubstein's serial model. In her paper (ibid: 430) she says:

> The two sets [overlapping and non-overlapping] would predictably show this difference in shared semantic features; indeed the opposite result, i.e. no difference, would be inconsistent with serial models. That is, it would be evidence against a serial model if the non-overlapping set were not distinct from the overlapping set in this way.

At first blush, the result of the present study would disconfirm a serial model, since there is in fact a difference in favour of a more closely semantically related *overlapping* set. However, we have to bear in mind that the similarity judgment experiment proposed by Laubstein (2002) is but one piece of evidence in support of a serial model.[20]

We should perhaps also ask ourselves whether our choice of categorisation of the Swedish blends in any way contributed to this conflicting result, since we chose to take the main stressed syllable as the distinguishing element in defining the two sets. The fact that there were very few sets that met Laubstein's criteria is an interesting finding for which we have no explanation. The reason may be that Swedish differs from English in some important respect that has a bearing on the data in terms of word length and phonological structure. Another possibility could be that the corpus of blends happens to differ on grounds of sampling.

The result of the study can also be viewed from another perspective, namely what it tells us about the possibility of interpreting the data in favour of an alternative model of processing, more in line with an interactive model like the one proposed by Jackendoff or Barsalou (see section 2.2 and 2.3). Recall that the activation level required for selection can, in the interactive model, be reached via additional stimuli from the lexeme level, i.e. by "feed-backing" activation to the lemma level. This means that fewer shared semantic features could very well be an indication that extra activation from the lexeme level is required. We must not draw the opposite conclusion that an interactive model is supported simply because the serial feed-forward-only model can be disconfirmed on the criterion of semantic similarity. The outcome of the similarity judgment experiment does not offer any strong evidence in favour of an interactive model either, but the result may very well support such a view, i.e. it *allows* for an alternative approach. However, it questions the serial-forward-only model and highlights the need for an investigation of other aspects of blends in pursuit of more convincing support for an interactive model. For that reason the next section takes a closer look at the relative frequencies, distribution and internal structure of the Swedish blends in order to see if we can identify any other aspect in the blend that may be informative of the speech production process.

4   Structural and relational aspects of blends

This section investigates the internal structure and the distribution of blends and how the structure relates to other linguistic factors important to a model of speech production. But, first some preliminary remarks have to be made with regard to the structure of syllables,

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[20] In Laubstein (1999:139-142) frequency effects of the conflicting lexical items are proposed as another verification of a serial model. Only in those sets that were phonologically overlapping could a frequency effect between the target word and the intruder be discerned. In addition, that report confirmed earlier studies on response times that claimed that frequency effects were found on the lexeme level (i.e. connected to the overlapping set) only and thus supported a serial model (Laubstein 1999: 140-141). (A test based on the frequency of the blended words has been carried out in this study too and will be presented in section 4.2).

which is an important notion throughout this section. Subsequently, the results of the word frequency test are discussed. This section also addresses the internal make-up of a blend and the issue of what elements are actually involved in blends. Particular attention is paid to semantic issues in connection with blends and how they relate to a processing model. The aim is to find more convincing support for a plausible model of speech production, since the similarity judgment experiment could not in principle provide such support.

4.1 Syllables and syllable structure

Like many other linguistic structures, phonological structure is hierarchical in nature. The smallest possible constituent, the phoneme, is contained within syllables consisting of one or more phonemes. Syllables are vital with regard to stress and intonation patterns.

Syllables are built up of phonemes grouped around vowels or vowel sounds. Within the syllable we normally distinguish three different parts. Consider the word *computer* [kəm.pju:.tə*]*. This word consists of three syllables (see Fig.3.); all grouped around the vowel sounds /ə/, /u:/ and /ə/. The first part of the syllable is called the *onset*. It consists of at least one consonant. The vowel sound in the syllable is called the *nucleus* and the succeeding consonants are grouped in the *coda* of the syllable. Often the nucleus and the coda are said to constitute a separate constituent named the *rime*. Codas are optional elements. Onsets are also optional but preferred over codas. The only obligatory element is thus the nucleus – the core of the syllable (Bruce 1998: 20-23; Fromkin et al. 2000: 587-589).

σ1. σ2. σ3.

(rime) (rime) (rime)

k ə m pj u: t ə

onset nucleus coda onset nucleus onset nucleus
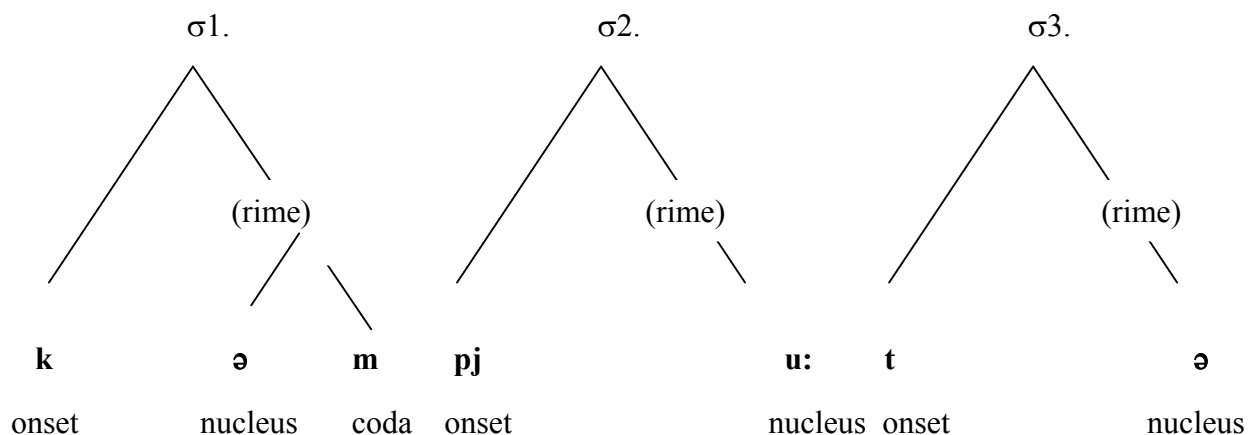
Fig. 3. Syllabic structure of the word *computer*

4.2 Frequency of targets as support for models of speech production?

In addition to her results of the semantic similarity tests, Laubstein (1999: 139-142) argues for a serial-feed-forward-only model on the basis of the results from a word frequency test of a corpus of blends. The assumption was that word frequency effects are located at the lexeme level. She shows that a frequency effect is found only in the set of blends with phonological overlap. Laubstein takes this as evidence for a serial feed forward model. That is, the frequency effect never influences the lemma level, since no activation from the lexeme can feed back (or boost) any information to the lemma.

A condition for performing such a test necessarily involves the distinction between the target and the intruder of a blend. Laubstein (ibid.138-139) suggests that the target be identified on the basis of the metrical foot and syllable structure of the blend, since these

features correspond to those of the target word. The intruder only contributes with the intruding element. Using these criteria some blends are defined as unambiguous, i.e. those where we can unambiguously tell which word is the target and which is the intruder; ambiguous blends are those where we cannot make a distinction based on these criteria. As an example, the set in (15) is unambiguous, since we recognise the metrical structure of the target word (*bekommer)* in the blend. In addition, it is obvious that the intruding word has contributed only the affix. Conversely, in (16) it is impossible to say which of the words is the target, since the blend has the same metrical structure as both the potential targets (*rapa* and *gapa*). It looks as if both targets have contributed equally to the blend in terms of intruding elements, since we do not know which word intrudes on the other with its onset from the first syllable.

(15)   bekommer-angår→ ankommer
        (be.**kɔ**.mer/**an**.go:r[1] (*have affect upon – concern)* **an. kɔ**.mer *(ankommer))*

(16)   rapa-gapa →grapa
        (**rɑ:**.pa-**gɑ:.**pa (*belch - open one's mouth:* grɑ:pa *(grapa))*

Our data consist of nineteen overlapping and nineteen non-overlapping sets which were judged as unambiguous according to the criterion outlined above and were thus tested for frequency effects (see Appendix II). The corpus used was the Swedish 12 million-word corpus *Press 1997* based on newspaper material from four major Swedish daily papers compiled during 1997 (www.spraakbanken.gu.se). Admittedly, some of the words tested in this experiment are relatively infrequent within that type of register. It is thus important to stress that *Press 1997* is a corpus based on written text only, while the blends are retrieved from spoken data.

Blend set	Higher frequency attested in percentage
Overlapping	42%
√ Fosterlandet (21)	Fäderneslandet (9)
Tillsättas (54)	Utses (111)
Förrädiskt (11)	Förödande (230)
√ Regnrock (2)	Regnjacka (0)
Tafffligt (4)	Töntigt (17)
√ Hitta (1731)	Finna (733)
Skitrolig (0)	Skittrevlig (0)
√ Stack (182)	Sträckte (61)
√ Skrålet (3)	Skränet (0)
√ Invändning (52)	Anmärkning (37)
Undanträngda (2)	Undertryckta (3)
Hyfsat (98)	Hyggligt (140)
Mängder (474)	Massor (504)
√ Genomblöta (3)	Genomvåta (1)
√ Syndrom (61)	Symptom (59)
Inkräkta på (6)	Inskränka (28)
Nyttigt (105)	Nödvändigt (514)
Fullt (1477)	Helt (8038)
Brallor (5)	Byxor (99)
Non-overlapping	42%
Initialer (6)	Signatur (37)
Teorier (126)	Modeller (268)
Anvisad (3)	Utsedd (88)
Färdig (293)	Klar (1341)
Bekommer (7)	Angår (46)
Struktur (182)	Funktion (265)
Terapi (59)	Remiss (94)
Samtycke (41)	Godkännande (111)
Innerligt (44)	Ärligt talat (108)
√ Saab (720)	Drott (73)
√ Röra (419)	Oreda (20)
√ Motverka (135)	Avvärja (21)
Tillhörighet (70)	Anknytning (185)
Tacksamhet (67)	Uppskattning (142)
√ Titta (815)	Känn (37)
√ Undertröja (6)	Blusliv (0)
√ Erbjudande (169)	Inbjudan (148)
√ Jagat (48)	Raggat upp (5)
√ Vänta (1086)	Lugna dig (234)

Table 2. Word frequency effects for target words in Swedish blends. "√ " indicates sets displaying frequency effects.

The left column of the table indicates how often the target word displayed a higher frequency than the intruder in the Swedish data. Laubstein's (1999) figures for the English blends showed a frequency effect in the overlapping set (61%), while that is not the case for the Swedish data (42%). The figures for English may be interpreted as evidence of a serial model which predicts that the phonologically overlapping set will be subject to a frequency effect in the target word. Interestingly, this does not seem to be the case for the overlapping Swedish blends. The corresponding figure for frequency effects in the non-overlapping set is also low (42%). Laubstein's figures for the English data show no frequency effect (45%), which again can be taken to be predicted by a serial model. In like manner as before, we cannot take the results to disconfirm an interactive model either. A test of this kind suffers in two important respects. Firstly, the test result is an evaluation based on written planned newspaper text instead of spoken spontaneous material. Secondly, we need to consider the issue of different lexical categories in the corpus. The figures for frequency may be deceptive as they are reported and analysed in a table as the one above. In some cases it is impossible to tell whether we are dealing with a verb or a noun match of the item in question. What is interesting is the fact that this seems to have been disregarded in earlier reports of frequency effects. Presumably, if one of the words in a blend is a noun, so is the other (the same would apply to verbs and other lexical categories). Such general patterns can be seen also in other aspects of blending. Given the definition of functional synonymy in blending it is unlikely that items of different lexical categories should be subject to blending, but more research is called for.

Logogen theory predicts that frequency is important in the selection process. The logogen can *fire* as a result of three factors; the frequency with which the item is selected, the predictability of a word and factors of contextual information (see also discussion in section 2.3). Granted that conceptual processing of a message precedes syntactic and formal processing and given the strong bond that exists between the logogen and conceptual structure discussed in section 2.3, we may hypothesise that contextual information has priority over the frequency effect in the logogen. This leaves us with the assumption that several logogens within long term memory would fit the context equally well, so that all of these are foregrounded in the first stage. In order to determine which logogen will be selected the processor turns to frequency. Frequent logogens are said to have a lower threshold. It seems plausible that even if the frequency effect as such is located at the lexeme level, the logogen *again* turns to the contextual (lemma) information and checks the appropriateness before selection proper. A very frequent word may for some reason be less suitable in a given context. It is when *two* logogens fire simultaneously that blends are produced, some with *more* lexeme information in common (the overlapping blends) and some with *less* information (the non-overlapping blends). But less lexeme information does not necessarily mean that *no* activation reaches the lemma level. Frequency effects are likely to be important, but only if we look upon them as contributing to the conceptual whole, not in isolation. Additional support for such a view is found in Levelt (1989: 202-203) where he says that as soon as the logogen fires:

> the logogen sends a phonological code to the so called Response Buffer, where it has a short existence.[…] The Response Buffer can use the phonological code to initiate a vocal response. It can also return the phonological code to the logogen system. In that case the logogen will be reactivated, and, since the logogen's threshold is still low, it will normally fire again, which means that the same phonological code is returned to the Response Buffer.

It seems to be a valid claim to say that when the phonological code has been sent back to the logogen system and reactivated the logogen, this could very well mean that also other features within the logogen either get reactivated, since we do not know if these features work

in isolation, or that the phonological code at least adds to the activation of the features already available, i.e. syntax and semantics.

As has already been pointed out, Levelt (1989: 109-110) does allow for the possibility of an interactive feed-back process during the very first stages of planning between the levels preceding formal linguistic production. He claims that macroplanning may indeed be affected by microplanning. However, it seems strange that feed-back activation should be possible at this early stage but not between lemma and lexeme. The reason may be that the earlier levels do not actually process any lexical material but rather function within the conceptual realm and thus are less restricted in their interaction.

In conclusion, the results of our word frequency test of Swedish blends yielded no conclusive results as to whether word frequency is a determiner of a serial model of speech processing. Moreover, we are left with the problem of which the target word is – the foundation of the whole experiment. Is there really one single target word or can both the blended words be called targets? The next section focuses on what parts of lexical items that are actually blended and what this may reveal about the speech process.

4.3   Blends and blending – of what?

Judging from our Swedish data, we can discern three different potentially error prone elements in a word. Firstly, the blend may be a fusion where one word imposes some single *phoneme* or some *phonemes* on the other word. The phoneme/s need not constitute a complete onset, nucleus or coda. Secondly, the fusion may involve the intrusion of an *onset,* a *nucleus* or a *coda* from one word to the other[21]. Thirdly, the error prone element may be a *stem* or an *affix*; i.e. a blend involving a complete syllable (in most cases this syllable is an autonomous morphological unit at the same time). Needless to say, a blend sometimes involves a combination of two of these types. For instance, an intruding rime may also function as a complete syllable (Laubstein 1999: 137-139). [22]

Taking a closer look at our data some patterns in the fused elements emerge.

Error element	Overlapping	Non-overlapping
Onset	13	12
Nucleus	11	0
Coda	5	6
Rime	2	1
Syllable	7	16
Total *	38	35

* The total sum is higher than 30 because some examples contained more than one potential miss-selected element.

Table 3. Distribution of the error prone elements in the blends

Table 3 shows that the onset of a syllable is comparatively often the locus of fusion in a blend, overlapping and non-overlapping blends alike. Furthermore, it is also the case that the fusion takes place in word or syllable initial position more often than final position, since the onset is subject to fusion more so than the rime.[23] However, in the overlapping set there are

---

[21] In most cases onsets exchange with onsets, nuclei with nuclei and so on. Only occasionally do segments of different categories exchange (Levelt 1989:325).

[22] It is worth mentioning that also other more abstract features such as voicing or other diacritical parameters may be affected by blending and surface as the only visible evidence that blending has taken place. (Levelt 1989:340-343). These features will not be explored further in this paper.

[23] These observations are supported by Crompton's analysis of the Fromkin corpus. (Crompton 1982:692-695). See also Levelt (1989:332-333).

almost as many cases of nucleus intrusion as we find instances of onsets imposing themselves on the other word. What is particularly interesting in this respect is the fact that the non-overlapping set includes no instances of nucleus intrusion. On the other hand, the non-overlapping set contains more than 100% more instances of complete syllable intrusion, often involving morphemes, sometimes constituting the stem of a word and sometimes an affix.

What then, may be the significance of the higher degree of complete syllable intrusion in the non-overlapping set? Again, this is difficult to say with any certainty, but a plausible hypothesis may nevertheless be that meaning plays a role here. In most cases of complete syllable intrusion, the syllable corresponds to a morpheme. Morphemes are carriers of meaning, which is not the case with phonemes.

Recall from section 2.3 that a lexical item needs to reach a certain level of activation in order to be selected, i.e. the selection, of two lexical items, that compete for the same syntactic slot. It has been proposed that the two competing words in a blend reach the required level of activation simultaneously either via phonological points in common (overlapping blends) or a higher degree of semantic similarity between the words (non-overlapping blends). Semantic content is a property associated with the lemma level of a lexical item. In a serial model of speech production, there is no possibility of the lemma receiving any further activation from the lexeme level, since information cannot be "feed-backed" to the previous level. The fact that only the non-overlapping set displays a predilection for affix/syllable intrusion seems to be a predictable result within that model, since the higher degree of semantic content added by these affixes boost the required level of activation at the lemma level, without any involvement from the lexeme.

Furthermore, the metrical structure in blends seems to play a role. Therefore, a closer investigation of the syllable structure of the blends was carried out. Again, a distinction was made between the overlapping and the non-overlapping set in order to establish if the difference has any bearing on the modelling of speech processing.

Number of syllables	**1syllable**	**2 syllables**	**3 syllables**	**4≥ syllables**	***Different number of syllables in target 1. and target 2. (30 pairs.)[24]***
Overlapping (60 items.)[25]	5 (8%)	30 (50%)	15 (25%)	10 (17%)	7 (23%)
Non-overlapping (60 items.)	4 (7%)	26 (43%)	22 (37%)	8 (13%)	16 (53%)

Table 4. Distribution of syllable patterns in the overlapping and the non-overlapping sets.

Table 4 shows that both the overlapping and the non-overlapping blends are often two-or three-syllable words and that the distribution also in other respects is fairly similar across the two blend groups. We also note that one-syllable words or words with four or more syllables are rare in both the overlapping and the non-overlapping blends.

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[24] In this footnote only *30 pairs* of words are included in each set. The reason is that we are interested in the difference *between the two target words* and not target 1 and target 2 in isolation (compare the difference to footnote 25)

[25] In Table 4 the syllable patterns of both words in the blend are illustrated since they may differ with regard to the number of syllables involved. The total number of words is therefore doubled to *60* in both the overlapping and the non-overlapping set respectively.

The syllable pattern of the blends nearly always corresponds to the pattern in one of the target words. That is, it is *hardly ever* the case that, for instance, the blend consists of three syllables and the two target words both consist of two syllables each. (Laubstein 1999: 138). Laubstein's finding is also supported by our data.

As the right-most column shows, and what is particularly interesting, is that the syllable pattern between the two target words of a blend need not always be the same. In the non-overlapping set, 53% of the blends were a result of the fusion of two competitors with *different* syllabic structure, i.e. instances where the number of syllables in one of the target words did not correspond to the other; a result to be compared with 23% in the overlapping set. We may wonder what the reason may be for this difference between the groups.

Let us assume that metrical features are a property of the lexeme level, since they are phonological in nature. Following the analysis presented in earlier sections, we further assume that the overlapping group receives most of its activation at the lexeme level, since it is additional phonological similarities that the two competitors in an overlapping blend have in common, and these similarities contribute to the required activation. If this is indeed the case, it is perhaps not so surprising that consistent parallel syllabic structures at the lexeme level should also be a typical property of overlapping blends and further boost their activation level in lexical access.

Again, adopting a serial model of speech production, such a hypothesis would also be consistent with the higher degree of differentiating syllabic structures in the non-overlapping set. The metrical features are located at the lexeme level and no feed-backing of that metrical information is possible, so we would expect to find a larger number of blends with deviating metrical structures in the non-overlapping set, which we also did. Their activation level is reached by other means, not visible in the syllabic pattern.

5   Conclusion

This paper set out to investigate the nature and distribution of Swedish blends in comparison to a set of English blends, and their criterial value in modelling speech production. The study involves a semantic similarity experiment, an investigation of possible frequency effects and some additional structural aspects of blends. For methodological reasons, a modular model of speech processing (Levelt 1989) was assumed, and the data were divided into phonologically overlapping and phonologically non-overlapping blends to be criterial for the process of speech production. Although we adhered to the terminology of earlier research, we modified the defining criteria of the two categories. Overlapping blends are defined as blends where the two target words share some phoneme in the main stressed syllable. In non-overlapping blends, the target words do not share any phoneme in that syllable. The change of the defining criteria was the result of very few instances of non-overlapping blends in our Swedish corpus according to Laubstein's (2002) stronger criteria. Judging from our data, it appears as if Swedish blends differ from English blends, either for reasons of word length and phonological structure or on grounds of sampling.

The purpose of the similarity judgment experiment in section 3 was to establish whether target words in non-overlapping blends are considered semantically more similar than the targets in overlapping blends. The hypothesis was that the non-overlapping blends are semantically closer than the overlapping blends, since the blending in the non-overlapping category is assumed to take place at an earlier stage (at the lemma level) than is the case for the overlapping ones (at the lexeme level). In blending, two functionally synonymous items are selected and retrieved simultaneously. In a serial model, the activation at the lexeme level can have no effect on the activation at the lemma level, i.e. a serial model predicts that in

order to reach the required level of activation for selection, the target words in non-overlapping blends must have more semantic (lemma-like) features in common. In an interactive model, the phonological lexeme level can add to the activation at the lemma level and, consequently, higher semantic activation at the lemma level is not a prerequisite in this model. It turns out that the similarity judgment experiment disconfirmed our hypothesis of a serial model of speech production. Informants judged the targets in overlapping blends to be closer related semantically and, as a result, we must allow for the possibility of an alternative, interactive, model of speech production.

Trying to establish a plausible model of speech processing, earlier research has also suggested that effects of frequency between the two target words are important in blending. Frequency is claimed to be a feature located at the lexeme level. Since a serial model predicts that no frequency effects can feed back to the lemma level and increase the level of activation, frequency effects are therefore typically associated with the set of overlapping blends. In the frequency test, no strong evidence was found in support for either a serial or an interactive model. Frequency in isolation appears to be a rather weak feature in boosting the level of activation in the lexeme and it is therefore possible that information from the lexeme is feed-backed to the lemma level to check the appropriateness before selection proper. Frequency seems to be an important contributing factor in lexical access but only when it interacts intimately with earlier levels in the language processor. Note, however, that such a conclusion is reached only on a theoretically possible basis and lacks empirical support.

The present study also investigated what parts of the blended lexical items are more vulnerable to blending. The distribution of error-prone sub-syllabic elements added little new insight in the process but at the syllable level some interesting observations could be made. There was a higher degree of complete syllable intrusion in the non-overlapping set than in the overlapping set. This state of affairs is taken as support for a serial model on the account that syllables often coincide with morphemes and the fact that morphemes are carriers of semantic content – a property typical of the non-overlapping group which needs more semantic features to reach the required level of activation in lexical access. A serial model seems to be supported, since only the non-overlapping group displayed a high degree of complete syllable intrusion.

A serial model was again attested in an analysis of the syllabic-metrical pattern between the two competing words in a blend. The assumption that syllabic patterns are a property of the lexeme rather than the lemma is supported by the high number of deviating syllabic patterns in the non-overlapping group. The relevant information about the syllabic pattern never reaches the lemma level and can thus not add to the activation in the non-overlapping group. Had there indeed been interaction between the lemma and the lexeme, this would probably be reflected in a lower number of deviating structures in the non-overlapping group.

The results presented in this paper are inconclusive. Some of the data are interpreted as support for a serial one-directional model of speech production, whereas other data appear to allow for the possibility of lexical material moving back to earlier co-operating levels within the language processor. More research into the phenomenon of blending and its relevance for modelling speech production is called for.

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Appendix I.[26]

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Bedömning av likhet i betydelse / Similarity Judgment Experiment

Instruktioner

I varje exempel finns två ord skrivna med stora bokstäver. Din uppgift är att avgöra hur nära varandra i betydelse de båda orden kan sägas vara. Under varje exempel finns en skala graderad från 1 till och med 5, där 1 representerar mycket liten eller ingen likhet i betydelse och där 5 representerar mycket stor likhet i betydelse. Indikera med en ring den siffra du anser motsvarar det betydelseförhållande som råder mellan de båda orden. I exemplena nedan bedömer du kanske BOK /NOVELL som 3 eller 4, och paret BOK / BIL som 1. Även om det ibland kan vara svårt att ge ett definitivt besked om förhållandet ber vi dig att **bara** avge **ett** svar för varje exempel.

Exempel: *Hur olika/lika är orden med stora bokstäver i exemplena som följer?*

Titta vilken fin BOK / NOVELL

1 2 3 4 5

Alltså, hur lika är BOK / NOVELL i betydelse?

Titta vilken fin BOK / BIL

1 2 3 4 5

Alltså, hur lika är BOK / BIL i betydelse?

Kom ihåg att hur bra orden passar in i meningen spelar ingen roll!

Du är i din fulla rätt att avsluta experimentet närhelst du önskar. Dina svar är anonyma och kommer att behandlas såsom konfidentiella. Om du är intresserad av syftet eller resultatet med det här experimentet eller har några andra frågor med anledning av det samma får du gärna höra av dig till mig.
(hans_malmstrom@hotmail.com)

Tack för din medverkan!

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[26] In this sample of the Similarity Judgement Experiment, the combination of letters are to be understood as O (overlapping), NO (non-overlapping) and F (filler category). The number in parenthesis beside each example is the average score on the scale of semantic relatedness for the two words involved in the example.

1. Leve kungen och FOSTERLANDET / FÄDERNESLANDET O (4.52)

      1   2   3   4   5

2. De är små och OBETYDLIGA / BESKEDLIGA   NO (1.74)

      1   2   3   4   5

3. Se vilka VÅGOR / STENAR   F (1.06)

      1   2   3   4   5

4. Det är så partiledarna bör UTSES/ TILLSÄTTAS   O (3.32)

      1   2   3   4   5

5. Du ska skriva dina INITIALER / din SIGNATUR NO (2.8)

      1   2   3   4   5

6. Det är det här kvällsätandet som är FÖRÖDANDE / FÖRRÄDISKT O (2.64)

      1   2   3   4   5

7. Jag vet inget om deras TEORIER / MODELLER NO (3.06)

      1   2   3   4   5

8. Vad ger du för BILEN / TAVLAN?   F (1.02)

      1   2   3   4   5

9. Detta är inte för UTANFÖRSTÅENDE / UTOMSTÅENDE   O (3.12)

      1   2   3   4   5

10. Hotellet är inte så flott UTRUSTAT / INRIKTAT   NO (1.54)

      1   2   3   4   5

11. En ANVISAD / UTSEDD expert   NO (2.8)

      1   2   3   4   5

12. Hur långt har ni KOMMIT / HUNNIT?   NO (3.96)

      1   2   3   4   5

13. Är du inte FÄRDIG / KLAR?   NO (4.84)

      1   2   3   4   5

14. För dig BEKOMMER / ANGÅR det ju inte   NO (3.44)

1 2 3 4 5

15. Akta HÅRET / LJUSET   NO (1.1)

  1 2 3 4 5

16. Jag läser aldrig ROMANER / NOVELLER NO (3.18)

  1 2 3 4 5

17. Jag vet inte vilken STRUKTUR / FUNKTION den har NO (1.88)

  1 2 3 4 5

18. Med KÄNNEDOM OM / TANKE PÅ problemet. NO (2.42)

  1 2 3 4 5

19. Någon TERAPI / REMISS skulle jag aldrig klara av. NO (1.3)

  1 2 3 4 5

20. Jag väntar på ert GODKÄNNANDE / SAMTYCKE NO (4.04)

  1 2 3 4 5

21. Jag hoppas det INNERLIGT / ÄRLIGT TALAT NO (2.84)

  1 2 3 4 5

22. Jag hejar på DROTT / SAAB NO (1.66)

  1 2 3 4 5

23. Oj vilken OREDA / RÖRA   NO (4.58)

  1 2 3 4 5

24. Ta på dig din REGNROCK/ REGNJACKA O (4.2)

  1 2 3 4 5

25. Jag vet inte SVARET / FRÅGAN F (1.3)

  1 2 3 4 5

26. Vi måste försöka AVVÄRJA / MOTVERKA konflikter NO (3.34)

  1 2 3 4 5

27. Jag känner ingen ANKNYTNING / TILLHÖRIGHET NO (3.94)

1   2   3   4   5

28. Det vore trevligt om hon visade sin UPPSKATTNING / TACKSAMHET NO (3.92)

1   2   3   4   5

29. BENNY / ÖSTEN var där   NO (2.6)

1   2   3   4   5

30. Vad ska vi TILLREDA / ANRÄTTA?   NO (3.92)

1   2   3   4   5

31. Ta inte min PENNA / BURK.   F (1.22)

1   2   3   4   5

32. TITTA / KÄNN hur skönt väder det är   NO (2.08)

1   2   3   4   5

33. Du gör saker och ting TAFFLIGT / TÖNTIGT   O (2.28)

1   2   3   4   5

34. De nya skorna var mycket DYRA / SMUTSIGA   F (1.06)

1   2   3   4   5

35. Du bör kunna FINNA / HITTA svaret här   O (4.88)
1   2   3   4   5

36. Vad får vi till MAT / FÖDELSEDAGSPRESENT idag? F (1.08)

1   2   3   4   5

37. Han är ju SKITROLIG / SKITTREVLIG   O (2..36)

1   2   3   4   5

38. Barnet ville inte RAPA / GAPA   O (1.24)

1   2   3   4   5

39. Det VIMLAR / SVAMLAR ju av svamp här   F (1.1)

1   2   3   4   5

40. Oskar STACK / STRÄCKTE fram klubban   O (3.16)

        1   2   3   4   5

41. Man kan höra SKRÄNET / SKRÅLET   O (4.16)

        1   2   3   4   5

42. Han byter KLÄDER / ÅSIKTER   F (1.06)

        1   2   3   4   5

43. Det går inte att hitta i ett sådant GYTTER / MYLLER   O (3.6)

        1   2   3   4   5

44. Jag har sånt där BLUSLIV / UNDERTRÖJA   NO (2.6)

        1   2   3   4   5

45. Det var en relevant INVÄNDNING / ANMÄRKNING O (3.44)

        1   2   3   4   5

46. Det är många som känner sig UNDERTRYCKTA / UNDANTRÄNGDA   O (3.06)

        1   2   3   4   5

47. Han är väldigt LÅNGRANDIG / MÅNGORDIG O (2.8)

        1   2   3   4   5

48. Vad har du I KIKAREN / FÖR PLANER   NO (4.3)

        1   2   3   4   5

49. Vi PACKAR UPP / PLOCKAR UPP sakerna   O (3.42)

        1   2   3   4   5

50. Det var ganska HYGGLIGT / HYFSAT   O (3.68)

        1   2   3   4   5

51. Efter föredraget kände de sig GLADA / HUNGRIGA F (1.08)

        1   2   3   4   5

52. Det finns ju MÄNGDER / MASSOR av folk som gör detO (4.58)

1   2   3   4   5

53. Kläderna var GENOMBLÖTA / GENOMVÅTA   O (4.84)

1   2   3   4   5

54. Jag har fått ett smickrande ERBJUDANDE / INBJUDAN NO (2.1)

1   2   3   4   5

55. Det är ett billigt sätt att LÅNA / LÄSA böckerO (1.28)

1   2   3   4   5

56. Sitt inte där och SLAFSA / GLUFSA i dig   O (3.62)

1   2   3   4   5

57. Detta SYMPTOM / SYNDROM känner vi inte till O (2.42)

1   2   3   4   5

58. Det är OUTHÄRDLIGT / ODRÄGLIGT   O (3.06)

1   2   3   4   5

59.Vi har JAGAT / RAGGAT UPP några kandidater   NO (2.62)

1   2   3   4   5

60. Man brukar använda den TEKNIKEN / TAKTIKEN   O (2.88)

1   2   3   4   5

61. Det vill jag inte INSKRÄNKA / INKRÄKTA PÅ O (2.44)

1   2   3   4   5

62. Att det ska vara så NYTTIGT / NÖDVÄNDIGT med selen   O (2.12)

1   2   3   4   5

63. Jag ska inte göra SAFT / SYLT   O (1.72)

1   2   3   4   5

64. Jag undrar vad han SYFTAR PÅ / DRÖMMER OM NO (1.2)

1   2   3   4   5

65. Låt dem inte få VETA / REDA PÅ detta   O (4.16)

    1   2   3   4   5

66. Ungen var FULLT / HELT utvecklad   O (4.52)

    1   2   3   4   5

67. Du får VÄNTA / LUGNA dig   NO (2.82)

    1   2   3   4   5

68. Jag är inte ett DUGG /DYFT badsugen   O (4.24)) This example was eliminated.)

    1   2   3   4   5

69. Du måste DUCKA / HUKA dig   NO (4.08)

    1   2   3   4   5

70. Jag gillar mina nya BRALLOR/BYXOR   O (4.9)

    1   2   3   4   5

Appendix II

Target word	Intruder word	Error element	Blend
Overlapping			
fosterlandet	fäderneslandet	syllable	foster**nes**landet
tillsättas	utses	syllable	**ut**sättas
förrädiskt	förödande	nucleus	för**ö**diskt
*utanförstående	utomstående	syllable/rime	ut**om**förstånde
regnrock	regnjacka	onset	regn**j**ock
taffligt	töntigt	nucleus	t**ö**ffligt
hitta	finna	onset	**f**itta
skitrolig	skittrevlig	onset	skit**tr**olig
*rapa	gapa	onset	**gr**apa
stack	sträckte	onset	**str**ack
skrålet	skränet	nucleus	skr**ä**let
*myller	gytter	onset/coda	**gy**ll**er**
invändning	anmärkning	syllable	**an**vändning
undanträngda	undertryckta	rime/syllable	un[**d**]**er**trängda
*mångordig	långrandig	onset	**l**ångordig
*packar upp	plockar upp	onset/nucleus	**pla**ckar upp
hyfsat	hyggligt	coda	hy[**k**]sat
mängder	massor	nucleus	m**ä**ssor
genomblöta	genomvåta	nucleus	genombl**å**ta
*läsa	låna	nucleus/coda	l**å**sa
*glufsa	slafsa	onset/nucleus	**sl**ufsa
syndrom	symptom	onset	syn**tr**om
*outhärdigt	odrägligt	syllable	o**utdräg**ligt
*tekniken	taktiken	onset/nucleus	te**kt**iken
inkräkta på	inskränka	coda	inkrä**n**kta på
nyttigt	nödvändigt	coda/syllable	[**n**]**öd**igt
*sylt	saft	nucleus/part coda	s**a**lt
*veta	reda på	onset	ve**d**a
fullt	helt	onset	**h**ullt
brallor	byxor	nucleus	br**y**llor

Non-overlapping			
*beskedliga	obetydliga	onset/syllable	obe**sked**liga
initialer	signatur	syllable	initia**tur**
teorier	modeller	coda	teoreller
*inriktat	utrustat	syllable	**utrik**tat
anvisad	utsedd	syllable	**ut**visad
*kommit	hunnit	onset/coda	**homm**it
färdig	klar	onset	**kl**ärdig
bekommer	angår	syllable	**an**kommer
*ljuset	håret	onset/coda	**hus**et
*romaner	noveller	onset/syllable	n**oman**er
struktur	funktion	coda/rime	stru**ng**tur
tanke på	kännedom om	syllable	tanke**dom på**
terapi	remiss	syllable	tera**miss**

samtycke	godkännande	syllable	**god**tycke
innerligt	ärligt talat	coda?	Innerli**t**
Saab	Drott	onset	**dr**aab
röra	oreda	onset	**o**röra
motverka	avvärja	syllable	**av**verka
tillhörighet	anknytning	syllable	**an**hörighet
tacksamhet	uppskattning	syllable	**upp**samhet
Östen	Benny	onset/syllable	**be**sten
*tillreda/anrätta	anrätta/tillreda	syllabe	**an**reda,**tillr**ätta
titta	känn	onset	[**ch**]itta
undertröja	blusliv	syllable	under**liv**
*i kikaren	för planer	?	i planerna
erbjudande	inbjudan	syllable	**in**bjudan
jagat	raggat upp	onset +extra prep	**r**agat upp
syftar på	drömmer om	?	syftar om
vänta	lugna dig	onset+coda	lä**ng**ta
ducka	huka dig	onset	**h**ucka

Comments

The starred examples above are deemed to be ambiguous on the grounds that it is impossible to tell which word is the target and which is the intruder. To take one example; In the pair *gytter-myller=gyller* we do not know whether the intended target was *myller* and the intruding word contributed with the onset element /g/, or, whether it in fact was *gytter* that was intended and the intruding word contributed with the coda element /ll/.

All potential intruding elements are in **bold** face in the sets above). The question marks mean that we are unsure what type of element is actually intruding. Potentially, we could be dealing with blends of a different kind, viz. those involving lexical material larger than the single word unit; what we have chosen to call syntactic or phrasal blends.