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SPEECH ERRORS AND THE ONTOLOGICAL STATUS OF THE MORPHEME

A close study of speech errors in English and Polish shows that something that can be called a morpheme exists. However, morphemes are not part of the sound stream. Instead, they are elements (logical knots or neurological nections [cf. Lamb 1999]) at a certain level of the relational network that constitutes a human linguistic system. Recent work on speech errors (still in progress) provides evidence for the stratificational explanation of the appearance of linear order in the process of producing the speech chain. In brief, this model relates, for example, a lexeme to an unordered composite of morphemes, which the morphotactics (syntax of morphemes) linearizes. Lexemes are linearized in the syntax or lexotactics. We have gathered examples of spoonerisms between morphemes of the same morpheme class in English and Polish, as well as some examples in other languages: *You'll need the commission of the permittee* shows a spoonerism of the prefix morphemes *com* and *per*. We first give a description of the process we infer as the source of both the proper realization and the erroneous one. A stratificational formalization of the logic of the relationships underlying the relevant portion of the morphotactics is then provided. The formalization shows the morphemes as a knot or nection inside the linguistic system of a particular language, rather than as an external manifestation. Thus the ontological status of a **morpheme** is like that of any other linguistic element: it exists only as a set of relations in a linguistic relational network. At present we are confident of the logical status of morpheme knots (in the logic diagram), but continuing advances in neurology and imaging give hope that the neurological status of the morpheme nections in the brain may soon be demonstrated directly.

INTRODUCTION

BACKGROUND

Consideration of the ontological status of anything must face two distinct yet interrelated questions: Does it exist? and What is its nature? These questions are particularly pressing in the case of language and its elements (emes). American structuralists of the Bloomfieldian school insisted on the existence of language as something in the real world that binds the members of a speech com-

munity together. They focused on the physical nature of language, centered on the morpheme. That is, the morpheme was composed of phonemes the size of a letter of the alphabet. Phonemes had direct acoustic realizations called phones that were grouped into morphs, the direct acoustic realizations of morphemes. In turn, morphemes, either by themselves or in combination with other morphemes, constituted lexemes, which were combined syntactically. Thus phones, phonemes, morphs, morphemes, lexemes, and sentences, like language, all had physical status. Chomsky rejected the idea of a speech community in favor of some hypothetical ideal speaker-hearer. But nothing in any of his theories or models over the past 55 years contradicts the inference that there is such a thing as language. In fact, he went further and proposed a concrete language module, hoping to formalize its nature mathematically. This idea has been maintained consistently by Chomsky and his adherents, though the locus of the language module has shifted from mind to brain to DNA. The success of their efforts was summarized by Gleason (1955: 52) at the boundary between Bloomfieldian and Chomskyan eras: "An exact definition (of the morpheme) is not feasible".

Gleason was correct. All attempts at isolating phones from a recording of a syllable have failed, and the inference that a phoneme is the size of a letter of the alphabet is based on a false and unnecessary assumption (cf. the analysis of Swadesh 1934 in Sullivan 2005). If the phone has no physical existence, neither do the phoneme and the morph. By extension, neither do morphemes, lexemes, or sentences. Moreover, Yngve (1996) and Lamb (1999) conclude that nothing like **language** exists, though for different reasons. Still, both recognize that people communicate linguistically. Yngve's approach rejects consideration of the ontological status of anything as a philosophical, non-scientific enterprise. Lamb has spent little time on the question in print, but his relational network (RN) theory provides a principled approach to it.

Lamb (1999) maintains that each human constructs, in the process of language acquisition, a linguistic system in the brain.¹ The linguistic system is a network of relations. Descriptive work leads to the conclusion that the system is stratified. Work in this approach by WJS and others suggests that a 5-stratum system is useful for describing languages like English, Russian, Polish, and Latin. This gives a general outline of the system like that in Figure 1 (next page). As Figure 1 indicates, each stratum has a central tactic pattern (e.g. semotactics, lexotactics/syntax, morphotactics) which defines the set of emes relevant to that stratum and the relationships between emes or classes of emes. Adjacent tactic patterns are connected by realizational (function-form) relations, and communication is effected by activation that spreads through the network, encoding messages from the cognitive store into sound (the downward direction) or de-

¹ Lamb has been saying and writing this since the early 60s, but this book provides the most complete explanation of his approach .

coding messages from sound (the upward direction). The linguistic system is surrounded by the cognitive store and each stratum can access the store directly, though most messages that originate in the store and are communicated linguistically probably enter the semology at the top.

Now, if **language** as usually conceived does not exist, and if linguistic systems individually constructed in individual brains is what we actually have, it is difficult to imagine what we can possibly say about emes, the elements of a linguistic system. More specifically, what can we say about morphemes? Instrumental measurements tell us they are not in the physical sound stream. Lamb's relational network theory rejects the idea of an element in a fictitious construct like **language**. If they exist, morphemes would have to be the basic elements of that part of the relational network found in the morphotactics. The problem is how to show that they exist and what their (neuro)logical nature is. We approach this by considering the implications of the kind of speech error we call timing errors. Before looking at these errors, we must explain something about the relational network approach to explaining the appearance of linear order in speech.

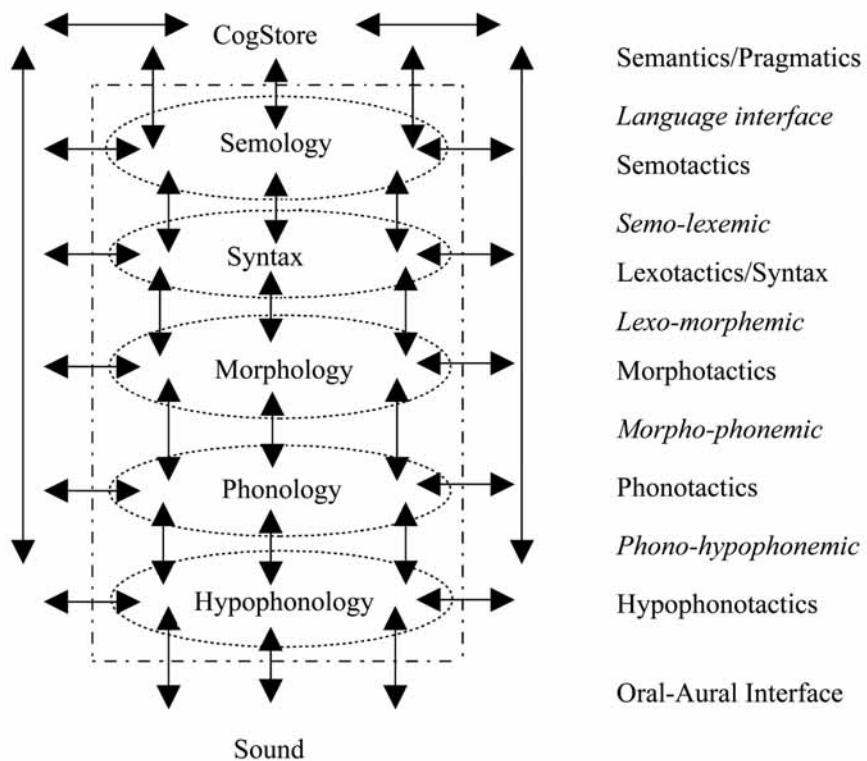


Figure 1. Outline of the linguistic system, relative to the cognitive store

LINEAR ORDER

The cognitive store, where messages originate, is non-linear. If we set out to tell a story, we generally know the entire story before we start. To tell it we must produce a text with a beginning, a middle, and an end.² Our conclusion is that all this linearization is provided during the encoding process. We conceive of it this way. Activation enters the network at the top and starts spreading gradually through the semotactics. Though the cognitive store is not linear, some linearization is imposed on the input by the semotactics. Activated sememes are grouped and groupings of sememes are linearized. A short while after the semotactic processing begins, activation starts spreading to the lexotactics via semo-lexemic relations. Sememes are related to lexemes, but those relations are not linear. The linear order between lexemes is provided in the syntax or lexotactics. A short while after the syntactic processing begins, activation starts spreading to the morphotactics via lexo-morphemic relations. And so on. This spreading activation is essentially loosely-yoked parallel processing (Dell and Reich 1977).

If the process works this way without a hitch, it accounts for the error-free appearance of linear order and the rate at which we speak. But we know that errors occur. The problem is how and where they originate. To begin with, it is unreasonable to assume that a biological system operates without rest periods. During physical exercise, opposing muscles operate in alternation, one resting while its opposite number flexes. Though definitive studies do not yet exist, it is likely that the brain operates this way, too. Building on the spreading activation via the system in Figure 1, we assume that each tactic pattern takes random rest periods during processing, while other tactic patterns continue processing or take overlapping rests. These rest periods, being random, are not coordinated. It may happen that uncoordinated rest periods in two adjacent strata cause processing to get out of synch. In such a case, we get a timing error.

ERRORS

We apply a body of speech errors to finding the answers to our two basic questions about the morpheme. Linguists have long had ambiguous feelings about errors, or at least in judging something to be an error.³ Bloomfieldians were very liberal in accepting an utterance as a valid linguistic datum without labeling it an error, though somewhat less open about what it was a datum of. Conversely,

² A more elaborated description appears in Sullivan in press.

³ Notable exceptions are Fromkin (1971) and Dell and Reich (1977).

errors have never been a problem for Chomsky for two reasons. First, the ideal speaker-hearer does not make errors. Second, much of the mechanism of Chomskyan theories over the years has been added to rule out erroneous structures. Hence, if Chomsky has considered errors at all, it is from a structural point of view having nothing to do with the provision of linear order, which is simply assumed underlyingly.

Our view of errors is different. What we call an error is something that is produced in the otherwise unremarkable use of the linguistic system but which is not what the speaker had intended to say.⁴ This covers a lot of territory, but it is not pure chaos. Keeping an ear out for what doesn't sound right has yielded a useful database. The present study focuses on timing errors, which result from interstratal asynchronies (cf. Sullivan in press). There are three kinds of timing errors, all long recognized (cf. Fromkin 1971): anticipation, perseveration, and spoonerisms. The comic strip *Frank and Ernest*, which often perpetrates outrageous puns, produced a deliberate example of the kind of thing that happens in timing errors. It was based on the second and third words of the expression *Mexican jumping beans*. A phonological anticipation of those two words would produce *Mexican bumping beans*. The onset of *beans* is anticipated in the onset position of *jump*, supplanting the [j]. A phonological perseveration would produce *Mexican jumping jeans*. Here the onset of *jump* perseverates, supplanting the onset of *beans*. Their punch line was the spoonerism *Mexican bumping jeans*. Errors of this type arise in the interface between morphology and phonology. We therefore call them morpho-phonemic errors, maintaining the hyphen to distinguish the name of the error from the familiar phenomenon of morphophonemic alternation.

In all three cases, structural integrity is preserved. That is, each timing error involves the onset of a stressed syllable or, in the spoonerisms, the onsets of two stressed syllables. Our initial data set had 64 examples of morpho-phonemic timing errors. Onsets, codas, vowels, rhymes, and entire syllables were involved. In all cases, structural integrity was preserved.

During the data gathering, we found examples of timing errors at other interstratal interfaces, but here we focus on lexo-morphemic timing errors. The question at hand is the ontological status of the morpheme. That is, is there a level of the linguistic system in a relational network theory that corresponds to what traditional descriptive linguists would call morphology, where morphemes are defined or determined and morphemic constructions are produced? It is our contention that timing errors provide evidence that there is, in four ways. First is the structural evidence for morpheme classes. Second is the status of individual morphemes. Third is the relations between individual morphemes and the hierarchy of classes. Fourth are the parallels with morphemes adduced by traditional

⁴ Clues as to what was intended come from context, self-correction, or audience reaction (laughter, confusion).

morphological analysis. The combination provides us with evidence for a number of individual morphemes and for at least some of the morphotactic (syntax of morphemes) structure.

We turn now to the examples and what they show.

LEXO-MORPHEMIC TIMING ERRORS

PRELIMINARY DISCUSSION

The examples presented herein were nearly all spontaneously produced by adult native speakers of the language in question.⁵ The majority of the Polish-language examples were gathered by students in the Instytut Anglistyki at Uniwersytet Wrocławski and Uniwersytet im. Marii Curie-Skłodowskiej (UMCS) for a year-long class in real language processing given by WJS. The students were instructed to submit examples of things said by adult native speakers which they felt were erroneous or that were erroneous only in the sense that the speaker had intended to say something else. The something else was either clear from context or was made clear by the speaker's self-correction (cf. fn. 4). The majority of the English-language examples were gathered by ST. WJS gathered examples wherever he was, finding about an equal number of Polish and English examples. WJS also recorded the errors in Latin and Russian. This method of data-gathering produced authentic examples, but it allowed a certain amount of chance. That is, an error observed when there was no opportunity to write it down may have been recalled later and recorded or it might not.

Note the imbalance in examples in Tables 1-3. There are 21 spoonerisms but only 7 examples of anticipation and 5 of perseveration. This may result from the chance factor in gathering examples mentioned above. But it might also be due to the fact that spoonerisms seem to be more easily noticed, possibly because there are two errors in the text produced. In the initial set of examples gathered (cf. Table 1 in Sullivan *in press*), spoonerisms at all linguistic levels outnumbered the sum of anticipations and perseverations by 81 to 75. At present we are less interested in the distribution of timing errors over the three subtypes than in what they tell us about how linguistic information is stored and processed.

We begin with the anticipation errors.

⁵ The few exceptions were produced by priests celebrating the traditional Latin Mass. Though not native speakers, the priests in question are all fluent Latin speakers and either reading texts or reciting memorized prayers.

ANTICIPATION ERRORS

The lexo-morphemic anticipation errors gathered are presented in Table 1 below. The anticipated morpheme is in bold in the observed column, and the intended forms and the morpheme class of the anticipated morpheme are given in columns two and three, as noted.

There are two clear examples of derivational suffixes: the adjective-forming *ive* in *they were in factive effective* and the *ish* in *selfish* in place of *selfless*. There are also examples of a case ending (Polish instrumental plural) and the English possessive and plural endings. The two last examples, *formal federal* and *Saudia Arabia*, are ambiguous. They could be morphological anticipation, as indicated. That is, the adjective suffix *al* supplants the comparative suffix *er*, also adjectival. But it could be a morpho-phonemic anticipation, with the rhyme of the unaccented final syllable of *federal* supplanting the rhyme of the unaccented final syllable of *former*. Both these morphemes always end up as the unaccented final syllables of adjectives. Either way, it is an anticipation error, with the only difference being what level of the linguistic system it occurs at. The question remains unresolved.

The situation is a little different with *Saudia Arabia*. If the *ia* of *Arabia* and *India* is taken as a morpheme, then we have a lexo-morphemic anticipation. Otherwise it looks like a morpho-phonemic anticipation. In this case it seems to us that the lexo-morphemic analysis is less likely, though again, it remains an anticipation error.

Assuming the lexo-morphemic analysis in all cases gives seven anticipated morphemes. Four are denominal adjectival suffixes. The other three are case-number endings.

Table 1. Lexo-morphemic anticipation errors

observed	intended	morphological class
they were in factive effective	they were in fact effective	nom-adj deriv suffix
śląskami rzeczami	śląskimi rzeczami 'Silesian things _{1pl} ',	Instr. pl. ending
the other's officer's wife	the other officer's wife	possessive ending
a driver kept dishes out surprises	a driver kept dishing out surprises	plural ending
is this a selfish act or could there be a hidden selfish motivation	is this a selfless act or could there be a hidden selfish motivation	nom-adj deriv suffix
you're a formal federal prosecutor	you're a former federal prosecutor	nom-adj deriv suffix
between Saudia Arabia and India	between Saudi Arabia and India	ambiguous

PERSEVERATION ERRORS

The lexo-morphemic perseveration errors gathered are presented in Table 2. The perseverated morpheme is in bold in the observed column, and the intended forms and the morpheme class of the perseverated morpheme are given in columns two and three, as noted.

Table 2. Lexo-morphemic perseveration errors

observed	intended	morphological class
easily enoughly	easily enough	adv. suffix
He really didn't say anything revealing or unexpecting	He really didn't say anything revealing or unexpected	adj-part-vb suffix
wcześniej Słowacja, Malta i Czech a	wcześniej Słowacja, Malta i Czechy 'earlier Slovakia, Malta and the Czech Republic'	case ending
torba owoców i słodyczów	torba owoców i słodyczy 'a bag of fruits and sweets'	Gen. pl. ending
ważniejszy jest człowiek, ważniejsza jest grupa	ważniejszy jest człowiek, ważniejsza jest grupa 'more important is the person, more important is the group'	masc. ending

Examples *easily enoughly* and *revealing or unexpecting* show clear perseveration. The *ly* is a productive suffix forming an adverb from an adjective. It does not supplant anything in *enoughly*, because *enough* is one of those adjectives that has the same form in adverbial function. The *ing* suffix on *unexpecting* appears on verb roots and neutralizes several functions. We call it a participle, which evokes both verbal and adjectival functions.

Each of the remaining examples can be analyzed in more than one way. *Czecha* and *słodyczów* were submitted as lexo-morphemic timing errors by students, but it is possible that they are morpho-phonemic perseverations. *Ważniejszy jest grupa* could be a perseveration of the masculine ending on *ważniejszy jest człowiek*. But it could also be a morpho-phonemic perseveration or a tactic pattern error (cf. Sullivan and Tsiang in press a).

Again assuming the lexo-morphemic analysis in all cases, we have five perseverated morphemes. One (*ly*) is a derivational morpheme that forms adverbs from adjectives. One (*ing*) is either inflectional or derivational, according to the way you look at the context. Three are inflectional endings, two on nouns and one on an adjective. That represents a wide spread of structural possibilities for only five examples.

Table 3. Lexo-morphemic spoonerisms

observed	intended	morphological class
the commission of the permit-tee	the permission of the committee	prefixes
hopely humbling to have his wish granted	humbly hoping to have his wish granted	(?verb/noun/adj) roots
Ekonoma Akademicka ‘Academic economy’	<i>Akademia Ekonomiczna</i> ‘Economic Academy’	(?noun) roots
niedzielnej wakacji ‘Sunday vacation _G ’	<i>wakacyjnej niedzieli</i> ‘vacation Sunday _G ’	noun roots
słuchawi łaskacze ‘?’	<i>łaskawi słuchacze</i> ‘kind listeners’	(?noun) roots
pourządkowanie	<i>uporządkowanie</i> ‘putting in order’	prefixes
pourządkować ‘?’	<i>uporządkować</i> ‘put in order’	prefixes
superprzylepna samotaśma ‘supersticking selftape’	<i>samoprzylepna supertaśma</i> ‘self-sticking supertape’	prefixes
colored-wash-ø apricot	color-ø washed apricot	verb/part. ending
powidła goździkowe ze śliwkami ‘clove jam with plums’	<i>powidła śliwkowe z goździkami</i> ‘plum jam with cloves’	noun stems
czarno-krucze ‘black-raven _{ADJ} ’	<i>kruczo-czarne</i> ‘raven-black’	adjective stems
modifcznie genetykowane	<i>modyfikowane genetycznie</i>	part-adv suffixes
modifically genetified	modified genetically	part-adv suffixes
miejscowości ludnowej ‘?’	<i>ludności miejscowości</i> ‘local population _G ’	(noun) suffix with adjective suffix, both with endings
gazenka kuchowa ‘?’	<i>kuchenka gazowa</i> ‘gas oven’	roots
nie gwałtuj tak hamownie ‘?’	<i>nie hamuj tak gwałtownie</i> ‘don’t brake so violently’	roots
qui fecit terrum et caelam	<i>qui fecit caelum et terram</i> ‘who made Heaven and Earth’	noun roots
bardzo poprawnie polityczna odpowiedź ‘a very correctly political answer’	<i>bardzo poprawna politycznie odpowiedź</i> ‘a very politically correct answer’	adj-adv suffixes
vsadnyj mednik	<i>mednyj vsadnik</i> ‘the bronze horseman’	nom-adj roots
St. Monk the Mark	St. Mark the monk	ambiguous x 2
wyłóż ławę na kawę ‘put the counter on the coffee’	<i>wyłóż kawę na ławę</i> ‘put the coffee on the counter’	ambiguous x 4

SPOONERISMS

The lexo-morphemic spoonerisms gathered are presented in Table 3 above. The spoonerized morphemes are in bold in the observed column, and the intended forms and the morpheme class of the spoonerized morphemes are given in columns two and three, as noted.

A run through the third column shows a great many structural relations. Roots, not always specific to a particular part of speech; noun and adjective stems; prefixes; and adjectival and adverbial suffixes. In the process, for example, the spoonerism of roots in *terrūm et caelām* leaves in place the accusative singular endings of the two Latin conjugations appropriate to the pre-spoonerized roots. This is an important point to which we return below.

Two of the examples are open to other interpretations. *St. Monk the Mark* was initially analyzed as a semo-lexemic spoonerism of noun lexemes. But at the same time, the two lexemes are mono-morphemic. We should not forget that a morphemic spoonerism is thus possible. The following example is even worse. *Wyłóż ławę na kawę* could be analyzed as a semo-lexemic spoonerism of the nouns *ławę* and *kawę*, as a lexo-morphemic spoonerism of the roots *ław* and *kaw*, or as one of two morpho-phonemic spoonerisms, between stressed syllable onsets or even between the stressed initial syllables.

Finally, there is one humorous aside that should be mentioned. The example *modificznie genetykowane* was recorded by WJS in Poland. The following example, *modifically genetified*, was recorded by ST in the United States. The intended forms are precisely Polish-English equivalents.

Again assuming the lexo-morphemic analysis in all cases, we have 33 timing errors involving morphemes or morpheme combinations. They include roots (some not uniquely assignable to a particular class), prefixes, verb endings, noun and adjective stems, and participial and adverbial suffixes.

ANALYSIS

The examples presented provide both direct and indirect evidence about morphemes and morphotactic relations in Polish and English. We take the evidence in order.

DIRECT EVIDENCE

Lexo-morphemic timing errors, as summarized in Tables 1-3, tell quite a bit about a number of morphemes directly, and by inference, much more about

morphotactic structure. We go into structural questions at all linguistic strata in some detail in Sullivan and Tsiang (in press b). Yet there are telling indications in just the examples given herein.

The direct evidence begins with the forms of the morphemes involved. We have anticipation and perseveration errors and spoonerisms involving root, stem, prefix, suffix, and ending morphemes in both English and Polish. Each error shows a misplacement of one or two morphemes, depending on the type of error. Morphemes identifiable in this way validate morphemes identified by the methods of traditional morphological analysis involving the identification of recurrent partial identities. Not all posited morphemes are identified by timing errors, but a substantial number are, enough to suggest that morphological analysis of some sort is or should be a scientifically valid, logically sound discipline.

We also have direct evidence here of structural relations in the morphotactics. Morphological classes identified in the course of traditional morphemic analysis (prefixes, roots, stems, etc.) can be seen because timing errors occur between identical structural positions (see below for a full exposition). There is no strong evidence in timing errors for noun roots vs. verb roots, but we are not sure there ever has been, even from the best morphological analysis.⁶

INDIRECT EVIDENCE

Indirectly, we have evidence for the morphemes or morpheme combinations that the timing errors involve. For example, *qui fecit terrum et caelam* for *qui fecit caelum et terram* ‘who made Heaven and Earth’ shows the roots for heaven and earth in the wrong order, yet the accusative singular endings appear where they should be, even though the feminine root has the neuter ending and vice versa. Thus we have direct evidence for the roots *terr* and *cael* and indirect evidence for the endings. Similarly, *torba owoców i słodyczów* ‘a bag of fruits and sweets (Gpl)’ for *torba owoców i słodyczy*, with the perseveration of the hard stem genitive plural ending, gives direct evidence for one case ending, and *śląskami rzeczami* for *śląskimi rzeczami* ‘Silesian things (Ipl)’, with the anticipation of the nominal instrumental plural ending, gives direct evidence for another. In this case we have direct evidence for the endings and indirect evidence for the roots. Thus we have both direct and indirect evidence for roots and endings in Polish and Latin.

We may infer some things about morphotactic structure. For example, if the root and ending occur in a fixed sequence, we may infer an ordered AND relation between them and may call it an Mword (morphemic word). We may also infer a

⁶ Is *comb* a noun or a verb? Is *red* a noun or an adjective? What about *piec* ‘bake/oven’?

set of endings and a set of roots (simple OR relations) at a tactic level intermediate between the individual morphemes and the Mword.

DISCUSSION

Other intermediate morphotactic levels may also be present, depending on the degree to which an individual's linguistic system is generalized. We have, in *poprawnie polityczna* 'correctly political' for *poprawna politycznie* 'politically correct' a spoonerism between an adjectival suffix + ending and an adverbial suffix + ending. Indirectly this gives us evidence for a modifying non-final suffix (*n*), the adverbial suffix *ie*, and the adjectival ending *a* 'nom sg fem'. Some of these intermediate levels would be AND relations, some would be OR relations. If we call them roots or stems or endings, that does not make them things in the sense that a house or a table is a thing in the real world. The terms relational network linguistics uses here are merely labels assigned for mnemonic usefulness. Yet the terms refer to relationships, the logic of which is verified by the speech errors observed.

We turn now to graphic descriptions of what these relations look like and how they interconnect.

A MORPHEME

The morpheme *ive* 'denominal adjective formant', for which we have direct anticipatory evidence in *in factive effective*, is represented by the diamond at the bottom of Figure 2. This diamond is related to three parts of the linguistic system. To left and right we have its realizational relations. To the left it is related first to lexemes like *effective* and then via these lexemes to the syntax or lexotactics. To the right it is related to phonology, where it is related to phonemes which are grouped into syllables, as in [I fek tIv], irrespective of its deduced morphological form. That is, it is encoded in the third syllable of *effective*, but its onset *t* comes from the root morpheme *effect* (or possibly *fект*, depending on the individual).

In the vertical direction the morpheme *ive* is related to the set of adjective-forming derivational suffixes, along with *al* and *ly* in English. Higher up, it is related to final position of an ordered AND node called Mword.

In short, this is a preliminary answer to the ontological status of the morpheme, or, more properly, of a particular morpheme: it is a relationship existing at a certain point in the human nervous system. Before providing a complete answer, we want to show how the relational network approach with spreading activation provides a rational explanation of the occurrence of timing errors.

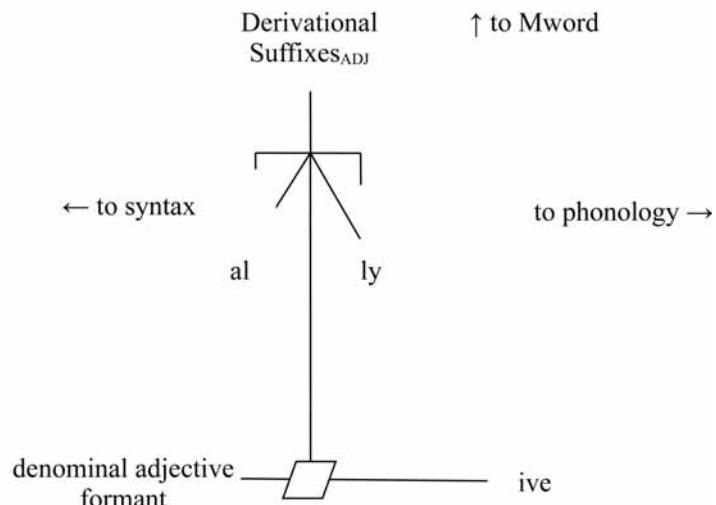


Figure 2. A morpheme and some of its relations

THE COMMISSION OF THE PERMITTEE

BACKGROUND

The American presidential historian Michael Beschloss appeared on a PBS-TV discussion panel with several other presidential historians in the early 2000s. One of the others made a comment. “But for that,” Beschloss responded, “you’ll need the **commission of the permittee**.” Of course, he had intended to say “...the **permission of the committee**.” No one on camera reacted to his spoonerism. Sitting at home, WJS asked his wife what Beschloss had said. Her answer: *the permission of the committee*. When challenged to try again, she thought and came up with *the commission of the permittee*, expressing surprise at what she now recalled. Evidently the actual utterance was still in her short-term memory. But her spontaneous reaction, replicated many times with other listeners on other occasions, raises interesting speculations, to which we return below. Still, the episode provides a basic scenario for the production of spoonerisms.

We believe the episode shows that timing errors are so natural a part of speaking that people do not react and perhaps only rarely notice them. Once you begin listening for them, you realize how frequent they are. The inference is that they are a natural part of communicating.

We turn now to a description and a scenario that provides a possible explanation.

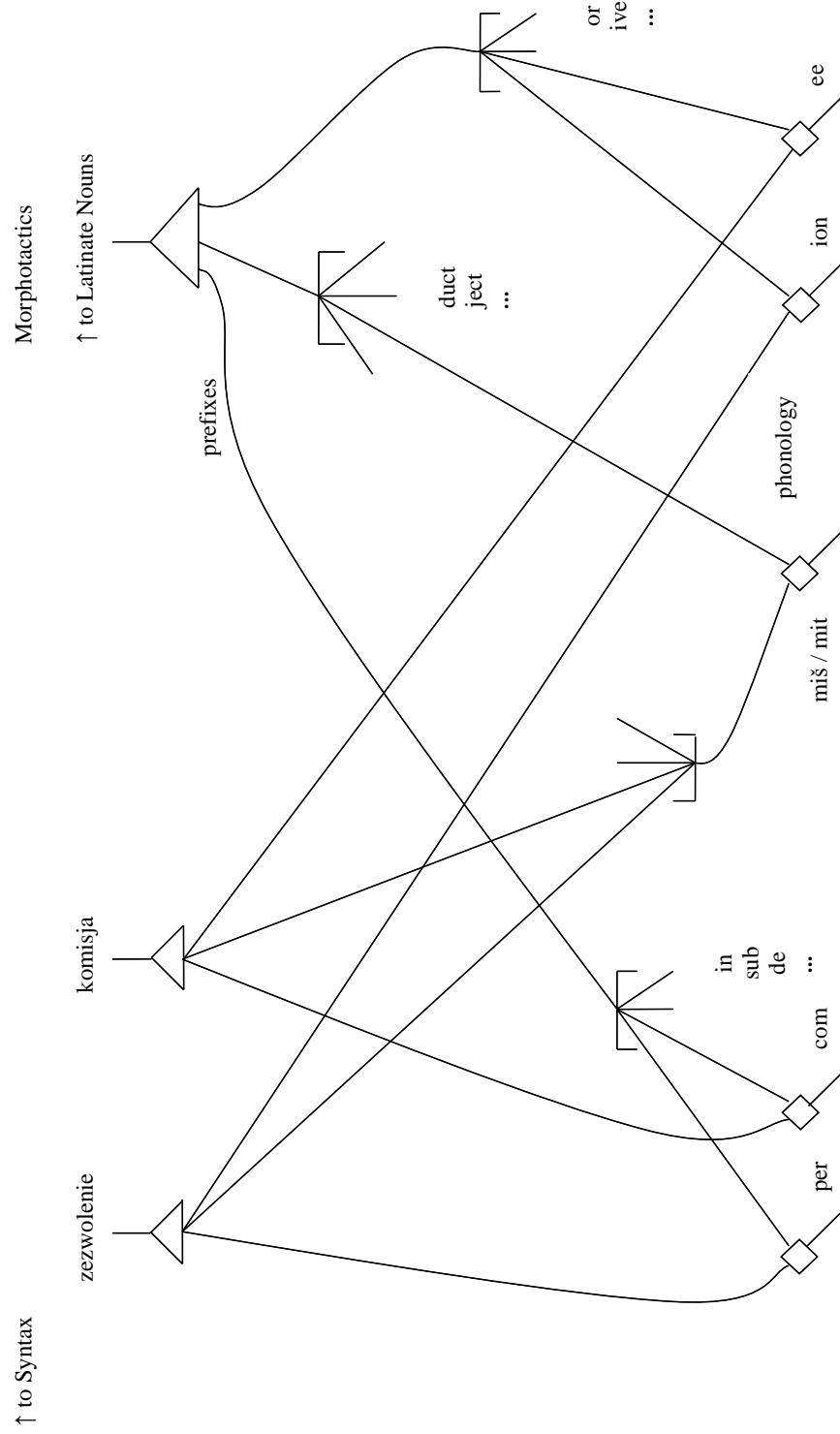


Figure 3. The lexo-morphemic interface and spoonerisms

A PARTIAL RELATIONAL DESCRIPTION

The portion of a relational network diagram needed to describe the lexomorphemic spoonerism Beschloss produced is given in Figure 3. The drawing is somewhat canted to provide a view from a perspective relating the diagrams in Figures 1 and 2. Always remember that crossing lines are geometrically skew. Lines only meet at explicit nodes. Figure 3 is a two-dimensional representation of a three-dimensional structure. Figure 3 shows only the part of the network necessary to explain the spoonerism and no more. It is not optimized or fully generalized, as this would make no sense in the context of an incomplete network.

Consider Figure 3 and remember, it is a logic diagram, not a neurological one. The triangles are AND nodes, the brackets are OR nodes. The diamonds at the bottom are individual morphemes. They knot (logically intersect) the lexomorphemic realizational relations, labeled with Polish lexemes, (NW-SE or upper left to lower right) to the potential morphotactic structures (NE-SW or upper right to lower left). We begin with the morphotactics at the upper right. The Latinate nouns of interest are related to an ordered AND node. The L-R ordering of the node results in 1-2-3 temporal ordering in processing. That is, activation spreads in that temporal sequence. This node linearizes prefix before root before suffix for a large set of etymologically and morphologically related nouns (inductee, dejection, subjection) and some potential nouns which are morphotactically well-formed but have no corresponding lexemes (subjectee, dejector).

Now shift to the upper left. The lexemes of interest here are the two nouns labeled *zewanenie* ‘permission’ and *komisja* ‘committee’.⁷ So the lexeme *zewanenie*, for example, is related to the diamonds labeled *per*, *miš*, and *ion* in no particular order. During a normal encoding process, the activation spreads from *zewanenie* to the three diamonds simultaneously. At the same time, morphotactic processing is spreading its own activation downward. At the ordered AND it spreads activation to the class of prefix morphemes attached to the left-hand line. At the OR node the activation spreads to all the prefix diamonds it is related to. The diamonds require activation from both realizational and tactic sides to spread activation further, in the direction of the phonology. But all the diamonds are realizationally inactive, except for the *per* diamond. Now fully activated, it sends activation to the phonology and the morphotactics continues with the processing of the rest of the AND node, producing *permission*.

Now suppose that when the syntax sends the activation via *zewanenie*, the morphotactics is resting, not spreading activation. By the time it continues processing and starts spreading activation again, the syntax has spread activation farther, now down via *komisja*. So when morphotactic activation spreads past the

⁷ We provide Polish labels to emphasize that a lexeme is related to morphemes but is a unitary eme, here a lexeme, on a completely different stratum of the linguistic system.

prefix OR, there are two prefix diamonds with activation from the syntax, *per* and *com*. If *per* had been sent to the phonology first, no error would have been noted. But in this example *com* was sent to the phonology first, followed unremarkably by *miš* and *ion*. When the time came to process *komisja*, the *com* prefix diamond had already been processed and was no longer active. But the *per* diamond was still active, awaiting the morphotactic input that was now provided, followed unremarkably by *mit* and *ee*, providing a morphemic spoonerism resulting from a lexo-morphemic timing error.

As conceived, each of these processes, both the error-free one and the erroneous one, would take perhaps milliseconds. Ironically, it takes much longer to explain.

FINDINGS AND A SPECULATION

Return to the two questions noted at the beginning: Does the morpheme exist? and What is its nature? The answers we supply are given in a relational network framework, and they are straightforward: yes, morphemes exist, and they are a product of the relationships they contract at a certain level of the human linguistic system. In logical form, as presented herein, they are represented by diamonds related to other morphemes of their class and eventually to Mwords in the morphotactics, and realizationally to syntax and to phonology. They are part of an individual's linguistic system and neither a part of **language** as generally conceived, which does not exist, nor of the physical world outside our skulls. We will not be able to claim concrete physical existence for the morpheme (or any other linguistic element) until neurology and the technology for studying the brain are much more advanced.

Yet the indications are good. Relational network descriptions of different languages have produced, for English and Polish, a linguistic system like that outlined in Figure 1 with emes like those in Figures 2 and 3 at each stratum. It is known that the brain constructs networks of relations in general and that processing involves activation that spreads along those networks. Applying these facts and the hypothesis of random rest periods to the linguistic system of Figure 1 predicts the types of timing errors observed without the construction of additional modules.⁸

Figures 1-3 are constructed as if the human linguistic system is a two-way system, adapted to decoding from sound as well as for encoding into sound. Figure 3 suggests that if encoding imposes linear order on the message, then decoding eliminates it in an almost mirror-image process. This alone suffices to

⁸ As for all other (non-RN) models of speech errors surveyed in Smith 2003.

explain, and even to predict the failure of hearers to perceive some, if not most, timing errors. Timing errors would automatically be sorted out of the decoded message as the linear order that realizes them disappears. We are nowhere near providing tests for this.

Similarly, we have evidence both direct and indirect for the ontological status of sememes, lexemes, phonemes, and hypophonemes as well as for a great deal of potential tactic pattern structure. Since the linguistic system developed by one native speaker need only be broadly similar to, not identical to, that of any other native speaker, it is possible that not every piece of inferred structure fits into a single linguistic system. Much more work is needed here.

In any case, data gathering on Polish and English continues and error classification is proceeding. Further studies are in the works.

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