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# LACUS FORUM XXXVII

**COMMUNICATION AND COGNITION:  
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Cognitive  
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# TACTIC PATTERN ERRORS AND THE ARCHITECTURE OF STRATIFICATIONAL THEORY

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**Abstract.** Speech errors constitute a substantial but generally neglected source of information about communication, especially concerning the architecture of the linguistic system and the way it is processed while messages are encoded into sound and while they are decoded from sound. Timing errors (anticipation, perseveration, and spoonerisms) at each interstratal level provide evidence for a linguistic system like that in Figure 1 (following page). Figure 1 also suggests the possibility of grammatical or tactic pattern errors at each stratum. Errors collected in Poland and the United States include examples of all of these types, thus providing further evidence for the architecture found useful in neurocognitive-stratificational descriptions of Polish and English.

**Keywords:** Speech Errors, Linguistic System, Processing, Decoding, Encoding, Stratificational Theory

**Languages:** English, Polish

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THE STUDY OF SPEECH ERRORS IS A FASCINATING UNDERTAKING, because errors are evidence of how an individual's linguistic system is actually used and, inferentially, because they provide indications of its architecture. The present study is based on the assumption that the human linguistic system consists of a network of relations. Work in neurocognitive-stratificational theory since Lamb (1966) has shown the utility of a system like the one in Figure 1, stretching between the general cognitive store, shown as extending on all sides of the linguistic system within the dotted boundary, and the organ systems for the production and perception of speech. The linguistic system indicated has five strata, each centered on a tactic pattern (TP) that incorporates structural relations between elements (emes) on that stratum and having realizational (i.e., form ↔ function) relations to each adjacent stratum. The system has major input-output (I/O) relations at the top and the bottom, but there may be I/O relations between the cognitive store and each TP.

However, the utility of a conceptualization like that of Figure 1 does not constitute proof of its existence, let alone proof of the details concerning its architecture: Chomsky's NP-trace is a prime example of this principle.<sup>1</sup> The present study is one in a series of studies that focus on speech errors and what they tell us about the architecture and operation of the human linguistic system in Polish and English. We begin with a bit of history on related research, define errors and types of errors, and proceed to the analysis of TP errors, which are the focus of this study. We conclude with a summary of findings to date and the directions continuing research is taking.

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<sup>1</sup> We are indebted to Henryk Kardela of UMCS for this observation.

I. SPEECH ERRORS AND THE OPERATION OF THE LINGUISTIC SYSTEM. A realistic account of human linguistic communication faces two major obstacles. First is the rate at which we speak. Second is the juxtaposition of a non-linear cognitive store with linear linguistic output/input. The relational network in Figure 1 produces linear output by providing the relevant (partial) linearization at each stratum (cf. Sullivan 2000). So the simultaneous semantic input to the semology is related to individual sememes.<sup>2</sup> The sememes are grouped into predications, and these groupings are linearized. The sememes of each predication are related to lexemes in the syntax, and the lexemes are linearized across clauses. Clauses already have their linear order from the linearized order of predications in the semotactics. An analogous process of operation can be cited at each stratum.

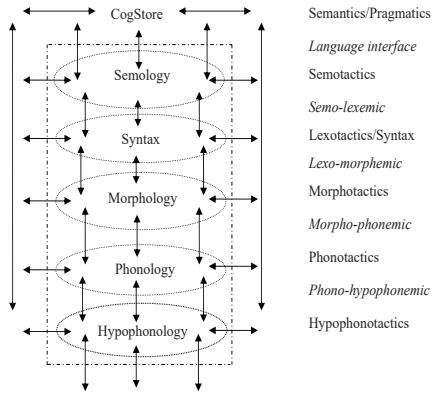


Figure 1. Outline diagram of the linguistic system, relative to the cognitive store

Given such a scenario, it is easy to account for the rate at which we speak by positing staggered processing in parallel.<sup>3</sup> That is, soon after semotactic processing begins, the signals start passing through the semo-lexemic realizational patterns to the syntax and syntactic processing begins. Soon after that, morphotactic processing begins. And so on through the system until the output from the motor cortex begins activating the organs of speech production.

Now this is a fairly realistic picture of error-free speech production. Peter Reich has also suggested that there is no reason to assume that processing at each stratum continues uninterrupted from start to finish. So at any given moment a particular stratum may be taking a rest. If the adjacent stratum does not pull too far ahead or lag too far behind in processing, there is no problem. But if the two strata get too far out of sync, a speech error results.<sup>4</sup>

<sup>2</sup> Temporal sequencing from real-world events may be provided, as in *veni, vidi, vici*, but cf. the discussion on cognitive-sememic spoonerisms below.

<sup>3</sup> Peter Reich, originally a personal communication in 1973; cf. also the publications by Dell and Reich.

<sup>4</sup> That is, a performance error occurring during oral communication. Written communication



The most widely-researched type of speech error is usually called a slip of the tongue, though Dell (1978) rightly calls it a slip of the mind. There are three types: anticipation, perseveration, and spoonerisms, which show what seems to be both anticipation and perseveration. Dell & Reich (1977) show that these slips appear between the phonology and the hypophonology (phono-hypophonemic). Dell (1986) expanded this to include morpho-phonemic, lexo-morphemic, and semo-lexemic slips. Sullivan (2011) offered additional examples of all these in Polish as well as English and provided further examples to include slips at the cognitive-sememic level. In all cases, the errors involve emes that are unordered on the upper stratum but linearized on the lower stratum. In a morpho-phonemic spoonerism like *to our queer old Dean*, we see two onsets appearing in onset position of stressed syllables, just not the correct or intended stressed syllable. In a lexo-morphemic spoonerism like *you'll need the commission of the permittee*, we see two prefixes that appear in prefix position of two adjacent morphemic words, just not the right ones. In a semo-lexemic spoonerism like *palenie raka powoduje tytoń* 'smoking a crab/cancer leads to tobacco', we see the Patients of two acts, one nominal and one verbal, appearing in each other's places. Finally, in a cogno-sememic spoonerism like *wystaw język i otwórz buzię* 'stick out your tongue and open your mouth', we see two predications conjoined by *i* 'and' but appearing in inverse order, defying the temporal sequence intended.

We call spoonerisms timing errors because they are errors in synchronicity. If we consider linear order a function of time,<sup>5</sup> then we can see that everything appears in an appropriate position, but at the wrong time. Anticipation and perseveration errors also involve timing. An eme appears in its correct linear order, but it also appears before or after its appropriate time, supplanting a corresponding eme.

In spite of the attention given to timing errors, they constitute somewhat less than half of the corpus of errors gathered to date. Sullivan (2011) notes that the relational network (RN) model of a linguistic system in Figure 1 predicts the appearance of such errors on the assumption that the tactic patterns are fairly well generalized.<sup>6</sup> A generalized tactic pattern can also give rise to the type of error that we call tactic pattern (TP) or organizational error—a structural error, if structural is understood in a general sense. The remainder of the present study concentrates on TP errors.

2. TACTIC PATTERN ERRORS. Tactic patterns on different strata have different combinatory missions. Hence, we predict different details regarding errors, depending on the stratum. We take the tactic patterns in order, beginning from the bottom.

2.1. HYPHONOTACTIC ERRORS. The hypophonotactics (HPT) adds determined (phonetic) features to combinations of phonemic features, e.g., in assimilation (cf. Sullivan 2002). It might also add, omit, or otherwise jumble the relations between hypophonemes. Examples of HPT errors are given in Table 2.

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has its own set.

<sup>5</sup> RATE x TIME = DISTANCE, at least since Newton.

<sup>6</sup> Note: fairly well generalized, not necessarily optimized.

	observed	intended	gloss
2a	<i>letny</i>	<i>letni</i>	summer (adj)
2b	<i>dzękuję</i>	<i>dziękuję</i>	I thank (you)
2c	<i>cipsy</i>	<i>czypsy</i>	(potato) chips
2d	<i>łuzek</i>	<i>łusek</i>	hull (g. pl)
2e	[welti]	[welθi]	wealthy

**Table 2. Hypophonotactic errors**

As it happens, very few HPT errors showed up in the examples collected in Poland, and only a single English example 2e was observed by ST. The first four in Table 2 are the only ones found in the student submissions.<sup>7</sup> Yet they show the range of HPT errors very nicely.

In *letny* (2a), the *n* is realized as Apical and Nasal, without the palatalization needed for *ń*. One feature is missing. In 2b, *dzękuję*, we have a similar situation. The *dz* is realized by Apical, Groove Release, and Voice. The palatodomal place of articulation needed for *dź* is missing. The opposite happens in *cipsy* (2c). The *cz* should be realized as Frontal and Groove Release, but palatodomal articulation is added erroneously to produce *ć*.

The error in 2d is an example of what might be called erroneous assimilation. The normal state of articulation in Polish includes voicing, supplied hierarchically in the HPT (cf. Sullivan 2002). It is an articulatory prosody (sometimes called a long feature) in the HPT. With voiced obstruents the voice is simply kept on. But with unvoiced obstruents, it must be turned off, making unvoiced obstruents hypophonotactically marked.<sup>8</sup> The speaker of *łuzek* simply failed to turn off voice between the *u* and the *e*.

In 2e, we see Closure instead of Spirant friction combined with Apical. This looks like a combination of omission with addition. But a closer look at the mechanics of articulation here provides a clearer picture of the HPT error. The [l] is articulated with the apex of the tongue touching the alveolar ridge, blocking the air flow along the central line and letting it escape laterally, around the sides. To make a [θ] we need a slit at the apicoalveolar position with the sides of the tongue in light contact with the roof of the mouth. The transition of [l] to [θ] requires making closure at the sides of the tongue while simultaneously opening an apicoalveolar slit. If the tongue is released for the [i] before the slit is formed, what is produced is a [t]. In fact, expanding on this would also explain the pronunciation [welt<sup>θ</sup>i].

This gives us the three categories of errors predicted: omitting a feature, adding a feature, and failing to switch off a feature temporarily. Since the HPT is tasked with providing determined features, adding or omitting a secondary phonemic feature, especially a dependent feature like palatalization, is simply a failure of this main

<sup>7</sup> The bulk of errors in Polish and other languages the students knew were submitted as assignments in classes in real language processing and relational network linguistics at UMCS and UWrocławski. WJS and ST both submitted additional error samples; ST provided the majority of examples in English.

<sup>8</sup> Whereas voiced Polish obstruents are phonotactically marked (cf. Sullivan 2002).

task. Articulatory prosodies are in fact the actual way assimilation is encoded in a relational network. Assimilation of phonemic voice merges with the non-phonemic voicing of sonorants and vowels in the HPT.

We now turn to phonotactics.

2.2. PHONOTACTIC ERRORS. The phonotactics (PT) is mainly concerned with syllabifying the morpheme chain input from the morphotactics (MT) during encoding. English has a fairly complex syllable structure. The syllable structure of Polish is even more complex. Essentially, the morpho-phonemic relations connect each morpheme to the appropriate set of phonemes. The morphemes are already linearized. In general, the phonemes to which they are related are not. Only the morpheme-initial phoneme is specified.<sup>9</sup> Now with complex syllable structure, a particular (consonantal) phoneme may potentially be realized in one of several syllable positions. Examples of PT errors are given in Table 3. We take them in order.

	observed	intended	gloss
3a	<i>druszlak</i>	<i>durszlak</i>	colander
3b	<i>starta</i>	<i>strata</i>	loss
3c	<i>móldmy się</i>	<i>módlmy się</i>	let us pray
3d	<i>kordla</i>	<i>koldra</i>	quilt
3e	[eɾleka]	[ełreka]	Eureka!
3f	<i>w Wrocławiu</i>	<i>we Wrocławiu</i>	in Wrocław
3g	<i>rózumiem</i>	<i>rozúmiem</i>	I understand
3h	<i>gramatyka</i>	<i>gramátyka</i>	grammar
3i	[skæt]	[stæk]	stack

Table 3. PT errors<sup>10</sup>

In examples 3a and 3b, we see problems with placing *r*. In the PT of the Polish syllable, *r* can appear as an onset, as a part of an onset cluster, or as a syllable coda. In 3a, the *r* was supposed to be in coda position, with the sonant slot in the onset cluster left empty.<sup>11</sup> Instead, the *r* appears in the onset cluster and coda position is empty. In 3b, we see the exact opposite.

In example 3c, the intended phonological word should have been syllabified *módl my się*, with the so-called trapped *l* as part of a complex coda cluster. What came out placed the *l* alone in coda position with the *d* in an onset cluster of the second syllable with *m*: *mól dmy się*. This is a completely different syllabification as well as a difference in ordering, but it is unremarkable. In fact, it has no trapped sonants and can even be said to be a relatively unmarked syllabification.

<sup>9</sup> Originally suggested to WJS by M. A. K. Halliday, it worked very nicely for Russian phonology.

<sup>10</sup>For 3e, Polish spelling has Eureka. We provide the phonetic transcription to show it is consonants mis-ordered.

<sup>11</sup>We are indebted to Jacek Baczyński for correcting a mistake in the way WJS read the student submission. He also pointed out that the observed form is regular in some regions, e.g., Kraków and the Kresy. The form was gathered in Lublin, however, where it is an error or at least not usual.

Example 3d is a bit more complex. It could be called a morpho-phonemic spoonerism, because the *l* and *r* appear in each other's position. Yet this would be a spoonerism between a coda position and part of an onset cluster. Not only are the tactic positions different, but the entire onset (*dr*) is not involved. Currently we have no other examples of morpho-phonemic spoonerisms that can be shown to involve less than a complete, corresponding PT constituent.

Instead, we consider this a PT encoding error. Assume that the MT supplies the order between the two morphemes: *koldr a*. Assume also (per Halliday) that the initial phoneme of the stem morpheme is specified and the rest are left to be ordered by the PT. Then what is supplied to the PT can be seen in Figure 4, with *k* coming first, *a* last, and everything else unordered in between.

	<i>o</i>	
<i>k</i>	<i>l</i>	<i>a</i>
	<i>d</i>	
	<i>r</i>	

Figure 4. Material supplied to the phonotactics in example 3d

Now we conceive of the syllabification as follows. There are two vowels, implying two syllables in Polish. The first syllable gets *o* as its vowel, the second syllable gets *a*, a consequence of morpheme ordering. The *k* must belong to onset position of the first syllable, leaving *l*, *d*, and *r* to be accommodated. The *d* can only go into onset position of the second syllable, leaving *l* and *r*. Each can go into coda position of the first syllable or into sonorant position of the onset of the second syllable. The speaker put the *r* into the first syllable, leaving the *l* as part of the *dl* onset to the second syllable, producing *kordla*. This is a perfectly good phonological word in Polish, it's just not a Polish lexeme. The lexeme requires the opposite choices for the *r* and *l*. In 3i, we have a parallel example involving *k* and *t* in the same syllable.

Example 3e is similar, except that there are no onset clusters and in fact no word-initial onset at all. Spelled *eureka*, this could be a tetrasyllabic word in Polish. But in normal speech, the pronunciation is essentially [ɛreka], where *l* is pronounced [w].

Example 3f is a violation of a standard Polish grammar rule. The rule is that *w* 'in' is realized as *we* before a word beginning with a *w*-cluster like *Wrocław*. But a *wwr* onset has a lengthened consonant that would not be phonotactically permissible in Polish, and one *w* would be omitted. That's what we posit here. The grammar rule is ignored in favor of a straight PT encoding, which is then cleaned up by the HPT.

In Example 3g, we have a word incorrectly accented on the antepenultimate syllable. This position of accent is possible under two circumstances. First, if the word is from Latin or Greek, e.g., *polityka*, the antepenult accent is realized. Second, if we have a word ending with an enclitic (cf. 3c), the normal penultimate accent of the pre-enclitic portion is retained. Neither condition holds here, yet the word got an antepenultimate accent, a purely PT error. In 3h, *gramatyka* reverses the situation and ignores the learned exception.

This completes the set of typical PT errors. We turn now to the morphotactics.

2.3. MORPHOTACTIC ERRORS. Polish has an extremely complex morphotactics (MT). English has a highly impoverished inflectional morphology and possibly, depending on the individual, a complex of relations that includes bits and pieces of the derivational morphology of the donor languages to its lexicon. We may predict certain kinds of MT errors: errors in inflectional class, substitution of unmarked endings where marked endings occur or the reverse, errors in stem class or gender assignment, erroneous derivational suffixes, or even combinations of these errors.

The complexity of Polish MT relations has the potential to provide more chances for error than any other stratum, though we have no statistically satisfactory counts for comparison. Typical examples of MT errors are given in Table 5.

	observed	intended	gloss
5a	<i>ze śmiećmi</i>	<i>ze śmiećiami</i>	with rubbish
5b	<i>rozumisz</i>	<i>rozumiesz</i>	you understand
5c	<i>lubiąlam</i>	<i>lubiłam</i>	I (f) loved
5d	<i>z przyjacielami</i>	<i>z przyjaciółmi</i>	with friends
5e	<i>spam</i>	<i>śpię</i>	I sleep
5f	<i>parę odcinki</i>	<i>parę odcinków</i>	a couple of excerpts
5g	had went	had gone	had gone
5h	derivating	deriving	deriving
5i	<i>częściejsze</i>	<i>najczęściej</i>	most often

Table 5. MT errors

Example 5a has a marked form of the instrumental plural ending, whereas *śmieć* takes the unmarked form. Example 5b has *rozumieć* assigned to the *-i-* conjugation, in parallel to *widzieć* ‘see’. This error is compatible with Jakobson’s observation that an unmarked form generally (but not always, cf. 5a) replaces a marked one. Example 5c is parallel to 5b, but it involves the assignment of the verb past tense to the wrong infinitive stem.

Example 5d has a double error. One error involves the instrumental plural ending, which should be marked *mi* instead of unmarked *ami*. This is the opposite of the error in 5a. The other error involves the stem. Most nouns have either hard or soft stem-final consonants throughout, excepting only cases of archiphonemic neutralization. But *przyjaciel* has a soft stem in the singular and a hard stem (*przyjaciół*) in the plural oblique cases.<sup>12</sup>

Example 5e has an error in which the present tense form expected from the infinitive appears instead of the soft stem that exceptionally takes the *-i-* conjugation.

Example 5f is a complete mystery. *Odcinek* is a masculine noun. The student who submitted this error suggested that *odcinki* was genitive singular for a feminine noun. The MT error here is in assigning *odcinek* to the wrong declension. But there is also a number error here, as *parę* ‘a few’ requires genitive plural. Barbara Bacz of Université Laval (p.c.) suggests a non-native Polish speaker, in spite of the fact that

<sup>12</sup>The shift of historically hard *l* to [w] and the *e* → *o* → *ó* shifts are historically regular.

the students were instructed not to submit errors from non-natives. In any case, if the student was accurate, this is a double MT error.

In 5g, we see an incorrect form of the perfect participle of *go*.<sup>13</sup> Errors 5h and 5i involve possible but incorrect derivations, 5h incorrectly back-forming the verb from the noun and 5i incorrectly deriving a superlative from the adjectival base *częst* ‘often’.

Table 5 provides a good cross-section of MT errors in our database, even if it cannot give a clear picture of their number, a question to which we return in Section 4. Instead we turn now to the syntax.

2.4. LEXOTACTIC ERRORS. The syntax or lexotactics (LT) provides a number of different opportunities for TP errors. In general, case assignment and agreement are LT errors. That is, a particular construction requires a certain case, e.g., genitive. All the LT must do is send a signal to the MT (or get a signal from the MT during decoding) that the noun (phrase) is in the genitive case. There are many forms that a Polish genitive ending may have, depending on whether the lexeme is a noun, a pronoun, a numeral, or an adjective and whether it is singular or plural. But the LT needs to know none of this. Its only interest is in the case. Let the MT take care of the form of the ending. The same division of labor is true of agreement. There are also potential word order problems, where all the lexemes appear in a clause, with one in a possible but incorrect slot. Examples of LT errors are given in Table 6.

	observed	intended	gloss
6a	<i>matkę głowa już nie boli</i>	<i>matki ...</i>	mother no longer has a headache
6b	<i>zainteresować go tematu</i>	<i>... tematem</i>	interest him in the topic
6c	<i>... with Carol and I</i>	<i>... me</i>	
6d	<i>... easier for we gaijin</i>	<i>... us gaijin</i>	<i>... easier for us ‘foreigners’</i>
6e	<i>ważniejszy jest grupa</i>	<i>ważniejsza</i>	more important is the group
6f	<i>the organization of the texts show</i>	<i>... shows</i>	
6g	<i>będzie nie zwracał ...</i>	<i>nie będzie ...</i>	he won’t be returning (sth.)
6h	<i>nie ma (mm) czego się bać</i>	<i>nie ma się ...</i>	there’s (um) nothing to fear
6i	<i>lubi inne ludzi</i>	<i>innych ludzi / inne rzeczy</i>	other people / other things
6j	<i>there’ll be you</i>	<i>→</i>	There You’ll Be (song title)

Table 6. LT errors

The errors in 6a–6d involve case assignment. *Matkę* in 6a is the direct object of *boli*. Since *boli* is negated, the object should be in genitive instead of the accusative that the object of a non-negated verb gets. *Zainteresować* in 6b takes two objects, a Patient in the accusative and a Range in the instrumental. The speaker produced the second object in the genitive case. The error in 6a is relatively common, but the appearance of genitive in 6b may be random or it may derive from an unintended blend with *zachęcić kogoś do tematu* ‘urge someone to [take up] the topic’.<sup>14</sup> Either way, it is a LT error.

<sup>13</sup>A common dialectal form, this example was collected from a speaker of Standard English.

<sup>14</sup>We are indebted to Barbara Bacz of Université Laval for this insight.

Examples 6c and 6d show pronouns in object position of prepositional phrases appearing in the nominative case. With 6c it could be claimed that the lack of case on *Carol* perseverated on *I*, but that claim does not apply to 6d. Explanations here are speculative, but two interesting TP possibilities can be suggested. First, it is possible that pronominal case loss is progressing in contemporary English. Second, it is possible that constructions with pronouns and nouns are not specified for case, as nouns in English have none. If no case is specified syntactically, the MT simply supplies the unmarked nominative case. There is also the less interesting speculation that these are fairly common hypercorrect productions. Still, all are LT errors and we speculate no further.

Examples 6e and 6f have errors in agreement. In 6e, we have a masculine adjective failing to agree with a feminine noun. The fact that the adjective is prior to and separated from the noun by the verb may have played a role here. We are just not in a position to provide statistical verification. Sequencing does not explain all the Polish examples we have.<sup>15</sup> In 6f, the situation is subject-verb agreement. The verb agrees with the nearest noun *texts* instead of with the more distant subject noun *organization*.

In 6g and 6h, we have word order errors. The Polish negative particle *nie* is proclitic to the verb. In 6g, it is proclitic to *zwracał* ‘he returned (something)’. But the full verb in this case is *będzie zwracał* ‘he will be returning’ so the *nie* should precede *będzie*. In 6h, the *się* should come after the first constituent (*nie ma*) in colloquial Polish or after the verb *bać* in a more literary variant. Responses to an informal survey weighed heavily against putting it after *czego*. As the *mm* ‘um’ indicates, however, the speaker hesitated after *nie ma*.<sup>16</sup> Possibly he hadn’t yet decided what he wanted to say. He could have started out to say *nie ma nic strasznego* ‘there’s nothing frightening’ and decided to soften it. Then the *się* came after the first word of the resumed utterance. Speculation again.

Example 6i is a true problem. There are many possible classifications of its error. In the **intended** column, we present two possibilities. Depending on which of those was intended, we have an error in agreement or in case. *Ludzie* has a genitive-accusative and *rzeczy* has a nominative-accusative. However, *inne* is the wrong gender and case to agree with *ludzi* but agrees correctly with *rzeczy*. Another possibility is that this is a type of error we have not yet taken up, a blending error of the two objects suggested. In any of these cases, though, it is a LT error. Barbara Bacz (p.c.) suggests another possibility, that *ludzie* was treated as a collective, instead of a masculine personal noun. Then the agreement makes sense syntactically. But there is certainly a semotactic (ST) modification—perhaps error—involved. Again, interesting but speculative.

<sup>15</sup>It is the impression of WJS that sequencing is relevant to the majority of such agreement errors (cf. also 6a).

<sup>16</sup>WJS gathered this example.

Finally, 6j involves two completely different sentence structures. In *there'll be you*, we have existential *there* as the topic, usurping subject position, followed by VS. *There You'll Be*, a song title, has locative *there* in the position of a sentence adverb followed by a clause in unmarked SV order. This might be a semotactic error (wrong lexeme), but it is still a TP error.

LT errors of the sorts found in Table 6 are common in the examples gathered, if not as frequent as MT errors. Yet the patterns are clear and correspond to the possibilities that the stratificational model predicts.

A longer example of the kind of LT error with all constituents realized in appropriate positions but not where they should be realized is given in 7.<sup>17</sup>

- (7) Attorneys for Lohan and *four people* suing her agreed Wednesday to reschedule a trial set for later this month. [...] Lohan is being sued by a woman who was in a vehicle chased by *Lohan and three men*.

If the first sentence is correct about four people suing Lohan, the *three men* in the second sentence should be conjoined with *a woman* and not with *Lohan*. Otherwise, the second sentence is completely unremarkable.

We turn now to semotactic (ST) errors.

2.5. SEMOTACTIC ERRORS. The semotactics is where sememes are related to each other in patterns appropriate to a particular language. Typically, a grouping of sememes is related semantically to a chunk of information the speaker wishes to encode and formally to a clause. Also typically, languages have many fixed collocations that can be triggered at this stratum. These include cultural idioms and phatic communion but also collocations that are frequently used by the speaker and have thus gained the status of a fixed sememic predication, even though they may be semantically transparent and morphologically and syntactically complex. But just because a fixed sememic predication can be triggered in communication, whether encoding or decoding, does not mean that it is triggered every time the need arises. Sometimes a more or less awkward ST alternative is encoded.<sup>18</sup> Examples of these kinds of ST errors are given in Table 8.

Most of the examples in the **observed** column of Table 8 are ST constructions that are very close in meaning to the fixed expressions in the **intended** column. In some cases, they could almost be called paraphrases. However, for some reason the input to the ST did not activate the fixed expression in its appropriate place. Instead, a ST construction was provided to the LT and the rest of the encoding process ran according to plan. In 8a, all the lexemes are present, but the wrong noun is modified. In 8b, the wrong kind of oil is 'added to' instead of 'poured on' the fire. In 8c and 8d, clumsy paraphrases are supplied in place of the shorter, more usual expressions.

<sup>17</sup>Gainesville SUN, 8 July 2010, page 2a.

<sup>18</sup>An example of the regular use of a fixed expression can be seen in police reports: "We then proceeded to walk around the house and check all the doors and windows" instead of more direct "we then walked".



In 8e, the speaker had a choice of two fixed lexemic idioms in Polish that parallel the English one, but she produced a novel expression that is inferentially equivalent in meaning. That is, crocodiles have no tears; their eyes are lubricated by nictitating membranes. Thus to *cry crocodile tears* is not to cry at all, because crocodiles cannot cry. Which makes *cry(ing) like a crocodile* not crying. Applying a little knowledge about crocodiles lets us conclude that all these expressions communicate the same scene.

Example 8f was produced in the context of a discussion about monuments to famous people. However, *za* ‘behind, beyond’ is not generally used with accusative in Polish temporal expressions. *Po* + locative is used, which requires a reference point like *śmierć* ‘(the point of) death’. Yet *śmierć* and *umarły* ‘dead’ are etymological relatives and semantically close. *Umarłość* is or should be the state noun derived from *umarły* ‘dead’. In short, a lot of tactic creativity went into the observed expression.

	observed	intended
8a	<i>po najmniejszej linii oporu</i> ‘along the smallest line of resistance’	<i>po linii najmniejszego oporu</i> ‘along the line of least resistance’
8b	<i>dodać oleju do ognia</i> ‘add (lubricating) oil to the fire’	<i>dolać oliwy do ognia</i> ‘pour olive oil on the fire’
8c	<i>być na leczeniu</i> ‘be on treatment’	<i>leczyć się</i> ‘be treated’
8d	<i>nikt nie miał opozycji</i> ‘nobody had opposition’	<i>nikt nie oponował</i> ‘nobody opposed’
8e	<i>plakać jak krokodyl</i> ‘cry like a crocodile’	<i>plakać krokodylimi łzami / ronić krokodyle łzy</i> ‘cry crocodile tears’
8f	<i>za umarłość</i> ‘beyond the dead state’	<i>po śmierci</i> ‘after death’
8g	<i>przerwa kawowa</i> ‘coffee break’	<i>przerwa na kawę</i> ‘a break for coffee’
8h	<i>czytając książkę, zgasła jej lampa</i> ‘reading a book, the lamp went out (on her)’	<i>kiedy czytała książkę, zgasła jej lampa</i> ‘while she was reading a book, her lamp went out’
8i	Victoria Secret’s ad	Victoria’s Secret ad
8j	My Mom is Hotter than Me	I’m Hotter than my Daughter

Table 8. ST errors

*Przerwa kawowa* in 8g violates a productive LT pattern. You can interrupt any ongoing activity to take time for something completely unrelated. The expression involved is *przerwa na* + a noun in the accusative, as would be expected. The submitting student suggested that the speaker had just returned from an extended stay in the US.

In 8h, there is a dangling participle in both Polish and English. The only difference is that the explicit Maleficiary *jej* ‘on her’ is more common in Polish than in English expressions of this sort, which generally identify the owner of the lamp.

In 8i, the fixed expression ‘Victoria’s Secret’ was not activated and a TP encoding was implemented. In the process, the possessive was attached to the wrong element. The same situation is described in 8j, but the observed utterance takes the point of

view of the daughter, while the intended utterance, referring to a TV show, takes the point of view of the mother.

All these errors involve ST encoding in place of fixed expressions. Other kinds of ST errors can be cited, if we take greater discourse blocks into consideration. For example, a complete logical argument could be presented with a number of clauses. The linear order of clauses is determined by the ST linearization of predications. If the linearization is partly or wholly jumbled in the ST, the logical argument will still be complete, but it may also be incoherent.<sup>19</sup> In general, cohesion, in Halliday's sense, is a product of ST well-formedness. Lack of cohesion is a ST error. Errors in pronoun-antecedent identification and in tense or tense-aspect choice (cf. Bogdan & Sullivan 2009) are part of this, but the size of texts necessary to demonstrate such errors precludes their inclusion here.

We turn now to a summary of the work in progress, beginning with a review of underlying assumptions and relevant previous findings.

3. SUMMARY. The assumptions underlying our and other stratificational studies on speech errors are given in 9. Findings from previous studies are given in 10. Findings from the present study are presented in 11.

- (9)
- a. The human linguistic system is a network of relations.
  - b. It is represented in the brain ultimately by a neurological network, probably via systems of cortical columns (cf. Lamb 2005).
  - c. The system functions by the spread of activation across the network.
  - d. The input to the system from the cognitive store is simultaneous, not linear (but see footnote 2).
  - e. Incremental linearization is provided on a succession of strata.
  - f. The strata are processed in loose parallel.
  - g. Each stratum takes random, uncoordinated rest periods.
- (10)
- a. Too great a lack of coordination in the random rest periods results in timing errors.
  - b. Timing errors include anticipation, perseveration, and spoonerisms.
  - c. Timing errors can appear between any two strata in Figure 1, including cogno-sememic, semo-lexemic, lexo-morphemic, morpho-phonemic, and phono-hypophonemic errors.
  - d. The level of an error is seen in the size (= combination of relationships) of the eme(s) out of place and the tactic positions involved.
  - e. The general outline of the system in Figure 1 is confirmed for Polish and English by timing errors.
  - f. The strata are interconnected, not modular.
  - g. Each stratum shows evidence of TP generalization.

<sup>19</sup>In fact, ST made just such an editorial correction, noting that WJS had inserted a paragraph of one section after the summary to that section, instead of just before it.

- (11) a. Some speech errors seem to arise within a single TP.  
 b. Though not modular (cf. point 10f), TPs have some leeway regarding independent operation.  
 c. The leeway in operation depends on the degree of generalization in a TP.  
 d. The degree and details of generalization depend on the individual language user.  
 e. The number and distribution of TPs matches the distribution of TP errors.  
 f. All findings are compatible with the assumptions and the findings of previous work on errors in neurocognitive-stratificational theory.

4. CONCLUDING REMARKS. Both previous work and the present study not only confirm the hypotheses, but they suggest a number of inferences about human communicative processes. First, if part of the encoding process is the linearization of the message and if decoding is an analogous but reverse process, it seems likely that decoding involves delinearization. If so, this suggests why timing errors are so rarely noticed by hearers (cf. Sullivan 2011). TP errors seem to be noticed but ignored, assuming they do not interfere with understanding.

The statistical distribution of errors also needs study, though it probably requires some sort of controlled experiment. Exactly what sort of experiment would produce satisfactory results, i.e., a design that does not bias the results, is not clear at present. Claims have been made about the numerically dominant relative frequency of morpo-phonemic timing errors, but Sullivan (2011) was unable to confirm these claims. More work on this needs to be done.

A third type of error still needs to be scrutinized, what we call blending errors (*conferences* observed when *constant references* was intended). There is also a body of yet unclassified errors. In addition, our studies may shed light on the unintended puns of Reich 1984 and other things, like redundancies, which are only errors stylistically.

5. AFTERWORD. Mel'čuk insists that our utterances are constructed from cobbling together pre-fabricated or memorized chunks like idioms or other fixed collocations (cf. Mel'čuk & Zholkovsky 1984), and no doubt this is true at least some of the time for at least some people. Chomsky has insisted from the beginning that each sentence is unique and individually generated. TP errors show that even though there are plenty of fixed collocations that appear in utterances, they may be overridden by TP creativity. But this creativity is not mechanical or automatic, as in Chomskyan theory, rather it is a consequence of the way cognitive/semantic input is encoded via activation spreading through a relational network. Research to date has shown some likely characteristics of this network. Further work will show more details of the architecture that must underlie the linguistic systems each of us constructs.

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