05. Linguistic analysis of impairment data.
05.03. Textual analysis of impaired speech samples:
05.03.02. Textual cohesion at *morphosyntactic* level: agrammatism and paragrammatism. Indices of syntactic complexity.

Textual cohesion: morphology and syntaxis in flexive languages

Although we define textual cohesion as a pragmatic characteristic, its dependence on grammar is obvious. Ángel Herrero defines it as follows: "*A set of linguistic mechanisms used by a text to ensure the explicit cohesion of its parts. Cohesion enables the linguistic interpretation of an element in the text (a morpheme, a word, a construction) to take place thanks to other elements in the same text*". (Herrero 2005: 306).

> Construcciones agramáticas de una hablante de 54 años con Afasia de Conducción.
>
> La logopeda le ha pedido que construya una oración a partir de dos imágenes: "sentarse" y "embarazada".
>
> Una embarazada sentado- sentarse- sembarazada- se siéntese- siento- no, se siente- sentarse- no, sensar- sen se sante- se sienta/ se siento

A text is well cohesioned when it makes appropriate use of word units or exponents, which are the formal traces (the materiality) of grammatical morphemes; therefore, impairments that affect the appropriate selection of these morphemes would undoubtedly point to an impairment of textual cohesion. The literature contains many descriptions of this kind of pathological situation, focusing on the grammatical component in which the incidence of the impairment (APPARENTLY) predominates. This gives rise to the classic difference between agrammatism and paragrammatism, particularly in aphasiology.

Below is a fragment from a transcription of a conversation involving two aphasic women; both have motor aphasia and both are of grade 3 severity on the Boston Test scale. The speakers with aphasia are C (aged 29) and A (aged 32); I is the researcher doing the recording; L is the speech therapist treating both women. You can access the full transcription on http://www.uv.es/~perla/GallardoyMOrenoVol2.AfNoFluente.pdf

0016	I:	(⇒I2) ¿tú cuándo cumples?§
0017	C:	§ (⇒E.) ¿qué?
0018	I:	¿cuándo los cumples tú?
0019	C:	eeh→(5.0) º(octubre/ noviembre/ octubre/ noviembree→)º (⇒E.) *(diz– ciembre↑)*
0020	A:	¡aah↑!// ¿y qué día?
0021	C:	veinte
0022	A:	(ASENTIMIENTO)ᴿ uh um/ ¡UY↑!// eeh– mira↑ (MOSTRATIVO)/ eeh– es que↑ uno p'a ti↑ ¡uy!/ uno de aquíi→ ¿eh?/ que seríaa→ (COMPÁSᴿ) eraa→ eraa↑// ¡ay! que no me acuerdoo↑// y los cumplía/ een→
0023	C:	¿veinte?
0024	A:	(RISAS) no hombre/ (COMPÁS, NEGACIÓN) treinta y cuatro (6.0) (⇒L. ASENTIMIENTOᴿ)
0025	L:	veinte↓ tú dices el día veinte
0026	C:	(ASENTIMIENTO) º(veintee)º
0027	A:	(⇒ I2) aah↑/(COMPÁS) yaa/ no/(ASENTIMIENTOᴿ) sí/ een– en ((xxx))/ sí/ eel– **quee los cum plís**/ el mismo día/// (5.0)
0028	L:	¿qué tal este fin de semana?

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0029	C:	(ASENTIMIENTO) bien
0030	L:	cuéntame ¿qué has hecho?
0031	C:	río// **he mos ido a(l) río**
0032	L:	¿a cuál?
0033	C:	eeh– nch// ¡uy!/ Requena↑//(MOSTRATIVO) **Poor tera**↑/// (6.0) TIJARES↑//
		(RISAS) MIJARES
0034	L:	¿y qué has hecho en el río?
0035	C:	nada// (COMPÁS) ehh–/fría fría fría// (NEGACIÓN) fría fría fría// [frío]
0036	L:	[¿pero] te bañas?
0037	C:	(ASENTIMIENTO) hombree↑///(6.0)

If you look at C's utterances, it is easy to see the simplicity and scant grammatical elaboration in her turns; this speaker constructs minimal syntagmatic chains. But, should her production be regarded as a case of agrammatism or of paragrammatism? Observe that the formal vacilations of the previous extract do not appear.

In their Boston Test, Harold Goodglass and Edith Kaplan describe agrammatism as the juxtaposition of nouns and verbs, omitting

"*practically all words from minor grammatical categories (or functional words) and traces of inflection in verb tenses, person and number*" (1983: 20).

The most radical cases of the symptom, which seem to fit our subject, are the manifestations of **telegraphic speech**, typical of motor or non-fluent aphasias, described by the Boston Test as:

"*partial availability of sentence forms, with the omission of many articles, prepositions, conjunctions, auxiliary verbs and flexive endings*".

The criteria proposed, as can be seen, refer to morphological questions, but they do not exactly constitute grammatical features (in the generativist sense of "contrary to grammatical laws"). Furthermore, Pérez-Pamies, Manero and Bertrán Serra, in the *Manual de Logopedia* (*manual of logopedics*) coordinated by Jordi Peña, characterise agrammatism by:

"*syntactic simplification and suppression of grammatical monemes, with relative preservation of informative value*". (1988: 397)

The symptom of agrammatism is classically opposed to paragrammatism, which is associated with sensory aphasias and which the Boston Test manual describes as a feature in which:

"*the majority of the inflections and words in minor grammatical categories fall elegantly into place, but in which there are asystematic substitutions or omissions of grammatical morphemes and words from the lexicon (that is, nouns, verbs, adjectives) together with confused grammatical organisation. […] paragrammatic patients are fluent and even 'hyperfluent', and their discourse is often rapid and resistant to interruptions*".

In parallel, Peña-Casanova's handook describes paragrammatism or **dissyntaxis** in the following terms:

"*Characterised by wholly unpredictable syntactic transgressions, such as the inappropriate use of prepositions or omission of the basic elements of the sentence; the meaning of the phrase is completely changed without the patient being able to perceive it*".

Despite the apparent similarity in the descriptions of both symptoms, the underlying distinction in this classic view leads to a displacement of the commonplace association of agrammatism-morphology and paragrammatism-syntax, rescuing other linguistic oppositions. We are referring to the opposition between **syntagmatic** and **paradigmatic** axes, and more specifically to a semantic difference between **constitutive lexical units** and **relational** units:

> "*Independently of the grammatical category they belong to, words, by their meaning, are constituted in two classes of units with different behaviour: some words, when they appear in discourse, are made as knots where bundles of relations converge; others, however, typify sets of relations that have to be supported by certain knots. [...] I have called the former constitutive units (CU) and the latter relational units (RU)". (López García 1977: 68)[1].*

This difference points to the way in which each lexical unit deploys its semantic value: in a self-contained way, with its own referential value (whether abstract or concrete in nature) or radially, weaving relations with other lexical units. It should be pointed out that the constitutive/relational opposition should not be confused with a concrete/abstract opposition. A repeated error in the analysis of semantic impairment is that of differentiating between abstract and concrete words, as if the meaning of "Table" were different to that of "Freedom"; what is different is the nature of the reality signalled by the meaning, but observe that the meanings, in terms of language units, are all equally abstract, in parallel to phonemes (but not sounds) and morphemes (but not word units). Both "table" and "freedom" are constitutive units. The following quote from Saussure (1916: 195) on the abstract nature of language, is relevant here:

> "*Language is a form and not a substance. We can never be too aware of this truth, because all the errors in our terminology, all the incorrect ways of naming things in language come from this involuntary supposition that there is some substance in the linguistic phenomenon".*

Returning to the description of grammatical impairment, we believe that it is possible to state that there is a type of impairment that affects constitutive units more, typically those belonging to morphological paradigms, and a type of impairment in which what is most affected is the syntagmatic relation, typical of co-present elements. The traditional association of agrammatism/morphology and paragrammatism/syntax can be reformulated[2], using the distinction between paradigm and syntagma.

But in both cases, the speaker reflects limitations in applying the grammatical laws; for their joint description, the concept of **syntactic under-determination** put forward by Carlos Hernández can be used (2006: 106)[3], consisting in

> "*(relative) absence of formal (univocal) expression for syntactic functions. Under-determination takes on its complete functional meaning when it is understood not only as a formal impairment category, but also as an essential correlation for giving a communicative context or*

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[1] López García, Ángel (1977): *Elementos de semántica dinámica (Elements of dynamic semantics)*, Zaragoza: Pórtico.

[2] "*We believe that the definitions we have reproduced on agrammatism and paragrammatism enable us to deduce that constitutive units of a paradigmatic nature would be more affected in fluent aphasias of typically paragrammatic speakers (hence the absence of required lexemes coexists with "morphological elegance"). On the contrary, relational units, deployed on the syntagmatic axis, would be more affected by the agrammatism of motor aphasias (in which there is a greater stress on the absence of functional words and grammatical word units)". (De Gallardo, B. 2007, Pragmática para logopedas (pragmatics for speech therapists)*, Cádiz: Servicio de Publicaciones de la Universidad de Cádiz).

[3] Hernández Sacristán, Carlos (2006a): *Inhibición y lenguaje. A propósito de la afasia y la experiencia del decir (Inhibition and language. On aphasia and the experience of saying)*, Madrid: Biblioteca Nueva.

Hernández Sacristán, Carlos (2006): "La unidad palabra y su significado: una perspectiva logopédica sobre la capacidad léxica" ("The word unit and its meaning: a speech therapy view of lexical ability"), in E. Garayzábal (Ed.): *Lingüística clínica y logopedia (Clinical linguistics and speech therapy)*, Madrid: A.Machado Libros, 197-277.

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situation its whole cosignificant value. It should be clear, then, that formally under-determined syntax does not equate, in principle, to impaired communicative use. (...) It is not under-determined use in itself, as such, but the inability to functionally associate it to a context, that enables us to refer to impaired communicative use".

As can be seen, Hernández highlights expressive and cosignificant value that the speaker gives the context in their impaired situation. This exploitation of expressive resources, of clear compensatory value, leads the speaker to use their conversational partner's inferential ability to the full, together with non-verbal codes. In this expressive option, the speaker makes the most of their formal possibilities, regardless of whether such an option is a clear grammatical transgression or not. This explains the resistance of agrammatism to in-depth description and systemisation, since, as every speech therapist knows, there is no record of either intra- nor inter-subjects. In PerLA corpus data, Hernández Sacristán analyses separately truly agrammatical symptoms and those indicating the absence of syntactic formalisation, concluding that:

"the phenomena of agrammatism in the strict sense are manifested non-recurrently (often only sporadically), whilst those of under-determined syntax are commonly observed". (2006a: 111).

Textual cohesion: indices of syntactic complexity.

One of the customary measurements in the study of syntax has to do with what is generically termed the "index of syntactic complexity".
Although in the 1960s various methods were put forward for measuring the degree of syntactic production of a text, the best-known proposal is that of Kellog Hunt (1965), based on Derivational Complexity Theory.
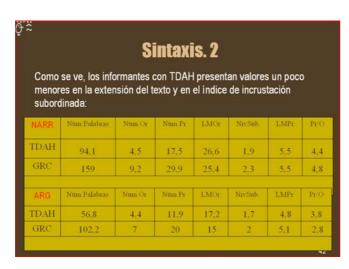
[Suggested additional reading: "Los índices de complejidad sintactica de Hunt a la luz de las distintas corrientes generativistas" (Hunt's indices of syntactic complexity in the light of the various generativist trends), Irene Checa and Cristóbal Lozano 2002]

We can adapt Hunt's proposal and analyse the following features for each example of text:
   a. Total number of words (PAL)
   b. Number of sentences/utterances (main verbs, OR)
   c. Number of propositions, including non-personal forms (Pr)
   d. Main indices of syntactic complexity:
        i. Average sentence length (LMO) in number of words.
        ii. Average proposition length (LMPr) in number of words.
        iii. Subordination index (Pr/O), that is, average number propositions per sentence.
        iv. Incrustation level (NivSub): depth of the subordinate incrustation by reference to the main verb (level 0).
   e. Secondary indices of syntactic complexity:
        i. average of adjectival, noun and adverbial clauses per sentence.

For example, we can use this type of measurements when describing different corpuses of data from children with and without a diagnosis of ADHD. The table on the slide shows the comparison between two groups of data:

Sintaxis. 2

Como se ve, los informantes con TDAH presentan valores un poco menores en la extensión del texto y en el índice de incrustación subordinada:

NARR	Núm.Palabras	Num.Or	Núm.Pr	LMOr	NivSub.	LMPr	Pr/O
TDAH	94,1	4,5	17,5	26,6	1,9	5,5	4,4
GRC	159	9,2	29,9	25,4	2,3	5,5	4,8

ARG	Núm.Palabras	Num.Or	Núm.Pr	LMOr	NivSub.	LMPr	Pr/O
TDAH	56,8	4,4	11,9	17,2	1,7	4,8	3,8
GRC	102,2	7	20	15	2	5,1	2,8

- NARR: narrative texts
- ARG: argumentative texts
- TDAH: children with ADHD diagnosis
- GRC: control group, of children with typical development.

As can be seen, the analysis of the measurements of syntactic complexity shows up differences according to which narrative texts are more complex (more elaborate) than argumentative texts, and the texts in the control group are more complex than in those of the ADHD group.

Another of the syntactic elements that can easily evidence paragrammatic mistakes is the **consecutio temporum** (sequence of tenses, or **correlatio temporum**, correlation of tenses), that is, the relation set up by a subordinate verb with its governing verb.

[Suggested additional reading: "Aprender a narrar: formas temporales y sus funciones en un niño de siete a nueve años de edad" (Learning to narrate: tense forms and their functions in children aged from seven to nine), Esther Álvarez 2005]
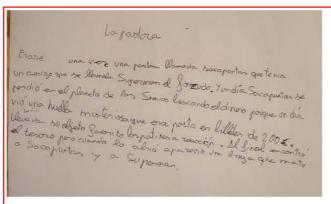
When we listen to a speaker who is not fully competent in the syntax of a flexive language such as Spanish or Catalan (and this is equally valid in users of a language as their L2, in other words, in the typical **interlanguage** of learning phases), it is easy to see that the appropriate use of verbal tenses can be particularly conflictive; this is especially so in the use of subordinate propositions in the subjunctive.

[Suggested additional reading: "Huellas lingüísticas de Teoría de la Mente: intersubjetividad y enunciación en TDAH" (Linguistic traces in Theory of the Mind: inter-subjectivity and utterance in ADHD), B. Gallardo 2008]

Incoherencia sintáctica en la narración de un niño de 11 años con TDAH, que se manifiesta en un fallo en la *correlatio temporum:*

"Y un día Sacapuntas se perdió en el planeta de los Simios buscando el dinero porque un día vio una huella misteriosa que era pasta en billetes de 200 euros."

The image shows a written exercise by an 11-year old boy, diagnosed with Attention Deficit Hyperactivity Disorder (ADHD); as you can see in the transcription, it contains errors in the correspondence between the verb tenses:

"*Once upon a time there was a shepherd girl called Sacapuntas who had a friend called Superman the strongman. And one day, Sacapuntas got lost in the planet of the Apes looking for the money because one day he saw a mysterious sign that was dough in €200 notes. He was carrying his favourite thing, his jet*

skates. In the end he found the treasure but when he opened it a witch appeared who killed Sacapuntas and Superman".

As we can see when analysing the strictly informative aspects (relative to the order of the textual superstructure categories) there are some textual incoherencies because the speaker (in this case, writer) does not make appropriate use of the syntactic resources available to them in the grammar.

In the example, presenting the narrative account without respecting the logical order of events requires a very specific use of verbal tenses. In our data we find that one of the sources of incoherence originates precisely in that the order in which the events are presented is not the logical order of the chain of facts; the speaker frequently introduces resolutions before their corresponding complications (effect before cause) but without employing the morphosyntactic markers provided by the language to introduce these marked orders. The text would be more intelligible if:

1. the order of events had been respected (he first sees the mysterious sign "of dough in notes", then searches for the treasure and then gets lost) or

2.   if the *consecutio temporum* had been respected (for which it would have been sufficient to use "had seen" instead of "saw").

<div align="center">* * * *</div>