Simplification Strategies in French Spontaneous Speech

DeTermIt! Workshop: Evaluating Text Difficulty in a Multilingual Context

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Overview

1. Introduction

1.1. ATS: a written-text-centered task?

- **A**utomatic **T**ext **S**implification (**ATS**) is an area of NLP that aims at automatically converting texts into **simpler variants**, by **reducing their linguistic complexity**, albeit **preserving their original meaning** and **grammatical coherence** [Horn et al, 2014; Stajner, 2021].

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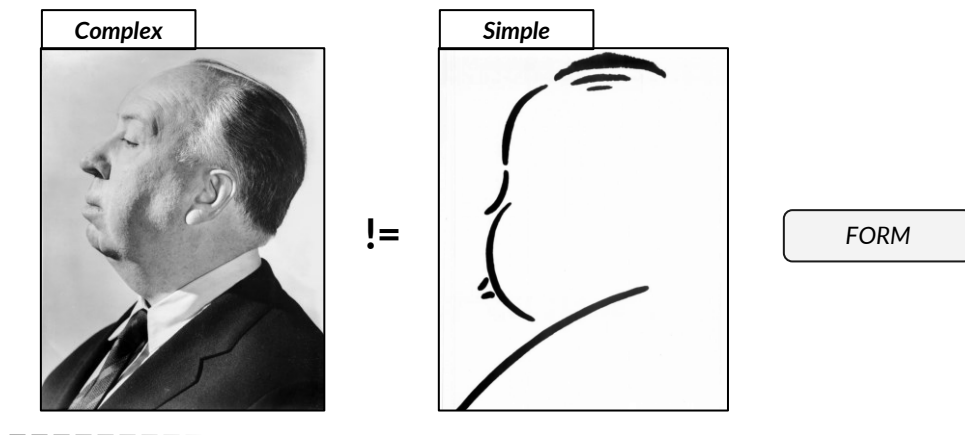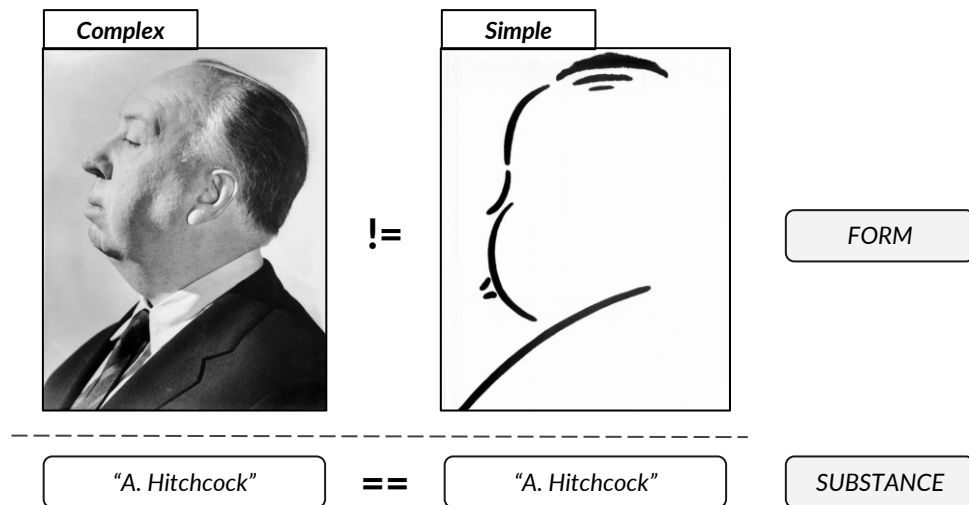- **A**utomatic **T**ext **S**implification (**ATS**) is an area of NLP that aims at automatically converting texts into **simpler variants**, by **reducing their linguistic complexity**, albeit **preserving their original meaning** and **grammatical coherence** [Horn et al, 2014; Stajner, 2021].
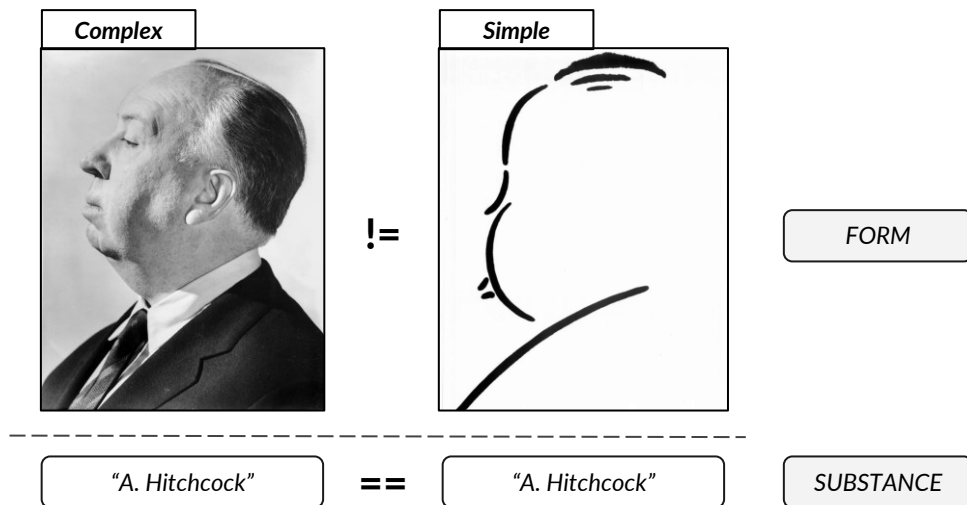
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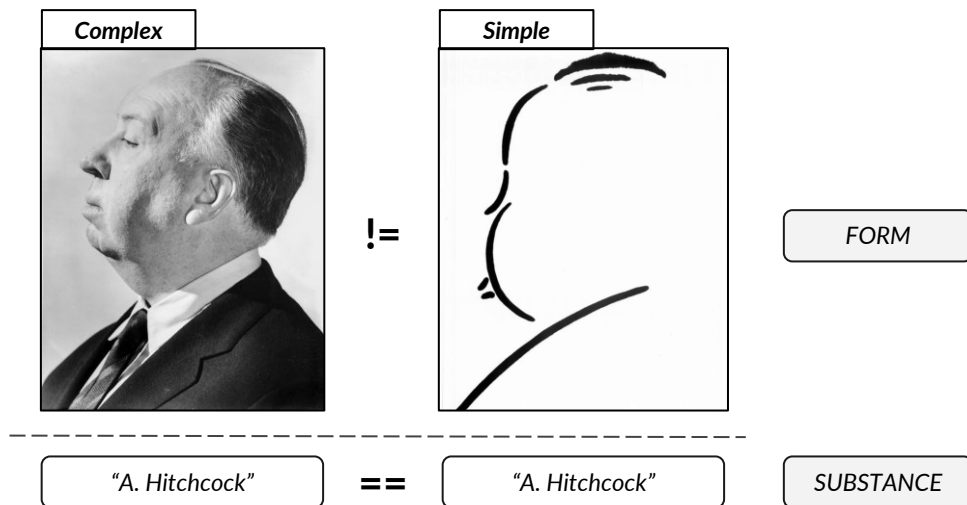
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  - **Healthcare documents**, *i.e.,* PharmMT [Li et al, 2020], BioLaySumm [Goldsack et al, 2022].
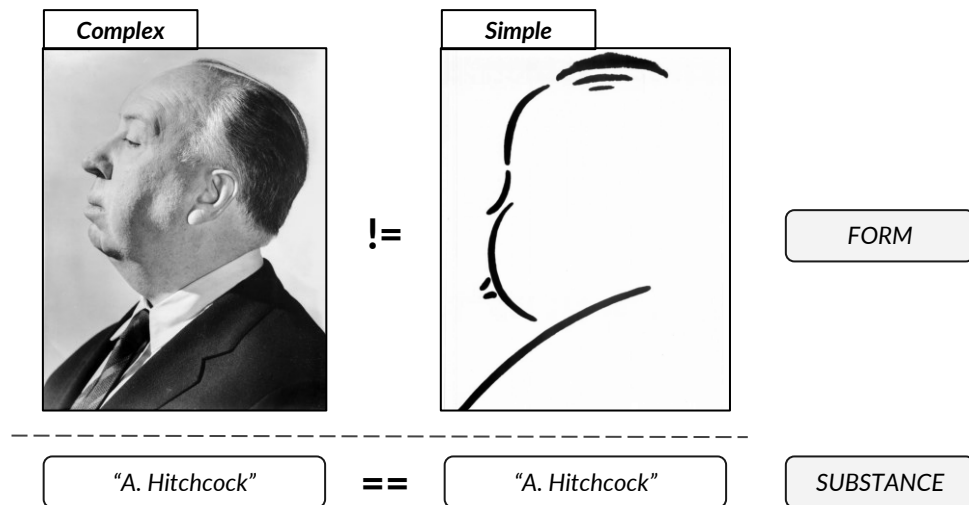
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1.2. Challenges in Speech Simplification (SpeechSimp)

What about applying simplification to a speech input instead?

- We often associate **complexity** in language with the **features** commonly found in **formal written texts**.

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2. Spontaneity and grammaticality

❑ **Traces of real-time construction of speech:** revisions, false starts, repetitions and self-corrections.

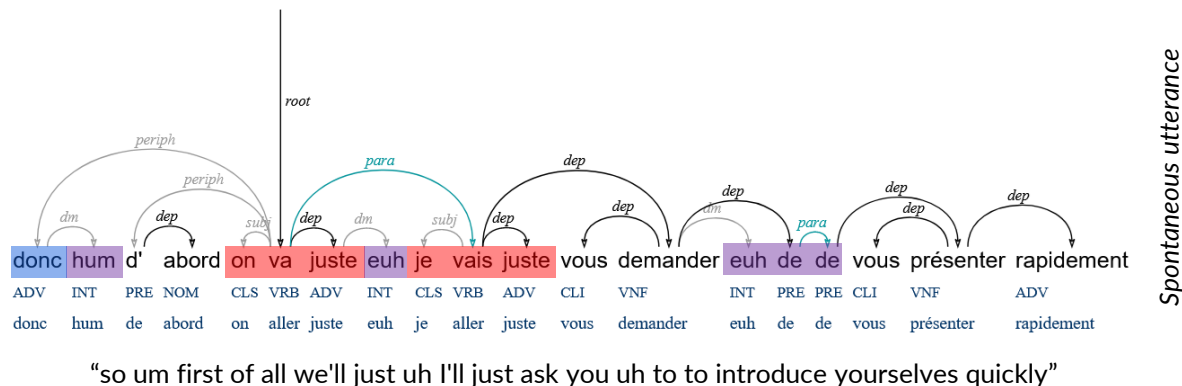❑ **Concatenations** of elements having a **paradigmatic relation** along the syntagmatic axis.

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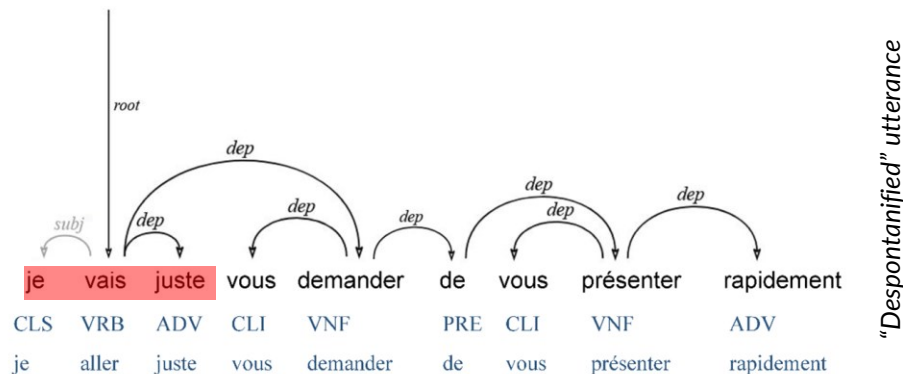
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Accessibility purposes	**Simplified transcripts** → Help clarify the input message for different target audiences.
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- **Main caveat about SpeechSimp→ No guideline to steer the simplification process.**
- **Need to characterize the process empirically:**
  - **Intuitive approach** [Allen, 2009].
  - Based on the **criteria** of **expert linguists**.
  - Output comparison with **ChatGPT**.

RESEARCH QUESTIONS

RQ1: What are the **edit operations** performed to obtain a **simplified version** of a **French spontaneous speech transcript**?

RQ2: How do **human simplification strategies align** with those adopted by **ChatGPT** and how **suitable** are they for a **non-native audience**?

2. Methodology

2.1. Source corpus and sampling

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  - Various **degrees** of **spontaneity**.
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- Resulting sample size → **100 utterances**.
  - **Reasonable workload** for respondents.
  - Not compromise the task's **stability** and **consistency**.

	Orféo-Test		
subcorpus	# utterances	%	# samples
Cfpb	362	1.69	2
Cfpp	3,232	15.06	15
Clapi	967	4.51	5
Coralrom	1,376	6.41	6
Crfp	2,259	10.53	10
Fleuron	217	1.01	1
Oral-Narr.	1,050	4.89	5
Ofrom	1,476	6.88	7
Reunions	1,245	5.80	6
Tcof	1,997	9.31	9
Tufs	4,525	21.09	21
Valibel	2,753	12.83	13
Total	**21,459**	**100**	**100**

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Due to the **absence** of **speech simplification guidelines**:

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- Setting a **manual simplification task**: **LimeSurvey platform**.

- **Survey** including **two questions** to respondents:

  1. Provide a **candidate simplified version** of the utterance.
  2. Explain the **chain-of-thought** followed to make such transformations.

Simplification du français parlé spontané

Notre corpus est constitué de phrases en français qui proviennent de **transcriptions de discours spontané**. Nous souhaiterions obtenir **leur équivalent simplifié**, c'est-à-dire, une phrase qui soit linguistiquement plus simple, sans pour autant perdre le sens et les informations originales. L'objectif est d'obtenir des phrases plus compréhensibles pour des locuteurs non natifs du français.

Pour chaque phrase, il vous est demandé de :

1. **Transformer la phrase donnée en une version plus simple.** Utilisez un langage clair, en évitant le jargon et les constructions grammaticales complexes. Vous pouvez également ajouter des signes de ponctuation si nécessaire. Notez que les mots avec le symbole « ~ » sont des amorces (termes inachevés).

2. **Expliquer votre raisonnement.** Après chaque simplification, énumérez et expliquez les transformations que vous avez effectuées. Par exemple, le remplacement de mots complexes par des synonymes plus simples ou encore la restructuration de la phrase.

*Voici la phrase à simplifier :
"ouais c'est ça sauf que moi on m'a jamais expliqué le rythme du coup"

Simplification :

Raisonnement :

2.3. Machine-based SpeechSimp: ChatGPT prompting

Human-crafted simplifications agree or differ against machine-generated ones?

- **Experts annotations** are **expensive** to produce.
- We sought to compare **human- vs. machine-based simplified outputs**.

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- We **prompted** one of the latest models (`gpt-4-0125-preview`) to **collect artificially-generated simplified transcripts**.

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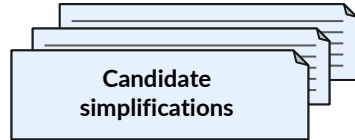
  - ○ `temperature=0` → Ensuring **consistency**.
  - ○ **One-by-one** basis → Avoiding history **influence**.
  - ○ **Identical prompt** than one used with **humans**.

```
completion = client.chat.completions.create(
    model="gpt-4-0125-preview",
    messages=[
        {"role": "user", "content": f"Notre corpus est constitué de
        phrases en français qui proviennent de transcriptions de discours
        spontané. \ Nous souhaiterions obtenir leur équivalent simplifié,
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        énumérez et expliquez les transformations que vous avez
        effectuées. \
        Voici les phrases à simplifier : \
        {sentence} \
        Voici le modèle pour ta sortie : \
        SIMPLIFICATION : \
        RAISONNEMENT :"}
    ],
    temperature=0
)
```
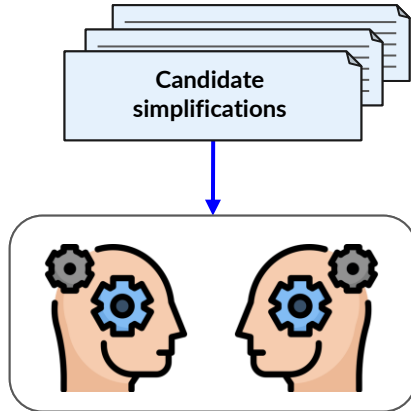
3. Results

3.1. Quantitative evaluation

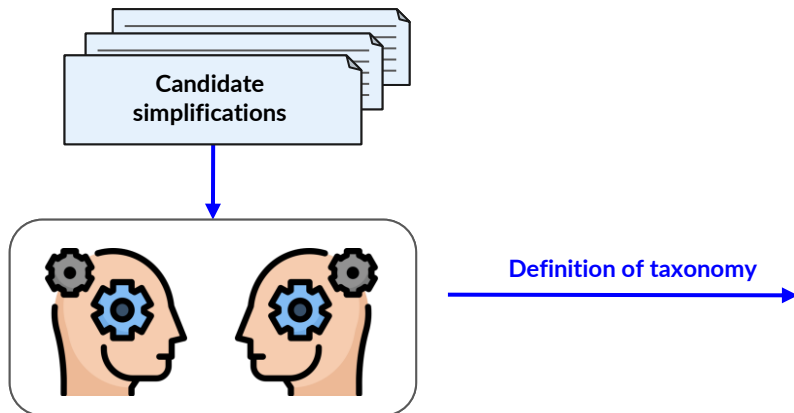**Once the collection of simplifications was completed:**

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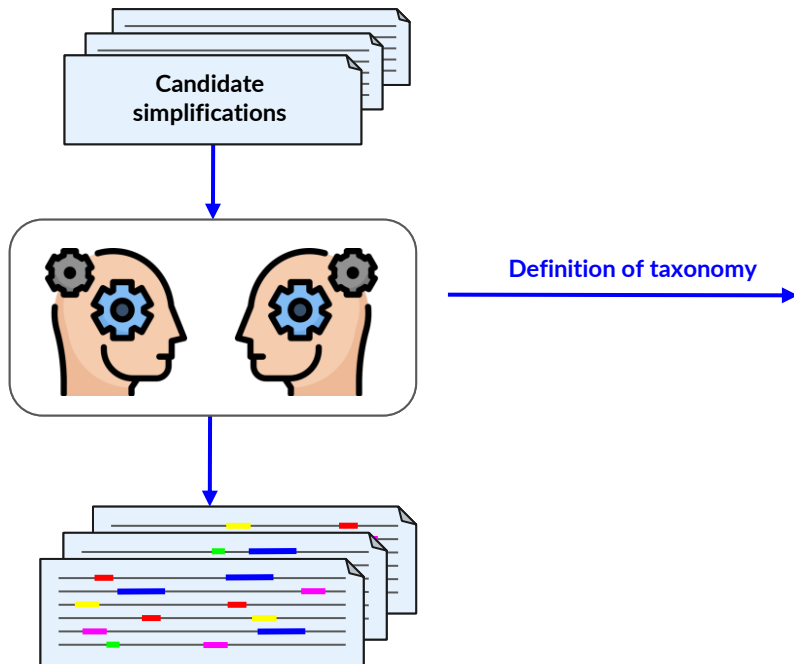
Definition of taxonomy

Edit	Level	ID	Linguistic unit(s) affected, operation
Deletion		1	Repetitions
		2	Affirmation and negation words
		3	Interjections
		4	Conjunctions
		5	Discourse markers
		6	Restarts and reformulations
		7	Adverbs and adjectives
		8	Incomplete words
		9	Statement verbs
		10	Pronouns
		11	Verbs with little semantic value
Replacement	Lexical	12	Simpler synonyms for content words
		13	Compression of nominal phrases
		14	More standard equivalents for content words
		15	Smoothing of swear words
	Verbal morphology	16	Intransitive to transitive verbs
		17	Pronominal to non-pronominal verbs
		18	Change of verbal tense
		19	Compression of verbal locutions
	Syntactic	20	Passive to active voice
		21	Cleft to canonical constructions
		22	Neutralization of dislocated subjects
		23	Pronoun transformations
Restructuration		24	Reorder
		25	Sentence splitting
		26	Sentence merging
Addition		27	Explicitation or disambiguation of a word
		28	Completion of truncated sentences
		29	Clarification of uncommon terms
Copy		30	Input sentence is left unchanged

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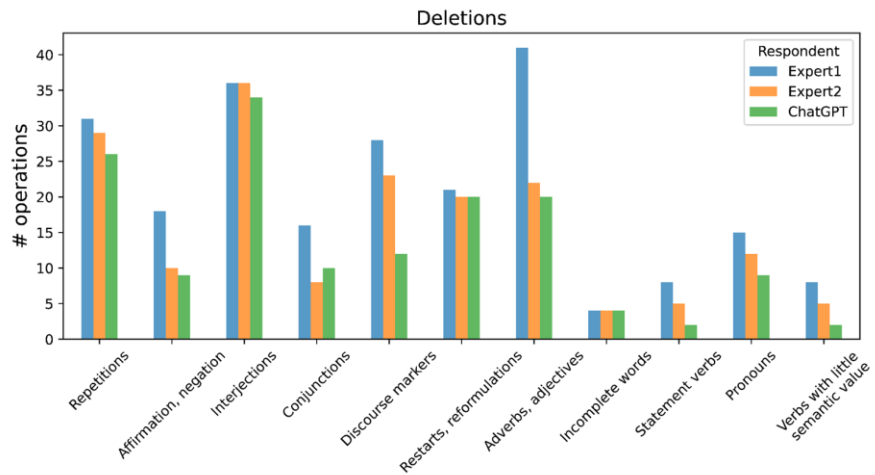
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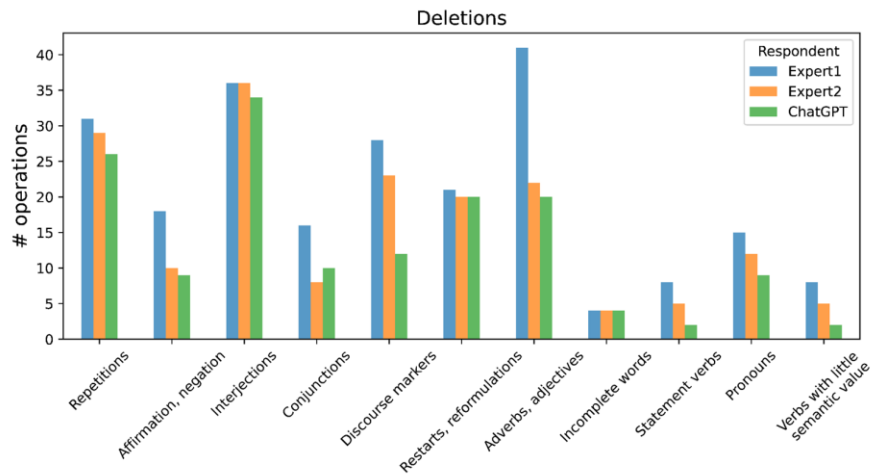**Once the collection of simplifications was completed:**

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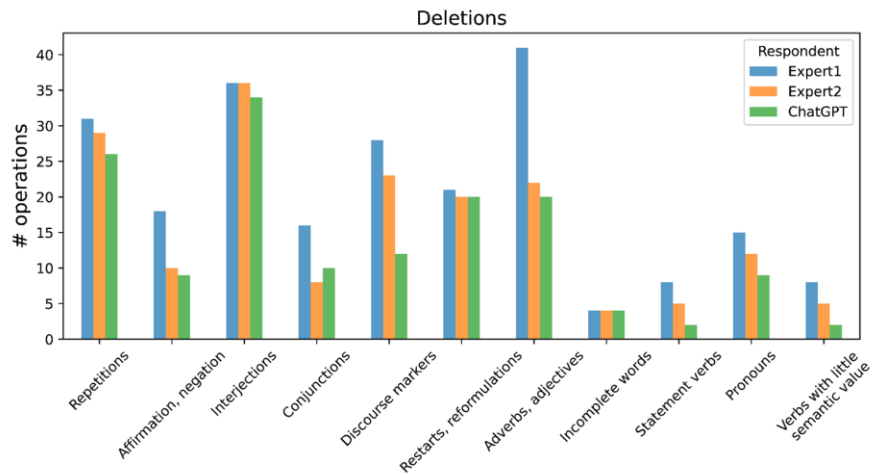| Input	ouais c'est ça sauf que **moi** on m'a jamais expliqué le rythme du coup
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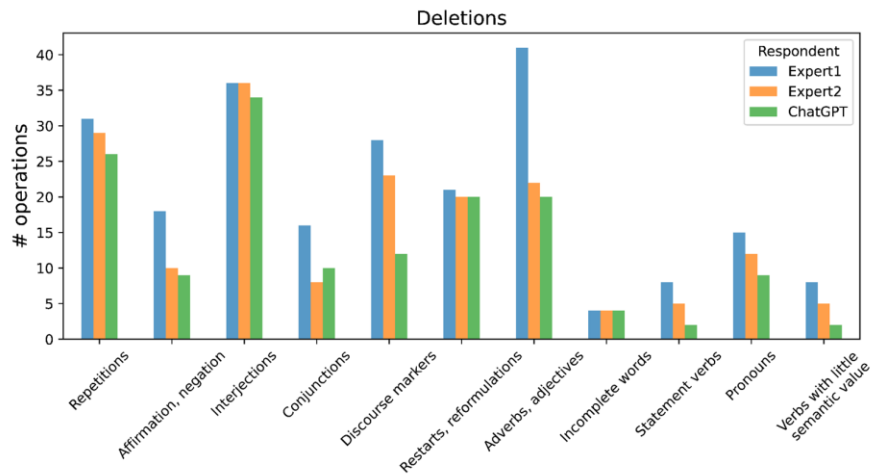
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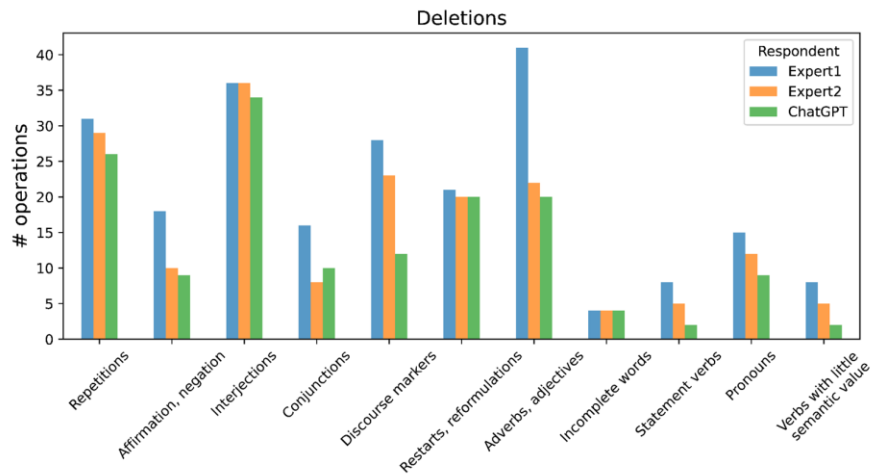| Input	**ouais** c'est ça sauf que moi on m'a jamais expliqué le rythme **du coup**
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RESULT

Simplified utterances seem to be "**writified**" or **register-standardized versions** of the **inputs** that just include their **propositional content**.

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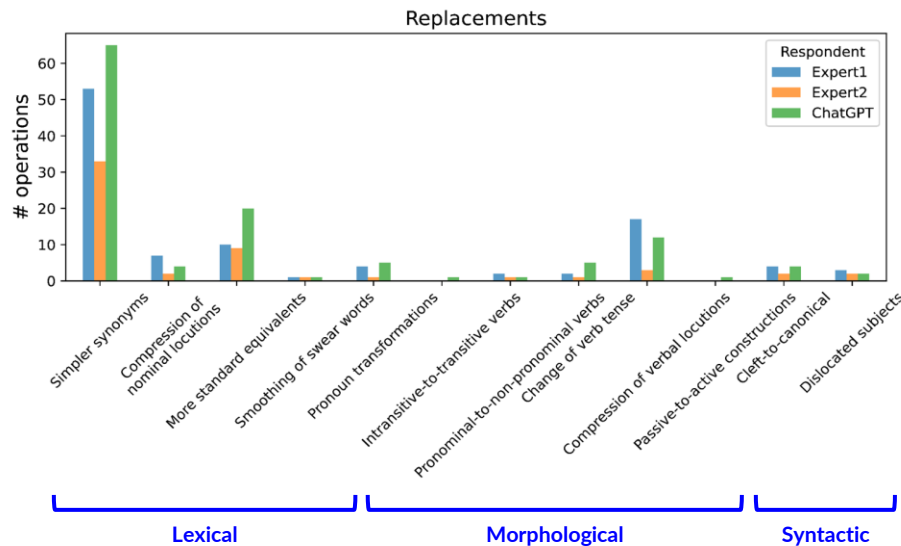
Input	mais enfin cette **confrérie** elle avait quand même un un avantage c' est que elle venait en aide euh aux malheureux
Expert 1	*Cette association avait un avantage, elle a aidé les démunis*
Expert 2	*Cette association avait l'avantage de venir en aide aux malheureux*
ChatGPT	*Mais cette confrérie aidait quand même les malheureux*

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- **Lexical** (more frequent):
  - Propensity to find **simpler** equivalents for **content words**.
  - But also: **smoothing** of **slang**, **colloquialisms** and **profanity** (*monde* → *personnes*, *bouquins* → *livres*).
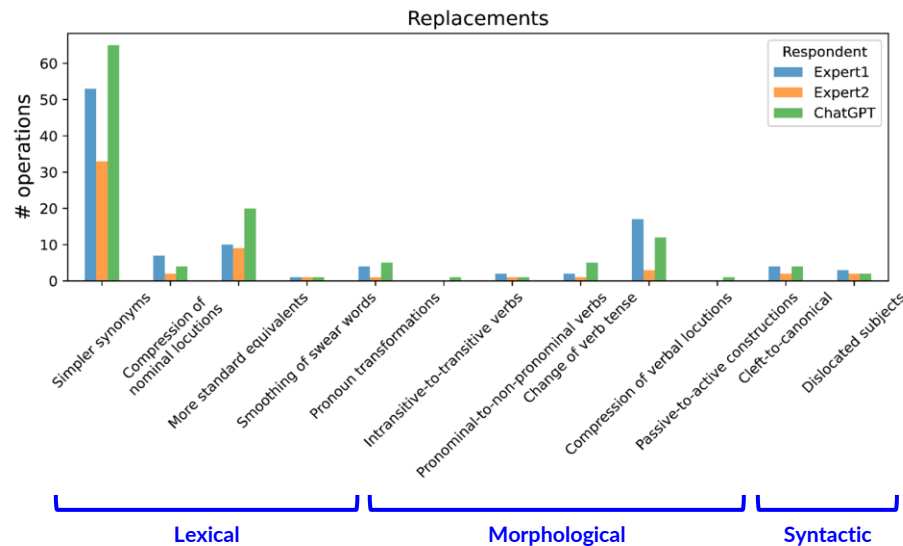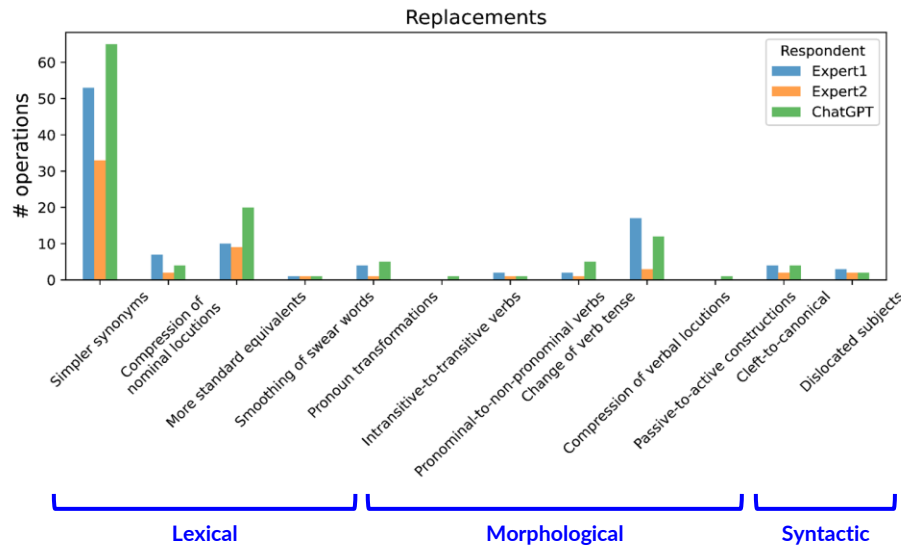

Input	et c' était pas son style de **bouffer** de la **merde**
Expert 1	c'était pas à son goût de manger mal
Expert 2	Et il/elle n'est pas habitué à manger des aliments de mauvaise qualité
ChatGPT	Il n'aimait pas manger de mauvaises choses

3.1. Quantitative evaluation: special focus on replacements

Category subdivided according to the **linguistic transformations** observed:

- **Lexical** (more frequent):
  - Propensity to find **simpler** equivalents for **content words**.
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- **Morphological** (less frequent):
  - **Compression** of **constituents**: nominal (*monde du travail →* *travail*) and **verbal** (*faire la demande → demander*) groups.

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- **Syntactic** (less frequent):
  - **Standardization** of **marked** information structures (cleft clauses and dislocated subjects).
  - **Passive voice** changes: **anecdotal**.

Replacements
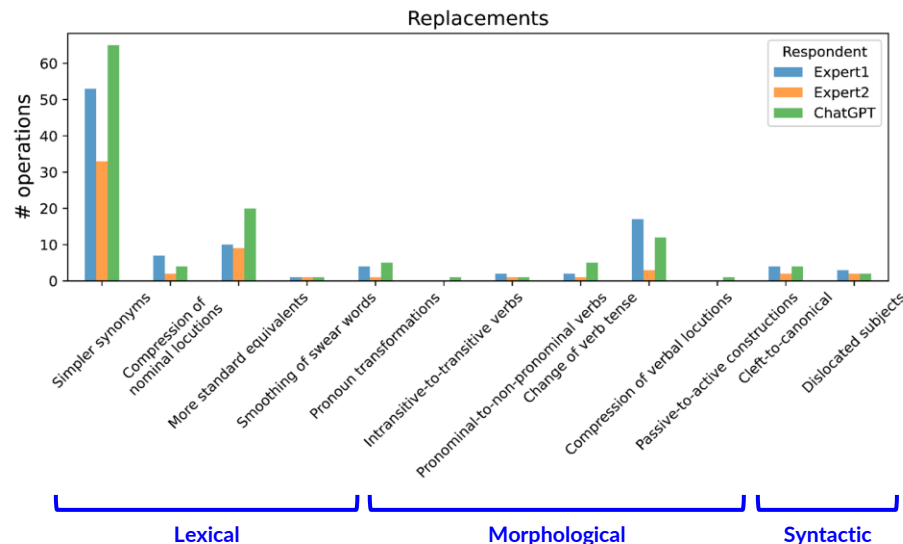
Input	**on sent que** la prise de conscience de ce genre de choses **elle s' est faite** tard
Expert 1	Nous pensons que la compréhension de ce problème est arrivée tard
Expert 2	La prise de conscience de ces choses-là est arrivée tard
ChatGPT	Les gens ont commencé à comprendre ces choses tard

3.2. Qualitative intrinsic evaluation

To assess the **suitability** of the **produced** human- and machine-based **outputs** for a **foreign-speaking audience**:

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Survey design:

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- Under two typical **ATS dimensions** [Yamaguchi et al, 2023]:

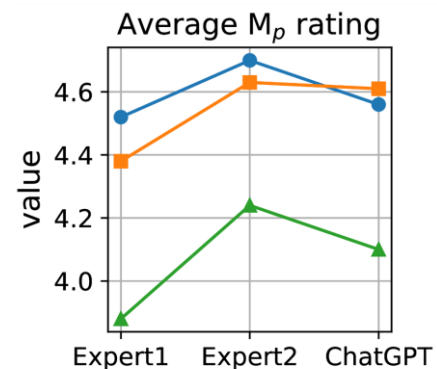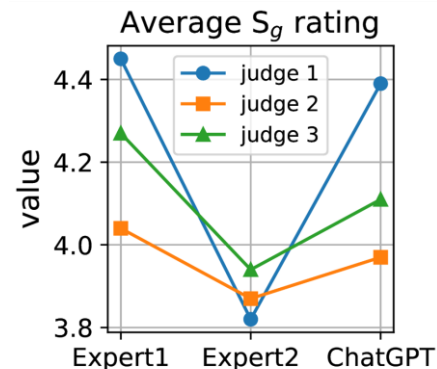| Simplicity gain (S_g)	Meaning preservation (M_p)
5 – Much simpler	5 – Fully preserved
4 – Somewhat simpler	4 – Mostly preserved
3 – Same difficulty	3 – Partially preserved
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1 – Unintelligible	1 – Unintelligible

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Average S_g rating

Average M_p rating

4. Conclusions and further work

- **Taxonomy** and **quantification** of simplification operations applied to French spontaneous transcripts.
- **Intuitive-based approach**, due to the lack of guidelines to steer the simplification process.

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- Provision of a dataset: **Propicto-Orféo-Simple*** → mapping Orféo-based audio-transcripts with simplified versions.

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LIMITATIONS

- **Small scale study** → Due to the **costly process** required to produce such data.
- **Lack of context** as an obstacle for the completion of the task **→ BUT motivated by representativeness purposes.**

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CONTRIBUTIONS

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FURTHER WORK

- **Propicto-Orféo-Simple** → Further use as an **evaluation set** to assess the performance of **speech simplification models**.

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Thank you for your attention!

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