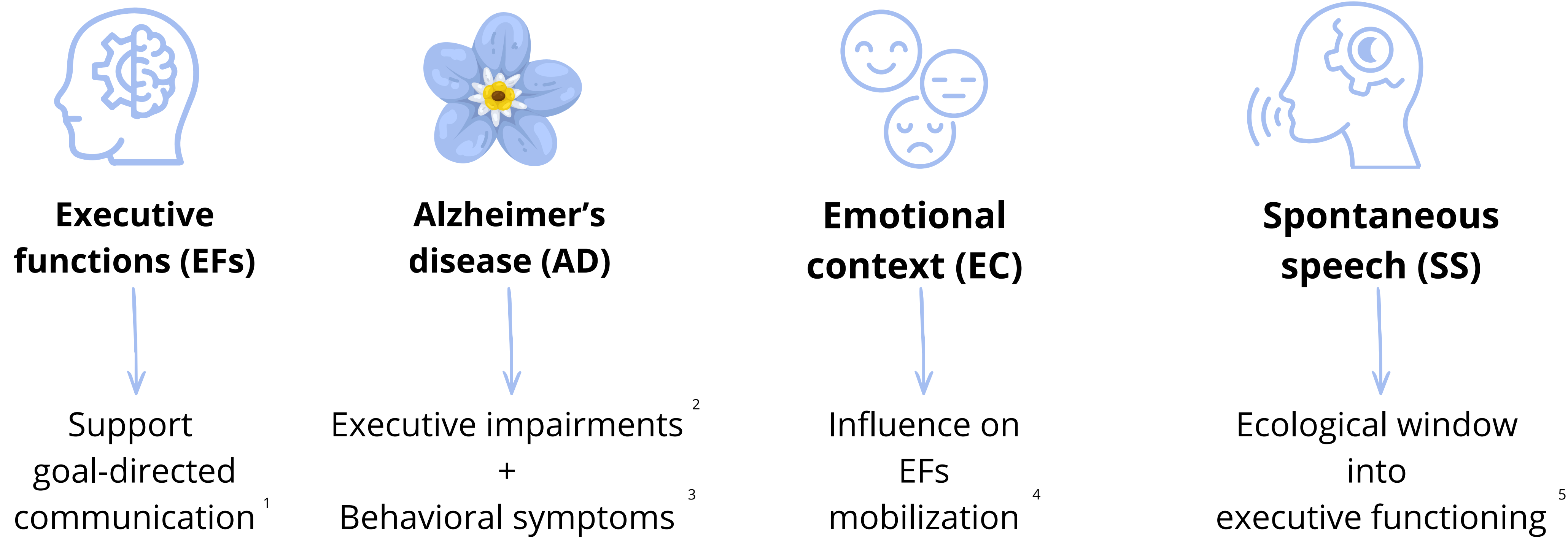


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## BACKGROUND



## OBJECTIVES

- Examine the impact of emotional context on three executive functions.
  - Inhibition
  - Cognitive flexibility
  - Planning
- Develop an automated tool for executive speech analysis.
  - ExEcoLang Scan
- Compare healthy older adults & patients with Alzheimer's disease.
  - Impact of the disease

## METHODS

### TWO-PHASES STUDY

Will begin in September 2026

#### PHASE 1 - TOOL DEVELOPMENT

##### Healthy elderly

- n = 59
- MMSE<sup>6</sup> ≥ 27 (mean = 28.69; SD = 3.85)
- Age ≥ 75 y.o. (mean = 80.26; SD = 5.94)

##### Participants completed:

- EFs tests (GREFEX<sup>7</sup> battery)
- 6 SS under 3 ECs (see table 1)

Block	Theme 1	Theme 2	Theme 3	Theme 4	Theme 5	Theme 6
1	Leg (N)	Water (+)	Bomb (-)	Girl (+)	Blood (-)	Street (N)
...	...	...	...	...	...	...
10	Window (N)	Mother (+)	Killer (-)	Hunting (-)	Tree (+)	Room (N)

Table 1: distribution of themes used in the spontaneous speech task during phase 1, categorized by emotional valence: positive (+), negative (-), or neutral (N).

#### PHASE 2 - APPLICATION IN AD

##### Moderate AD

- n = 54
- MMSE<sup>6</sup>: 10 - 20
- Age ≥ 75 y.o.

##### Severe AD

- n = 54
- MMSE<sup>6</sup> < 10
- Age ≥ 75 y.o.

##### Participants will complete:

- EFs screening (BREF<sup>8</sup>)
- 9 SS under 3 ECs (see table 2)

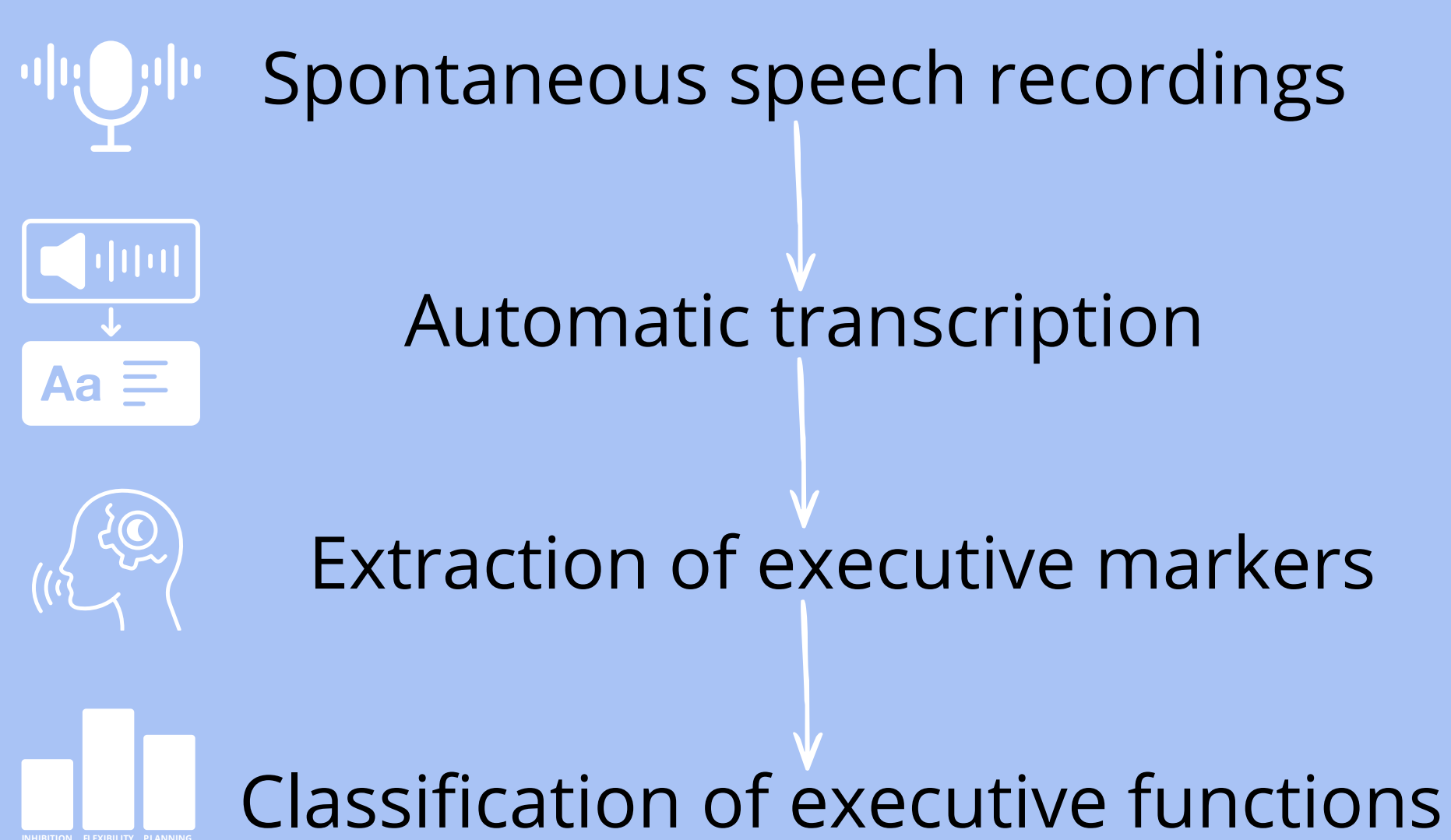
Positive themes	Negative themes	Neutral themes
Flower	War	Leg
Mountain	Killer	Room
Sea	Hunting	Shoe

Table 2: selection of the 3 words for each valence with the highest mean production times and highest mean number of content words during phase 1.

## Development of the automated tool

**IN PROGRESS**

### ExEcoLang Scan:



### Executive markers in SS

INHIBITION	COGNITIVE FLEXIBILITY	PLANNING
Repetitions	Grammatical inconsistencies	Pauses
Semantic neighbors	No rhematic progression	Discursive breaks
No thematic progression		Contradictions

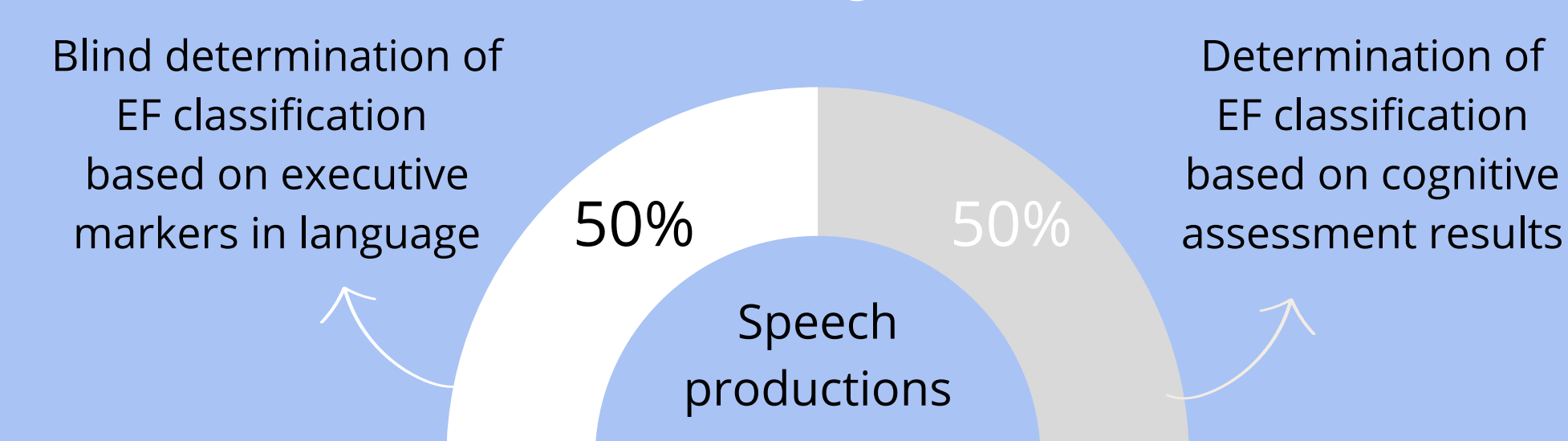
*"I went to the store, the store ... um... to buy food, or something like food, like bread. It were about global warming. I bought milk, but I don't drink milk, I didn't buy it."*

repetition, pause, semantic neighbors, grammatical inconsistency, discursive inconsistency, contradiction

### Technical framework:

- Natural Language Processing (NLP) pipeline.
- Integration of validated open-source libraries.

### Validation of the Python model



## PRELIMINARY RESULTS

### Speech corpus:

- 355 speech recordings.
- 11.5 hours of audio.
- 20 themes per valence.

Control	Positive themes	Negative themes	Neutral themes	p
Number of content words	Median = 78.5 (MAD = 37.5)	Median = 82 (MAD = 39)	Median = 78 (MAD = 34)	0.278
Audio duration (sec)	Median = 72.49 (MAD = 33.82)	Median = 66.37 (MAD = 29.90)	Median = 74.64 (MAD = 32.18)	0.038*

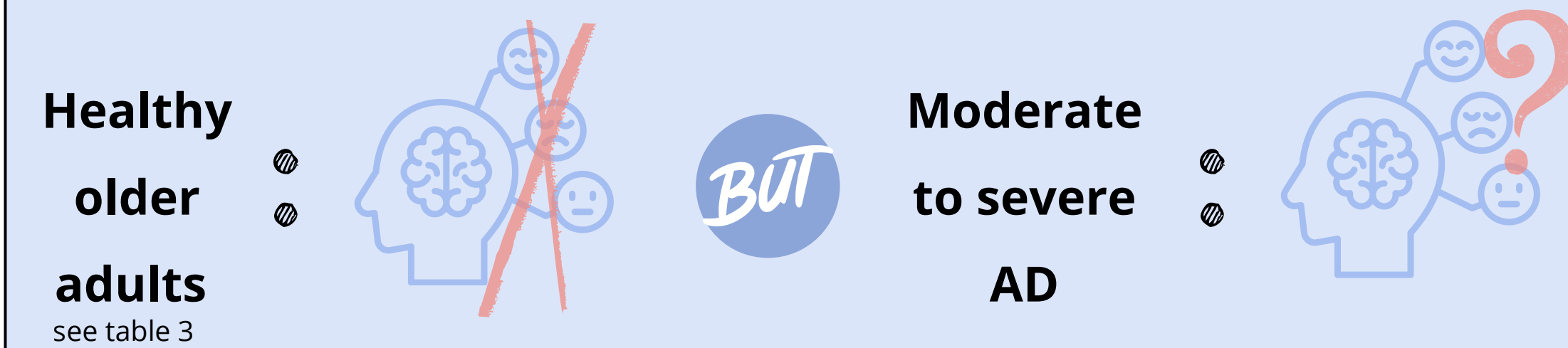
Table 3: Median and MAD of the number of content words and audio duration for each emotional valence. The p-values indicate a significant effect of valence on audio duration, but not on number of content words. \*p < .05 (Friedman test)

### Hypotheses:

- Correspondence between EFs: language ↔ traditional tests.
  - Software: detection of executive markers + EFs classification.
  - Residual EFs : Moderate > Severe.
- Positive/Negative > Neutral. } in AD

## PRELIMINARY DISCUSSION

### For number of content words:



### PERSPECTIVES

- Ecological assessment of EFs in AD.
- Correlation: EF and behavioral disturbances.
- Best practice guide for (in)formal caregivers.

### STUDY'S FINAL OBJECTIVE

🎯 = reducing inappropriate behavior in AD through better communication.

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