

# ON BASIC COGNITIVE PROCESSES

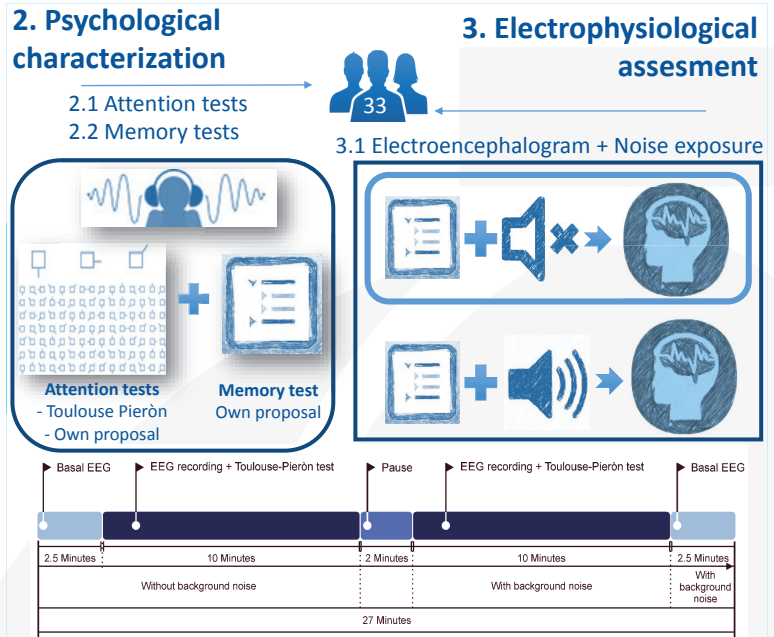
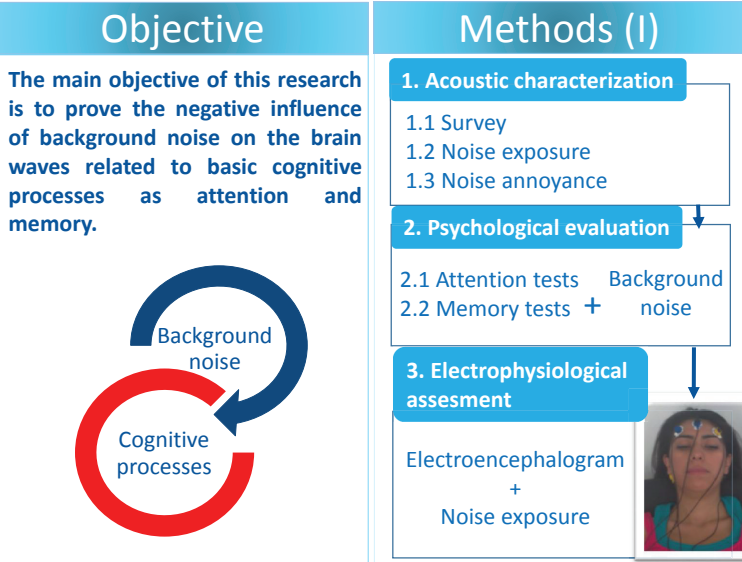


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## Abstract

The attention processes in people is affected by background noise produced by many different sources. Beta (13-30 Hz) and Theta (4-7 Hz) waves are directly related to attention and memory processes. Volunteers were asked to perform an attention test with and without background noise and their cerebral activity was recorded through electroencephalography (EEG). Results shows significant decreases in both beta and theta frequency bands (beta 13-30 Hz and theta 4-7 Hz) under background noise exposure. The attentional improvement is related to increases of the beta and theta waves, and we have observed that those decreases are directly related to a lack of attention caused by the exposure to background noise.

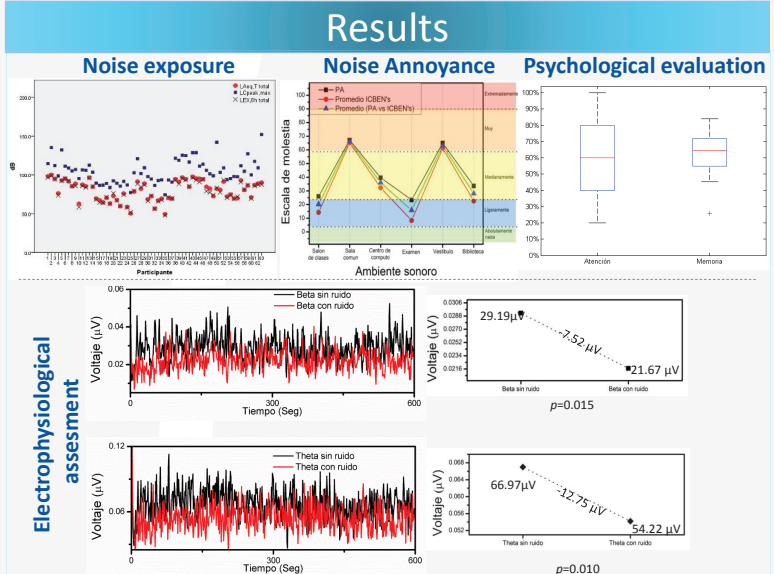
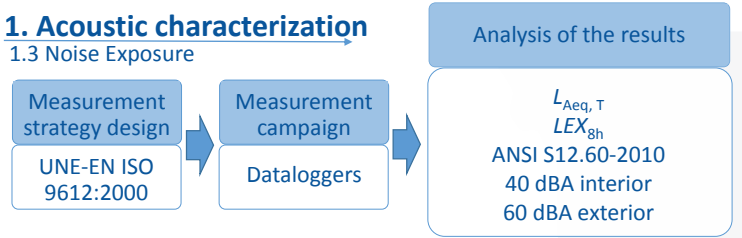
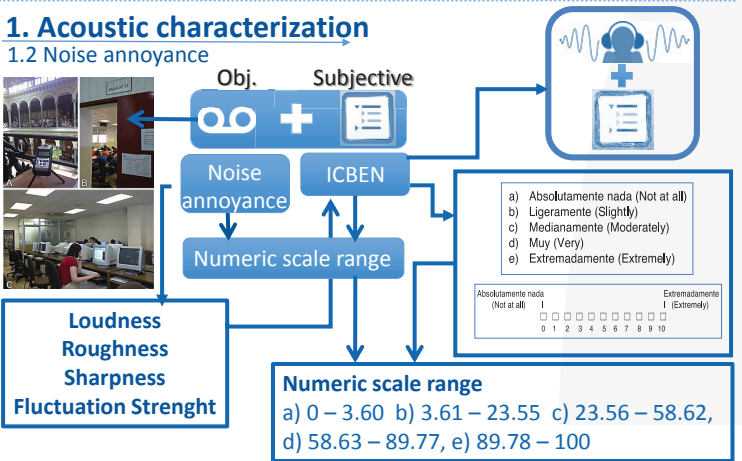


### Methods (II)

#### 1. Acoustic characterization

##### 1.1 SURVEY: perception about noise

# Questions*	Participants	Mode		Educational level		
		Online	Face-to-face	Bachelor	Master	PhD
8	454	50%	50%	85%	10%	5%



### Conclusions

- **Survey:** Sound environments studied are aggressive.
- **Levels of noise:** Excessives and not appropriate for concentration activities and the environments are considered very annoying.
- **Psychometric evaluation:** Unreliable data.
- **EEG:**  $\beta$  y  $\Theta$  decrease with influence of background noise. We can relate it with attention and memory reductions.

### Papers at Journals & Conferences

- Tristán E., Pavón G., López, J.M (2015). "Characterization of sound environments of university students". Int. J. Occupational Safety and Ergonomics (JOSE).

- Tristán E., Pavón G., López, J.M. (2016) "Evaluation of psychoacoustic annoyance and perception of noise annoyance inside university facilities". International Journal of Acoustics and Vibration (IJAV).

