

Abstract

# Bistable Perception's Oscillations Dynamics, Individual Differences and Cognitive Flexibility: A Behavioral Study <sup>†</sup>

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<sup>†</sup> Presented at the 3rd International Electronic Conference on Brain Sciences (IECBS 2022), 1–15 October 2022; Available online: <https://iecb2022.sciforum.net/>.

**Abstract:** Perceptual oscillations between different interpretations of unchanging, ambiguous stimuli have been studied for decades, being that this special phenomenon is considered a key towards the understanding of perceptual awareness and, ultimately, consciousness. The finding that brain dynamics (as registered, for example, through magneto- and electro-encephalography—M/EEG) of the spontaneous alternations between the percepts reflect the intrinsic dynamic properties of the (unconscious) perceptual processing impacts on many theoretical scenarios which consider perception as an inference process, and all other subserving cognitive processes as working in a coordinated and coherent way. Amongst cognitive processes, cognitive flexibility is the one sharing the most characteristics with the perceptual alternations, typical of bistable phenomena, these being the ability to change a rule or accordingly inhibit certain information differently between individuals; this “switching” ability has been shown to be correlated with the general “functioning” of a person (this, in turn, being reflected by the individual neural system organization and dynamics). A preliminary behavioral study (N = 26) has been performed to provide evidence that all these aspects are indeed correlated. Performances in computerized classic experimental paradigms (Stroop, Simon Task, Task-switching Tests, Wisconsin Card Sorting Test) have been correlated to perceptual switches and percept durations of spontaneous and voluntary alternations of the Necker Cube and with scores in Cognitive Flexibility, Barrat's Impulsiveness, DASS-21, and the short version of the Big Five questionnaires. Future studies with EEG and brain connectivity measures can provide a more direct insight on the brain dynamics of this perceptual and cognitive processing, shedding light on the mechanisms at the basis of this supposed concerted coherent synchronization.



**Citation:** Saracini, C. Bistable Perception's Oscillations Dynamics, Individual Differences and Cognitive Flexibility: A Behavioral Study. *Biol. Life Sci. Forum* **2022**, *19*, 13. <https://doi.org/10.3390/IECBS2022-13742>

Academic Editor: Stephen Meriney

Published: 25 November 2022



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**Keywords:** bistable perception; perceptual awareness; cognitive flexibility; individual differences

**Supplementary Materials:** The presentation material of this work is available online at <https://www.mdpi.com/article/10.3390/IECBS2022-13742/s1>.

**Funding:** This research was funded by ANID (Agencia Nacional de Investigación y Desarrollo) grant Fondecyt de Iniciación project number 11190828.

**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee (Comité de Ética Científico) of the Catholic University of Maule (protocol code Acta N.23-2022, date of approval: 28/3/22 and Acta N.39-2022, date of approval: 6/4/22).

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.

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