

What is the role of attention in conscious perception? Despite numerous attempts to unravel the relationship between attention and consciousness, our understanding of the interplay between these two ubiquitous functions of our mind and their neural substrates remains limited. Currently, there is no consensus on the role that these two processes play to each other. Attention is a fundamental process in the brain, playing a crucial role and being connected to various functions. Similarly, conscious perception is pervasive in our everyday experiences, and the effects of attention can be observed at various levels of conscious processing. Therefore, it is imperative to strive towards a better understanding of the relationship between attention and consciousness, as it represents a significant goal in advancing our comprehension of the mind.

This project aims to gain a better understanding of the interaction between attention and consciousness. Many attempts have already been made to dive into that topic. However, it is very difficult to disentangle consciousness and attention in scientific experiments, even though the distinction is critical for the theory. Previous research failed to present a full picture of the phenomenon because the methods that had been used were always confounded by a mix of the different kinds of processes that were compared. Thus, it was never possible to clearly distinguish between attention and consciousness. Furthermore, it is often unclear whether a single type of attention is solely responsible for observed performance effects, as multiple attentional mechanisms may be concurrently at play. This ambiguity makes it challenging to draw definitive conclusions about the precise role of attention in modulating conscious experience. To address this issue, this project will employ rigorous methodology and experimental designs that aim to disentangle different types of attention and their contributions to performance outcomes, providing a more nuanced understanding of the relationship between attention and consciousness.

We will test a large sample of volunteers willing to take part in our experiment. Firstly, we plan to gather an ample set of behavioral data that will allow us to delineate the interactions between conscious visual perception and the three attentional networks that constitute one of the major theories of attention. Participants will perform a version of the Attention Network Test (ANT) combined with a novel consciousness measure - the LAG of consciousness. The LAG is a quantitative measure permitting the comparison between subjective and objective perception within the same dimension of task performance. This task employs dynamically changing stimuli rather than static events, and allows for a correlational approach, instead of a contrastive one. In this task, participants are presented with a continuously elongating line on a computer screen. Their first objective is to press the button as soon as they perceive it appearing on the screen, which stops the line elongation. Their second and critical task is to estimate how long the line was when they first saw it on the screen. The underlying hypothesis is that there will be a consistent disparity between the actual starting length of the line and the perceived starting length. This difference between the objective and subjective starting points represents the "LAG" on consciousness, indicating a delay or discrepancy in the awareness of the line's initiation. The experiment will incorporate elements from the ANT task. The modified task will involve two possible line locations and three types of cues, allowing for a more comprehensive examination of attentional processes. Additionally, a flanker task will be included as part of the experiment. This task involves presenting stimuli that may either facilitate or interfere with participants' ability to focus their attention on the target line. The results of the behavioral experiment will allow us to formulate strong hypotheses about how each of the networks interacts with conscious visual perception. We will test these hypotheses in a series of EEG experiments that will aim to characterize the time course of conscious visual perception and its interaction with attention. We hope that this experimental design will shed light on how different attentional networks interact with conscious perception and how they influence objective and subjective measures of task performance.

This basic science research aims to uncover the relationship between attention and consciousness, with the potential for groundbreaking discoveries about the brain. While practical benefits may be challenging to assess directly, understanding these mechanisms and having a better grasp on the subjective experience that goes along with altered attention can lead to improved treatments for attention deficits. Disentangling the influences of attention and consciousness might provide a deeper insight into the nature of occurring impairments. Thus, this research can also drive clinical investigations into conditions like dementia and ADHD, as they frequently involve abnormal attention patterns. Additionally, changes in consciousness linked to acute brain dysfunction consistently affect attention directly. Therefore, this project stands for an important attempt on our way to comprehend the mechanisms and dynamics underlying the relationship between attention and consciousness.