### Explanation

Hi Liad,

This introduction is supposed to provide a short coverage for the debate regarding unconscious processing. I tried to keep it at the conceptual level instead of diving into specific examples for and against unconscious processing (although I did include some).

I **did not format** the introduction yet, hence I would currently like to get your feedback regarding the logical order and the content of the text.

Included here is only the introduction, but I am now working on rewriting and improving the next sections:

* In the section that follows the introduction I claim that the difficulty to find a definitive answer to the existence of UC processing could stem from using "bad" measures. I then present the advantages of motion tracking over keyboard response.
* Then I present papers that used motion tracking to probe the UC and papers that used both motion tracking and keyboard.
* Finally I present Xiao's paper where he compared mouse tracking to keyboard. I elaborate on the advantages of motion tracking over mouse tracking and review some of the pitfalls in Xiao's awareness measurements.
* Then I present our current research.

### First draft of introduction

Unconscious effects are notoriously small and weak and thus raise much skepticism regarding their existence. Proponents and opponents for unconscious (UC) processing exchange commentaries trying to explain away each other's supporting theories and findings.

In a paper from 2013 Hassin (@@ Cite @@) takes on one extreme of the debate by claiming that any fundamental function performed by conscious (C) processing can also be done unconsciously. He then presents a line of empirical evidence showing a variety of functions being performed unconsciously: cognitive control, goal management, information broadcasting, reasoning, memory, implicit learning, emotional cues extraction and comparison of self with others. Although available to UC processing, the realization of these functions may differ between C and UC since the affecting factors and the resulting implications are different.

Furthermore, UC processing isn't expected to perform these functions at all unless the three following conditions are met: proper capacity of working memory and executive functions, automatization of the relevant process by practice, high motivation for performing the relevant function unconsciously. For example, a social task asking to recognize friendly / hostile faces is more motivating than a cognitive task asking to differentiate between tables / chairs, which is why UC processing is usually found in social but not cognitive psychology experiments.

The interpretation of this discrepancy between social and cognitive psychology isn't accepted by those opposing the concept of UC processing. They claim UC processing is extremely limited and instead attribute the existing UC effects to the failure of discovering the residual awareness of the stimuli. This type of underestimation occurs when the awareness measure fails to be reliable (influenced by the factors that affect performance), relevant (measures aspects of awareness relevant to the performance task), immediate (follows immediately after the performance task, hence preventing forgetting and interference) or sensitive (able to discover residual awareness if it exists) (@@ Cite Newell 2014 @@). Even when these four criterions are met, awareness can still be underestimated if the participant sets a high criterion for reporting a seen stimuli or if the awareness assessment task is too difficult; A difficult task could diminish the motivation for exhaustive introspection and hinder the accurate report of awareness.

Another factor that can inflate the UC effect is "bad" experimental design; Failing to include a proper baseline condition could lead researchers to conclude a positive UC effect when in fact the result stems from a negative C effect. For example, when C memories and judgments are distorted by "over thinking" a solution. A False UC effect might also be deducted when behavioral results can be explained by direct associations between stimuli and response, thus making the mediating unconscious stage between them redundant. Finally, a major cause for inflation is pitfalls in the analysis, such as failing to account for regression to the mean (Shanks, 2017). When taken into consideration regression to the mean can show that previously found UC effects are a result of noise in the awareness measurement (@@ Cite Shanks 2014 @@).

That said, a recent paper used simulated data to show that the regression to the mean procedure makes the analysis completely insensitive to UC effects, preventing it from discovering even extreme ones (@@ Cite Sklar 2021 @@).

Between the two aforementioned attitudes to UC processing lies a more neutral attitude that claims UC processing might be able to perform complicated functions, but the current research isn't strict enough to prove it. Reviews in favor of UC processing tend to be biased and present only successful discoveries of UC effects while ignoring failed replications. Moreover, many of the successful experiments come from the field of social psychology where the lack of awareness is either assumed but not tested or tested as awareness of the stimuli's influence instead of the stimuli itself.

As can be understood, the small effect sizes found when probing UC processing provoke rigid opposing opinions that make it hard to reach a concise answer regarding the existence of UC processing. Hence one approach to solving this controversy is utilizing more sensitive measures to increase the found effects.