

# Abstract 2

**Title:** Investigating non-conscious stimulus-related reactions

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**Abstract:** We spend much of our awake lives monitoring and reacting to environmental stimuli. When reacting, we typically experience ourselves as conscious of it (action awareness). It might thus seem that action awareness necessarily accompanies (or at least follows) any stimulus-reaction event. But is this always the case, for any reaction?

This study aims to shed light on the divide between behaviors that can and cannot manifest without action awareness by testing whether certain simple reactions can take place without action awareness. In our previous experiment, we used a go/no-go paradigm while recording participants' muscle activity using electromyography (EMG). After each trial, we asked the participants whether they were aware of their own action. We found that no-go stimuli sometimes invoked measurable muscle activation while participants reported being unaware of any response (i.e., their reports were “false negative” with respect to EMG activation). Our results thus appeared to suggest that action awareness was not necessary for simple muscle contractions in response to sensory stimuli.

However, our later analysis identified a potential limiting factor: it was unclear whether the participants were completely unaware of their action when they reported so. The results showed that in 24% of trials where the participants answered “yes” to the binary question “Have you felt that you just moved?”, we detected no EMG activation (i.e., the participants' reports were “false positive” with respect to EMG activation). We carried out several control analyses. Their results suggested that, when uncertain, the participants sometimes picked their binary response randomly. Our results do not exclude the possibility that this was the case also for the opposite situation—when answering “no”. This issue hence limits the validity of our main result.

We tested several potential solutions. The most appropriate solution seems to be to explicitly set participants' response criterion to be as liberal as possible. I.e., we asked the participants to report even the smallest movement possible as a "yes". Our pilot trials so far demonstrated that the criterion explains the non-zero false positive rate in our previous task. However, making the criterion more liberal also drastically decreased the false negative rate investigated by our hypothesis, and even nullified it in approximately one third of the participants.

In this poster, we summarize the issues described above in more detail and present our future directions. We hope to receive helpful constructive feedback on ways to continue the project.

**Keywords:** consciousness, electromyography, action awareness, go/no-go task