Title: Electrophysiological correlates of tactile awareness and associated confidence

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One way of studying perceptual consciousness experimentally is to contrast conscious and unconscious processing while recording subjective reports of perception and self-consciousness (confidence). In a detection task, we applied weak vibrotactile stimuli to 18 healthy participants while keeping stimulation intensity at the perceptual threshold using an adaptive procedure. We asked participants to report whether they perceived (hit) the stimuli or not (miss) and how confident they were in their response. A Bayesian mixture model revealed that confidence in hits was surprisingly low and spread over intermediate values, while confidence in correct rejections and misses were higher, with most extreme values observed when participants report confidently perceiving nothing in the absence of stimulus (i.e., correct rejection). Results from concurrent EEG recordings showed that N2 and P3 event-related potentials as well as 8 – 30 Hz time-frequency activity correlated with tactile awareness over the sensorimotor cortices. The same EEG features also encoded the confidence of subjects in their hits. Furthermore, we developed a signal detection theory model with EEG features as input. Behavioral data was best fitted when the model related single-trial estimations of P3 amplitude to variability in the amount of perceptual evidence, but not to decision criterion. Conversely, behavioral data was best fitted when relating N2 amplitude or 8-30 Hz time-frequency activity to decision criterion, but not to perceptual evidence. In sum, by contrasting hits and misses while keeping the physical properties of the stimuli fixed, our results suggest that the P3 is a neural correlate of the amount of perceptual evidence while the N2 and 8-30 Hz time-frequency activity are neural correlates of the decision criterion. A similar approach linking EEG features to confidence is now being applied using a Bayesian model of confidence. Electrophysiological correlates of tactile awareness and associated confidence.