

SE-01-03

How can we measure the quality of consciousness?

Makiko Yamada*QST*

Abstract

Many of the major neuroscience studies to date on the quality of consciousness, aka qualia, have utilized visual illusions. For example, in polysemic figures such as Rubin's vase or binocular rivalry, only one of the two visual images rises to consciousness and switches at regular intervals. By exploiting such illusions, brain activity that changes in correlation with the content of consciousness has been identified, even though the external stimuli are constant. However, most previous studies have trivialized the quality of consciousness into a binary question of whether a particular visual image was seen or not, and examined the corresponding brain activity, and have not been able to capture qualia themselves (e.g., subjectively perceived redness of an apple) in terms of brain activity.

In my talk, I will present two of our new approaches to the quality of consciousness, which has been difficult to define. One is to apply the Yoneda Lemma to characterize qualia in relation to their surroundings and identify qualia structure from brain activity patterns. The other applies the idea of "quantum cognition" to test whether the experience of consciousness is determined by measurement by examining violations of Bell's inequality.