Study shows expectation important component of rubber-hand illusion

June 26 2013, by Bob Yirka

(Medical Xpress)—A team of researchers in Italy has found that expectation is an important component of the famous rubber-hand illusion. In their paper published in the journal *Proceedings of the Royal Society B*, the team describes their study that showed that actual touching need not occur for the illusion to work.

Fourteen years ago, researchers at Princeton University discovered a property of human perception that has come to be known as the rubber-hand illusion. Volunteers that sat at a desk with one hand under a table and a rubber hand placed on the table claimed to be able to feel it when the rubber hand was stroked by the research team. Since that time, more than a 100 papers have been published in several journals documenting findings associated with the rubber-hand illusion. In this new effort, the team from Italy has found that just the expectation of being touched was enough to convince volunteers that they were about to experience stimulation from the rubber hand.

In the current study, 15 volunteers were asked to sit at a table similar to that described by the Princeton team back in 1999. Each sat with their own hand hidden from view. A rubber hand was placed on the table in front of them in the same orientation as their real hand. Then, the researchers moved as if to stoke the rubber hand, but stopped just before doing so. That was enough, the team reports, to cause the volunteers to feel as if their real hand was about to be stroked. The researchers confirmed what the volunteers' reports by attaching monitors to their hands to record skin conductance.

As part of the same study, the researchers replicated the first experiment but placed the rubber hand at a different orientation than that of the volunteers' real hand. They also tried placing a block of wood on the table instead of a hand. They found the volunteers did not respond to either of the objects as they did in the first study, indicating that the expectation of being touched only applies if the rubber hand is similar to their own and in a similar orientation.

The researchers say their study shows that earlier theories suggesting the rubber-hand illusion showed proof of a strong bond between vision and touch aren't quite correct. Instead, they claim, there appears to be an added sensory perception involved—that of expectation of being touched. Their results also might better explain, they add, the phantom hand phenomenon felt by people who lose limbs.

More information: The body beyond the body: expectation of a sensory event is enough to induce ownership over a fake hand, Published 26 June 2013 doi: 10.1098/rspb.2013.1140

Abstract
More than 100 papers have been published on the rubber hand illusion since its discovery 14 years ago. The illusion has been proposed as a demonstration that the body is distinguished from other objects by its participation in specific forms of intermodal perceptual correlation. Here, we radically challenge this view by claiming that perceptual correlation is not necessary to produce the experience of this body as mine. Each of 15 participants was seated with his/her right arm resting upon a table just below another smaller table. Thus, the real hand was hidden from the participant's view and a life-sized rubber model of a right hand was placed on the small table in front of the participant. The participant observed the experimenter's hand while approaching—without touching—the rubber hand. Phenomenology of the illusion was measured by means of skin conductance response and

questionnaire. Both measures indicated that participants experienced the illusion that the experimenter's hand was about to touch their hidden hand rather than the rubber hand, as if the latter replaced their own hand. This did not occur when the rubber hand was rotated by 180° or replaced by a piece of wood. This illusion indicates that our brain does not build a sense of self in a merely reactive way, via perceptual correlations; rather it generates predictions on what may or may not belong to itself.

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