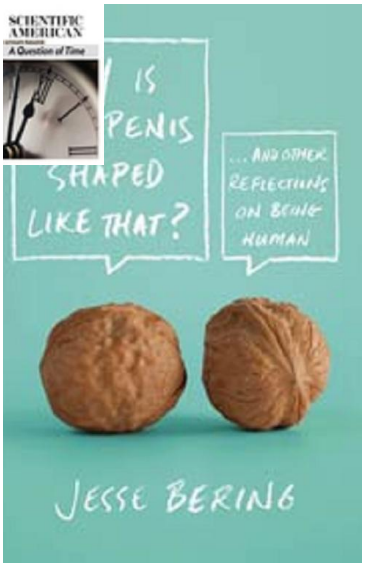
MIND

Can Another Body Be Seen as an Extension of Your Own?

Surprising results show the fluidity of the "body schema"

By Julie Sedivy on January 12, 2016



The relationship between a person's notion of self-hood and the openness of their body schema to another human being hints that perhaps it's no coincidence that tango, which takes entanglement to sublime heights, originated in a culture that orients toward interdependence.
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Among dance forms, tango holds a unique and potent allure. It showcases two individuals—each with a separate mind, body, and bundle of goals and intentions, moving at times in close embrace, at times stepping away from each other, improvising moves and flourishes while responding to the imaginative overtures of the other—who somehow manage to give the impression of two bodies answering to a single mind. For performers and viewers alike, much of tango's appeal comes from this apparent psychic fusion into a super-individual unit. Michael Kimmel, a social and cultural anthropologist who has researched the interpersonal dynamics of tango, writes that dancers "speak in awe of the way that individuality dissolves into a meditative unity for the three minutes that the dance lasts. Time and space give way to a unique moment of presence, of *flow* within and between partners."

Tango offers more than aesthetic bliss; like all artistic practices that demand great skill, it also presents a seductive scientific puzzle, highlighting the mind's potential to learn and re-shape itself in dramatic ways. But it's only very recently that scientists have started building a systematic framework to explain how a person might achieve the sort of fusion that is needed for activities like social dancing, and what the impact of such an interpersonal entanglement might be.

At the heart of the puzzle is the notion of a *body schema*—a mental representation of the physical self that allows us to navigate through space without smashing into things, to scratch our nose without inadvertently smacking it, and to know how far and how quickly to reach for a cup of coffee without knocking it over. We can do all these things because our brains have learned to identify the edges of

our bodies using information from multiple senses and devote exquisite attention to stimuli near our bodily boundaries.

As it turns out, the body schema is remarkably fluid. Scientists have had strong evidence for more than a decade now that it can easily incorporate objects that we interact with. For example, after using a tool for a period of time, people respond in a heightened way to visual stimuli near the end of that tool just as they would to stimuli near the edge of their hand—their brains have learned to treat the tool as an extension of their hand. Presumably, this is what gives us the feeling that, once we've learned to ski or play tennis, the skis or racquet no longer feel like foreign objects, but like parts of our bodies.

But can other *people* come to feel like extensions of our bodies just as objects can? In a recent paper, psychologist Tamer Soliman and his colleagues used the tool-based studies as inspiration to explore whether coordinating physical actions with other humans can lead us to integrate their bodies into our own body schema in much the same way that interacting with objects extends our perception of our physical boundaries.

To do this, the researchers had some of their participants use a tool rigged with two handles to jointly saw through candles with an experimenter; others performed the task solo, or simply watched the experimenter do it. Each group of participants then performed one of two tests intended to measure whether they had expanded their bodily boundaries to include the experimenter's sawing hand.

The first test was used to establish whether the participants would

show heightened perception for visual stimuli near their partner's hand if they had performed the task jointly—much as the tool-based studies showed heightened attention to stimuli at the edge of a tool that participants had used. Subjects felt a short burst of vibration either under their thumb or their index finger, and were told to use a foot pedal to indicate as quickly as possible which finger had been vibrated (toe for index, heel for thumb). However, just before the vibration, they also saw a light flash near either their own or the experimenter's thumb or index finger. Normally, flashing a light near a subject's *own* thumb slows down their detection of a vibration under their index, and vice versa, because the light stimulus near the hand is integrated with the vibrating sensation. The question was whether participants would show similar interference from the light flashed near the *experimenter's* hand. They did, but only if they had jointly performed the sawing action a while earlier.

The second test was designed to get at whether participants' actions—and not just their perceptions—would be affected by the actions of a partner with whom they'd previously coordinated movements. In this task, subjects had to draw a straight line while watching the experimenter draw an oval; their own lines became more curved if they had previously sawed candles jointly with the experimenter than if they had watched or performed the task alone.

Both of these tests showed that participants extended their body schemas to incorporate a partner's body part when it had been involved in a jointly coordinated activity. But not everyone was equally affected by the joint task. The researchers also had participants fill in questionnaires to measure the extent to which

they held an independent sense of self versus an interdependent one. An independent mindset, most common in the individualistic cultures of North America and western Europe, is revealed by "yes" responses to questions like "I enjoy being unique and different from others in many respects"; an interdependent mindset, more typical in Asian, African or Latin American cultures, yields "yes" responses to questions like "My happiness depends on the happiness of those around me." Subjects who had taken part in the joint sawing task were more likely to become physically entangled with their partner if they inclined toward an interdependent view. In other words, their personal philosophy of the self affected how readily they extended their bodily boundaries to include a partner.

The relationship between a person's notion of self-hood and the openness of their body schema to another human being hints that perhaps it's no coincidence that tango, which takes entanglement to sublime heights, originated in a culture that orients toward interdependence. It also raises an intriguing question: if emotional boundaries between the self and others can influence bodily perceptions and actions, can the reverse be true as well? There is already evidence for it: a recent study led by Paul Reddish found that asking people to move together to keep time to a beat—rather than having them move to separate beats, or even just do their own thing to the same beat—led to a more interdependent mindset and more cooperative behavior.

Many have argued that tango is not merely a dance form, but the embodiment and enactment of a relationship between two people; it has taken a while for the science to catch up with the art, but there is now a scientific framework within which this romantic notion can

thrive—and become more profoundly understood.

ABOUT THE AUTHOR(S)

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