Touch tracking bypasses mind control

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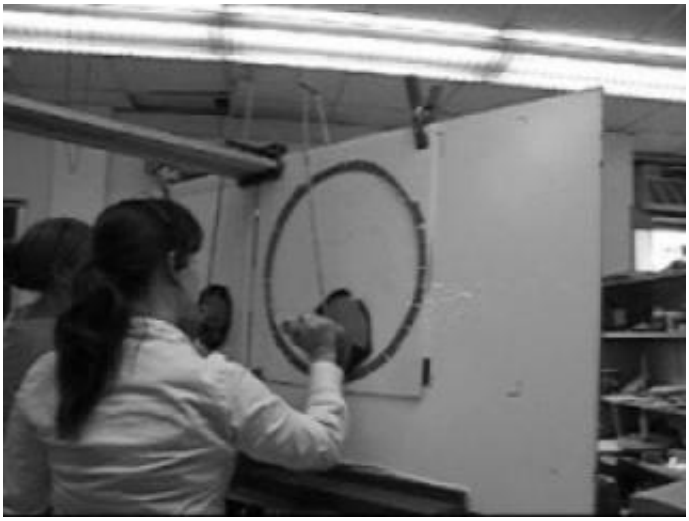

Researcher traces circle in haptic tracing experiment. Credit: David Rosenbaum, Penn State

For people unable to simultaneously rub their stomach while patting their head, a new twist may be at hand. Touch, rather than concentration, could let people multi-task with their hands, and this may also potentially help improve the performance of people with coordination problems, according to psychologists.

"Most normal people cannot simultaneously draw a circle with one hand and a square with the other," says David Rosenbaum, distinguished professor of psychology and director of Penn State's Laboratory For Cognition and Action. "It is a fundamental limitation that the nervous system seems to impose on the hands for reasons that are not fully

understood."

Rosenbaum thinks the key to the problem lies in the higher neural centers responsible for concentration on multiple tasks. "When you perform one task, you conceptualize it as one," he explains, "but when you have two tasks to do at the same time that you can't think of as one, it gets complicated because the mind has to shift attention back and forth from one task to the other."

Magnetic button used by subjects to perform haptic tracing experiment. Credit: David Rosenbaum, Penn State

To test this idea, Rosenbaum and his Penn State colleagues, Amanda Dawson, a recent Ph.D. recipient, and John Challis, associate professor of kinesiology, set up an experiment in which participants could track moving objects with light touch and without having to concentrate on the tracking.

Volunteer participants who kept their eyes closed during the experiment tried to keep their hands in contact with two moving disks. The

participants could independently trace the paths of the disks, even when the disks moved in ways that are normally very hard for people to produce on their own. For example, they could trace a square and a circle at the same time, which is normally impossible.

The disks were driven by moving magnets on the other size of an opaque pane of glass. "If the person exerted little more than a feather touch on the disks, the magnets decoupled and the experiment came to a stop. So the participants' hands were not simply being dragged along by the magnetic force on the disks," explains Rosenbaum, whose findings appear in the November/December issue of the Journal of Experimental Psychology.

Researchers say the test provides the strongest evidence yet that the reason most persons are unable to voluntarily multi-task with their two hands is that their mind gets in the way.

"We created a situation where each hand simply reacts to the motion of the object being felt, so in effect we bypassed the high-level cognitive system. The excellent performance displayed by our participants took no training whatsoever," added Rosenbaum. "Using haptics, we managed to get into the motor system through the backdoor."

Researchers say the findings could benefit people with coordination problems, and that haptic tracking might help such persons learn to better control their irregular hand movements.

Source: Penn State