Brain activity exposes those who break promises

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Scientists from the University of Zurich have discovered the physiological mechanisms in the brain that underlie broken promises. Patterns of brain activity even enable predicting whether someone will break a promise. The results of the study conducted by Dr. Thomas Baumgartner and Professor Ernst Fehr, both of the University of Zurich, and Professor Urs Fischbacher of the University of Konstanz, will be published in the journal *Neuron* on December 10, 2009.

The promise is one of the oldest human-specific behaviors promoting cooperation, trust, and partnership. Although promises are generally not legally binding, they form the basis for a great many everyday social and economic exchange situations. Promises, however, are not only kept, but also broken. Material incentives to deceive are in fact ubiquitous in human society, and promises can thus also be misused in any social or economic exchange scenario in order to cheat one's interaction partner. Business people, politicians, diplomats, attorneys, and private persons do not always behave honestly, as recent financial scandals have dramatically demonstrated.

Despite the ubiquity of promises in human life, we know very little about the brain physiological mechanisms underlying this phenomenon. In order to increase understanding in this area, neuroscientist Thomas Baumgartner (University of Zurich) and economists Ernst Fehr (University of Zurich) and Urs Fischbacher (University of Konstanz) carried out a social interaction experiment in a brain scanner where the breach of a promise led both to monetary benefits for the promise

breaker and to monetary costs for the interaction partner. The results of the study show that increased activity in areas of the brain playing an important role in processes of emotion and control accompany the breach of a promise. This pattern of brain activity suggests that breaking a promise triggers an emotional conflict in the promise breaker due to the suppression of an honest response.

Furthermore, the most important finding of the study enabled the researchers to show that "perfidious" patterns of brain activity even allow the prediction of future behavior. Indeed, experimental subjects who ultimately keep a promise and those who eventually break one act exactly the same at the time the promise is made - both swear to keep their word. Brain activity at this stage, however, often exposes the subsequent promise breakers.

Catching culprits

As neuroscientist Thomas Baumgartner elucidates, these findings indicate that brain activity measurements may already reveal malevolent intentions at a point in time prior to commitment of a dishonest or deceitful act. "Such a finding thus permits the speculation that the measurement of brain activity could be applied in the (distant) future not only to catch culprits, but even beyond this perhaps to aid in the prevention of fraudulent and criminal intrigues - a vision already made reality in the science fiction film 'Minority Report'."

"We've discovered critical elements of the neuronal basis of broken promises," economist Ernst Fehr explains. "In light of the significance of promises in everyday, interpersonal cohabitation in society, these findings offer the prospect of being able to fathom and better understand the brain physiological basis of pro-social and especially of antisocial behavior in general."

Source: University of Zurich