What Your Computer Mouse Movements Might Reveal About You

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New research out of the Eller College of Management finds that if you're lying, your computer mouse-cursor movements might let others know.

Eller professor of management information systems Joe Valacich [1] and his co-authors, Jeffrey Jenkins at Brigham Young University, Jeff Proudfoot at Bentley University, G. Mark Grimes at the University of Houston and Jay Nunamaker [2], Regents' Professor of Management Information Systems at the Eller College, found that mouse-cursor movements can significantly differentiate between people concealing information and people telling the truth.

Their experiment involved 66 participants, half of whom were randomly assigned to commit a mock theft; the other half were asked to perform a benign activity, according to the forthcoming paper.

The mock theft involved going to the MIS department's front office and picking up an envelope. These "guilty" participants were then told to enter the elevator on the first floor, take it to the fourth floor, and only then open the envelope and read the instructions inside.

The instructions led them to a computer in the MIS office, and told them to avoid raising suspicion and speak only if spoken to. If asked what they were doing, participants were told to lie and say they were teaching assistants in need of a file from the computer.

Participants logged into the computer, using the credentials in the instructions, and then had to open a file on the desktop labeled "department credit card numbers." Participants then copied the file to a provided flash drive, logged off the computer and delivered the flash drive to a room on the first floor.

"Truthful" participants were instructed to go to the fourth floor to retrieve a piece of paper containing a news article and then return the paper to the same room on the first floor.

All participants were then notified by an experiment facilitator that a theft had occurred and that they were a suspect. They then were asked to complete a specialized screening questionnaire called a concealed information test—a polygraph-based questioning technique that also has been used in eye tracking and postural rigidity.

The questionnaire included two types of questions: baseline questions, which asked about the theft of nonrelevant items, such as passwords, health records and encryption codes, and key questions, which asked about the theft of credit card numbers.

The researchers found that the response activation time for people concealing information
was slower on key questions than on baseline questions.

"In our experiment, we presented stimuli on a computer screen and had people answer each question using a computer mouse," Valacich says. "Respondents were required to move the mouse from the bottom middle of the screen to one of the two upper corners of the screen, each of which contained a possible answer. People concealing information were consistently more biased toward the opposite answer."

In other words, mouse trajectories of guilty participants showed greater attraction toward the opposite response on key questions than on baseline questions or than the mouse trajectories of truthful people. Further, people concealing information moved the mouse more slowly while responding to key questions, compared with responses to baseline questions or compared with truthful people.

Mouse-cursor movements can be monitored online in people's natural environments without any specialized hardware or software installed on their computers, which means there is potential for mass deployment.

"People who conceal information about adverse behaviors in organizations present a significant danger to both the private and public sectors, and the detection of concealed information is traditionally a difficult, expensive, error-prone and time-consuming task," Valacich says. "This system can be deployed easily through links in an email and embeds on a website, and data analysis can be computed in under a second."

Companies can use this type of approach to screen individuals for concealed information and trigger follow-up evaluations as needed or to further screen individuals who are already flagged as potential threats by existing systems, thereby decreasing the number of false positives that may be found through electrodermal activity — which is the measurement of an individual's emotional responses via electrical conductivity of the skin.

The research will be published in the Journal of the Association for Information Systems under the title "Sleight of Hand: Identifying Concealed Information by Monitoring Mouse-Cursor Movements."

A version of this article originally appeared on the Eller College of Management website.

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