Carnegie Mellon, Pitt Team to study psychosocial stress

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The eWatch, developed by Carnegie Mellon University, periodically will ask wearers questions about stress in a federally funded study to evaluate new ways of measuring psychosocial stress. Credit: Carnegie Mellon University

Researchers from Carnegie Mellon University and the University of Pittsburgh, led by Pitt Psychology Professor Thomas Kamarck, are studying the effectiveness of a wrist-mounted instrument for measuring psychosocial stress exposure during the course of daily life.

Kamarck and his colleagues have received a $426,000 grant from the National Institutes of Health (NIH) for the first year of their four-year project, which is part of a larger NIH initiative to study environmental factors that people encounter every day that may increase their risk of certain diseases.

The study will make use of the eWatch, a multisensor package about the size of a large wristwatch that has been developed by Daniel Siewiorek, director of the Human-Computer Interaction Institute in Carnegie Mellon's School of Computer Science, and Asim Smailagic, research professor in Carnegie Mellon's College of Engineering. Both are co-investigators in the new study.

Previous studies have determined that people who report highly stressful lifestyles may develop higher rates of a variety of illnesses, ranging from viral infection to heart disease, but measuring exposure to stress is problematic.

However, Kamarck says traditional methods of measuring life stress don't quantify the duration or intensity of exposure effectively. For example, "a husband and wife may react to the death of the same relative very differently," he said. "Furthermore, stress is an ongoing fluctuating process. At what point does a stressor begin or end?"

In the new study, Kamarck will outfit each participant with an eWatch, which can sense sound, motion, ambient light, skin temperature and other factors that provide clues about the wearer's location, health status and current activity. Every 45 minutes over the course of five days, the eWatch will prompt wearers to take part in a 2-to-3-minute interview. The instrument will record their response to questions about their current activities, such as "Working hard?" and "Working fast?" By the end of the study, several hundred people will have tested the eWatch.

Previous research has shown that responses to such interviews help predict who will show higher rates of plaque development in the arteries, a risk factor for heart attack or stroke. Using interviews in real time allows researchers to quantify how stressors affect one's daily life, as well as to pinpoint when these effects begin and when they end.

Use of the eWatch technology should assist researchers in finding the optimal method for responding to such interviews during daily activities, whether by pressing a button, moving the wrist or speaking into a wireless ear bug device. Environmental data collected by the eWatch also may assist the researchers in characterizing the types of environments people find most stressful, so that their location, such as home or work, may be recorded automatically.

“We want to capture a slice of life in people’s daily routine,” says Kamarck. “We hope that these new tools will allow us to do so while minimizing disruptions imposed by the act of measurement.”

First developed in 2004 as a class project at Carnegie Mellon, the eWatch has been the subject of a number of studies in which it has shown itself capable of monitoring behaviors and conditions.

“This new study is important in eWatch’s development because it requires that we simplify the device’s operation,” Siewiorek said. “The eWatch must be simple enough to be used by anyone who wears it, even those who are not technically savvy. And we need to develop manuals and written procedures that will make it possible for other research groups to use it to gather data for their own studies.”

Source: Carnegie Mellon University