Human cognitive performance suffers following natural disasters, researchers find

10 February 2012

Not surprisingly, victims of a natural disaster can experience stress and anxiety, but a new study indicates that it might also cause them to make more errors - some serious - in their daily lives. In their upcoming *Human Factors* article, "Earthquakes on the Mind: Implications of Disasters for Human Performance," researchers William S. Helton and James Head from the University of Canterbury explore how cognitive performance can decline after earthquakes and other natural disasters.

Past research has indicated that more traffic accidents and accident-related fatalities occur following human-made disasters such as the September 11, 2001, terrorist attacks, due to increased cognitive impairment that can lead to higher stress levels and an increase in intrusive thoughts. However, no research has been conducted on the effects of natural disasters on cognitive performance. The authors were unexpectedly presented with a unique opportunity to investigate the impact of the devastating 2010 earthquake in Christchurch, New Zealand, with participants in a study on human performance they were conducting at the time of the quake.

"We were conducting a [different] study on human performance requiring two sessions," said Helton. "In the midst of the study, between the two sessions, we had a substantial local earthquake, which resulted in the rare opportunity to do a before/after study. We were quick to seize the opportunity."

The researchers measured participants' cognitive control by asking them to either press a button corresponding to numbers presented on a video screen or to withhold a response to a preselected number presented on the same screen. Normally, participant performance would improve during the second session, but the authors found an increase in errors of omission following the earthquake.

Helton and Head also noted distinct differences in pre- and post-earthquake findings depending on self-reported responses to the disaster: If the participants reported being anxious following the quake, their response times sped up and they made more errors of commission, whereas those who reported depression logged slower response times.

"The article provides evidence for a phenomenon many people report experiencing after a major event like an earthquake," said Helton. "People would find themselves zoning out and making more errors than usual after the quake."

Future research is needed to explore this phenomenon further, but the researchers' findings may point to potentially serious complications arising from postdisaster performance in daily life and work tasks. These findings also suggest that police, emergency responders, and others working in the aftermath of the disaster may also experience cognitive disruption, which can interfere with their ability to perform rescue-related tasks.

"Presumably people are under increased cognitive load after a major disaster," Helton continued. "Processing a disaster during tasks is perhaps similar to dual-tasking, like driving and having a cell phone conversation at the same time, and this can have consequences."

Provided by Human Factors and Ergonomics Society