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What We Have Learned About Experience, Time Pressure, and Difficult Tradeoffs from Experiments with Firefighters in Virtual Reality

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What We Have Learned About Experience, Time Pressure, and Difficult Tradeoffs from Experiments with Firefighters in Virtual Reality

Abstract

In general, attendees will learn that experience does not guarantee faster and more accurate decisions. Furthermore, experienced firefighters demonstrated higher level of threat-related stress than inexperienced firefighters.

Disciplines

Agriculture | Bioresource and Agricultural Engineering | Operational Research

Comments

The abstract, "What We Have Learned About Experience, Time Pressure, and Difficult Tradeoffs from Experiments with Firefighters in Virtual Reality" (Nir Keren), as published in the Proceedings of the ATMAE 2012 Conference (2012 ATMAE Annual Conference, Nashville, TN, November 14–17, 2013) is a copyrighted publication of ATMAE, the Association of Technology, Management, and Applied Engineering, 1390 Eisenhower Place, Ann Arbor, MI 48108. This paper has been republished with the authorization of ATMAE, and may be accessed directly from the ATMAE website at <http://atmae.org/index.php/conference-20#pastconfpaper>.

Safety

What We Have Learned About Experience, Time Pressure, and Difficult Tradeoffs from Experiments with Firefighters in Virtual Reality

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Need: Firefighting is a high-risk environment and optimal fire ground decisions are vital to successful front line fire response. Though the number of structure fires continues to decline and steps have been taken to dramatically increase safety, the fire service has been unsuccessful in eliminating the hundreds of firefighter fatalities occurring every decade on the fire ground. Emphasizing the critical concern over firefighter injuries and fatalities, researchers have suggested that firefighters can keep themselves out of harm's way by *making good decisions*. Enhancing decision-making skills in firefighters, especially in the stressful environment of the fire ground, is critical to breaking this chain.

Overview: The effects of stress on decision-making strategies have not been well documented. Several theories have been proposed to explain how these decisions are made. However, due to the lack of technology, these often fail to address the interaction between stress and decision making in the dynamics of real-time naturalistic conditions. The objectives of this study were to identify the relationships among firefighter experience and decision-making processes, and to determine the relationship between acute stress and these processes in firefighters. Utilizing the highest resolution computerized virtual reality system in the world, firefighters were exposed to life-like scenarios varying in the stressors of time pressure and tradeoff values. Decision-making processes and final decision choice were assessed in real-time, and physiological indicators were used to characterize participant's stress state.

Major Points:

- Comparison between expert and novice performance in decision making process
- Association of physiological stress response to firefighter decision strategies
- Cue identification training needed for expert decision making
- The "tribal learning" process where inexperienced firefighters are learning from experienced firefighters may not be adequate for enhancing decision making skills

Summary: In general, attendees will learn that experience does not guarantee faster and more accurate decisions. Furthermore, experienced firefighters demonstrated higher level of threat-related stress than inexperienced firefighters.