COGNITIVE THEORY AND MODEL OF ANTICIPATORY THINKING

PROJECT DESCRIPTION: Surprises or unanticipated events increase the chance of accidents or disasters in dynamic environments as there is limited time to regain situation awareness and decide on a new course of action. Anticipating potential future problems by thinking “what if this happens” and having a contingency plan to handle them can reduce surprises; however, little is known about how and when humans engage in this anticipatory thinking (AT) or what makes it successful. Related work with the concept of understanding, models of sensemaking and situation awareness, and research with expert decision making provides some theoretical guidance. However, there is no standard conceptual model of AT, no clearly defined cognitive mechanisms, and no established method for measurement. This research project aims to address these gaps and improve understanding of AT by: 1) clearly defining underlying cognitive mechanisms, 2) developing and refining a conceptual model, 3) deriving AT measurements, and 4) using experimental data to establish and validate the conceptual model and measurements, and lay the foundation for building a more complete cognitive theory of AT. The selected Repperger intern will do a literature review, analyze data, and learn about ACT-R, a software-based cognitive architecture used for specifying models and theories of human cognition and performance.

ACADEMIC LEVEL: Masters, PhD

DISCIPLINE NEEDED:
- Cognitive Science or Psychology
- Human Factors
- Industrial-Organizational Psychology

RESEARCH LOCATION: Wright-Patterson AFB Dayton, OH

RESEARCH ADVISER: Alexander Hough, PhD
Human Factors/Industrial-Organizational Psychology, Wright State University, 2021

Dr. Hough is a Research Psychologist in the 711th Human Performance Wing, Warfighter Interactions & Readiness Research Division, Cognitive Models Branch. His educational background is in decision making, reasoning, coordination within game theory, and cognitive modeling. He has published work related to how humans coordinate over time, understanding in humans and machines, and the identification of strategy use and detection of strategy switching in decision making and categorization tasks. He is leveraging this work to build an empirical foundation for a cognitive theory and model of anticipatory thinking. Photo courtesy the U.S. Air Force Research Laboratory.