UNIVERSITY OF CENTRAL FLORIDA

Post-Participation Explanation

For the study entitled:
"Flight Procedures & Episodic Memory I"

Thank you for participating in our research study. We greatly appreciate your contribution. As a reminder, one goal of participating in a research study is to understand how empirical research in psychology is conducted as part of the Immersive Research Experience. The best way to learn about psychological research is to experience it first-hand, and your involvement has contributed to both your learning and the advancement of psychological science.

The purpose of the study was to advance our understanding of how pilots may acquire the knowledge and skills to perform procedures during flight operations. Specifically, we sought to investigate the effects of two independent variables (IVs)—*immersion* and *episodic facilitation*—on different aspects of memory. These two IVs have been identified as factors in the effectiveness of a given training system.

- Immersion is as an objective property of a technology system (i.e., a "system factor"), defined as the extent to which the system provides an inclusive, extensive, surrounding, and vivid illusion of reality to users' senses (Slater & Wilbur, 1997). Immersion was operationalized in our study in the use of the desktop computer & monitor system (lower immersion) versus the use of a virtual reality (VR) system (higher immersion), for the task simulation.

- Episodic facilitation is an instructional approach (i.e., a "instructional factor"), which applies instructional design principles in alignment with the properties of the episodic memory system (Sonnenfeld et al., 2023). Episodic facilitation was operationalized in our study in the use of one of two advanced organizers (AOs) before instruction—a checklist of steps to be performed (not used) versus a narrative of a pilot conducting the task (used).

The task of interest to this study was exterior preflight inspection, which is a check conducted by a pilot to ensure the airworthiness of aircraft systems and components before flight. A task simulation was used to provide (1) a tutorial of controls, (2) instruction on the task, and (3) a performance assessment.

We collected data on dependent variables (DVs) related to different aspects of memory formation. Declarative memory, of facts and concepts related to the task, was assessed through knowledge test score gains (pre-test vs. post-test). Procedural memory, of how to perform the task, was assessed as a function of performance accuracy, efficiency, and precision in the simulation. Episodic memory, of events and spatial-temporal relationships involved in the task, was assessed using a combination of free-recall, matching, and mapping tasks. By conducting this study in two parts, we sought to collect both short-term learning and long-term retention data for each of these DVs.

A series of other measures were administered to account for the effects of individual differences (e.g., personality, prior experience), process factors (e.g., simulation sickness, presence), and other training outcomes (e.g., satisfaction, self-efficacy).We expect that the use of immersion will positively impact on procedural and episodic memory, but negatively impact declarative memory, and that episodic facilitation will solely improve episodic memory. Furthermore, we expect episodic memory to have a stronger correlation with performance than declarative memory.

If you have any questions or want to learn more about this topic, please contact the principal investigator, Nathan Sonnenfeld, PhD student, by email: Nathan.Sonnenfeld@ucf.edu. You may also reach out to the advisor, Dr. Florian Jentsch, Professor, Department of Philosophy Chair, Team Performance Laboratory, Institute for Simulation & Training, University of Central Florida, by email: Florian.Jentsch@ucf.edu.

Thank you again for your valuable participation.