

SYMPOSIUM OVERVIEW

INTERRUPTIONS, DISTRACTIONS, AND ATTENTION MANAGEMENT: A MULTI-FACETED PROBLEM FOR HUMAN FACTORS

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Interruptions and distractions are a serious problem for many tasks, from programming a device to forming a battle plan, and from driving a car to monitoring airspaces. Interruptions and distractions can interfere with short term memory in planning and executing plans, and they can divert attention and reduce processing capacities for the detection and interpretation of significant events in dynamic situations. Attention management across tasks, and even within complex tasks, is a multi-faceted cognitive, perceptual, and social problem for users and display designers alike. The key to improving attention management is understanding the human, task, and environment issues and designing technologies that dovetail with and exploit that understanding. The research presentations in this session delve into several different facets of attention management and interruption. They analyze the issues, develop design principles, and evaluate alternative interface designs.

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One way to decompose the problems is to consider the timeline of an interruption or distraction: before, during, and after. Issues involved prior to an interruption include the structure and dynamics of the primary task, methods of alerting or signaling the user about events arising in the secondary task with regard to the mental resources required to process them, and when and how to schedule or prepare for interrupts, if possible, in order to minimizing disruption to the primary task. Issues involved during the interruption include the nature of the secondary task and its disruptive effects on resources devoted to continued processing of, or retaining memory for, the primary task. Issues involved following the interruption include any resumption lag in returning to the primary task, retrieving goals and states in the primary task, regaining situation awareness, and determining what might have changed in the primary task during the interruption. For all stages, there are numerous interface design issues for managing attention and maximizing performance on both primary and secondary tasks. The key to improving attention management is understanding the human, task, and environment issues and designing technologies that dovetail with and exploit that understanding.

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Wickens, Dixon, and Seppelt delve into the issues surrounding distractions and the degree and kinds of resources taken away from the primary task in order to address them. What resources are required of the interruption? How does the distraction impact the primary task, and vice versa, and for how long? What are the important design parameters of modality, representation, and physical layout that can exacerbate or ameliorate those impacts?

Trafton, Altmann, and Brock delve into the issues surrounding the problem of how to return from an interruption and resume the primary task where one left off. What can be done to prepare or schedule an interruption? What happens to the representation of the primary task during the interruption? How can it be retrieved or re-invoked efficiently? What are the cognitive mechanisms, and what design principles exploit them?

St. John, Smallman, and Manes delve into the issues surrounding the detection of significant events in dynamic situations. How do attentional limitations that manifest as change blindness and inattention blindness interfere with event detection, and how are these problems exacerbated by distractions and interruptions? What can be done to facilitate situation awareness recovery following an interruption? What role should automated event detection play, and what new issues and design principles arise from this solution path? Are there classes of design that work better or worse?

Sarter delves into the issues surrounding interruption handling and alerting. How do interruptions differ in their urgency, priority, and content, and how should this information be conveyed to the user? What resources are required to understand an alert signal and evaluate its priority? Can alert signals be designed to minimize distractions, and what modalities and representations can be exploited to implement this objective?