

# Sleep loss and complex team performance

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*Jeff Whitmore, Scott Chaiken, Joseph Fischer, Richard Harrison,  
& Donald Harville  
Air Force Research Laboratory, Texas  
USA*

## **Abstract**

There are few objective assessments of the impact of sleep loss on team performance. The present study was designed to quantify the effects of fatigue on teams performing a complex task and to compare team data with individual data on a similar task. Participants were trained on a complex air battle management task (both in individual and team mode) for one week and then experienced a 36-hr period of sustained wakefulness. Forty-minute scenarios (individual and team) were iteratively completed throughout each experimental period alongside traditional cognitive performance tasks (e.g., simple math processing). Individual data showed the well-established performance reduction resulting from sleep loss and circadian variation at both the simple and complex task levels. Significant decrements were seen for both process measures (e.g., information gathering) and outcome measures (e.g., number of targets attacked) after sleep-loss on the complex task. In contrast, team scores on similar measures after sleep loss, did not degrade, and in some cases showed improvements relative to baseline (indicating a continuing team building process). Individual performance (both simple and complex) was significantly degraded during the early morning hours. Team data did not show the expected performance decrements.

## **Introduction**

Fatigue, due to both sleep loss and circadian variation, and the resultant subjective and performance effects, have been extensively documented at the individual level. For a review, including the impact of fatigue upon decision-making see Harrison & Horne, 2000. However, very few studies have reported objective data regarding the effects of fatigue upon aspects of team performance. The research presented in this paper was designed to address the issue of fatigue on teams by examining complex team performance (using command and control simulations based upon demanding USAF operational tasks) in a sustained operations laboratory environment using USAF military personnel as research participants.

Teams may be defined as, "two or more individuals working toward a common goal in an interdependent fashion" (Salas, Dickinson, Converse, & Tannenbaum, 1992). Teams of individuals perform tasks ranging from the esoteric (e.g., battle management) to the every-day (e.g., administrative functions in offices). Many of

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