

38. SWACSM Abstract

Obstacle Negotiation Gaze Strategies Of The Physically Fatigued

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ABSTRACT

Proper obstacle negotiation while in a fatigued state is a safety concern for first responders, firefighters and other primary relief personnel in their high-risk line of work. During locomotion the central gaze is focused beyond the obstacle to plan future steps while the peripheral vision spatially tracks the obstacle. Previous work indicates that following intense exercise people experience a narrowed peripheral visual field, making them more reliant on central gaze. Thus, it is possible that when physically-fatigued people become more reliant on central gaze to perceive obstacles, leaving them unable to plan future steps as effectively.

PURPOSE: This study further explored the relationship between fatiguing exercise and narrowing field of peripheral vision and increased reliance on central gaze when navigating obstacles that suddenly appeared in a walker's path. **METHODS:** Twenty-one healthy, young subjects completed a total of ten trials. The first five were completed while in a rested state. Then participants immediately followed a fatiguing aerobic protocol prior to completing the last five trials. All trials consisted of the participant navigating a dark laboratory where a light would illuminate an obstacle as they approached it to test their ability to avoid bodily collision. Pupillary movement was tracked and quantified in both conditions by wearable eye-tracking glasses. Further, the obstacle was marked as an area of interest (AOI) which illustrated the direction of participants' gaze towards the obstacle. **RESULTS:** Participants in a fatigued state exhibited significantly increased reliance on the use of central gaze when encountering the obstacle. This in turn resulted in a suboptimal gaze strategy where narrower vision was used to perceive a larger area as confirmed by the increased angular displacement of their central gaze. The time to first fixation and visual reaction time were not affected. **CONCLUSION:** Worker safety and effectiveness is important in physically laborious careers during emergency situations as slipshod navigation predisposes an individual to sustaining bodily injury. The role of vision is inextricably linked to efficient obstacle navigation. Understanding this relationship may inform the development of training protocols to enhance peripheral vision and gaze strategies.