THE EFFECTS OF EXTERNAL STRESSORS ON CONSTRUCTION WORKERS' SAFETY PERFORMANCE

Abstract

The construction industry is among the most hazardous sectors, accounting for 60,000 fatal injuries annually and 1,000 to 200,000 non-fatal injuries daily, causing up to $6 billion in productivity and wage losses. Given the dynamic and complex nature of the construction industry, remaining situationally aware of the surrounding environment is crucial for worker safety. Situational awareness (SA) has also been identified as one of the antecedents of human error in accident occurrence. SA includes three different levels, namely, identifying events that are happening within the surrounding environment (i.e., level 1), understanding their meaning (i.e., level 2), and projecting their consequences in the future (i.e., level 3). Situational awareness is the prerequisite for decision-making, so an adequate SA reduces human errors, leading to safer decisions.

Working within one of the most stressful industries, construction workers face intensive stress loads that adversely affect their safety and productivity. These high-risk situations expose workers to various mental and physical stressors that can lead to severe injuries and even death. Specifically, several external factors such as task, environmental, and social stressors might impact different levels of SA and increase human errors. Specifically, construction workers are often subject to performing multiple tasks within a limited time due to being behind the project schedule; that can put them under time pressure and productivity demand (i.e., task stressors). Further, construction workers are more likely to experience heat stress (i.e., environmental stressors) as they mostly require working under arduous outdoor weather conditions. Another potential stressor can be the social influence of a risky peer, also regarded as the peer effect, which can highly influence various levels of SA. Such diverse factors can impair individuals' hazard identification (level 1 of SA), perception of potential risks (level 2 of SA), and projection of associated adverse consequences (level 3 of SA), leading to increases in human errors and unsafe behaviors. While the negative impact of stressors on job sites has been discussed in the literature for many years, the potential effects of stressors on workers' risk decision-making and rational judgments are rarely empirically investigated within the construction domain.

In addition, previous researchers found that adding safety protections—as the main suggested solution to reduce the number of accidents—can reduce workers' SA by influencing their cost-benefit analysis when engaging in high-risk activities. Specifically, individuals may alter their behaviors based on the costs and benefits they perceive with the activity called "risk compensation". Specifically, risk compensation cognitive bias adversely impacts individuals' risk perception (level 2 of SA), causing them to incorrectly estimate the level of potential risks as lower than the actual risks, which can lead to greater risk-taking behaviors. While these studies investigated the adverse effects of the risk compensation phenomenon in increasing workers' unsafe behaviors at the individual level, there is a paucity of research to assess the impact of the external factors (e.g., task-related, environmental and social stressors) on such destructive compensatory phenomenon and workers' situational awareness.

To address these gaps, the overall goal of this doctoral research is to *examine the theoretical foundations and empirical evidence of changes in workers' decision dynamic in the construction industry when exposed to task-related (e.g., productivity pressure and mental demand), environmental (e.g., heat stress) and social (e.g., peer pressure) stressors*.