

WHY SOCIAL SCIENCE ?

Because It Can Help Us Maintain Safer Workplaces

January 31, 2023

By Jesus M. de la Garza, Ph.D. (Clemson University), E. Scott Geller, Ph.D. (Virginia Tech), and Sogand Hasanzadeh, Ph.D. (Purdue University)

This article was republished with permission from [The Conversation](#). Read the original article [here](#).

Interventions designed to keep people safe can have hidden side effects. With an increased perception of safety, some people are more likely to take risks.

For example, some vehicle drivers [take more risks when they are buckled up](#) in a shoulder-and-lap belt. [Some construction workers step closer to the edge](#) of the roof because they are hooked to a fall-protection rope. Some parents of young children [take less care with medicine bottles](#) that are “childproof” and thus difficult to open.

Techniques designed to reduce harm can promote a false sense of security and increase risky behavior and unintentional injuries.

As [civil engineers](#) and [applied behavioral scientists](#), we are interested in ways to improve workplace safety. Our ongoing research suggests that employers need to do more than provide injury-protection devices and mandate safety rules and procedures to follow. Job-site mottos like “safety is our priority” are not enough. Employers need to consider the crucial human dynamic that can counteract their desired injury-prevention effects – and tap into strategies that might get around this safety paradox.

“Techniques designed to reduce harm can promote a false sense of security and increase risky behavior and unintentional injuries.”

Why precautions can trigger more risks

A well-established psychological phenomenon known as [risk compensation](#) or [risk homeostasis](#) explains this safety paradox. An intervention designed to prevent or reduce unintentional injury decreases one’s perception of risk. Then that perception increases the person’s risk-taking behavior, especially when taking a risk has a benefit, such as comfort, convenience or getting a job done faster.

Just as thermostats have a set point and activate when the temperature deviates from normal, people maintain a target level of risk by adjusting their behavior. They balance potential risks and perceived benefits.

For instance, a driver may compensate for safety interventions like a vehicle shoulder-and-lap belt, an energy-absorbing steering column and an airbag by driving faster – trading off personal safety for time saved. The heightened odds of a crash at higher driving speeds don’t affect only the driver; they also put other vehicles, pedestrians and cyclists at more risk. An individual’s risk compensation can influence the injury-prevention impact of protective devices and safety-related rules and regulations for the population overall.

In our own research, we investigated the risk compensation phenomenon among construction workers using an immersive mixed-virtual reality scenario that simulated a roofing task. We asked participants to install asphalt shingles on a real 27-degree sloped roof within a virtual environment that conveyed the sense of being 20 feet off the ground. Then we monitored the workers’ actions and physiological responses while they completed roofing tasks under three levels of safety protection.

WHY SOCIAL SCIENCE?

As expected, more safety interventions created a false sense of invulnerability in participants. Adding guardrails to the roof's edge and providing a fall-arrest system for the roofer provided real protection and rightfully increased a sense of security, which resulted in participants' stepping closer to the edge of the virtual roof, leaning over the edge, and spending more time exposing themselves to the risk of falling. Participants [increased their risk-taking behavior by as much as 55%](#). This study provided empirical evidence that safety devices can implicitly encourage workers to take more risks.

One hypothesis that flows from our research is that educating people about the risk compensation effect could reduce their vulnerability to this phenomenon. Future studies are needed to test this possibility.

A perception of choice matters

A crucial consideration is whether people feel the decision to take precautions is their own.

In studies one of us conducted with a colleague, pizza-delivery drivers demonstrated [safer driving overall when they chose to increase particular safe-driving behaviors](#). For instance, drivers at one store participated in setting a goal to stop completely at intersections at least 80% of the time, while at another store management assigned drivers the 80% complete stopping goal. Drivers from both groups met that goal. But among the drivers who self-selected the target, there was a spillover effect: They increased their use of turn signals and lap-and-shoulder belts.

[A study early in the COVID-19 pandemic](#) identified a similar spillover or response generalization effect. People who wore a face mask outdoors where mask wearing was not mandated also maintained a greater interpersonal distance from others than did people without masks.

In this case, as with the delivery drivers, one safe behavior spilled over to another safe behavior – the opposite of risk compensation – when people had the perception of personal choice. We believe perceived choice was the critical human dynamic that influenced people to generalize their safety behavior rather than compensate for the reduction in risk.

“...one safe behavior spilled over into another safe behavior—the opposite of risk compensation—when people had the perception of personal choice.”

Top-down rules and regulations can [stifle a perception of choice](#) and actually motivate people to intentionally do things that flout a safety mandate in order to [assert their individual freedom or personal choice](#). People tend to bridle against the feeling of having a freedom taken away and will do what they can to regain it.

“Click It or Ticket” and other management attempts to dictate safety come with disadvantages that might negate any safety gains. Letting people feel they have a say in the matter can decrease the amount of risk compensation they experience and increase a safety spillover effect.

Jesús M. de la Garza, Ph.D., is the Director of the School of Civil and Environmental Engineering and Earth Sciences at Clemson University. Prior to this appointment, he was the Chair of the Glenn Department of Civil Engineering at Clemson University. Prior to his Clemson appointments, he was the holder of the Vecellio Endowed Professorship in Construction Engineering and Management at Virginia Tech. Dr. de la Garza has been inducted into the National Academy of Construction. He has received the Faculty of the Year award from the ASCE's student chapter, ASCE's 2011 Peurifoy Construction Research Award, ASCE's Thomas Fitch Rowland Prize, and ASCE's Richard R. Torrens Award. In 2014 he was elected to the grade of Distinguished Member of ASCE and in 2021 he received the ASCE Outstanding Projects And Leaders (OPAL) Award.

E. Scott Geller, Ph.D., Alumni Distinguished Professor, just completed his 50th year as a teacher and researcher in the Department of Psychology at Virginia Tech, and Director of the Center for Applied Behavior Systems. Dr. Geller is also a co-founder and Senior Partner of Safety Performance Solutions, Inc. He is a Fellow of the American Psychological Association, the Association for Psychological Science, the Association of Behavior Analysis International, and the World Academy of Productivity and Quality Sciences. He is past Editor of the Journal of Applied Behavior Analysis (1989-1992) and Associate Editor of Environment and Behavior (1982-2017), and current Consulting Editor for Behavior and Social Issues, the Journal of Organizational Behavior Management, and the Journal of Safety Research.

Sogand Hasanzadeh, Ph.D., is an Assistant Professor of Civil Engineering at Purdue University. Her interdisciplinary research topics lie at the intersection of civil engineering, cognitive psychology, and computer science aiming to explore several aspects of technology and applied science, and to suggest engineering solutions and behavioral interventions in response to the current and future challenges in the community and complex projects.



@COSSADC • #WhySocialScience

www.whysocialscience.com • www.cossa.org