

Modeling Erosion of Security and Safety Awareness

By

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Extended abstract

Human factors – “human failure” – is implicated in 80-90% of security and safety problems. “Security” concerns guarding confidentiality, integrity and availability of data. “Safety” is concerned with the aspect of prevention of disease, hurt, injury, or loss, mainly in the frame of risks from organizational accidents.

Although the role of malicious agents is much more prevalent in the case of security, one key aspect of human failure – maybe the key one –, viz. vulnerability due to gradual erosion of standards, is common to security and safety issues.

The causative space of safety and security problems is very rich. (Reason 1990, 1997; Schneier 2000; Anderson 2001) Among the human-related factors that might impair safety or security are throughput pressure; the shrinkage of allowable action as it often occurs over the history of a given system; “behavioral economics”; etc. However, a mechanism based on behavioral regulation theory of instrumental conditioning and risk misperception, analogous to the one presented in a parallel paper for the erosion of safe sex practices, (Gonzalez 2002) should be considered a “minimum” explanation for the general case of erosion of safety or security standards. Indeed, such hypothesis would conform to basic facts of human character (propensity to misperceive risk, biological roots of instrumental conditioning) and the proposed mechanism would always be operative, whereas other proposed causes might be absent due to particular circumstances (e.g. no throughput pressure).

We develop a simple generic model for the erosion of safety or security standards based on the behavioral regulation theory of instrumental conditioning and on risk misperception. We show that model is able to render expected reference behavior.

To counteract the erosion of safety and security we propose policies in accordance with the behavioral regulation theory of instrumental conditioning mediated by risk perception, viz. educational programs to improve risk perception and ‘social proof’. (Cialdini 1993)

For details about the simulation model, cf. the parallel paper. (Gonzalez 2002) There we model the erosion of safe sex practices for people at risk of contracting HIV-infection through frequent change of sex partners in a high-risk group. The parallel paper contains also a section on issues on safety and security.

References

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