Homeostatic regulation of risk-taking behaviour, or why many safety campaigns fail
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Published in:
Journal of Behavioral Decision Making

IMPORTANT NOTE: You are advised to consult the publisher’s version (publisher’s PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
1997

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):

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Book Review

Homeostatic regulation of risk-taking behaviour, or why many safety campaigns fail


Review by Laurie Hendrickx, Center for Energy and Environmental Studies, University of Groningen, The Netherlands

A provocative theory, a wide variety of evidence, some interesting anecdotes, and a colourful writing style; with these main ingredients, Gerald Wilde has composed a book that entertains the reader, but also presents him or her with a comprehensive theory about the psychological processes that underly risky behaviour. Risk Homeostasis Theory (RHT), the origins of which date back to the late 1960s, was inspired by findings in the field of traffic safety. Most of the data presented in the book pertain to traffic safety, but the scope of RHT is much wider. In principle, RHT applies to all activities in which people are exposed to risks over which they have some form of behavioural control. Examples are accident-prone self-paced tasks like car driving or skiing, hazardous occupational activities, and health-related habits or life-styles, such as smoking.

The key idea in RHT is that when people are, say, driving a car, they will behave in such a way that the 'perceived level of risk' remains equal or acceptably close to some optimal or 'target' level of risk. The first factor, perceived risk, tends to vary during task performance and is assumed to depend on the (perceived) accident potential of the immediate situation and on the (perceived) adequacy of the personal resources and skills. The target risk level, on the other hand, is assumed to be more stable and to be primarily determined by motivational factors, in particular by the expected costs and benefits of the available behaviour options. Perceived and target risk are monitored and whenever there is a significant discrepancy, corrective action is taken: if the perceived risk level exceeds the target level, people will behave more safely, and vice versa. This results in a homeostatic control process, where behavioural adjustments keep the risk level close to the target value.

One implication of RHT is that the time-averaged risk level and, consequently, the resulting accident rate, will depend on only one factor: people’s target level of risk, or, in other words, their willingness to take risk. Changes that do not affect the target risk level will only have temporary effects, since people will adapt their behaviour to counter changes in perceived risk. Essentially, Wilde presents two types of evidence to support this hypothesis. Historical traffic accident statistics show that the (per caput) accident rate has remained remarkably stable, despite large changes in the traffic system. Wilde also describes numerous examples of unsuccessful attempts to reduce accident rates, either through technological improvements (better cars, safer roads), educational efforts (various driver training programs) or legislation and enforcement (e.g. alcohol use and seatbelt wearing). According to RHT, the reason that many campaigns failed is that they did not affect the drivers’ target level of risk. As a consequence, drivers reacted to the increase in perceived safety by behaving more riskily; for instance, by driving faster they exchanged the potential gain in safety for a gain in travel time.

The formulation of RHT lead to fierce discussions in the traffic safety research community. The vehemence of these debates still echoes through some sections of the book, but time (and Wilde’s humour) have taken the edges off. Although Wilde succeeds in countering many of the objections that have been raised against RHT, some difficulties remain. One is that it is hard to falsify RHT; that is so because the theory does not explicitly specify the domain to which it applies. As a consequence, violations of RHT can be ‘argued away’ by broadening the domain. Suppose, for instance, that traffic accident rates are found to decrease in a way that violates RHT; one may then argue that people are adapting to the increased risks in some other area (say, environmental hazards) by driving more safely. Not specifying the domain to which RHT-predictions apply is like creating a back door through which the theory may always escape falsification.

Another difficulty is the nature of the evidence presented in favour of RHT: for a large part, the evidence consists of cases that were selected post-hoc and that pertain to instances where some safety measure failed to have an effect. With this type of data, it is usually not hard to come up with alternative...
explanations, and the evidential value of many examples in the book can be challenged on these grounds. Experimental (field) studies could offer much stronger evidence but, unfortunately, that type of study seems to be scarce. A notable exception is a study in which a random sample of Munich taxicabs was equipped with an anti-lock brake system (ABS) that strongly reduces the risk of skidding; in accordance with RHT predictions, drivers of ABS cabs were found to drive more riskily and to have similar accident rates as drivers in ‘normal’ cabs.

From an academic point of view, it is unfortunate that Wilde does not explicitly contrast RHT with alternative models that have been proposed. For instance, behaviour which counteracts the expected effects of safety measures can also be explained by utility-maximization models, if one makes some plausible assumptions regarding the (dis)utility of travel time and accidents (see e.g. Janssen and Tenkink, 1988). Contrary to RHT, where ‘accident risk’ acts as the central steering variable, utility-maximization models assume that people aim to optimize a compound utility function, of which ‘accident risk’ is just one component. Utility maximization is more general and — in my opinion — psychologically more plausible than risk optimization. Since both models will often yield different behavioral predictions, empirical tests should not be difficult to design.

Despite these difficulties, Target Risk convincingly establishes that people are inclined to counteract expected changes in risk. For safety engineers and risk managers, this implies that it is naive to design safety measures under a ceteris paribus assumption regarding human behaviour. Unless a measure succeeds to lower their ‘willingness to take risk’, people will always find ways to convert the potential safety gain into a gain in, for example, time or money. Wilde not only succeeds in explaining and demonstrating this mechanism in a clear and convincing way, he also anchors it in an elegant theory and offers a thorough discussion of the practical implications. In addition, the book contains several case stories that, at least to me, will serve as salient and powerful reminders against too naive assumptions regarding human reactions to safety measures. An example is the introduction of so-called ‘child-proof’ caps on drug bottles, which was found to result in an increase of accidental poisonings in children.

REFERENCE