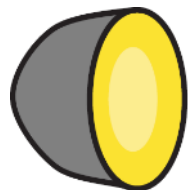


A Primer on Risk Compensation

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Human Factors & Road Safety

Collision Risk

- Based upon Dr. Hauer's definition of road safety: number of collisions, or collision consequences, by kind & severity, **expected** to occur on an entity during specified period of time
- Since there is always a risk of a collision, driving therefore involves risk
- Risk is defined in terms of a ratio of collisions to exposure

Ministry of Transportation Roadside Safety Manual (1993)

1. Remove the hazard.
2. Relocate the hazard outside the clear zone.
3. Minimize the hazard by making it traversable or, in the case of sign supports and posts, by using breakaway devices.
4. Shield the hazard with barriers or crash cushions.
5. In the absence of other options, improve the awareness of the hazard through delineation or other warning devices.
6. Reduce the posted speed.

Letter to The Times, July 13, 1908

hedges as suggested by the secretary of the Motor Union they

Four years ago I cut down the hedges and shrubs to a height of 4ft for 30 yards back from the dangerous crossing in this hamlet. The results were twofold: the following summer my

the average pace of the passing cars was considerably increased.

This was bad enough, but when the culprits secured by the police pleaded that 'it was perfectly safe to go fast' because 'they could

This was bad enough, but when the culprits secured by the police pleaded that 'it was perfectly safe to go fast' because 'they could see well at the corner,' I realized that I had made a mistake. Since

speed of many passing cars considerably increased. It is perfectly plain that there are many motorists who can only be induced to go at a reasonable speed at crossroads by consideration for their own personal safety.

Hence, the advantage to the public of automatically fostering this spirit as I am now doing. To cut hedges is a direct encouragement to reckless driving.

Your obedient servant,
Willoughby Verner

(Young, Frantz, Rhc?)

Moral Hazard

- Arrow, 1963
- Economics term for a change in behaviour because you know you are insured

The Peltzman Effect

- Peltzman, 1975
- Argued that NHTSA regulations have had no effect on highway deaths:
 - Seat belts
 - Energy-absorbing steering column
 - Penetration-resistant windshield
 - Dual braking system
 - Padded instrument panel

Risk Homoeostasis / Risk Compensation Theory - Gerald Wilde (1 of 2)

- The collision rate per time per road user exposure is the output of the maximizing of choice between prudent and risky road-user behaviour
- Time-averaged collision risk is independent of the physical features of the environment or operator skills
- Overall safety can be improved by widening the utility difference between having and not having a collision

Risk Homoeostasis / Risk Compensation Theory - Gerald Wilde (2 of 2)

- Theory does not claim that the level of collision risk can not be altered
- Instead, the theory argues that any change in collision risk is due to:
 - An increase or decrease in the expected benefit of risky behaviour
 - An increase or decrease in the expected cost of cautious behaviour

Risk Compensation Theory

Issues (1 of 2)

- Cannot be proved empirically – data instead is used to support the theory, clarify, or to justify speculations
- Does not explain the mechanism of how people calculate risk:
 - Assumes fully rational, conscious behaviour
 - Some of the risk probabilities are incredibly small, and people are bad at understanding small probabilities
- Does not provide a mechanism for measuring risk

Risk Compensation Theory

Issues (2 of 2)

- Elvik, 2004
- Risk compensation theory can be invoked to explain any finding: if the number of accidents remains unchanged, then this is exactly what the theory predicts if the target level of risk does not change; if the number of accidents is reduced, then the target level of risk must somehow have changed.

Compensation Index, Hedlund, 2000

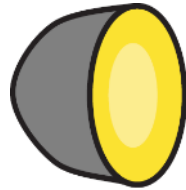
Behavioural adaptation is not likely to occur for a given safety measure if:

- **Visibility:** A safety measure is not easily noticed
- **Effect:** A safety measure does not affect (physically or mentally) the road user
- **Motivation:** If the road user is not motivated to change behavior
- **Control:** If the road user is tightly controlled

Conclusions

- People adapt to changes in their environment, however, there is no scientific reason to say that the collision rate should revert to what it was before the change
- Behavioural adaptation generally does not eliminate safety gains from countermeasures and treatments, but tends to reduce the size of the expected benefits
- Four factors influence risk compensation: visibility, effect, motivation, and control

More Information?



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