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Summer Session, 18th - 24th June 2017

Social Representations in the social arena faced with social demand: a wide range of societal issues investigated in various thematic areas in multiple applied contexts

European / International Joint Ph.D. in
Social Representation and Communication

Role of scientific and common knowledge in road safety Policy

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There are many entrances about the duality science/common knowledge in Moscovici's writings. I choosed three of them:

- Reciprocal transformation of familiar/ unfamiliar in driving situation
- Causal attribution of traffic accident
- Diffusion of knowledge for road safety policy

To start : short review about social representations and road safety

- Road accident and risk (Barjonet et al.),
- Traffic rules and norms (Havarneanu),
- Speed (Barjonet, Pianelli et al.)
- Driving and car (Campos et al.)

- Source : M.-A. Granié et F. Varet

Speed and speed limit representations

N = 1 005

Rangs moyens d'importance
2

Fréquence
150

Danger	473/1,6	Plaisir	256/2,1
Accident	239/1,9	Imprudence	158/2,1
		Sport automobile	150/2,1
Vigilance	77/1,9	Peur	36/2,1
Excès de vitesse	61/2	Répression	112/2,3
Limitation	58/1,9	Gain de temps	143/2,1
		Voiture puissante	95/2,2

Speed=Hazard

Speed=Hazard=Pleasure

Speed=Hazard=Recklessness

N = 1 005

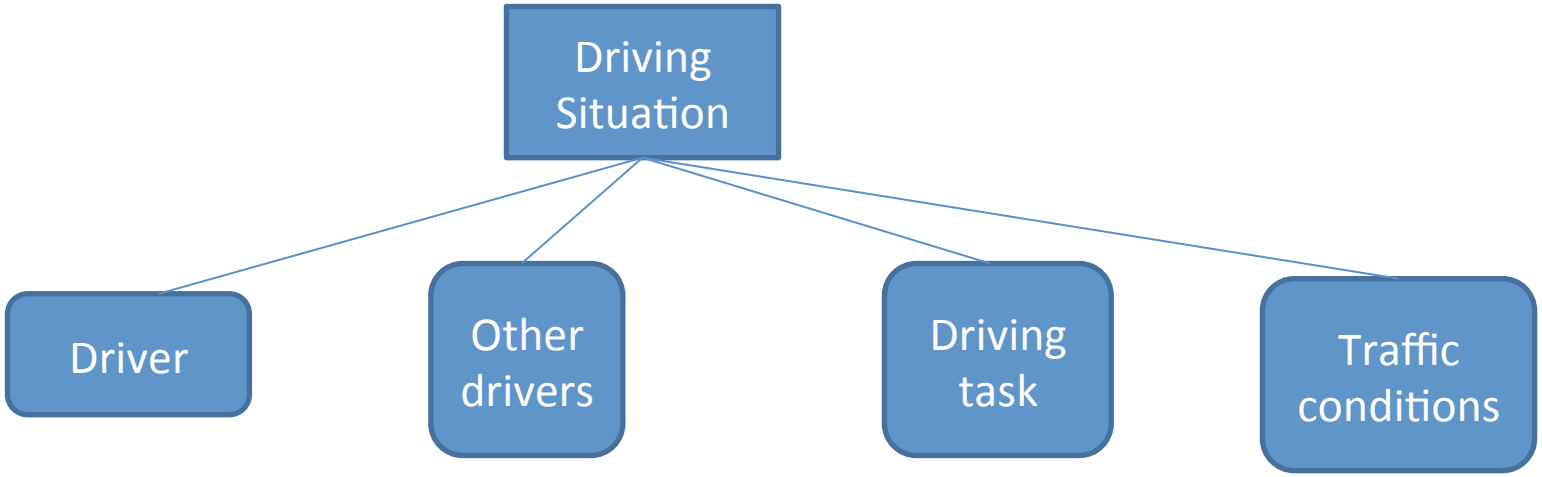
Rangs moyens d'importance
2

Fréquence
150

Sécurité	437/1,6	Répression	471/2,2
Respect des limitations	348/1,8	Contrainte	151/2,2
Prudence	306/1,9		
Danger	293/2		
Réglementation	39/1,8	Bien	125/2,1
	29/1,9	Bête	50/2,1
		Mal adaptée	50/2,1
		Signalisation	61/2,2

PRUDENTS	DEFIANTS	HEDONISTS	PRAGMATISTS
Danger	Danger	-	-
-	Pleasure	Pleasure	-
-	-	Rapidity	Rapidity
-	-	Gaining time	Gaining time
-	-	-	Enforcement
-	-	-	Vigilance
N=216	N=56	N=42	N=80
55% of the population	14% of the population	11% of the population	20% of the population

Representation of Driving situation



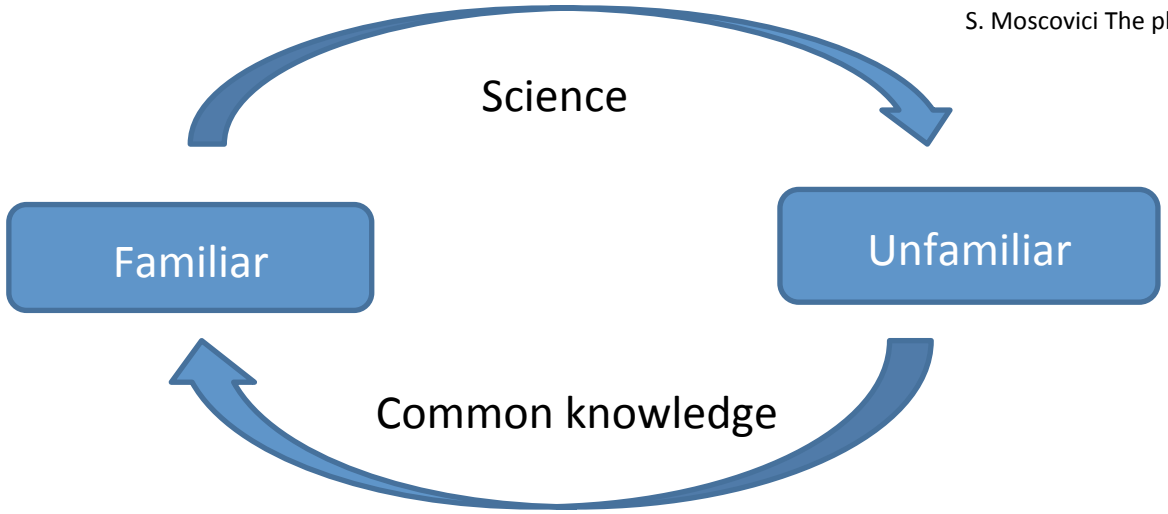
Highway Code

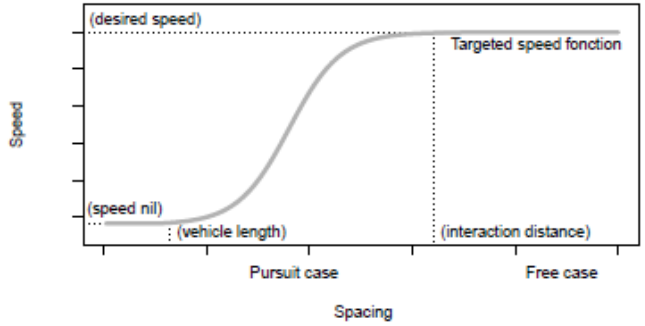
Complex and Insuffficiently structured (F. Saad)

Source : Campos, Lagares from Abric

Driving task and kinematics

S. Moscovici The phenomenon of social representations





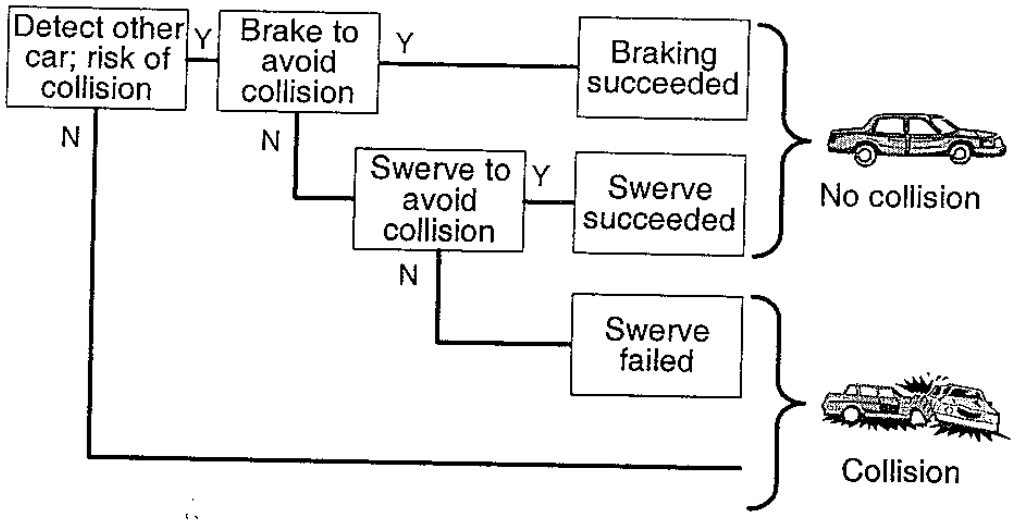
$$\dot{x}_n(t+T^r) = \mathcal{R}\{x_{n+1}(t) - x_n(t), \dot{x}_{n+1}(t)\}$$

Algorithms
ACC Automatic Cruise Control
Autonomous vehicle

Longitudinal and lateral Control of trajectory and speed

- Car following

- Crash avoidance
  - Breaking
  - Swerving

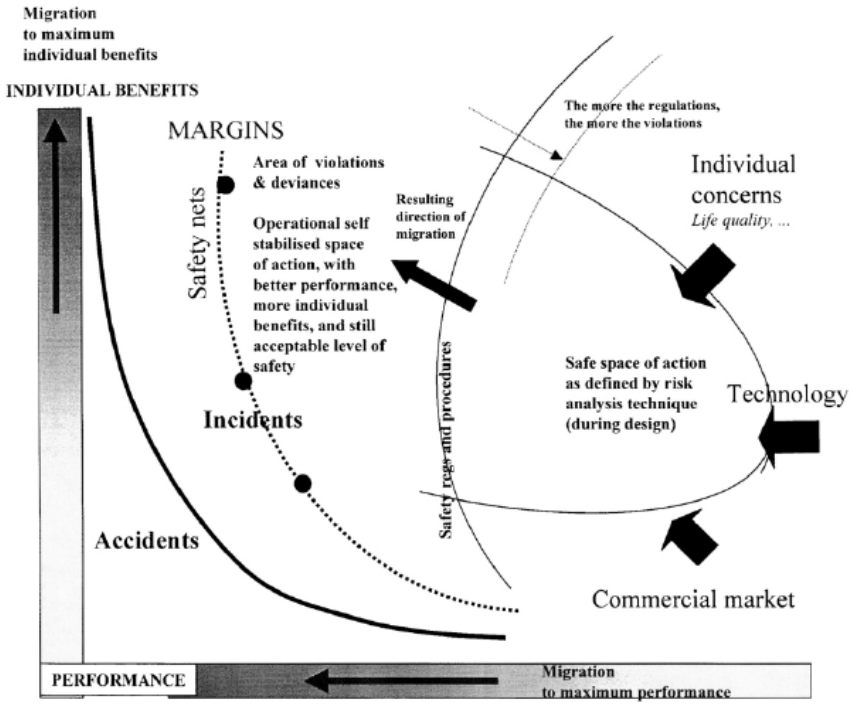


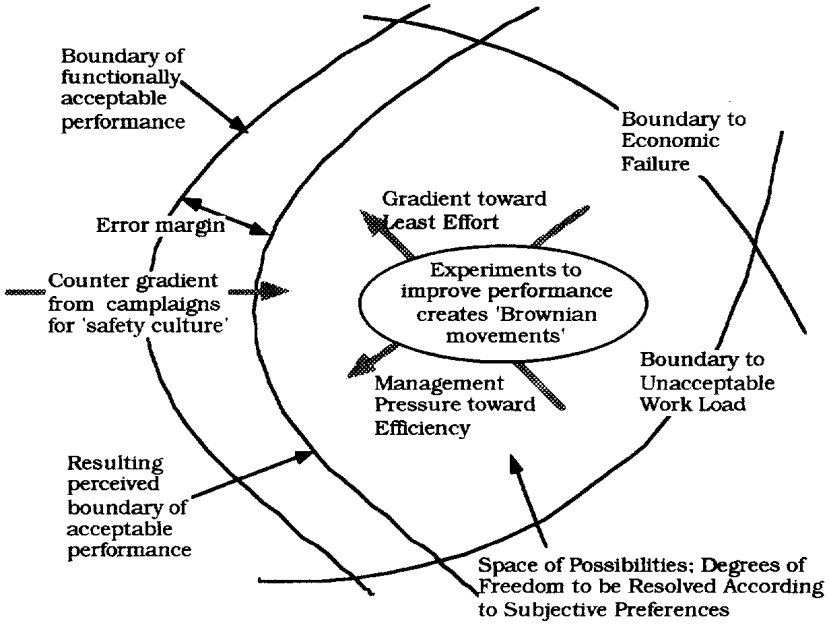
- « Thanks to this popular physics we avoid colisions » . Not so good, then Driving aids :
  - ABS *Antiblockiersystem*
  - *ESC Electronic stability control*

Risk homeostasis and risk perception

- Some individuals then Imitation , then mass deviances (excess of speed limits) and perverse norm
- Solution : make the limit explicit and known and learn to manage the limit
- Problem with the safety interventions : risk homeostasis through behvioural adaptation
- Exemples
  - ABS system on car
  - Delineators on road

Migration to limits

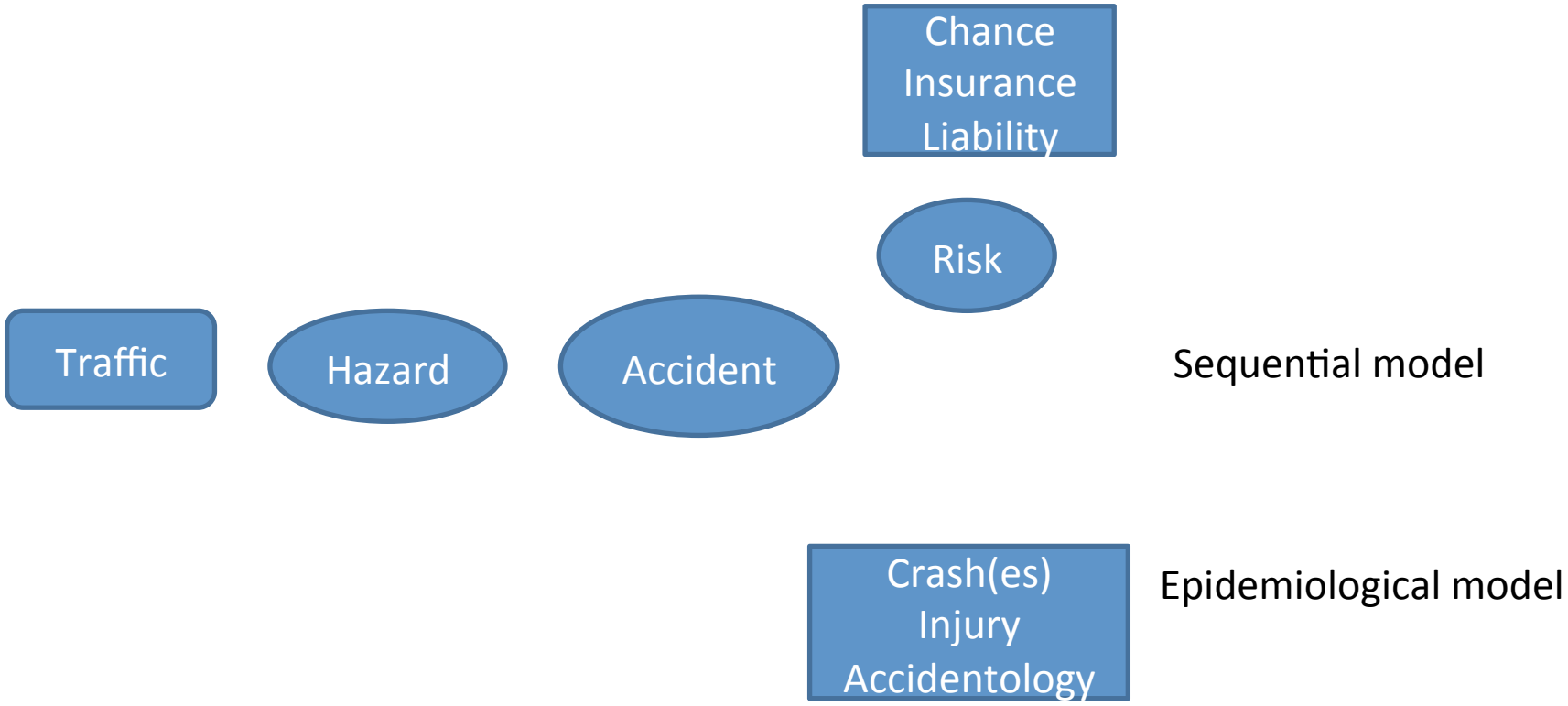




J. Rasmussen, R. Amalberti

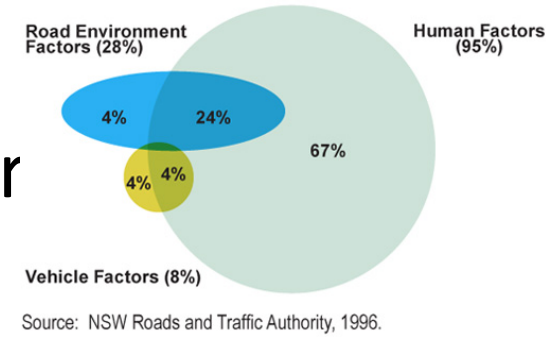
Causes of accident

- How: Scientific Accident concepts



- Why: Bi-causal explanations
  - Primary: quest for motive and intention rather than cause (imputation), il n'y a pas de fumée sans feu
  - Secondary: from effect to cause on the basis of information (attribution), the invisible is hidden behind the visible
- Primacy of system of social representations that dictate the attribution either to the society (external) or to the individual (internal), according to the conformity with a prototype.
- Attribution of responsability in the accident
  - Cause/blame/punishment

- Still importance of fatality in accident occurrence (= risk acceptance)
- Human factor or human error. Driver responsible for the accident
  - Common knowledge reinforced by interpretation of accident investigation studies on risk factors
  - Role of speed denied/stressed by some lobbies



Source: NSW Roads and Traffic Authority, 1996.

Accident models

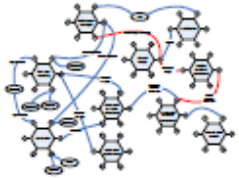
Simple linear outcomes
Single ("root") causes, component failures (decomposable)

Sequential

Complex linear outcomes
Multiple (latent) causes (decomposable)

Epidemiological

Non-linear (emergent) outcomes
Tight couplings, coincidences, resonance (non-decompopsable)



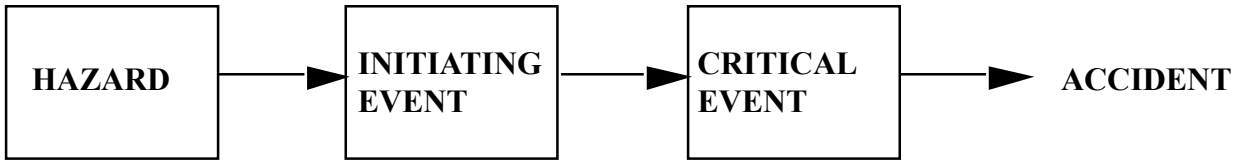
Systemic

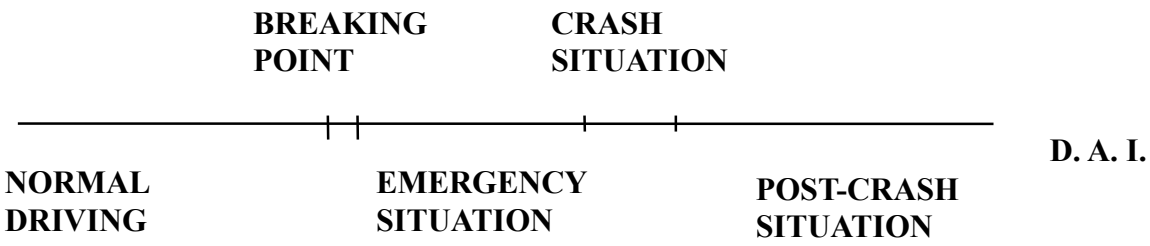
1920 1940 1960 1980 2000

E. Hollnagel (2004) Barriers and accident prevention. Ashgate.

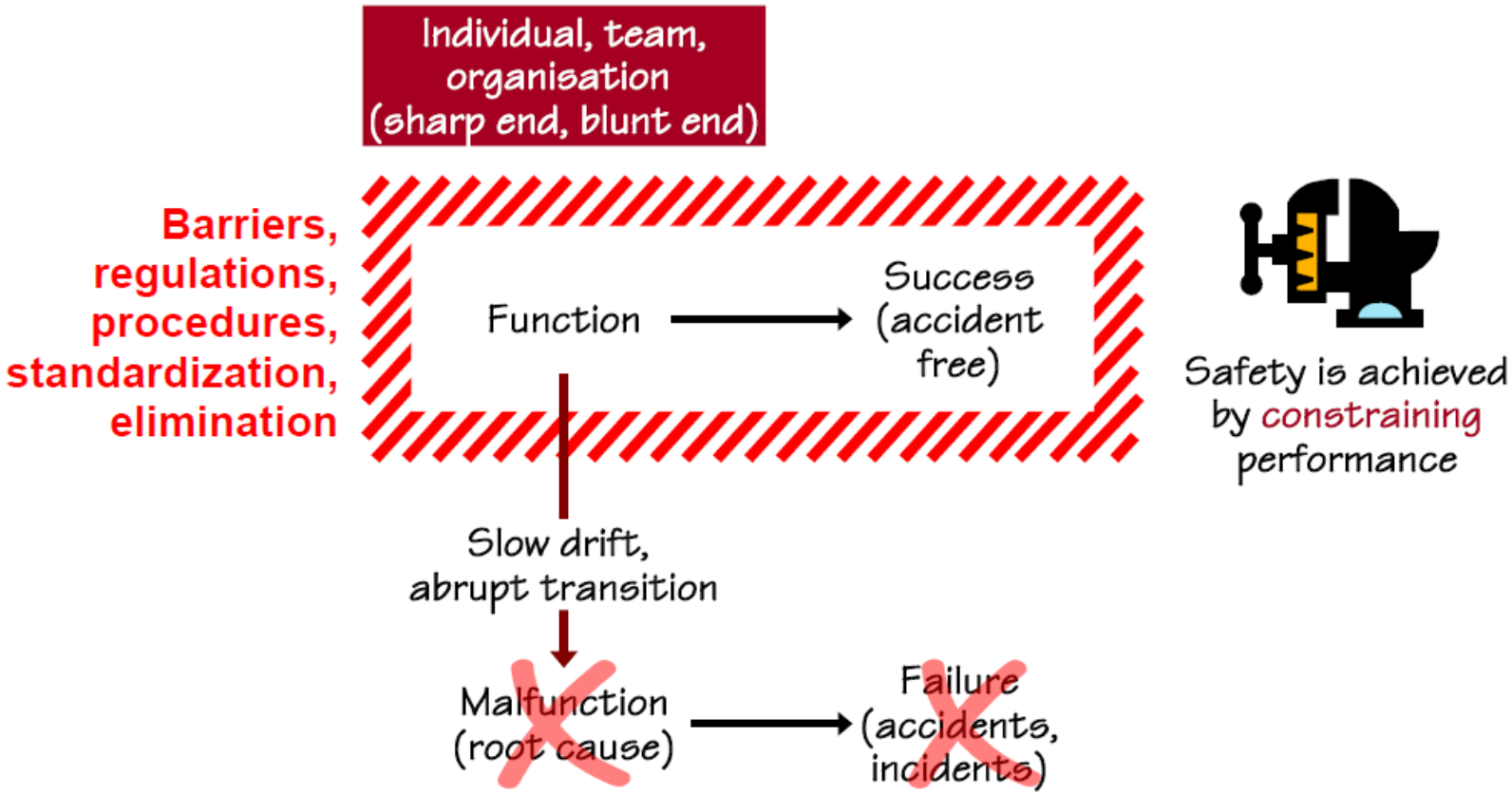
Simple linear outcomes
Single ("root") causes, component failures (decomposable)

Sequential





Safety by constraint



Epidemiological model

Complex linear outcomes
Multiple (latent) causes
(decomposable)

Epidemiological

Desease	Host	Agent	Vector	Interaction
Malaria	Man	Plasmadium sp.	Mosquito	Bite
Skull fracture	Man	Mechanical energy	Moto	Collision

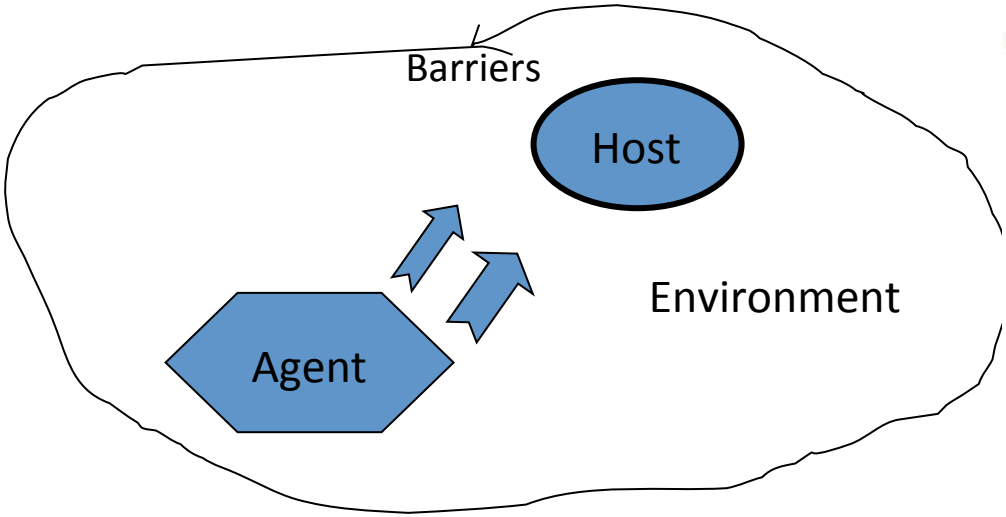


Figure 2: Haddon's matrix, applied to motor vehicle crashes (1)

	Host	**Agent**	**Environment**
Pre-event	alcohol speed	tires brakes	signs, signals, surface
Event	belt use helmet use	seat belt airbags	side slope, guardrails
Post-event	health age	fuel system flammable materials	EMS response road shoulders

- W. Haddon's matrix

Figure 2: Haddon's matrix, applied to motor vehicle crashes (1)

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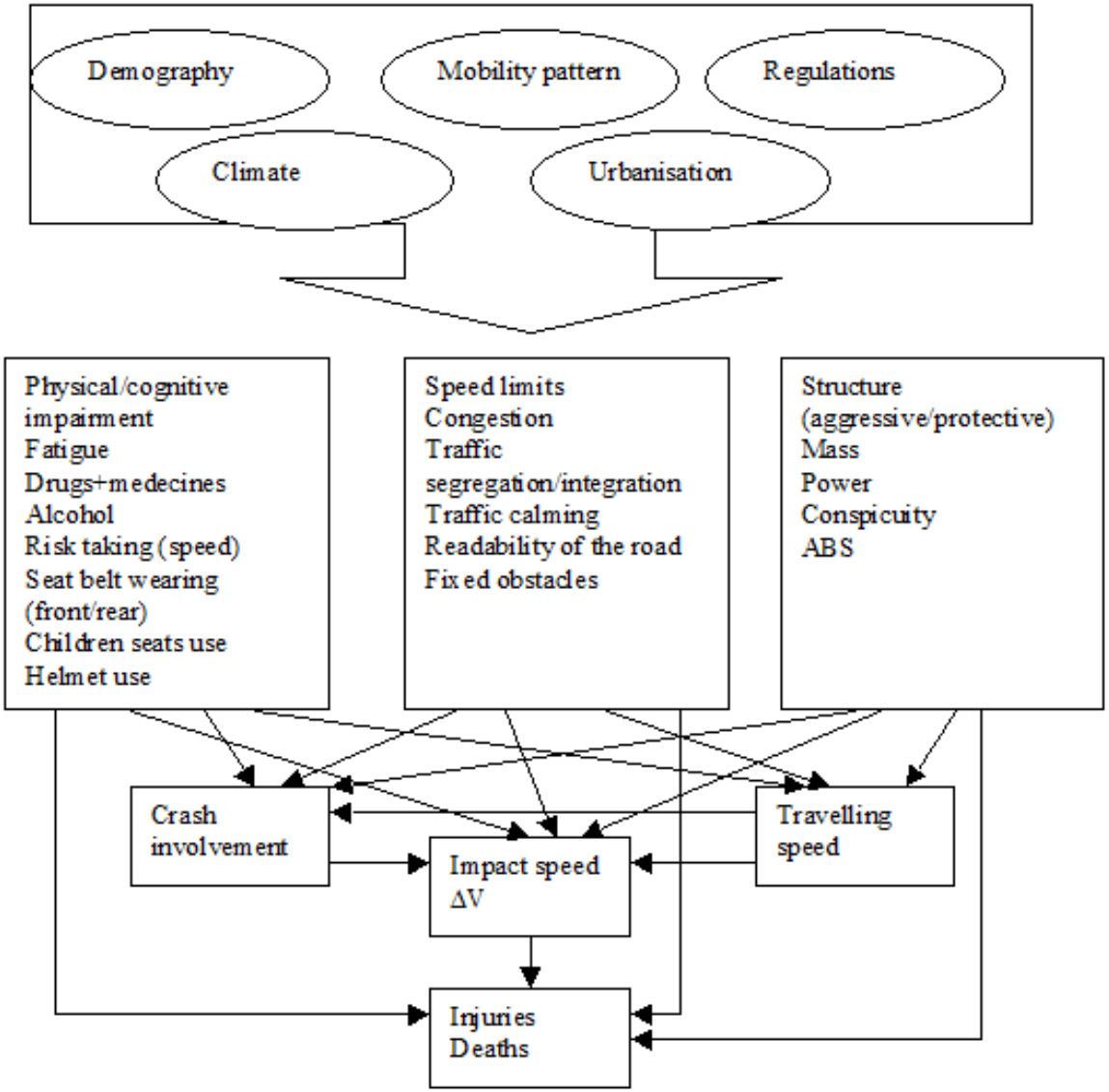
Causal web proximal/distal conditions and factors



Latent conditions

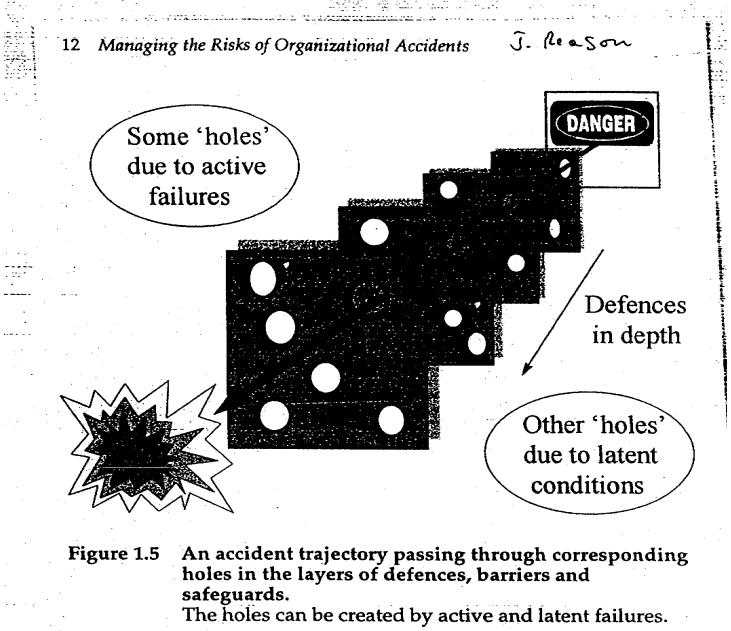
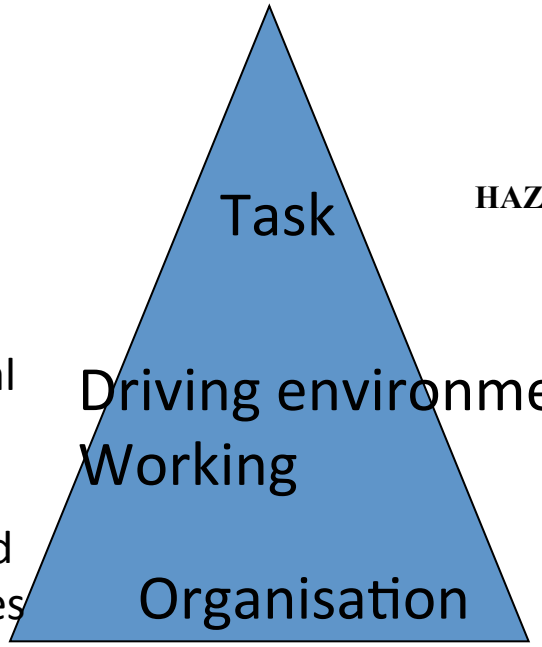
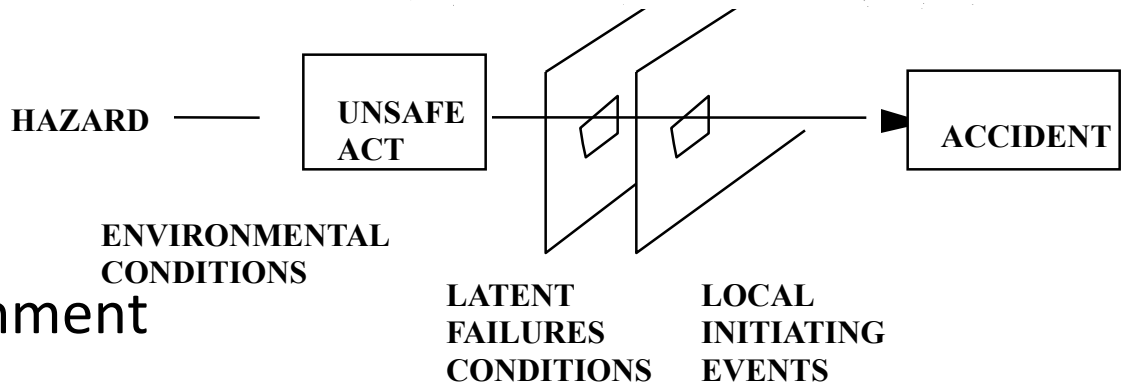


Figure 1.5 An accident trajectory passing through corresponding holes in the layers of defences, barriers and safeguards.
The holes can be created by active and latent failures.



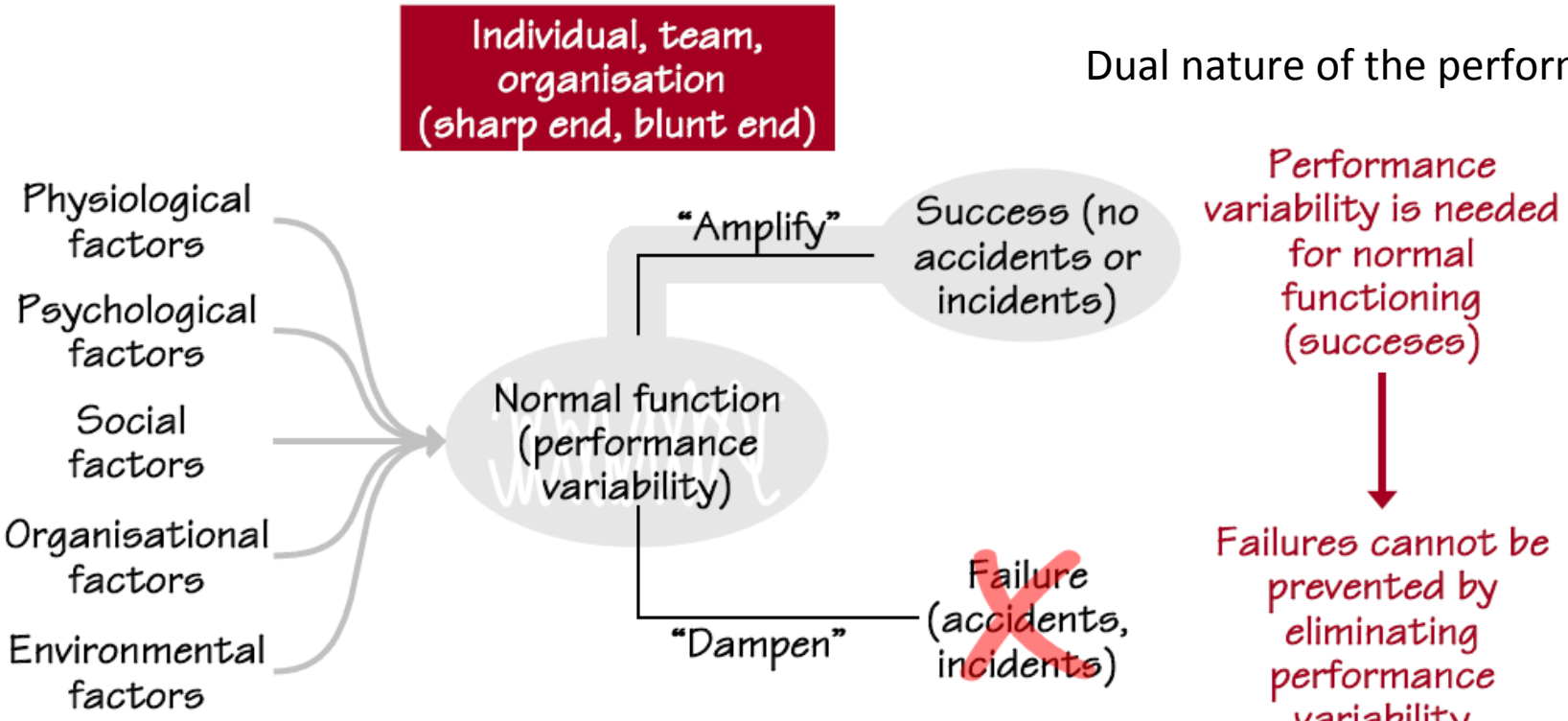
Social and organisationnal Factors

Production and Social pressures



Unsafe act = **Performance deviation** rather than human error
Latent failures conditions degrade the defences (origin = organisational)

Safety by management



Dual nature of the performance

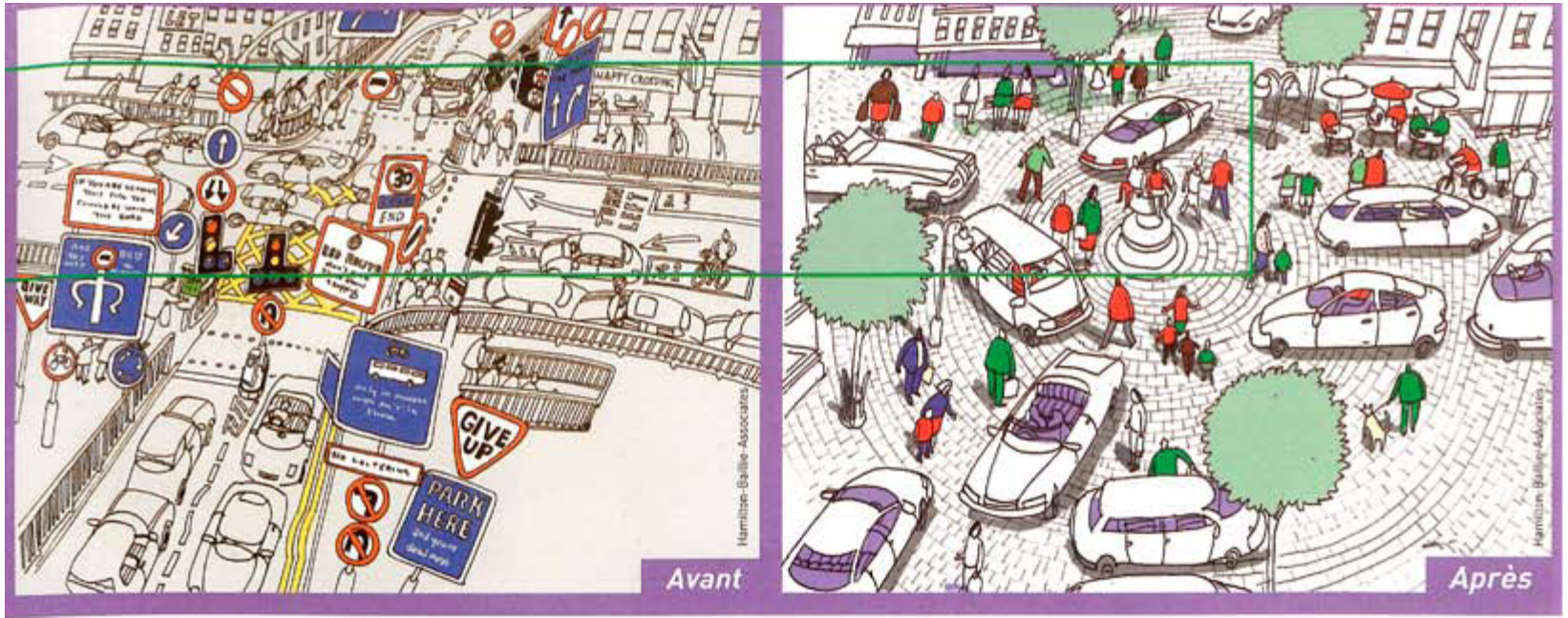
Performance variability is needed for normal functioning (succeses)

Failures cannot be prevented by eliminating performance variability

Monitoring **Detection** **Dispersion** **Correction**

Exemple 1

- Shared spaces
- Hans Monderman
- Reified/Consensual universe
- Heteronomous/autonomous



Diffusion of knowledge for Road Risk regulation

- Road accident is a socio-technical risk that has to be regulated by state authorities (automobile sector/other sectors)
- Road safety is a public good
- Implies a road safety policy and institutions design
- The shape of
  - the governance process (public policy)
  - the management process (institutions)

  varies according to countries and in time

Multi-level approach

- Policy settings or governance
- Organisational settings (public service managers)
- Front-line practitionners
  - Wide range of professionnals in road safety « services »

3E

- Engineering (Highway design)
- Enforcement
- Education (driving learning)

- Emergency
- Transportation
- Urban planning
- Health

sharp end / blunt end
Hierarchy of controls and knowledges

Risk management in a dynamic society: a modelling problem

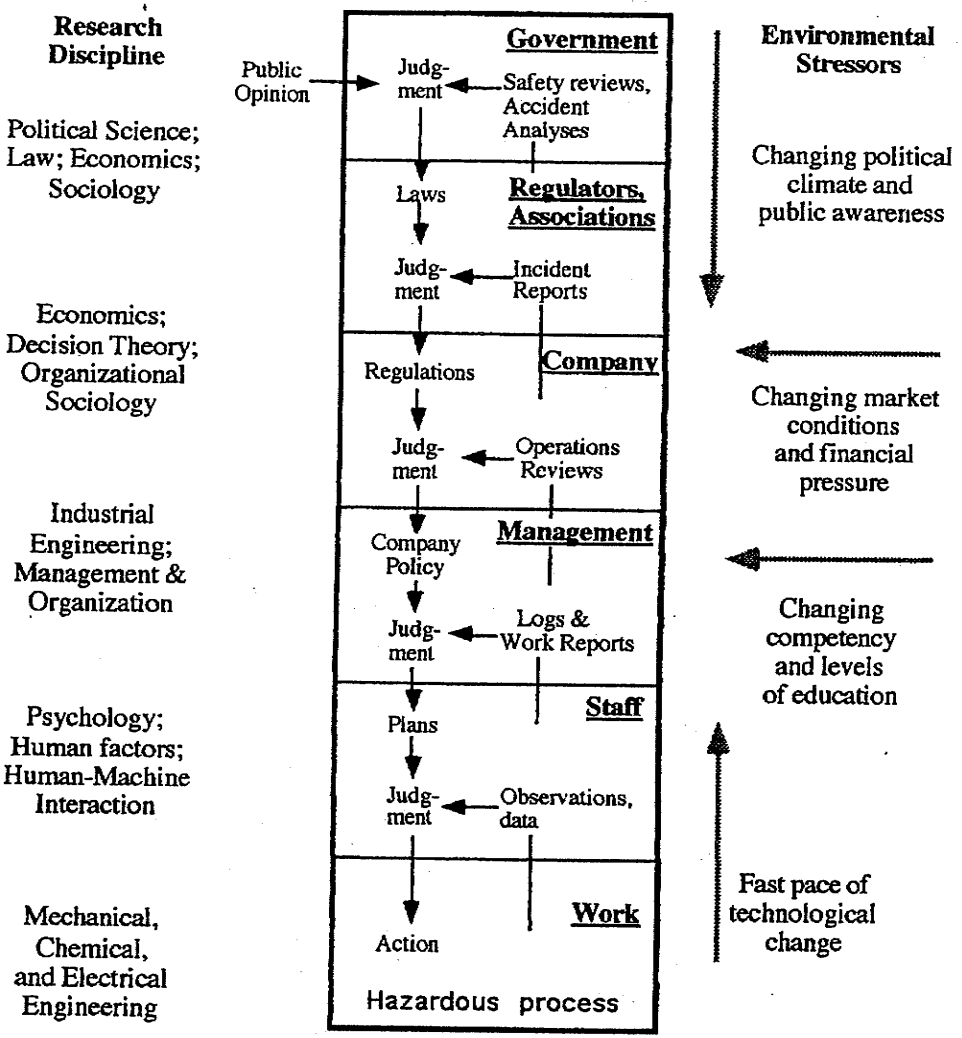
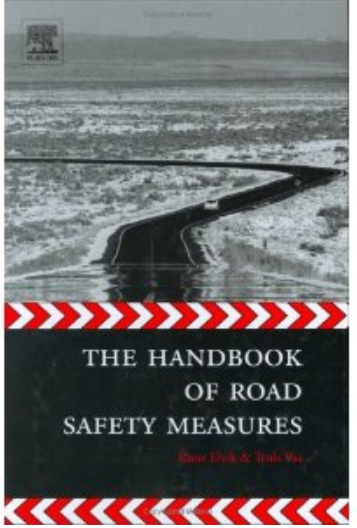


Fig. 1. The socio-technical system involved in risk management.

Rasmussen

Internal diffusion
What works ?



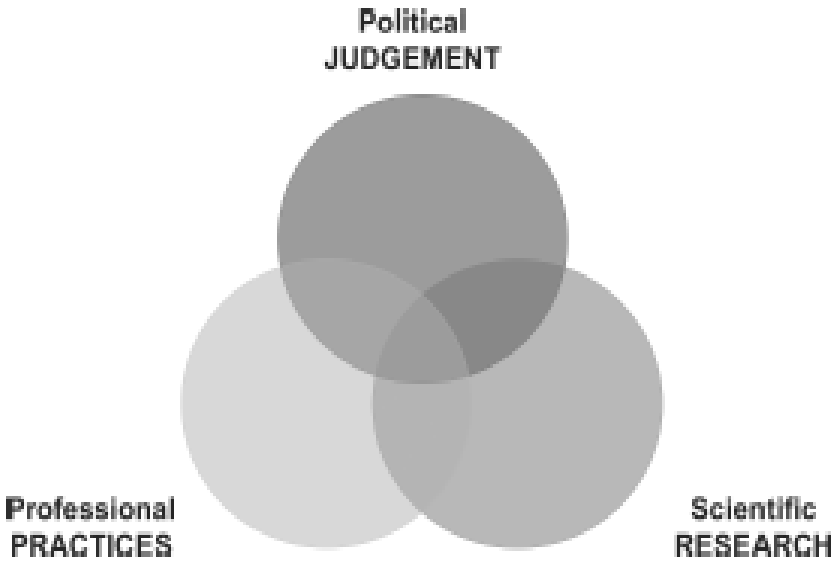
- Effectiveness
- Efficiency
- Acceptability

- Rune Elvik, Truls Vaa The handbook of road safety measures
- World report on injury prevention (WH
- Sharing road safety (CMF), OECD

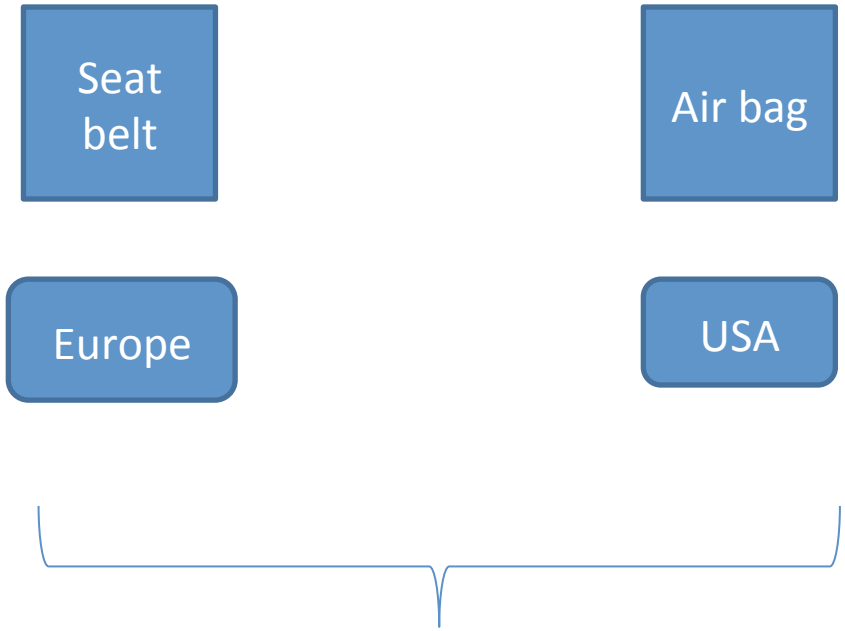
- Not limited to scientific knowledge (Other types of knowledge)
- Uncertainty of scientific knowledge
- Trust in quality (experimental design rare)

Brian Head

Figure 1. Three Lenses of Knowledge and Evidence



Exemple 2 technology

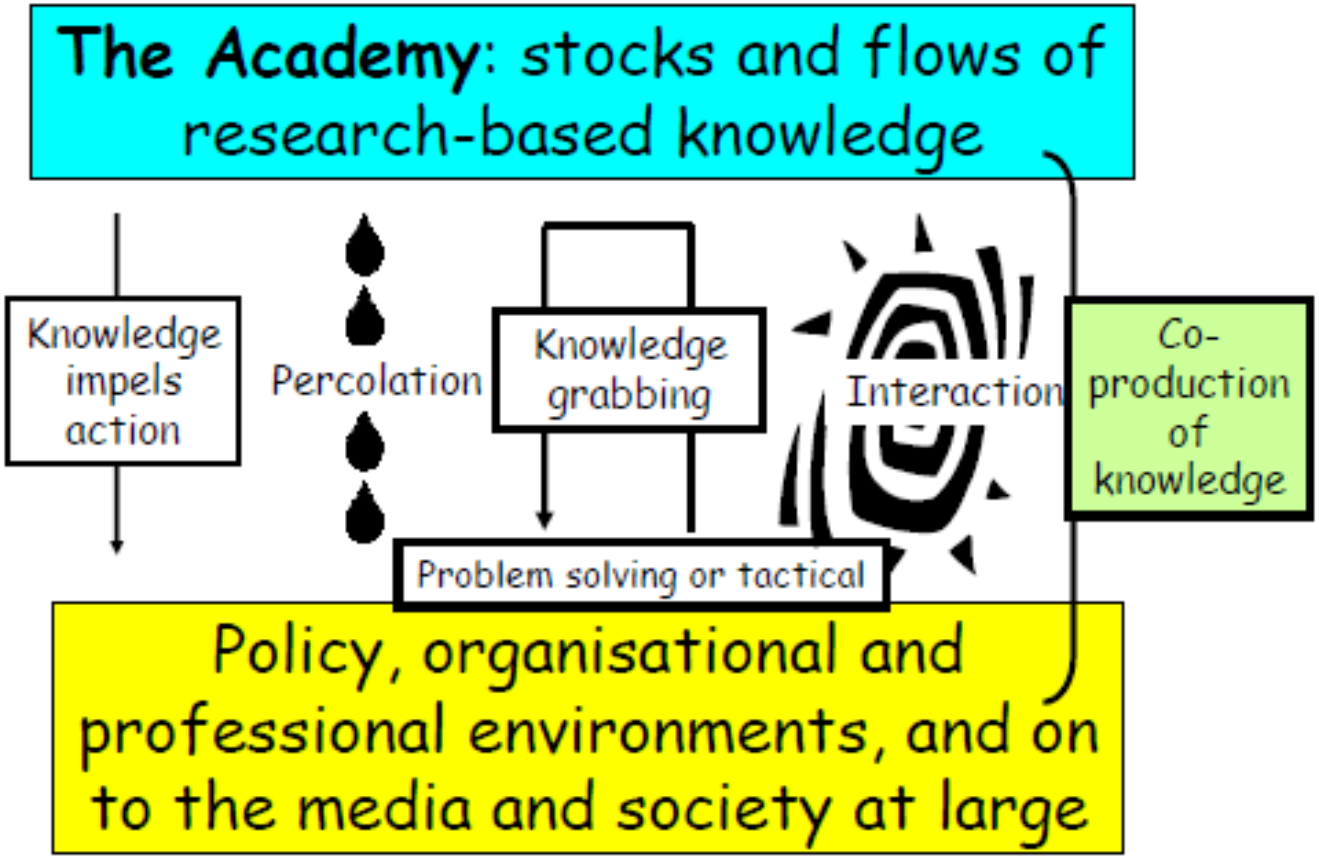


Nils Bohlin, concepteur de la ceinture de sécurité à trois points (Volvo)

Crash tests
Dummies

External diffusion

Many different ways of 'using' research:



Sandra Nutley

- Change of logic: formal to natural
- Emission (few)/reception (many) plus mediators (lobbies)
  - Refusal/selection/resistance (innovation)
  - Minority/majority groups
- Integration of scientific knowledge
  - Through professionalism (road safety officers)
  - Guidelines, benchmarking, best practices
  - Commissions

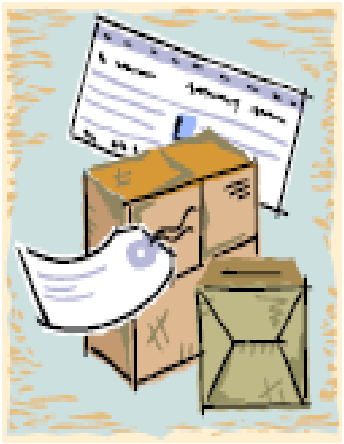
Evidence-based policy ?

interpretation of evidence as "the available body of facts or information indicating whether a belief or proposition is true or valid", a definition drawn originally from the Oxford English Dictionary. Davoudi (2006, p. 20) infers from this that "facts or information are not themselves evidence, they become evidence when they are used in conjunction with other facts to prove or disprove a proposition . . . [it] is not limited to research findings and includes multiples sources of different forms of formal and informal, expert and experiential, and systematic and tacit knowledge." The culmination of filtering through a series of lenses produces research-based evidence, although other forms of evidence (both knowledge and information) would also be used in planning, even in EBP. In other words, information and knowledge both have a place in broader planning practice.

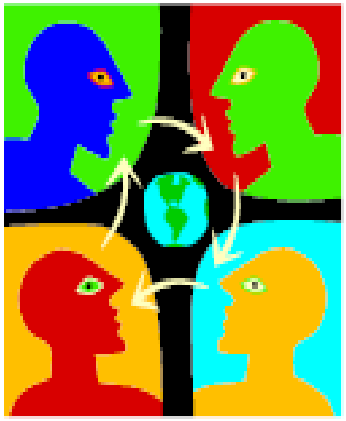
Kevin Krizek

Chapelon, J., Lassarre, S., (2010) Road safety in France: The hard path toward science-based policy. *Safety Sci., doi: 10.1016/j.ssci.2010.04.015.*

Evidence-informed practice



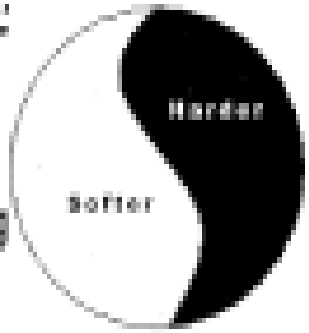
Moving away from ideas of 'packaging' knowledge and enabling knowledge transfer - recognising instead:



- The importance of ***context***;
- ***Interaction*** with other types of knowledge (tacit; experiential);
- Multi-voiced ***iterative dialogue***;
- 'Use' as a ***process*** not an event.

But knowledge required for effective services is *much* broader than simply "what works"

- ***Know-about (problems):*** e.g. the nature and formation of social problems.
- ***Know-why (requirements of action):*** relationship between values & policy/practice.
- ***Know-how (to put into practice):*** e.g. pragmatic knowledge about implementation.
- ***Know-who (to involve):*** e.g. building alliances for action.



Need research evidence and other knowledge to address these issues

Sandra Nutley

Road safety policy and Representations

- Political Vision and ideology
- Values

Vision zero

Vision Zero is based on the ethical imperative that (Tingvall and Haworth, 1999):

"It can never be ethically acceptable that people are killed or seriously injured when moving within the road system."

Vision Zero strategic principles are:

- The traffic system has to adapt to take better account of the needs, mistakes and vulnerabilities of road users.
- The level of violence that the human body can tolerate without being killed or seriously injured forms the basic parameter in the design of the road transport system.
- Vehicle speed is the most important regulating factor for safe road traffic. It should be determined by the technical standards for roads and vehicles so as not to exceed the level of violence that the human body can tolerate.

Sustainable safety

Road safety policy evolves with scientific paradigms on road safety

Table 5. The five Sustainable Safety principles (Wegman and Aarts 2006).

Sustainable Safety principle	Description
Function of roads.	Mono-functionality of roads: as either flow roads, or distributor roads, or access roads, in a hierarchically structured road network.
Homogeneity of masses and/or speed and direction.	Equity in speed, direction, and masses at medium and high speeds.
Predictability of road course and road-user behavior by a recognizable road design.	Road environment and road-user behavior that support road-user expectations through consistency and continuity in road design.
Forgivingness of the environment and of road users.	Injury limitation through a forgiving road environment and anticipation of road-user behavior.
State awareness by road user.	Ability to assess one's task capability to handle the driving task.

Holistic approach

This is the background against which this road safety strategy is being developed and it requires us to approach the task in a more holistic way than previous strategies. In addition to looking at specific road safety levers and assessing road safety impacts, we need to ensure that what we propose progresses as many of the DaSTS goals and challenges as possible, and delivers outcomes that are acceptable to users across the whole of their travelling experiences. So, for example:

- we have rigorously assessed our proposed interventions and are clear that their overall impact is not detrimental in terms of greenhouse gas emissions;
- our road safety strategy needs to have an overall positive impact on public health, taking account of the health benefits of walking and cycling for adults and children, as well as the obvious public health benefit of avoiding large numbers of premature deaths and serious injuries;
- road safety measures must pass the test of better regulation, and must be proportionate in terms of their economic impacts on different sectors of society.

Safe system as an international normative approach

Safe System – the new frontier

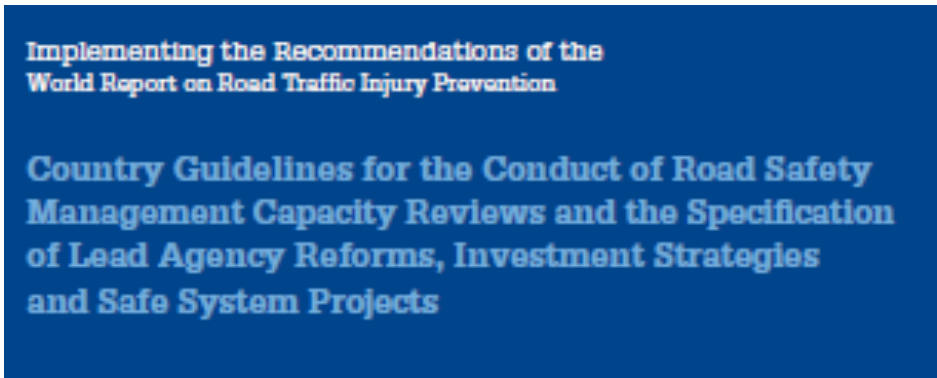
An unequivocal long term goal to eliminate death and serious injury with time-limited outcome and output targets driving and made possible by:

An exacting strategy for system-wide, multi-sectoral intervention based on known safety principles to address human limitations made possible by:

Strengthened, accountable institutional management

requiring best practice & continuous innovation across all elements of the road safety management system.

OECD (2008) Towards Zero : Ambitious road safety targets through a safe system approch



Tony Bliss
Jean Breen
WB GRSP

Conclusion

- Fruitful Field of application of RS
- Importance of technology rather than science
- Design of the system : autonomous/ heteronomous

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