



Roots of



RESILIENCE

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Over-concentration on danger
has lead to a neglect of safety

Risk reduction \neq achieving safety

Fear of failure
may decrease safety

Accepting risks
may increase safety

Without errors
there is no new learning

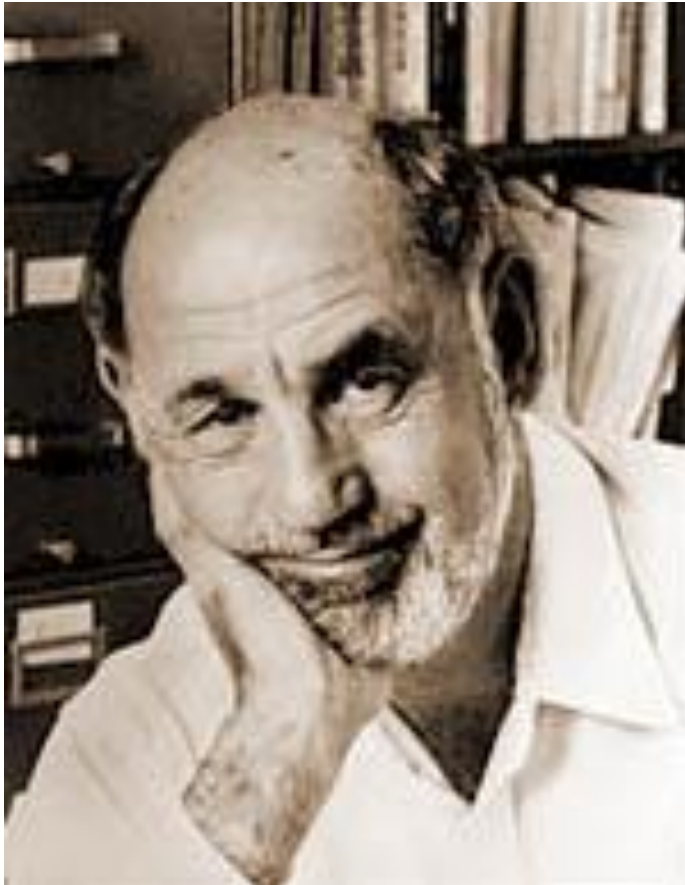
Cure may be better
than prevention

Content

- The world according to Wildavsky
 - Traditional risk strategy: anticipation
 - New risk strategy: resilience
 - Possible errors
 - How to choose between strategies
- The world surrounding Wildavsky
- Conclusions



Aaron Wildavsky (1930-1993)



Roots of Resilience

AARON WILDAVSKY

Traditional risk strategy: anticipation

- Focus on hazards
- Prevent harm

- Fear of failure & regret
- Risk averse

- Enhance stability
- Investments in safety devices
- Trial without error

World according to Wildavsky

- Dynamic systems
- Uncertainties
- Predicting accidents difficult

- Anticipation may lead to
 - Micro-safety
 - Rigidity
 - Overspending on useless defences
 - Decreased safety

New risk strategy: resilience

Skill of the system
to recognize, comprehend and react
to dangers
after they became manifest

New risk strategy: resilience

Anticipation

- Focus on hazards
- ~~Prevent harm~~
- ~~Fear of failure & regret~~
- Risk averse
- Enhance stability
- ~~Investments in safety devices~~
- Trial without error

Resilience

+ benefits

Active search for safety

Rule of sacrifice
taking

variability

Resources available for
repression

and (small)

BUT: Potential for catastrophe

Errors: ignorance of

- Opportunity benefits
- Safety risks of proposed remedy
- Large existing benefits while concentrating on small existing risks
- Effects of economic costs
- Trade off between errors of commission and errors of omission
- Displacement of risk onto other people

Choosing the best strategy

- (un)Certainty
 - Effects
 - Probabilities
 - Groups at risk
- Avoid extremes

Choosing the best strategy

		Knowledge how to act to dangers	
		a little	a lot
Predictability of change	a little	Resilience	Combination, but more resilience than anticipation
	a lot	Combination, but more resilience than anticipation	Anticipation



HIW & RUN

The world surrounding Wildavsky

Disasters

1976 Seveso

1982

1984 Bhopal & San Juanico

1986 Challenger

1988 Piper Alpha

1990

1996

1999

2000+

2009

Rules & regulations

SEVESO I

Cullen report

SEVESO II

OSHAS 18.001

NEN ISO 31.000

Safety Science

Perrow

Wildavsky

Rasmussen, Leveson,

Hollnagel, Woods,

Dekker

Over-concentration on danger
can lead to a neglect of safety

Hazard reduction \neq achieving safety

Fear of failure
may decrease safety

Accepting risks
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Without errors
no new learning

Cure may be better
than prevention

Accept
to live with small accidents

Don't try
to prevent *all* future hazards