

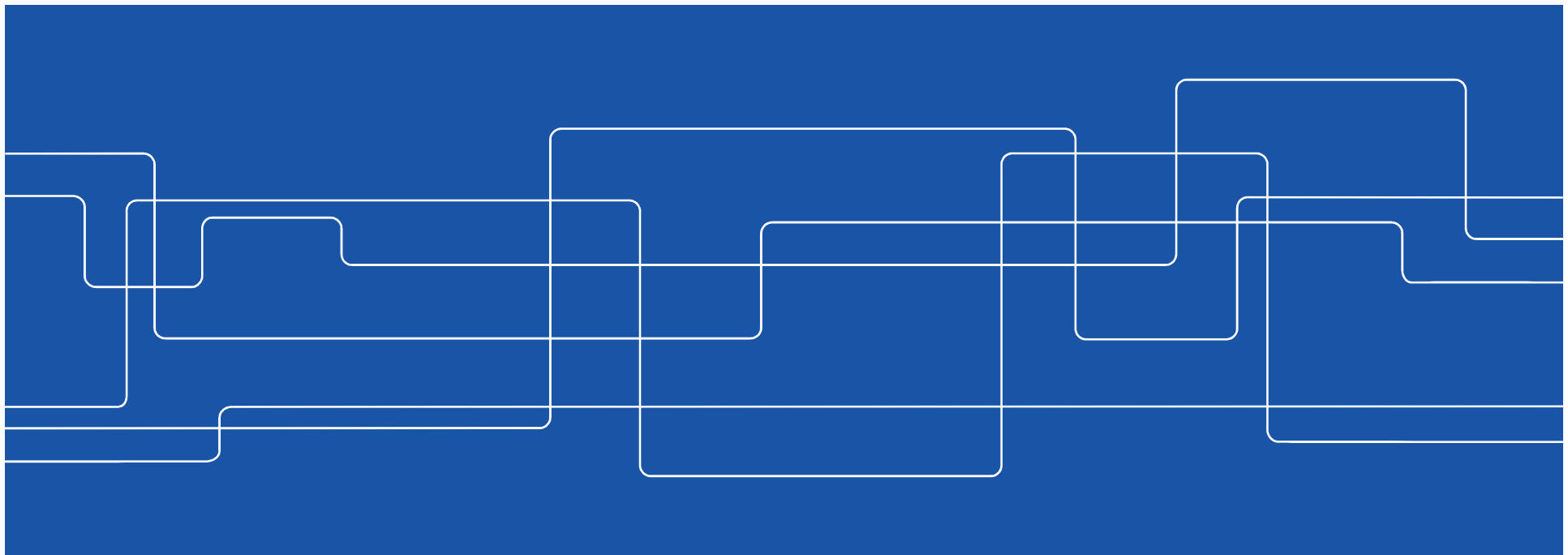


# The concept of risk

Implications for science education

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## Background

Multidisciplinary project team:



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**Target:** Upper-secondary students' decision-making abilities in socio-scientific issues (SSI)

- How can risk and risk assessment be included in science teaching?

See also: Iann Lundegård & Leena Arvanitis, next  
Margareta Enghag Thursday 11:30 Q119



## The concept of risk

Risk literature: engineering, philosophy, linguistics, economy, sociology, psychology, etc...

- Mapping how risk is used
- Proposing definitions
- Capturing the concept

*Can the science education field benefit from these efforts?*



## Risk is polysemous

I usually think of an act whose consequences are very problematic. For instance to cheat on a test may be a risk, a consequence may be that you get disqualified and get poor grades

Risk of getting a disease later in life, such as cancer





## Use of the noun risk

- Every-day language and in specialised technical contexts
- More frequent in academic texts than in fiction or spoken language
- Strongly associated with health and medicine
- Non-academic and spoken language: non- or semi-quantitative meanings (i.e. risk  $\neq$  numbers but may collocate with more, smaller etc.).
- Specialised uses: quantitative ( i.e. risk can be numbers, operationalisations for risk assessment)

Hamilton et al., *Discourse Soc* 2007; Zinn, *Crit Approaches Discourse Anal Across Disciplines* 2010; Hardy & Colombini, *Int J Corpus Linguis* 2011; Boholm et al, *Risk Anal* 2016.



## Attempts to define risk

### Risk is:

E.g. Knight, 1921

- Measureable uncertainty [known distribution]
- Potential for unwanted consequences
- Expected loss
- A situation or event where something of human value is at stake and the outcome is uncertain
- Uncertainty about and severity of the consequences of an activity with respect to something humans value
- *and many more....*

Eg. Aven and Renn, 2009

Aven, *Reliab Eng Sys Saf* 2012; *SRA glossary of risk* 2015; Knight, *Risk, uncertainty and profit* 1921; Aven & Renn, *J Risk Res* 2009.



# Separating the concept and the descriptions

- Relatively recent move (e.g. SRA 2015)
- Acknowledge that there are multiple definitions/ways to operationalise risk.
- Different situations may need different operationalisations.



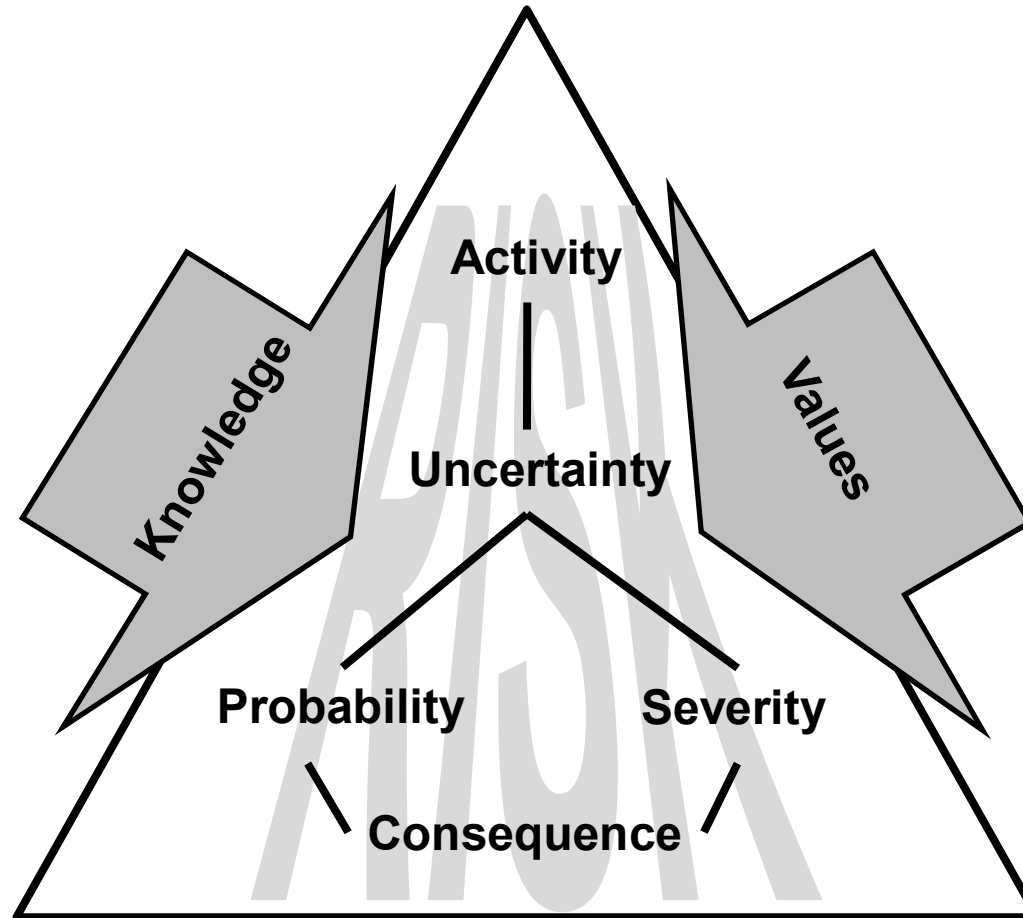


## Attempts to capture the concept

- It is undetermined or at least unknown whether or not that event will occur.
  - > uncertainty and probability
- Undesirable events
  - > consequence.
- Decision-making/action
  - > activity
- Both subjective and objective components
  - > interface between knowledge and values

Luhmann, *Risk: A Sociological Theory* 1993; Rosa, *J Risk Res* 1998; Hansson, *J Risk Res* 2010; Aven & Renn, *J Risk Res* 2009; Boholm, *Risk Anal* 2011; *SRA Glossary of risk*, 2015.







## Conclusions

Teaching about risk should take into account that:

- Risk is a polysemous term. Differences seem to be especially large between everyday and specialist uses.
- Different risk descriptions fit different situations.
- Risk cannot (or should not) be separated from reflections on values.



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# Thank you for your attention!

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Iann Lundegård & Leena Arvanitis next speakers  
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