How Can We Survive Between Safety And Risk?

‐ An Elucidation of Appropriate Definition ‐

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Points of Presentation

- **The Level of Common Understanding on Word**
  - **Two Different Understandings**
  - **Science and Philosophy**
  - **Ontology of Concept**
  - **Analogy of Concept**
  - **The Essence of Definition**
- **Risk Communication**

ISO/IEC Guide 51

- *Safety*; Freedom from unacceptable **risk** of harm

- *Risk*; The **probable rate** of occurrence of hazard causing harm and **degree of severity** of the harm

Other Definitions of Risk

- **Risk**: probability and consequences of an event, as expressed by the "*risk triplet*" that is the answer to the following three questions: (1) What can go wrong? (2) How likely it is? and (3) What are the consequences if it occurs?

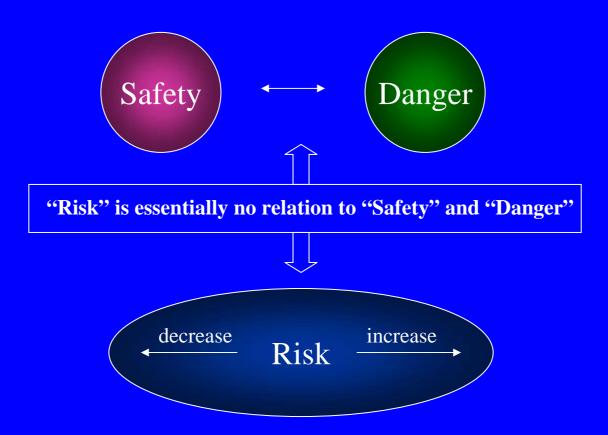- **Risk** is usually associated with the *uncertainty* and undesirability of a potential situation or event

The Definition of Safety

- Safety is the condition of being protected against failure, breakage, error, accidents, or harm. Protection involves here both causing and exposure.

Two Different Understandings

Structure of Wording

Safety ⟷ Danger

"Risk" is essentially no relation to "Safety" and "Danger"

decrease ← Risk → increase

The Difference of Three Basic Concepts

Typical Understanding of Three Concepts

Science and Philosophy

Three Levels of Understanding

Level 3; Wisdom Region

Apart from Philosophy

Level 2; Metaphysics Region

Philosophy

Level 1; Worldly Region

Natural Science

L.Wittgenstein

- Twentieth Century, Austrian Philosopher
- Lecture on Ethics,1929
- Absolute Safety
  - Now the same applies to the other experience which I have mentioned, the experience of absolute safety. We all know what it means in ordinary life to be safe. I am safe in my room, when I cannot be run over by an omnibus. I am safe if I have had whooping cough and cannot therefore get it again. **To be safe essentially means that it is physically impossible that certain things should happen to me and therefore it is nonsense to say that I am safe whatever happens. Again this is a misuse of the word 'safe' as the other example was of a misuse of the word 'existence' or 'wondering.'**

Nagarjuna

- The third century, Indian Buddhist and Philosopher

- the Madhyamakakarika, "Verses on the Fundamentals of the Middle [Way]"

- Concept
  - The **ultimate truth is that there is no ultimate truth**
  - To abandon concepts altogether and achieve an unmediated awareness of the absolute, and nonconceptual, nature of the world

Ontology of Concept

- Possibility of Definition
  - If ["Safety" exists] is axiom, it can be defined
  - If ["Safety" does not exist] is axiom, it can not be defined
- Ontological Problem of Reverse Concept, Pair word
  - Ontological and Metaphysical Discussion about Reverse Concept like "Safety" are important
  - Reserve Concept is impossible to define, because it is not existing, it is just only related each other

Perspectives

- The reverse concept is essentially impossible to define its meaning in ontological principle

- The language is not easy target to define its meaning by natural scientists who do not understand the ontology of concept

Analogy of Concept

- **Academic Domain**
  - Safety and Risk is interpreted dissimilar in various academic fields

- **Industrial Domain**
  - Safety and Risk is interpreted by typical elucidation of natural science and engineering fields

- **Worldly Domain**
  - Safety and Risk is interpreted by sense of everyday life's value dissimilarly

Comparison of *Usual* Meaning of "Safety" and "Risk" between Various Academic Domains

Academic Fields	"Safety"	"Risk"
Social Science	No Danger, No Crime (Safety Myth)	Danger, Crime (Risk Society)
Economics	No Money Loss (Safe Stock)	Money Loss, Trust Loss, Adventure, Gamble, **P/C** (Investment Risk)
Politics	Security, Peace, No Poverty (Safeguard)	Threat, Trust Loss, War, Poverty (Troop Risk)
Literature	No Danger (Safe Person)	Danger, Adventure, Wrong (Risky Action)
Criminology/Jurisprudence	No Crime (Safety Law)	Crime (Murder Risk)
Natural Science (Environment Science)	Not Die, Not Injure, Not be Sick (Public Safety)	Accident, Death, Injury, Illness, **P/C** (Cancer Risk)

Comparison of *Usual* Meaning of "Safety" and "Risk" between Various Engineering Industries

Industry Fields	"Safety"	"Risk"
Nuclear	Not Die, Not Injure (Safety Goal)	Danger, Accident, Failure, Death, Injury, Land Cont. Cost, P/C (Public Risk)
Aerospace	Not Die, Not Injure (Flight Safety)	Danger, Accident, Failure, Death, Injury, Cost, P/C (Crash Risk)
Chemical	Not Die, Not Injure, Not be Sick (Plant Safety)	Danger, Accident, Failure, Death, Injury, Cost, P/C (Toxic Release Risk)
Railway Transportation	Not Die, Not Injure (Passenger Safety)	Danger, Accident, Failure, Death, Injury, Cost, P/C (Derail Risk)
Automobile Transportation	Not Die, Not Injure (Driving Safety)	Danger, Accident, Failure, Death, Injury, Cost, P/C (Collision Risk)
Marine Transportation	Not Die, Not Injure (Transportation Safety)	Danger, Accident, Failure, Death, Injury, Cost, P/C (Sunk Risk)
Mechanics/Electronics	Not Die, Not Injure (Product Safety)	Danger, Accident, Failure, Death, Injury, Cost, P/C (Risk based Design)
Architecture/Construction	Not Die, Not Injure, Not be Sick (Construction Safety)	Danger, Death, Injury, Illness, Cost (Asbestos Risk)
Medical	Not Die, Not Injure, Not be Sick (Safe Treatment)	Danger, Death, Injury, Illness, Cost (Medical Error Risk))

Comparison of *Usual* Meaning of "Safety" and "Risk" between Various Non-Engineering Industries

Industry Fields	"Safety"	"Risk"
Financial Market	No Money Loss (usually it is not used, Safety Box)	Money Loss, Trust Loss, Adventure, Gamble, P/C (High Risk High Return)
Information Technology	No Information Release (Safety Guard)	Information Release (Trust Risk)
Insurance	Not Die, Not Injure, Not be Sick (Life Safety)	Money Loss, Danger, Accident, Failure, Death, Injury, P/C (Disaster Risk)
Food(Agriculture/Fisheries)	Not Die, Not be Sick, Not Injure (Food Safety)	Danger, Accident, Failure, Death, Injury , Illness (BSE Risk,etc.)
Education	Not Die, Not Injure (School Safety)	Danger, Accident, Failure, Death, Injury, Illness (School Security Risk)

Worldly Level Risk
（Widespread Interpretation of word "Risk"）

- Danger（Risky Place）
- Threat（Terrorist Risk）
- Consequence（Fear Risk）
- Probability（Reduce Risk）
- Wrong thing (Commit Risk)
- Degree of Hazard (High Risk)
- Error (Human Risk)
- Hazard (Seismic Risk)
- Accident (Nuclear Risk)

- Gamble (Take Risk)
- Loss (Invest Risk)
- Injury, Death (Transportation Risk)
- Health Damage (Environmental Risk)
- Adventure (Risky Attempt）
- Failure (Be afraid of Risk)
- Trouble (To avoid Risk)
- Crime (Compliance Risk)
- Harm (No Risk)
- Responsibility (On Your Risk)

Many different meanings are used, combined and connected to "Risk"

Definition of Risk

- National Research Council; Improving Risk Communication, Appendix C, p.258
  - However , **the definition of risk**, like that of any other key term in policy issues, is inherently **controversial**. The **choice** of definition can affect the outcome of **policy** debates, the allocation of resources among safety measures, and the distribution of **political** power in society

Perspectives

- *Safety* and *Risk* is understood dissimilarly in various domains

- The definition of *Safety* and *Risk* is a quite difficult work to abstract them as a single meaning

- Analogy of *Safety* and *Risk* should be more enhanced by speculating a total environment of application

The Essence of Definition

What Is the Definition?

- Assumption Which Controls the Document?
- General Meaning of Word Used?
- Philosophical Meaning of "Essence"?
- Issue of Semantics in Philosophy?
- Comprehension or Interpretation of Target?
- Social Agreement of Wording?
- Political Intension to Govern Something?

Formal Definition and Operational Definition

- ***Formal definition*** is basic definition of concept used in mathematics as formula

- ***Operational Definition*** is a method to abstract the whole things of gathering the actual trials after continuing of operating the concept by not defining it formally, this is a different method of Inductive Definition

Inductive Definition and Deductive Definition

- ***Inductive Definition*** is a method to define by gathering many instances and try to abstract them
- ***Deductive Definition*** is a method to define by utilizing the well-known knowledge which is defined formally as concept (a priori knowledge)

Perspectives

- The definition work shall have clear purpose on their definition
- The definition work shall have the appropriate definition method on their definition
- The elucidation of appropriate definition is very important

Risk Communication

- Basic agreement of word *Risk* meaning is questionable even among the engineering people

- Philosophy and Analogy about *Safety* and *Risk* should be considered

- *Risk* communication has not been ideally executed under broad *Risk* meanings with laypeople

Conclusion

- How Can We Survive Between Safety And Risk?
  - Please have correct understanding of word "Safety" and "Risk" which will influence **your everyday life and your business**
- An Elucidation of Appropriate Definition
  - Do not believe the current definition of "Safety" and "Risk" without any verifications and critics by **yourself**