



The semantic field of risk

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ABSTRACT

A recurring theoretical focus in risk and safety research is the analysis of certain concepts of special interest (e.g. the concepts of risk, safety, and hazard) and how they are related. Together, related concepts form networks sometimes referred to as 'semantic fields'. In this paper, the semantic field of risk is identified and analysed. Based on dictionaries, thesauri, and other lexicological resources, 244 words related to the concept of risk are identified. These words are classified into 25 specific categories based on their type of semantic relationship to the risk concept. Based on this semantic field analysis, three implications for risk and safety research are discussed: (i) the merit of an extensive and general overview of a conceptual field (previously subject to only partial and scattered treatment) for future analysis, (ii) methodological consequences for the study of social processes addressing risk and safety issues, and (iii) the opportunity for cross-cultural comparison.

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1. Introduction

In risk and safety research, there has been extensive theoretical interest in concepts central to the field, for example, the concepts of risk and safety (see, e.g., Aven, 2010, 2012, 2014; Aven and Renn, 2009; Aven et al., 2011; Hansson, 1989, 2012; Kaplan and Garrick, 1981; Rosa, 1998). This theoretical interest often includes questions of how the concepts of interest are related to each other (e.g., Ale, 2009; Aven, 2009, 2014; Kaplan and Garrick, 1981; Knight, 1964 [1921]; Luhmann, 1993; Löfstedt, 2011; Manunta, 2002; Möller et al., 2006; Sonnett, 2010). In linguistics and philosophy, networks of related words are sometimes referred to as 'semantic fields' (e.g., Lehrer, 1974; Sonnett, 2010). Although seldom treated as a 'semantic field' as such, the semantic field of risk has attracted the interest of many scholars of risk and safety research. There has been interest in how 'risk' is semantically related to words such as 'hazard' (Kaplan and Garrick, 1981; Löfstedt, 2011), 'danger' (Douglas, 1992; Luhmann, 1993), 'safety' (Aven, 2009, 2014; Möller et al., 2006), 'security' (Manunta, 2002), and 'uncertainty' (Knight, 1964 [1921]).

Many of these discussions focus on distinctions. For example, according to Knight (1964 [1921]), 'risk' refers to a condition of known probabilities and differs from 'uncertainty' which refers to a condition of unknown probabilities. Another example is that risk is often understood as the probability of a hazard. Accordingly, 'hazard' denotes 'the potential for a substance, activity or process to cause harm or adverse effects', while 'risk' refers to 'a combination of the likelihood and the severity of a substance, activity or

process to cause harm' (Löfstedt, 2011, p. 149). Luhmann (1993) takes the word 'risk' to presuppose decision-making, while 'danger' does not (cf. also Beck, 1995; Fischhoff and Kadavy, 2011). Aven (2009, 2014) and Möller et al. (2006) have debated the relationship between 'risk' and 'safety' and whether 'safety' is to be considered a proper antonym of 'risk'. According to Möller et al. (2006), epistemic uncertainty is fundamental to safety but not to standard conceptions of risk. According to Aven (2009), however, uncertainty is as essential to the concept of risk as it is to that of safety. What is shared by these analyses is the attempt to precisely determine the structure of concepts by attending to their relationships to other concepts, which is the basic approach of semantic field analysis.

The basic thesis of structural semantics is that the meanings of words are partially determined by their relationships to the meanings of other words (de Saussure, 1959 [1916]; Lehrer and Lehrer, 1998; Lyons, 1963, 1977; Trier, 1931). In structural semantics, it is argued that the structure and extension of a concept are co-determined by the boundaries of related concepts and the semantic fields in which these concepts are organized.¹ Following Lehrer

¹ The structuralist thesis should not be interpreted too generally (see e.g. Cruse, 2000; Geeraerts, 2010; Lehrer, 1974; Lehrer and Lehrer, 1998). Semantic relationships are not the only determinants of meaning, as some early structuralists claimed. Rather, there are other aspects of meaning that are not purely linguistic in nature. For example, the meaning of a word, besides depending on its relationship to the meanings of other words, also depends on knowledge of the world, i.e. encyclopaedic knowledge (Allwood, 1998; Fillmore, 1985; Quine, 1951). Semantic networks are one of several principles that organize the lexicon, but arguably an important one; for example, the difficulty of explaining the meaning of 'Monday' without referring to 'weekday' and the other days of the week, or the meaning of 'father' or 'mother' without envisaging the concept of child, illustrates the semantic interconnection between words (Fillmore, 1985).

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(1985, p. 283), we can define a semantic field as 'a set of lexemes which cover a certain conceptual domain and which bear certain specifiable relations to one another'. A lexeme is an abstract notion referring to the set of inflectional forms of a word. For example, the inflectional forms 'field' (singular noun) and 'fields' (plural noun) are instances of the same lexeme. In this paper, the word 'word' will be used in the sense of lexeme unless specified otherwise.

The 'specifiable relations' referred to by A. Lehrer include relationships of similarity (synonymy), opposition (antonymy), and inclusion (hyponymy) of meaning, which have been studied extensively by scholars of lexical semantics (Cruse, 1986, 2000; Lehrer, 1974; Lyons, 1977; Murphy, 2010). These relationships will be discussed in more detail below (Section 2.4.1).

The methodological implication of the structuralist thesis is that analysis of a specific concept, such as that of risk, requires mapping the semantic relationships to other concepts with similar, more general, or opposite meanings. Details and subtle nuances of words' meanings are apparent only after comparison with related words. Thus, analysis of semantic fields can serve an important role in conceptual analysis (in turn, fundamental to any academic activity). Luhmann (1993), for example, in the structuralist spirit, attempts to determine the concept of risk by turning to the field of 'concepts of misfortune' (Luhmann, 1993, p. viii): 'Since the existing language has words for danger, venture, chance, luck, courage, fear, adventure (aventure) etc. at its disposal, we may assume that a new term comes into use to indicate a problem situation that cannot be expressed precisely enough with the vocabulary available' (Luhmann, 1993, p. 10).

Continuing previous work on the conceptual network in which risk is situated, this paper identifies and analyses the semantic field of risk. Despite previous interest in synonyms (e.g. 'hazard') and antonyms (e.g. 'safety') of 'risk', there have so far been only limited systematic attempts to address the wider semantic field of risk more generally (cf. Duffley and Arseneau, 2012; Fillmore and Atkins, 1992, 1994; Sonnett, 2010). This article sets out to do this by (a) identifying words related to 'risk' and (b) analysing the types of semantic relationships to the concept of risk. In total, close to 250 words are considered and classified based on their relationships to the concept of risk. Due to the vast number of words and relationships considered in this holistic approach, detailed semantic analysis of each relationship is impossible. Rather, the analysis provides a general overview that could, and should, be addressed in more detail in future research.

2. Methodology: semantic field analysis

Based on Lehrer's (1985) definition of semantic field, we can define semantic field *analysis* as the endeavour of (a) identifying the vocabulary used for a certain conceptual domain and (b) analysing how the words of this vocabulary are related to each other. Here, the concept of risk is the starting point for these two processes. We identify words that are semantically related to 'risk' and analyse how they are related. Both these processes will soon be discussed in detail, but first a few basic remarks will be made about the core element of analysis, namely, risk.

2.1. The word 'risk' and its family

'Risk' can refer to both a noun and a verb, each having various inflectional forms. Through the word-formation processes of compounding and derivation, the 'risk' vocabulary is extended. Compounding is the process of combining two (or more) words. For example, 'health' and 'risk' can be combined into 'health risk'. Derivation is often defined as the process whereby a new word is formed through affixation. For example, the adjective 'risky' results

from combining 'risk' with the bound suffix '-y'. It should be noted that in some analyses, nouns such as 'risk' are considered the result of 'zero derivation' (Bauer and Valera, 2005), the noun 'risk' being seen as derived from the verb 'risk'.

The notion of 'word family' is helpful for present purposes (Bauer and Nation, 1993; Cruse, 2000). A word family is a set of words derived from a single root (Cruse, 2000, pp. 149, 189, 194). For example, the same morpheme 'risk' is part of many different words of different word classes, such as the nouns 'risk' and 'riskiness', the verb 'risk', and the adjective 'risky', that are clearly related semantically. With the concept of word family we can collectively refer to such sets. Capital italic letters will be used to represent word families (e.g. *RISK*).

2.2. The concept of risk

The nature of concepts is controversial (Laurence and Margolis, 1999). The perspective adopted here is that concepts are word meanings seen at different levels of abstraction. Following Hansson (2011) and others (Merriam-Webster.com, n.d.; OED Online, n.d.), the noun 'risk' has the following three senses in everyday use (i.e. the noun is polysemous):

- (a) an *unwanted event* that may or may not occur, as in 'lung cancer is a risk for smokers';
- (b) the *cause* of an unwanted event that may or may not occur, as in 'smoking is a risk'; and
- (c) the *probability* of an unwanted event that may or may not occur, as in 'the risk of a nuclear meltdown is one in a million'.

Besides these senses, 'risk' is often ascribed additional meanings (Aven, 2012; Aven and Renn, 2009; Hansson, 2011). One such understanding of 'risk', common within risk and safety research, is as the (numerical) product of the probability and magnitude of an unwanted event.

Substantially less academic interest has been directed towards the verb 'risk' and the adjective 'risky', though there are more analyses of the verb than the adjective (see, e.g., Boholm, 2012; Duffley and Arseneau, 2012; Fillmore and Atkins, 1992; Kjellmer, 2007; Pustejovsky, 2000; Zaefferer, 2002). The verb 'to risk' essentially means to do something that could result in something unwanted (cf., e.g., Merriam-Webster.com, n.d.; OED Online, n.d.). The direct object of the verb can semantically take different forms. It can represent a potential unwanted event that could be incurred (e.g. to risk losing money), a valued possession (e.g. to risk one's life), or a deed (e.g. to risk a bet) (Duffley and Arseneau, 2012; Fillmore and Atkins, 1992, 1994). The agent of the risking can be the person affected if the unwanted event is realized, but need not be (cf. risking one's own life vs. risking the lives of others). In everyday use, the adjective 'risky' applies to a potential source of unwanted event (Boholm et al., 2016; Merriam-Webster.com, n.d.; OED Online, n.d.). However, note that dictionaries also list another but much rarer sense of 'risky', namely, that of *risqué*, i.e. slightly indecent and liable to shock (OED Online, n.d.).

On a more abstract level, the senses listed above have two semantic elements in common. First, the concept of risk implies adversity. Second, the concept of risk implies potentiality (e.g. events that 'may or may not occur'), referring to potential (not actual) events. Because of this potentiality, these events are also uncertain: it is unknown whether or not the event will occur. Given the adversity, the concept of risk presupposes a value at stake (Aven and Renn, 2009; Boholm and Corvellec, 2011; Hansson, 2010; Hilgartner, 1992; Möller, 2012; Rescher, 1983; Rosa, 1998; Shrader-Frechette, 1991).

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