Harmonising the Vocabulary of Risk

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Abstract

At a meeting held in November 2001 within the framework of the Council of Europe's Major Hazards Agreement, the need was expressed for an improved harmonisation of the vocabulary of 'risk', and specifically for a dictionary of key terms within the field. The present paper argues that an effective approach to meeting these needs would benefit from having a basis in frame semantics. The theory would enable lexicographers to indicate precisely similarities and differences between related terms, to produce an integrated semantico-syntactic analysis, and to classify relevant collocates. The paper seeks to demonstrate the applicability of frame theory, focusing on certain 'risk' terms and drawing on data from the BNC.

Introduction

At the Strasbourg Forum, organised from 19-21 November 2001 within the framework of the Council of Europe's EUR-OPA Major Hazards Agreement, a number of environmental scientists and other specialists – including terminologists and lexicographers – were invited to address the problems of reducing 'scientific uncertainty' in the field of environmental security and improving communications between scientific experts and decision makers. One issue singled out for particular attention at the Forum was the need to harmonise the terminology of 'risk' science. The present paper aims to set out some of the problems entailed by such a task, and in particular to consider proposals for a multilingual dictionary of key terms in the vocabulary of risk.

Terminological dictionary of 'risk' terms

Calls for such a dictionary came from the linguist and phraseologist Gertrud Gréciano [2001], supported by a group of lexicographers and computational linguists specialising in terminology. The dictionary would provide for encoding as well as decoding, include references to semantic role categories and phraseology and take account of differences of denotation and connotation between the uses of terms in specialist and non-specialist contexts.

Existing technical reference works and (especially) corpus data accessible on the Internet were the resources chiefly considered as suitable by the group. Some helpful support is already provided by the draft glossary *Terminology on Disaster Reduction* compiled by the Secretariat of the International Strategy for Disaster Reduction (ISDR). Though the definitions of key terms, which may in any given case be drawn from two or more different documents, are not always models of precision, the supporting documentation is often extensive, and provides many contextual aids to defining. The entry for *vulnerability*, for

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example, offers a detailed comparison of three possible definitions, each relating to a specific scientific discipline. The explanations shown at (1), (2) and (3) reflect the usage of natural and physical scientists, engineers, and social scientists, respectively. It is arguable that such variety-based differences might all be reflected in the same dictionary of the vocabulary of risk.

(1)   (*natural and physical scientists*) 'vulnerability is defined as proximity or exposure to natural hazards, or the probability of a disastrous occurrence'

(2)   (*engineers*) 'vulnerability [is defined] as the inability of a built structure (and/or infrastructure) to resist the strain or force exerted by natural or other disaster agents'

(3)   (*social scientists*) 'vulnerability [is defined] as the amount of coping capacity, or the degree to which social, cultural, political and economic factors influence the ability to prepare for, respond to, or recover from disaster'

These examples also illustrate the point that the accuracy of a definition in this domain depends in part on the precision with which key associated terms are used in that definition. For example, the word *hazard*, a key term in the vocabulary of risk, appears (appropriately) in the first definition of *vulnerability*. Similarly, in one definition of *hazard* itself, we find the words 'damaging physical events which …will lead to economic and social loss that may reach the scale of a disaster …', a clear recognition that disasters are at the end-point of a *scale* of 'damaging events'.

A connected point is that if terms such as *risk, hazard, danger, vulnerability, disaster, damage*, are indeed related semantically, and if their definitions are to be rigorously harmonised, then 'damaging event' (say) must be used consistently in all the definitions in which it appears. The evidence of the ISDR document, drawing as it does on a variety of specialist glossaries, indicates that this is far from being the case across many definitions of the vocabulary of risk. We need to ask, too, whether precision in defining can be achieved without the support of a theoretical framework.

Defining terms in the light of frame theory

In my own contribution to the Forum, I argued that an informed approach to the harmonisation of the key terms, and the fruitful analysis of concordances for purposes of compiling a multilingual dictionary, would benefit from having a basis in 'frame semantics'. In such an approach, according to Fillmore and Atkins, 'speakers can be said to know the meaning of a word only by first understanding the background "frames" [or "knowledge schemata"] that motivate the concept that the word encodes' [Fillmore & Atkins 1992; cf. Atkins 1994; Cowie 1998]. Within the theory, semantically linked words (such as *hazard* and *vulnerability*, for example) are not related to each other directly (in terms of synonymy or hyponymy, say), but by means of their connections to partly shared, 'semantic elements' in a given frame. In the semantics of the key term *risk* – already the subject of a detailed study by Fillmore & Atkins [1992] – various choices and possibilities, and negative and positive outcomes, give rise to elements in the basic frame, including uncertainty about the future (the element CHANCE) and a potential unwelcome development (the element HARM).

According to the study, these two categories alone make up the core of our understanding of several other terms within the field, including *peril, danger, venture, hazard*. Notice specifically, as is shown by the elaboration (at 4) of a definition originally found in the ISDR document, the elements RISKY SITUATION ('event or state of affairs threaten[ing] to cause ...'), HARM ('physical damage or economic loss'), and CONTEXT 'an area of known settlement, etc.' are crucial to our understanding of *hazard* as well as *risk*:

(4)   **hazard**: a natural or man-made *event or state of affairs which threatens to cause physical damage or economic loss*, or endangers human life and well-being (perhaps to the extent of causing a disaster), if it occurs in or close to *an area of human settlement, or agricultural or industrial activity*.

Opportunities and challenges of the approach

Semantic frame theory, I believe, offers a number of opportunities to terminologists and lexicographers in treating the vocabulary of 'risk'. First, as we have just briefly shown, the theory enables us to indicate very precisely points of similarity between closely related terms. Of undoubted value, too, is the fact that the model brings together semantic and syntactic insights, in that the one-to-two (or one-to-many) relations between elements and lexico-syntactic structures are clearly demonstrated.

In the following examples incorporating the noun threat, for instance, we can see that aggressor is realized first as a grammatical subject and second as a prepositional phrase introduced by from:

(5)   Aggr {the dolphins} were
        a threat
        VO {to the local fishing industry}

(6)   an imagined threat
        Aggr {from the few remaining ex-revolutionaries}

One of the useful lessons here for lexicographers is that many prepositional phrases relate to core elements in a given frame, and are not to be consigned to an adverbial waste-paper basket.

A third way in which frame theory can benefit lexicographers is by throwing light on the structure of various syntactic units, including complex *noun* phrases, and their relationships with other constructions. Of the two examples at (7) and (8), the first is a complex NP, the second, a clause. Despite the superficial differences, the units are semantically linked by virtue of the presence in both of VALUED OBJECT – *the plant's existence*:

(7)   the threat
        VO {to the plant's existence}

(8)   VO {the plant's existence}
        is under threat

These comments form part of a small exploratory study. Its samples are drawn from a broad range of BNC data, not from specialized sub-corpora, or from larger bodies of scientific material accessible on the Internet. Its conclusions relate to general, including semi-technical, English material only.

Semantic elements and syntactic structures

Referring earlier to *hazard* and *risk*, I tried to show how frame theory could bring to light close similarities of meaning. But equally, it can throw light on fine differences. Consider now *hazard* and *threat*. At the level of semantic roles, there are certainly important differences between these nouns. While *threat* as noun occurs freely in contexts in which VALUED OBJECT is realized as post-modification, *hazard* is not found in such a context. A typical post-modifier for the latter is one that realizes the element POTENTIAL VICTIM.

(9)   a greater threat
        VO {to the democratic constitution}

(10)   hazards
        PV {facing public service workers}.

Let us now turn to consider semantic elements in relation to syntactic structures. We shall look at *threat* and focus chiefly on the first structural element after it – its post-modification. So, *a threat to*, *a threat of*, *a threat from*, and so on.

The evidence, drawn from the British National Corpus, though not restricted in this study to any scientific domain, supports three major semantico-syntactic groupings:

- Post-modification realises VALUED OBJECT (VO)
- Post-modification realises INTENDED VICTIM (IV)
- Post-modification realises HARM (H)

The first two, with their verbal analogues, are shown at (11) and (12), and we can see that only the semantic roles of the prepositional phrases distinguish between them.

(11)   a threat
        VO {to everything he had fought for}
        ↔ threaten everything he had fought for

(12)   the threat
        IV {to people who blow the whistle on their employees}
        ↔ threaten people who blow the whistle on their employees.

The final group differs in three respects from the first two. As we can see, there is a superficial difference of preposition choice:

(13)   the threat

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H {of a price war}
↔ threaten a price war

But we notice too that H can combine with IV, and that consequent structural changes to the phrase affect the verbal analogue.

(14)　The threat
　　　　IV {to consumers}
　　　　H {of a price war}
　　　　↔ threaten consumers with a price war

We pick out, finally, the facts that post-modifiers are often infinitives, that they also realise the element Harm, and that in some cases there may be an equivalent preposition + noun (or gerund) pattern:

(15)　threats
　　　　H {to withdraw from the UK}
　　　　↔ threats
　　　　H {of withdrawal/withdrawing from the UK}

Let us finally turn to consider the collocability of *threat* and *hazard* – and specifically their verb collocates – in the light of the model we have been using. We need to note, first, that if we concentrate solely on verbs co-occurring with *hazard* or *threat* as their direct object or complement, there are wide differences in simple frequencies of occurrence. *Threat* as direct object or complement is found to occur 76 times out of 150 with a verb, *hazard* only 53 times out of 150. Moreover, whereas the copular verbs – *be, become, constitute, represent,* and so on – account for 36 out of the former total of 76, they are a much higher proportion of the latter total: 30 out of 53. This is largely explained by the fact that highly technical excerpts – including some texts from the field of environmental control – feature disproportionately in *hazard* material. Allowing for the small size of the sample, there is a marked tendency for *hazard* to occur in highly specialized contexts. This in turn helps to explain a high level of nominalisation, and a consequent dearth of lexical verbs.

Threat, by contrast, co-occurs with 40 lexical verbs, and these fall interestingly into three major sets reflecting, first, the aggressor's utterance of a threat, and then, the intended victim's possible attitude towards, or reaction to, a threat. We have, then, the following groups:

- UTTERANCE　　*make, offer, utter, issue, yell a threat*
- PERCEPTION　　*view as, take lightly/seriously, regard as, perceive as, see as a threat*
- REACTION　　　*dismantle, shrug off, respond to, deal with, combat, see to, reduce a threat*

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Conclusion

This has been a small-scale, exploratory study, expressing the response of one member of a discussion group to a number of descriptive challenges. It concentrates on only two of the features set out in the dictionary blueprint presented at the Strasbourg meeting, and addresses none of its multi-lingual concerns. Perhaps enough has been said, however, to show that frame semantics has much to offer to the designer of a terminological dictionary.

Semantic elements such as RISKY SITUATION and HARM – as we saw in the case of *hazard* – are a powerful support when refining definitions or distinguishing between related items. Then too, one can look to the model to provide an integrated description of semantic categories and syntactic structures, such a description being of particular value for encoding. Finally, as we have just seen in the case of *threat*, the approach can throw light on the semantic classification of collocates.

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