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6. Frame-based contrastive lexical semantics in Japanese FrameNet: The case of *risk* and *kakeru*

Kyoko Hirose Ohara

1. Introduction

Following Fillmore and Atkins' (1992) pioneering study of the English Risk frame, this paper proposes a contrastive analysis of linguistic expressions in Japanese and English pertaining to the concept of RISK, encountered during the creation of Japanese FrameNet (hereafter JFN). It examines the advantages and limitations of a frame-based approach to contrastive lexicography, and considers polysemy structures across typologically unrelated languages (cf. Fillmore and Atkins 2000; Boas 2001, 2005; Subirats and Petruck 2003). In particular, the paper analyzes correspondences between English and Japanese expressions pertaining to the Risk frame by investigating translation equivalents of the English verb *risk* and by examining the polysemy structure of one of the corresponding Japanese lexical units (hereafter LUs).

The paper is based on data from the JFN project (Ohara et al. 2004), whose goal is to create a FrameNet-style lexicon of Japanese described in terms of Frame Semantics by annotating corpus examples with frame elements (hereafter FEs). The resulting JFN database will thus contain valence descriptions of Japanese LUs and a collection of annotated corpus attestations. JFN asks two important research questions. First, to what extent is the Frame Semantics approach suitable for analyzing the Japanese lexicon? Second, to what extent are the existing English-based semantic frames suitable for characterizing Japanese LUs?

Furthermore, JFN will eventually link its database to those of FrameNets for other languages, so that the integrated databases can be used as frame-based multilingual lexical databases (cf. Boas 2001, Fontenelle 2000, Subirats and Sato 2004).¹ Boas (2005) has already suggested frames

1. A joint project between FrameNet and JFN on "Frame-based Japanese-English bilingual lexicon", linking FrameNet and JFN data, started in April,

as interlingual representations for multilingual lexical databases. Under such a view, lexicon fragments are linked to each other via semantic frames, which function as interlingual representations. However, the hypothesis has not been examined systematically for typologically unrelated languages such as English and Japanese. The present work begins to fill this gap.

Investigating whether semantic frames may serve as an interlingua between English and Japanese, this paper discusses English-Japanese correspondences in both directions. First, it focuses on the English verb *risk* and examines its Japanese translation equivalents, exploring whether the Japanese expressions should indeed be defined as LUs in the same set of frames as *risk*. The paper then analyzes the Japanese verb *kakeru*, one of whose senses is comparable to that of English *risk*, and considers the semantic frames that the Japanese verb evokes.

The paper is structured as follows. Section 2 first summarizes previous analyses of semantic frames related to the concept of RISK and presents the senses of the English verb *risk*, the basis for the discussion of Japanese data in the rest of the paper (Section 2.1). It then analyzes Japanese translation equivalents of the verb *risk* (Section 2.2) and discusses the English-Japanese correspondences via frames (Section 2.3). Section 3 describes the semantic network of the Japanese verb *kakeru* and compares it with that of *risk*. Finally, Section 4 concludes the discussion.

2. The Risk frame: *risk.v* and its Japanese translation equivalents

The complexity of the Risk frame makes it particularly appropriate for studying polysemy structures of lexical items in English and Japanese: while the frame itself is static, it evokes a hypothetical scenario (Hasegawa and Ohara 2006: 356); and yet, since every culture needs to deal with the concept, every language will have a means of expressing it. While the Risk frame and the LUs that evoke it have been studied extensively for English (Fillmore and Atkins 1992, 1994, Fillmore et al. 2003, Pustejovsky 2000), the Japanese lexical material that pertains to the concept of RISK has not been examined at all until recently (Ohara 2006).

2007 and continued until March, 2009. The joint project was being supported by the Japan Society for Promotion of Science (JSPS) under the Japan-U.S. Cooperative Science Program.

First, as a summary of the previous work on RISK-related frames and of the senses of the English verb *risk*, I present the analyses by Hasegawa et al. (2006). They will be the basis for the discussion of the Japanese data and for the contrastive analysis of English and Japanese in the rest of the paper. They provide the most recent and updated treatment of the frames and of the verb by one of the co-authors of the seminal papers on the topic (Fillmore and Atkins 1992, 1994). Next, to determine whether semantic frames may function as interlingual representations for LUs in the two languages, the Japanese translation equivalents of English *risk.v* in each of the frames are discussed. Finally, it is shown that even if it is possible to posit the same semantic frames for the purpose of analyzing both Japanese and English, sometimes seemingly corresponding words and expressions in the two languages may overlap only partially in their distributions across the semantic frames.

2.1. The Risk frame

The schema, or the situation type, for the Risk frame, taken from Hasegawa et al. (2006: 2), is shown in Figure 1:

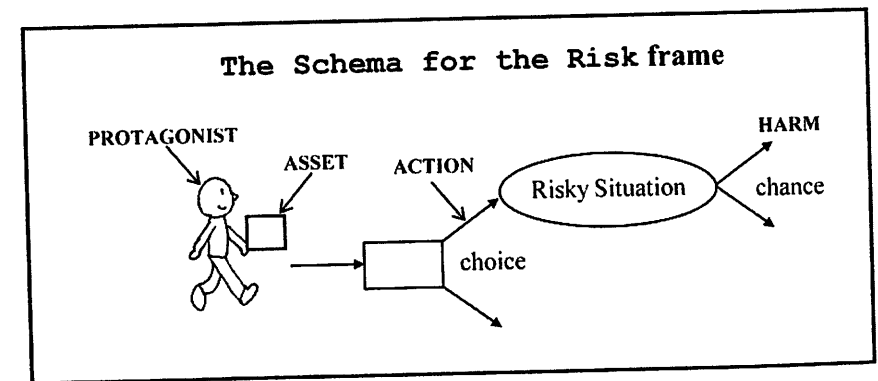


Figure 1. The schema for the Risk frame

Currently FrameNet classifies FEs into three levels: core, peripheral, and extra-thematic, based on their centrality to a particular frame (Ruppenhofer et al. 2006: 26). A core FE instantiates a conceptually necessary component of a frame, while making the frame unique and different from

other frames (*ibid.*). The core FEs pertaining to the *Risk* frame are captured by the following definitions²

The core FEs of the *Risk* frame³

- ACTION:** the act of the **PROTAGONIST** that has the potential of incurring **HARM** (*a trip into the jungle, swimming in the dark*).
- ASSET:** a valued possession of the **PROTAGONIST**, seen as potentially endangered in some situation (*health, income*).
- HARM:** a potential unwelcome development coming to the **PROTAGONIST** (*infection, losing one's job*).
- PROTAGONIST:** the person who performs the **ACTION** that results in the possibility of **HARM** occurring.

Following Hasegawa et al. (2006: 5), I analyze the senses of *risk.v* as distinguishable by positing three frames, differing from one another in terms of which FEs are foregrounded (Fillmore et al. 2003). They are the *Jeopardizing*, *Incurring*, and *Daring* frames.⁴ In the *Jeopardizing* frame, the **PROTAGONIST** and **ASSET** are foregrounded and encoded as core FEs,⁵ as in (1), where the **PROTAGONIST** is realized as the subject and the **ASSET** as the direct object of the verb. In the *Incurring* frame,

the **PROTAGONIST** and the **HARM** are foregrounded, as in (2), where the **PROTAGONIST** is the subject and the **HARM** is the direct object. In the *Daring* frame, as shown in (3), the **PROTAGONIST** and the **ACTION** are foregrounded as the subject and the direct object, respectively.

(1) *Jeopardizing* frame

He risked **his life** {for a man he did not know}.

PROTAGONIST ASSET BENEFICIARY

(2) *Incurring* frame

He risked **losing his life savings**

PROTAGONIST HARM

{by investing in such a company}.

ACTION

(3) *Daring* frame

I wouldn't risk **talking like that in public**.

PROTAGONIST ACTION

By stating the facts about the direct object of the verb in terms of the FEs **ASSET**, **HARM**, and **ACTION**, the three frames allow the verb senses to be described perspicuously and accounted for straightforwardly.⁶

I argue that each of the *Jeopardizing*, *Incurring*, and *Daring* frames bears a particular relation to the *Risk* frame which may be characterized as a type of frame-to-frame relation, namely that of *Perspective_on* (Ruppenhofer et al. 2006: 103–108). FrameNet currently defines eight types of frame-to-frame relations: *Inheritance*, *Perspective_on*, *Subframe*, *Precedes*, *Inchoative_of*, *Causative_of*, *Using*, and *See_also*. Each frame relation in the FrameNet data is a directed (asymmetric) relation between two frames, where one frame (the less dependent, or more abstract) may be called the *Super_frame* and another (the more dependent, or less abstract) the *Sub_frame*. In the *Perspective_on* relation, a more specific and infor-

2. According to Hasegawa et al. 2006, the peripheral FEs of the *Risk* frame include the following: **CHANCE:** the uncertainty about the future. **RISKY SITUATION:** the state of affairs within which the **ASSET** might be said to be at risk. These FEs are not realized linguistically in *risk.v* sentences.

3. In the previous analyses, the FEs are given slightly different names, but their definitions are essentially the same (Fillmore and Atkins 1992: 81–84; Fillmore and Atkins 1994: 16; Fillmore et al. 2003: 241): **ACTION:** formerly **DEED** (Fillmore and Atkins 1992), **RISK_ACTION** (Fillmore et al. 2003); **ASSET:** formerly **VALUED OBJECT** (Fillmore and Atkins 1992), **POSSESSION** (Fillmore and Atkins 1994); **HARM:** formerly **BAD** (Fillmore and Atkins 1994), **BAD_OUTCOME** (Fillmore et al. 2003); **PROTAGONIST:** formerly **ACTOR** (Fillmore and Atkins 1992).

4. The current FrameNet analysis of the senses of *risk.v*, however, places them in a family of frames with relation to other frames. The *Jeopardizing* and *Incurring* uses of *risk.v* are analyzed as different perspectives on a generalized scenario (see the *Risk_scenario* and *Risky_situation* frames). The *Daring* sense of *risk.v* is in a separate frame, *Daring*, which is a subtype of the *Intentionally_act* frame (Russell Lee-Goldman, personal communication). See also Pustejovsky (2000).

5. In determining which FEs are considered core, FrameNet also considers some formal properties that provide evidence for core status. For example, when a FE always must be overtly specified, it is core (Ruppenhofer et al. 2006: 26).

6. Even though the three frames reflect the three 'dictionary senses' of *risk.v*, which are partly constrained by the condition of substitutability, they do not correspond to different schemas (cf. Fillmore and Atkins 1994: Figure 5). In Frame Semantics, "polysemy exists when the use of a word instantiates different schemas." (*ibid.*: 18) Therefore, it is debatable whether it is appropriate to characterize the three frames as describing a polysemy structure in the strict Frame Semantics sense. For the time being, however, I treat the three frames as describing the polysemy structure of *risk.v*.

mative name is given to the Super_frame and the Sub_frame: Neutral frame and Perspectivized frame, respectively. The Perspective_on relation is characterized as “(t)he use of [the Perspective_on] relation indicates the presence of at least two different points-of-view that can be taken on the Neutral frame” (brackets are mine).

According to Ruppenhofer et al. (2006), a Neutral frame is normally Non-lexical and Non-perspectivized. Also, a single Neutral frame generally has at least two Perspectivized frames, but in some cases, words of the Neutral frame are consistent with multiple different points-of-view while the Perspectivized frame is consistent with only one. Whenever there is a state of affairs that is describable by a frame in a Perspective_on relation, all the other frames connected to it by the frame relation can also be used to describe the same state of affairs (ibid.: 106–7).

An example of sets of frames that have Perspective_on relations are the Commerce_goods_transfer, the Commerce_buy, and the Commerce_sell frames. The Commerce_goods_transfer frame is the Neutral frame, which is Non-lexical and Non-perspectivized; the Commerce_buy and Commerce_sell frames are Perspectivized frames, which are evoked by verbs like *buy* and *sell* respectively.

In the case of the RISK-related frames, the Risk frame is the Neutral frame and the Jeopardizing, Incurring, and Daring frames are the Perspectivized frames. English *risk.v* is consistent with the three points-of-view associated with the Jeopardizing, Incurring, and Daring frames. That a state of affairs describable by one of the three frames can also be described by the other two frames is shown in the following sentences, which may be construed as describing the same scene:

(4) Jeopardizing frame

He risked his life {for a man he did not know}.

PROTAGONIST ASSET BENEFICIARY

(5) Incurring frame

He risked losing his life {for a man he did not know}.

PROTAGONIST HARM BENEFICIARY

(6) Daring frame

He risked saving a man he did not know.

PROTAGONIST ACTION

English *risk.v* is peculiar since it is compatible with multiple perspectives. In contrast to *buy.v*, which is compatible only with the perspective of the Commerce_buy frame and *sell.v*, which is compatible only with

the Commerce_sell frame, *risk.v* is compatible with the perspective of any of the Jeopardizing, Incurring, and Daring frames.

Having discussed the senses of English *risk.v*, the semantic frames that the verb evokes, and the relations among the frames, let us now turn to the Japanese translation equivalents of the English verb to see whether the ‘corresponding’ Japanese expressions involve the same semantic frames.

2.2. The Japanese translation equivalents of *risk.v*

English *risk.v* in the Jeopardizing, Incurring, and Daring frames and the Japanese translation equivalents are shown in (I) through (III). The Japanese expressions that correspond to English *risk.v* are indicated by the bold type in sentences (1a) through (3a).

(I) Jeopardizing frame

PROTAGONIST risk.v ASSET
NP.Ext target NP.Obj

- (7) [He_{Protagonist}] **risked** [his life_{Asset}] [for a man he did not know_{Beneficiary}].

Corresponding Japanese Expressions: *kakeru, tosu, kiken ni sarasu*

- (8) naze [syooboosi wa_{Protagonist}] [hito no tame ni_{Beneficiary}]
why firefighters TOP people GEN sake DAT

[inoti o_{Asset}] **kakeru** no ka.
life ACC NMLZ Q

‘Why do firefighters risk their lives for others?’

- (9) ... [syoku o_{Asset}] **tosu** ta yuuki ni atama ga sagaru.
career ACC PERF bravery DAT head NOM descend

‘(I) take off my hat for the bravery of risking her career.’

- (10) ... [kanozyo wa_{Protagonist}] iraku ni itte [inoti o_{Asset}]
she TOP Iraq GOAL go life ACC

kiken ni sarasita.
risk DAT expose-PAST

‘She went to Iraq and risked her life.’

(II) Incurring frame

PROTAGONIST risk.v HARM
NP.Ext target PPby.Obj

- (11) [He_{Protagonist}] **risked** [losing his life savings_{Harm}]
 {by investing in such a company_{Action}}.

Corresponding Japanese Expression: *kiken o okasu*

- (12) ... [sizi kiban kara no hanpatu no_{Harm}]
 support base ABL GEN objection GEN
kiken o okas azaru o enakatta ...
 risk ACC take could.not.help
 '(He) had to risk objections from (his) support base.'

(III) Daring frame

PROTAGONIST risk.v ACTION
 NP.Ext target VPing.Obj

- (13) Daring frame
 [I_{Protagonist}] wouldn't risk [talking like that in public_{Action}].

Corresponding Japanese Expression: *aete*

- (14) ... buka no temae, tataka e nai to yuu koto
 subordinates GEN front fight can NEG COMPL say thing
 wa, sazo iinikukatta ni tigainai ga,
 TOP how was.difficult.to.say DAT must CONJ
 sono zyoo wa sutete, **aete**
 that emotion TOP abandon daringly
 [hakkiri yuu beki desita_{Action}].
 explicitly say should PAST
 'It must have been very difficult (for him) to say in front of the men
 under his command that (Japan) cannot fight, but (he) should have
 abandoned such an emotion and (he) should have risked saying it
 explicitly.'

Risk.v in the Jeopardizing frame may be translated into Japanese using either of the verbs *kakeru* or *tosu*, or a multi-word verbal expression *kiken_ni_sarasu*, as shown in sentences (8) through (10). Among the three Japanese expressions, *kakeru* will be discussed in more detail in Section 2.3.1 below.

Risk.v in the Incurring frame is usually translated into Japanese with the multi-word form *kiken_o_okasu*, literally meaning 'to commit a

risk'.⁷ When the noun *kiken* 'risk' is modified by a linguistic realization of the notion HARM, the whole sentence is interpreted as pertaining to the Incurring frame as in (12). Uses of *kiken_o_okasu* will be discussed in more detail in Section 2.3.2 below.

Daring.risk.v is usually translated into Japanese NOT using a verb but instead using an adverb *aete* 'daringly' as in (14). That is, in the case of Daring sentences, the possibility of expressing the concept of RISK as a clausal head does not exist in Japanese (See also Section 2.3.3 below and Hasegawa et al. 2006: 10).⁸

2.3. English-Japanese correspondences via semantic frames

First, informal representations of the correspondence between *risk.v* and *kakeru.v* in the Jeopardizing frame are given. Next, issues concerning the multi-word form *kiken_o_okasu* are discussed, namely, which of the three Risk-related uses it can have and under what conditions, as well as whether it should be recognized as an LU in each of the three Risk-related frames. Lastly, the correspondence in the Daring frame is discussed.

2.3.1. Risk.v and kakeru.v

The uses and the valence patterns of Jeopardizing.*kakeru.v* closely correspond to those of Jeopardizing.*risk.v*. In addition to the core FEs PROTAGONIST and ASSET, *kakeru* can also be accompanied by an

7. There is a variant form *risuku_o_okasu* with the noun *risuku* 'risk' instead of *kiken*:

(i) ... [nihon gawa kara taiwa o utikiru_{Harm}]
 Japan side ABL dialogue ACC cut.off
risuku wa okasi taku nai ...
 risk TOP take want NEG
 '(We) don't want to risk cutting off the dialogue from the Japanese side ...'

8. Other so-called interpretation predicates in English such as *manage*, *deign* and *condescend* are also translated into Japanese as adverbials, with almost no possibility of expressing the idea in a main verb. This seems to be due to differences in basic clause structure between English and Japanese and suggests profound semantic-typological differences between the two languages (Hasegawa et al. 2006: 13).

expression encoding one of the following FEs: BENEFICIARY (16), PURPOSE (18), or MOTIVATION (20):

(15) Jeopardizing frame

Why did [he _{Protagonist}] **risk** [his life _{Asset}]
[for a man he did not know _{Beneficiary}]?

(Fillmore and Atkins 1992: 88)

[NP-*ga* _{Protagonist}] [NP-*no tame ni* _{Beneficiary}] [NP-*o* _{Asset}] *kakeru*

(16) *naze* [syoo_{boosi} *wa* _{Protagonist}] [hito *no tame ni* _{Beneficiary}]
why firefighters TOP people GEN sake DAT

[*inoti o* _{Asset}] **kakeru** *no ka*.
life ACC NMLZ Q

'Why do firefighters risk their lives for others?'

(17) Jeopardizing frame

Why should [he _{Protagonist}] **risk** [his life _{Asset}]
[to try to save Brooks _{Purpose}]? (Fillmore and Atkins 1992: 89)

[NP-*ga* _{Protagonist}] [NP-*no tame ni* _{Purpose}] [NP-*o* _{Asset}] *kakeru*

(18) "doosi" to *ie ba,* *mukasi wa*
QUOTE say COND formerly TOP

keppan *o* *osite,*
petition-sealed-with-blood ACC seal

[*kyootuu no* *mokuteki no* *tame ni* _{Purpose}]
common GEN purpose GEN sake DAT

inoti o _{Asset}] **kakeru** *nakama desita*.
life ACC buddy COP-PAST

'In the past, *doosi* referred to buddies among whom people risked their lives for a common goal, by sealing (documents) with blood.'

(19) Jeopardizing frame

I have **risked** [all that I have _{Asset}] [for this noble cause _{Motivation}].
(Fillmore and Atkins 1992: 89)

[NP-*ga* _{Protagonist}] [NP-*ni* _{Motivation}] [NP-*o* _{Asset}] *kakeru*

(20) ... [yamanoi *husai* *no* _{Protagonist}] *akumademo*
Mr. and Mrs. GEN persistently

[*onore no yume ni* _{Motivation}]
self GEN dream DAT

[*inoti o* _{Asset}] **kakeru** *sono sugata ...*
life ACC that attitude

'... the attitude of Mr. and Mrs. Yamanoi, who risked their lives for the sake of their own dream...'

Among the three Risk-related frames, the use of the Japanese verb *kakeru* is restricted to that of Jeopardizing. Thus, it seems appropriate to define the Japanese LU *kakeru* as evoking the Jeopardizing frame (But see Section 3 below). Tables 1 and 2 below summarize relevant valence information for Jeopardizing.*risk.v* and Jeopardizing.*kakeru.v*, respectively.

Table 1. Valence table for *risk* in the Jeopardizing frame

-
- | | |
|----|--|
| a. | [PROTAGONIST: NP.Ext] <i>risk.v</i> [ASSET: NP.Obj] |
| b. | [PROTAGONIST: NP.Ext] <i>risk.v</i> [ASSET: NP.Obj] [BENEFICIARY: PP- <i>for</i> .Dep] |
| c. | [PROTAGONIST: NP.Ext] <i>risk.v</i> [ASSET: NP.Obj] [PURPOSE: VP- <i>to</i> .Dep] |
| d. | [PROTAGONIST: NP.Ext] <i>risk.v</i> [ASSET: NP.Obj] [MOTIVATION: PP- <i>for</i> .Dep] |
-

Table 2. Valence table for *kakeru* in the Jeopardizing frame

-
- | | |
|----|---|
| a. | [PROTAGONIST: NP.Ext- <i>ga</i>]
[ASSET: NP.Dep- <i>o</i>] <i>kakeru</i> |
| b. | [PROTAGONIST: NP.Ext- <i>ga</i>] [BENEFICIARY: NP.Dep- <i>no tame ni</i>]
[ASSET: NP.Obj- <i>o</i>] <i>kakeru</i> |
| c. | [PROTAGONIST: NP.Ext- <i>ga</i>] [PURPOSE: NP.Dep- <i>no tame ni</i>]
[ASSET: NP.Obj- <i>o</i>] <i>kakeru</i> |
| d. | [PROTAGONIST: NP.Ext- <i>ga</i>] [MOTIVATION: NP.Dep- <i>ni</i>]
[ASSET: NP.Obj- <i>o</i>] <i>kakeru</i> |
-

Based on the valence descriptions, the partial correspondence between the two LUs is represented in Figure 2.⁹

9. The actual correspondence between the valence tables of the two LUs is quite large. In fact, one of the aims of the Japan-U.S. joint project "Frame-based Japanese-English bilingual lexicon" funded by JSPS was precisely to pursue ways in which correspondences between LUs via semantic frames in the two languages may be best represented and described (See also Note 1).

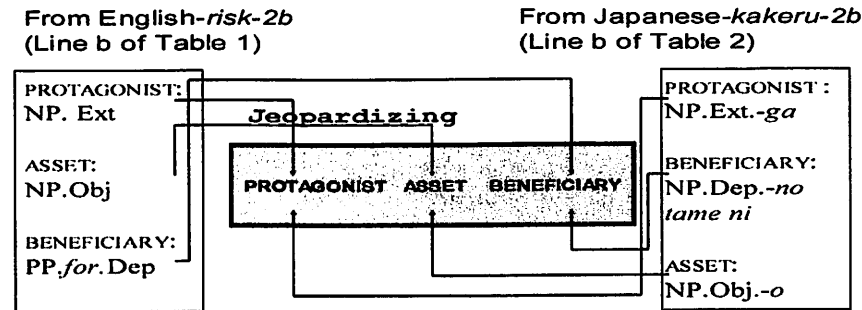


Figure 2. Linking relevant English and Japanese lexicon fragments via the Jeopardizing frame

2.3.2. Risk.v and kiken_o_okasu.v

The multi-word phrase *kiken_o_okasu*, presented as a translation equivalent of *Incurring.risk.v* in Section 2.2, also pertains to the Jeopardizing and the Daring frames as well. First, when the noun *kiken* in the multi-word form *kiken_o_okasu* is modified by linguistic material that expresses an ASSET, the sentence is interpreted as evoking the Jeopardizing frame, as shown in (21).

Jeopardizing: [NP-*no* _{Asset}] *kiken o okasu*

(21) ... [inoti/seimei no _{Asset}] *kiken o okasite* mo
life GEN even

[syoogensi _{Action}] te kureru yuiitu no hito deatta ...
testify sole GEN person COP-PAST

'... (she) was the only person who would testify even risking (her) life...'

Occurrences of the Jeopardizing sense with *kiken_o_okasu* seem to be restricted to cases where the modifying phrase of *kiken* contains either of the two nouns *inoti* and *seimei*, both meaning 'life'.

Second, when the multi-word phrase is used sentence-medially followed by an ACTION VP with no modification on the noun *kiken*, the sentence is interpreted as evoking the Daring frame, literally meaning "the PROTAGONIST, taking a risk, performed the ACTION," or "the PROTAGONIST took a risk and performed the ACTION." In other words, in such a sentence, the multi-word expression as a whole is functioning as an adverbial modifying the following ACTION VP, as seen in (22).

Daring: *kiken o okasi(te)* [VP _{Action}]

(22) ... [kookai zyuusatusareru ootoo o
public execution-PASS younger.brother ACC

sukuuo to _{Purpose}] *kiken o okasite*
rescue COMPL risk ACC take

[saigon (gen hootimin) si e sinnyuusuru _{Action}] ...
Saigon present Ho Chi Minh City GOAL enter

lit. '(She) entered Saigon (present Ho Chi Minh City), taking a risk, to rescue her brother from public execution.'

'(She) risked entering Saigon (present Ho Chi Minh City) to rescue her brother from public execution.'

The multi-word expression in question appears sentence-medially in the default continuative form *kiken_o_okasi* or in the *-TE* form *kiken_o_okasite* (22), and thus not as the main predicate of the sentence. Moreover, unlike the *Incurring* use in (12), the multi-word expression is not preceded by a modifier expressing a HARM. Instead, a VP encoding an ACTION follows *kiken_o_okasi(te)*.

Based on examples such as (21) and (22) pertaining to the Jeopardizing and Daring frames, in addition to the *Incurring* uses in (12), it thus seems appropriate to define *kiken_o_okasu* as a multiword LU in each of the three Risk-related frames.

2.3.3. Risk.v and aete.adv

As pointed out in Section 2.2, *Daring.risk.v* can only be translated into Japanese using an adverbial, i.e., *aete.adv*. There seems to be no possibility of expressing the concept of the Daring frame using a clausal head in Japanese (See also Note 8). The correspondence between English *risk.v* and Japanese *aete.adv* via the Daring frame is a case in which semantic frames as an interlingua representation link words belonging to distinct parts of speech in two languages.

Let us summarize the above discussions concerning English-Japanese correspondences via semantic frames. The analyses of the Japanese translation equivalents of English *risk.v* have revealed three different types of English-Japanese correspondences. First, as for *risk.v* and *kakeru.v*, their uses may be regarded as corresponding to each other in the sense that they both evoke the same Jeopardizing frame. That is, both *risk.v* and *kakeru.v* are compatible with the perspective of the Jeopardizing frame. Second, as for *kiken_o_okasu.v*, it is compatible with any of the

perspectives of the Jeopardizing, Incurring, and Daring frames, just like *risk.v*. Finally, English Daring.*risk.v* corresponds to Japanese Daring.*aete.adv*, even though they belong to different parts of speech.

The above analyses, especially those pertaining to Jeopardizing. *kakeru.v* and Incurring.*kiken_o_okasu.v*, suggest that when contrasting the semantics of words in different languages, it is not sufficient to examine only the corresponding senses of the words in the two languages. It is also necessary to take into account the entire polysemy structure of each word within the language before trying to link the words in the two languages. Let us now turn to the analysis of the semantic network of the Japanese verb *kakeru*, since among the LUs which are construed as translation equivalents of *risk.v*, *kakeru.v*'s correspondence to the English verbs via the Jeopardizing frame seems to be the most straightforward in that it is a one-to-one correspondence.

3. Japanese *kakeru.v* and its frames

This section discusses the semantic network for *kakeru*, one of the translation equivalents of *risk.v*. In most English-Japanese bilingual dictionaries, the verb *kakeru* indeed occurs as one of the equivalents of *risk*. It should be noted in passing that in Japanese there are several sets of characters used for the same sound sequence. However, the fact that the same characters 賭ける are used for each of the senses described below motivates hypothesizing their semantic interconnectedness, at least synchronically. In the rest of this section, I will first provide the network diagram of the senses of *kakeru*, following the semantic network analyses of English *crawl* and French *rampier* by Fillmore and Atkins (2000). I will then discuss the overlaps and mismatches between the senses of *risk* and *kakeru* and finally consider how far these two verbs are true equivalents. The semantic network for *kakeru* is given in Figure 3.

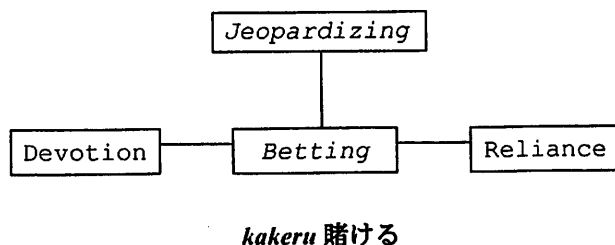


Figure 3. Semantic Network for the Verb *kakeru*

In Figure 3, each of the senses is identified by a frame name, which will be described below. The senses 'shared' with *risk* are shown in italics. The lines can be thought of as representing sense extensions.

In addition to being used in the Jeopardizing sense, *kakeru* is used in the Betting sense as well, just like *risk*. The Betting frame may be characterized as showing a relationship between PROTAGONIST, INVESTMENT, and a chance-involved entity or event CHANCE. The PROTAGONIST exposes the INVESTMENT to loss by wagering it on a CHANCE (see also Fillmore and Atkins 1992: 100).

Betting frame

(23a) [We_{Protagonist}] *risked* [all that money_{Investment}] [on a horse_{Chance}].
(Fillmore and Atkins 1992: 100)

(23b) [kare wa_{Protagonist}] [3000 en_{Investment}]
he TOP 3000 yen ACC
[sono uma ni_{Chance}] *kaketa*.
that horse DAT bet PAST
'He bet 3000 yen on that horse.'

Let us now examine the uses of *kakeru*, which are not shared by *risk* (non-italicized in Figure 3 above). Unlike *risk*, *kakeru* may be used in the Devotion frame, which involves a situation in which the PROTAGONIST expends an ASSET, usually time or energy, to perform some ACTIVITY in order to achieve some meaningful goal. Here, *kakeru* means 'devote' or 'dedicate.'

Devotion frame

(24a) [I_{Protagonist}] am *devoting* [myself_{Asset}] [to this mystery_{Activity}].
because I want to be a man. (from *British National Corpus*)

(24b) [kare wa_{Protagonist}] [seesyun o_{Asset}] [yakyuu ni_{Activity}] *kaketa*.
he TOP youth ACC baseball DAT PAST
'He devoted his youth to (playing) baseball.'

Kakeru may also be used in the Reliance frame. The Reliance frame is currently defined in FrameNet as follows.¹⁰ "A PROTAGONIST needs a MEANS_ACTION performed for their BENEFIT. The relevant MEANS_

10. At the time of writing this paper, the Betting and Devotion frames have not yet been defined in FrameNet.

ACTION is often evoked only by reference to an INTERMEDIARY who performs it. Also, if the PROTAGONIST performs the MEANS_ACTION himself, the INSTRUMENT that they use may be referred to in place of the MEANS_ACTION." In this frame, *kakeru* means 'rely on.'

Reliance frame

(25a) [She_{Protagonist}] had to **rely on** [friendly passers-by_{Intermediary}].
[to give directions_{Benefit}]. (from *British National Corpus*)

(25b) [kare wa_{Protagonist}] [syoosin o_{Benefit}]
he TOP promotion ACC
[tyokuzoku zyoosi ni_{Intermediary}] **kaketa**.
direct supervisor DAT rely PAST
'He relied on his direct supervisor for a promotion.'

Finally, let us consider how far *kakeru* and *risk* are true equivalents. Although *kakeru* seems to have the same uses as *risk* in the Jeopardizing and Betting frames, it cannot be used in the Incurring and Daring uses and is instead used in the Devotion and Reliance frames. I suspect that the following may be the reason for the divergences: While both of the notions of CHANCE and HARM are central to *risk*, what is crucial for the senses of *kakeru* is the notion of CHANCE only (see also Fillmore and Atkins 1992: 80).

In its use in the Jeopardizing and Betting frames *kakeru* seems to be equivalent to *risk*. The Jeopardizing and Betting frames involve both of the notions of CHANCE and HARM. That is, both frames have to do with uncertainty about the future and possible loss of an ASSET, i.e., a HARM. In Jeopardizing *kakeru* sentences, the noun *inoti* 'life' often appears instantiating the ASSET as in (26). In Betting *kakeru* sentences, the ASSET is restricted to something that can be regarded as INVESTMENT, such as money as in (27).

(26) Jeopardizing frame

[tai tero butai wa_{Protagonist}]
anti terrorist team TOP
[hitoziti kyuusyutu ni_{Purpose}] [inoti o_{Asset}]
hostages rescue DAT life ACC
kaketa.
risk PAST

'The antiterrorist team risked their lives to rescue the hostages.'

(27) Betting frame

[kare wa_{Protagonist}] [hitoziti kyuusyutu seikoo ni_{Outcome}]
he TOP hostages rescue success DAT
[100 doru o_{Asset}] **kaketa**.
dollar ACC bet PAST

'He bet 100 dollars on the success of the hostage rescue operation.'

The Devotion frame also pertains not only to the notion of CHANCE but also HARM. However, whereas the HARM involved in the Jeopardizing and Betting frames is usually losing an ASSET, the HARM pertaining to the Devotion frame is wasting the ASSET, e.g. time or energy. In (28), for example, failing to create *sake* with a new taste does not usually involve dying.

(28) Devotion frame

[kore made ni naku karuku, sukkirisita sake o]
this until DAT non-existent light pure ACC
[tukuridasu koto ni_{Purpose}] [zinsei o_{Asset}] **kaketa**.
create thing DAT span.of.life ACC dedicate PAST
'(He) dedicated his life to creating *sake* which tastes lighter and purer than has ever been tasted.'

The Reliance frame does not directly involve the notion of HARM (29) and pertains to CHANCE only (30).

Reliance frame

(29) [kantoku wa_{Protagonist}]
manager TOP
[kare no gizyutu to keiken ni_{Instrument}] **kaketa**.
he GEN technique and experience DAT rely PAST
'The (baseball) manager counted on his technique and experience.'

(30) [ato no iti-wari ni_{Instrument}] **kakeru**.
rest GEN 10% probability DAT
'Rely on the last 10 percent probability.'

As discussed in Section 2.1, the Jeopardizing, Incurring and Daring frames describe the same scene but they are associated with different points of view. Further analysis is needed, but at least the reason why *kakeru* does not have the Incurring use appears to be due to the

fact that the notion of HARM, which is foregrounded in the Incurring frame, is not central to the senses of *kakeru*.

4. Conclusion

This paper investigated lexical correspondences between English and Japanese, a typologically unrelated pair of languages, with respect to the viability of semantic frames as an interlingua for the two languages. It demonstrated the complexity of lexical correspondences between two languages. Specifically, I analyzed the correspondences between the English and Japanese expressions involving the concept of RISK. Assuming the same set of semantic frames for the concept in the two languages, I examined the Japanese translation equivalents of the English verb *risk*. Some seemingly corresponding words in Japanese only involve one perspective on a RISK-related scene, while at least one Japanese expression, namely, *kiken_o_okasu*, is compatible with all the perspectives associated with the English verb *risk*.

I also explored the polysemous verb *kakeru* and showed that the different senses of the Japanese verb rely on the knowledge structured in four different frames, only one of which corresponds directly to the frame for English *risk.v*. While it is always possible that we are dealing with a language specific irregularity or a word peculiarity, it is necessary to continue to question the viability of frames as an interlingua for cross-lingual FrameNet lexical resource development.

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Data

CD-Mainichi Newspaper 1992–2002.

7. Typological considerations in constructing a Hebrew FrameNet¹

Miriam R. L. Petruck

1. Introduction

The FrameNet Project² implements the theoretical constructs of Frame Semantics (Fillmore 1977, 1982, 1985, Petruck 1996), including the semantic frame, frame elements, frame-to-frame relations, coreness status of frame elements, and semantic types. While FrameNet is being developed to determine the valence descriptions for the lexicon of contemporary English, and document these findings with corpus evidence, the working assumption is that the frames in the FrameNet hierarchy represent conceptual structure, not an application driven structured organization of the lexicon of contemporary English. The present work describes a project to develop Hebrew FrameNet, one of whose long-term goals is determining how the existing machinery of FrameNet would transfer to languages other than English,³ in part by comparing frame structures of FrameNet frames with those needed for characterizing the lexicon of contemporary Hebrew. Because Hebrew (Semitic) is genetically distinct from English (Germanic), as well as from the other languages for which FrameNet (or FrameNet-like)⁴ databases have been developed, it provides a unique testing ground for this research.

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1. Parts of this paper derive from presentations at the 2nd Cross-Linguistic FrameNet meeting (held in Saarbrücken) and at the 23rd National Association of Professors of Hebrew International Conference on Hebrew Language and Literature (held at Stanford University), both in 2005.
 2. <http://framenet.icsi.berkeley.edu/~framenet>.
 3. For an overview, see Boas (2005).
 4. FrameNet projects for other languages (i.e. Spanish and Japanese) are described in this volume. The German SALSA project does not develop a new frame if FrameNet hasn't defined it; hence it is only FrameNet-like.