UC Berkeley
UC Berkeley Previously Published Works

Title
On the universality of frames

Permalink

Journal

ISSN

Authors
Hasegawa, Yoko
Lee-Goldman, Russell
Fillmore, Charles J

Publication Date

DOI

Peer reviewed

On the universality of frames

Evidence from English-to-Japanese translation*

Yoko Hasegawa, Russell Lee-Goldman and Charles J. Fillmore
University of California, Berkeley and International Computer Science
Institute

This paper investigates the cross-linguistic applicability of the concept of *frame* as developed in the Berkeley FrameNet project. We examine whether the frames created for the annotation of English texts can also function as a tool for the assessment of the accuracy of English-to-Japanese translations. If the semantic structure of a source text is analyzed in terms of the frames evoked by its constituent words and the ways in which the elements of those frames are realized, then those frames, their constituent elements, and their interconnections must somehow be present in the translation. The paper concentrates on passages involving causation, as causal relationships are considered by many to exhibit the most salient differences in rhetorical preference between the two languages.

Keywords: causation, Frame Semantics, FrameNet, noun-centered vs. verb-centered typology, parallel-text corpora, rhetorical structure, topic-worthiness, transitivity, translation assessment

1. Introduction

This paper investigates the cross-linguistic applicability of the concept of *frame* as developed for English in the FrameNet project (Fillmore & Baker 2010; Fillmore et al. 2003). In particular, we will examine whether or not the frames created for

---

* An earlier version of this paper was presented at the 11th International Pragmatics Conference held in Melbourne, Australia in 2009. The paper was revised to its present form in 2009, but the manuscript was never published until now. In February 2014, one of the authors, Charles J. Fillmore passed away. We hope that this paper, the final collaboration among all the co-authors, retains the Fillmorean wit and wisdom that everyone has come to expect. We are grateful to the following individuals for valuable discussions on the themes addressed in this paper: Kimi Akita, Hans Boas, Michael Ellsworth, Albert Kong, and Ashlyn Moehle.

Constructions and Frames 6:2 (2014), 170–201. DOI 10.1075/cf.6.2.03has
ISSN 1876–1933 / e-ISSN 1876–1941 © John Benjamins Publishing Company

the annotation of English texts can also function as an assessment tool for the accuracy of English-to-Japanese translation. The hypothesis to be tested is that if the semantic structure of an original English text is carefully analyzed in terms of the frames evoked by its constituent words and the ways in which the elements of those frames are realized, such frames and frame elements, as well as their interconnections, must somehow be shared by the translation.[1]

FrameNet is an online lexical resource based on the principles of *Frame Semantics* (Fillmore 1982, 1985, 1994; Fillmore & Atkins 1992). A *frame* is a schematic understanding of types of events, situations, individuals, and things, including the participants, props, parts, and their relations to each other and to the larger situation. Words are understood with a particular frame as background, or, in FrameNet terms, words *evoke* frames. The FrameNet database groups words with the same background knowledge into frames, and defines in prose these frames and the parts of the frame (the props, participants, etc.; they are called the *frame elements* in the FrameNet project). For instance, the words *vend*, *sell*, *vendor*, *seller*, *auction*, and *retail* are grouped in the `Commerce_sell` frame (frame names are in the Courier typeface), as they all have as background a commercial transaction and take the point of view of the seller of goods. Note that a single frame may contain both nouns and verbs (or any part of speech).

The frames are arranged in a hierarchy, connected by several types of relationships. The `Commerce_sell` frame is a more specific type of the `Giving` frame,[2] so it *inherits* features from the `Giving` frame. At the same time, it is a *perspective on* a more general `Commercial_scenario` frame. Another perspective on that general frame is `Commerce_buy`, which includes the words *buy* and *purchase*. Alongside inheritance and perspective, we expect that the relations *causative_of* and *inchoative_of* will play a major role in considering English-to-Japanese translations. To give two examples, `Endangering` (*imperil*, *endanger*) is the causative counterpart of `Being_at_risk` (*safe*, *at risk*), and `Death` (*die*, *pass away*) is the inchoative counterpart of the stative `Dead_or_alive` (*dead*, *deceased*, *alive*,

---

1. Empirically, the acceptable ranges of translation accuracy vary significantly by the type of text and the initiator's purpose for translating the text (see Hasegawa 2011 for further discussion on this topic). As explained below, we adhere in this paper to scientific texts for which factual accuracy is normally expected.

2. There are many interesting issues to investigate in the cross-linguistic applicability of frames. For example, the verb *give*, the archetypal member of the English `Giving` frame, does not entail a transfer of ownership. That is, *Give it to me* can mean simply 'hand it over to me', where the speaker does not intend to keep the item indefinitely. By contrast, the Japanese verbs *ageru* and *kureru*, which are most commonly used as translational equivalents of *give*, necessarily entail a transfer of ownership. The FrameNet database can serve as a precious resource for this kind of subtle yet significant cross-linguistic difference.

living). We expect frames will aid greatly in establishing relations between word senses in different languages, and in understanding one way in which translations may differ from originals by evoking different, but related, frames.

It is widely agreed that translation must be regarded as an art, not a science (Newmark 1981: 137), and that translations, especially of passages anchored in the author's culture, are bound to lose some meanings due to different expectations and experience on the part of the target-text readers. In order to minimize the effect of cultural differences for our investigation, we have examined a parallel-text corpus consisting of selected passages from the *Scientific American* magazine and their Japanese translations appearing in the *Nikkei Saiensu* magazine. This decision is based on the assumption that scientific writing is a genre in which considerations of factual specificity and conceptual clarity are mandatory, while those of aesthetic elegance and cultural nuances are normally less relevant. Therefore, we expect scientific translations to be a base-line testing ground for the utility of FrameNet tools: if the frames needed for scientific texts turn out not to be cross-linguistically applicable, there will be little reason to expect FrameNet frames to serve as a *tertium comparationis* (i.e. a common platform of comparison) for texts in such areas as esthetics, social structure, religion, or art.

Influenced by common formulations of salient differences between English and Japanese, which will be explained in detail in Section 2, we concentrate on passages involving causation. In short, many Japanese linguists see expressions of causal relationships as a context for one of the most salient differences in rhetorical preference, or perhaps even differences in general cognitive tendencies, between the speakers of English and Japanese.

The organization of this paper is as follows: Section 2 illustrates the rhetorical differences in causal expressions (including transitivity), attempts to reformulate as empirical hypotheses the cognitively deep typological characteristics claimed to differentiate the two languages, and explores ways of testing these hypotheses with data taken from our parallel texts. Section 3 analyzes source-and-translation pairs exhibiting the kinds of differences discussed in Section 2, using descriptive notions developed in FrameNet. Section 4 is devoted to a discussion of our findings and their implications for broader issues in translation.

2. Typological differences in framing causal events

In 1930 Japan, a silent movie entitled *Nani ga kanojo o soo saseta ka* made a sensation and achieved box-office success.

(1) *Nani ga   kanojo o   soo saseta   ka.*
      what NOM she   ACC so made.to.do Q
      'What made her do it?'

This success was reportedly due in significant part to its linguistically eccentric title; it used familiar vocabulary and familiar grammatical structure, but it juxtaposed an abstract subject (*nani* 'what') to a VP headed by a verb with causative morphology, and that was just not possible in normal Japanese. Even today, after decades of noticeable rhetorical-style changes influenced by English, sentences that pile up abstract nouns, such as (2), continue to sound strange or foreign to Japanese ears.

(2) *Kono jijitsu no   ninshiki   ga   mondai no   kaiketsu ni   kooken-suru.*
      this   fact   GEN awareness NOM problem GEN solution DAT contribution-do
      'The recognition of this fact will contribute to the resolution of the problem.'

(Even the denominal verb *kooken-suru* 'contribute' permits an analytic gloss as 'makes a contribution', adding another abstract noun.) A more idiomatic formulation of the content intended in (2) would be along the lines of (3).

(3) *Kore ga   wakar.eba,   mondai wa zutto kaiketsu-shi.yasuku naru.*
      this   NOM if.understand problem TOP much solution-do.easily   become
      'If we understand this, the problem will become more manageable.'

Many Japanese grammarians have offered descriptions of this type of rhetorical difference between Japanese and English, but their characterizations are sometimes so impressionistic that researchers whose native language is not Japanese find them inscrutable. Among such claims, Ikegami (1988: 9) appears to assert that the different ways of encoding are derived from a deep-seated difference in cognition: in Japanese text, "[a]n individuum is not seen in isolation; it is not clearly separated from what it stands contiguous with. It is merely a part of a larger whole, with which it may become merged to the extent of losing its identity." Adapting Ikegami's idea, Maynard (1997: 172) characterizes the same phenomenon as *scene-orientation* (as in Japanese) vis-à-vis *agent-orientation* (as in English). She contends, "[f]or Japanese people, the scene of an event as a whole assumes the primary focus of attention (in comparison to English, where the agent is the primary focus)."

    We find it necessary to examine the phenomena that led to such speculation in less impressionistic ways, in the hope of providing testable hypotheses about differences in rhetorical preferences between the two languages. To this end, we have selected a parallel-text corpus consisting of the first several paragraphs of a number of *Scientific American* articles published between October 2005 and October 2006 and their Japanese translations in the *Nikkei Saiensu* magazine. This corpus

contains 266 English sentences, mostly multi-clausal, accompanied by translations into Japanese created by professional translators and judged to be reflective of idiomatic Japanese.

Let us begin our examination with Seidensticker & Anzai's (1983) claim that English uses transitive constructions with significantly greater frequency than Japanese. We found that 382 English and Japanese clause-pairs agreed in transitivity (i.e. transitive or intransitive in both languages), whereas 119 clause-pairs did not.[3] That is, of all the English clauses that were translated fairly straightforwardly into Japanese, approximately 75% maintained their transitivity, but 25% switched it.[4] Of the 119 unmatched clause-pairs, 99 English transitive clauses were translated into Japanese intransitive clauses, e.g. (4):[5]

(4)   Initially the brain can function normally as it loses dopaminergic neurons.
      Doopamin-sadoosei nyuuron ga   shooshitsu-shite mo *toosho wa*
      dopaminergic   neuron NOM disappear   even initially TOP
      seijoo.ni kinoo-suru.
      normally function
      Backtranslation: 'Even if dopaminergic neurons disappear, [the brain]
      functions normally at first.'

By contrast, only 20 English intransitive clauses were translated into Japanese transitive clauses, e.g. (5):

(5)   Gleevec [a drug] has been a huge clinical success.
      Guribekku wa rinshoo no ba   de ooki.na seikoo o   osameta.
      Gleevec   TOP clinical GEN place in huge   success ACC accomplished
      Backtranslation: 'Gleevec accomplished a huge success in the area of clinical
      trials.'

The ratio of "English transitive into Japanese intransitive" vs. "English intransitive into Japanese transitive" is approximately 5:1. Therefore, as Seidensticker & Anzai

---

3. Categorization between transitive and intransitive was made based on semantic, rather than morphosyntactic, criteria. *Point to*, for example, is morphosyntactically intransitive, but semantically transitive. We used paraphrasability as a diagnostic test. That is, if the predicate can be paraphrased into transitive, e.g. *point to* into *suggest*, we categorized it as transitive. To simplify our analysis, we considered passive clauses to be intransitive, although we are aware that they could be categorized as transitive because, in most cases, two entities are involved.

4. Some clauses are either not translated at all or translated into significantly different constructions. We did not count those cases.

5. Most example sentences are somewhat simplified for expository purposes.

claim, we conclude that transitive clauses are indeed significantly less preferred in Japanese than in English.

The next hypothesis to consider is Ikegami's (1981) typology of *DO-language* (*suru no gengo*) vs. *BECOME-language* (*naru no gengo*). Citing Bloomfield (1933), Ikegami argues that the most favored sentence structure in English is *actor-action*, and, thus, it is a DO-language, where events are described as actions involving actors. Japanese, by contrast, is said by Ikegami to be a BECOME-language, preferring to describe events as a chain of state-changes.

When checking this hypothesis with our parallel texts, we could not simply count transitive and intransitive clauses and assign them respectively to the DO-type and the BECOME-type descriptions. Many transitive verbs in English indicate states (e.g. *have*, *entail*, *know*, *represent*, *suggest*) or non-agentive events (e.g. *experience*, *fail*, *lose*, *reach*, *complete*, *undergo*), and many intransitive verbs indicate acts and processes (e.g. *function*, *pervade*, *pass through*, *run*, *work*). Therefore, we first identified predicates that denote a change of state and then determined whether the depicted situation is given a DO type or BECOME type expression.[6] The sentences in (6) exemplify the former, and those in (7), the latter.

(6) I had built a model of a room that was part of my lab. [DO]
     Watashi wa kenkyuu.shitsu no   naka ni   heya no shukushoo-mokei
     I   TOP lab   GEN inside LOC room GEN miniature-model
     o   tsukutta.
     ACC made
     Backtranslation: 'I made in my lab a miniature model of the room.'

(7) The world's population is stabilizing. [BECOME]
     Sekai jinkoo   wa anteeka-shi.tsutsu-aru.
     world population TOP is-stabilizing
     Backtranslation: 'The world's population is stabilizing.'

The results of sorting clauses under these criteria, summarized in Table 1, do not support Ikegami's hypothesis that English favors the DO-type and Japanese the BECOME-type of description ($\chi^2 = 0.03$, *df* = 1, *p* > 0.1).

Table 1

	English	Japanese
DO	110	104
BECOME	255	248
Total	364	352

---

6. When the clause in question is negated, we considered the affirmative counterpart.

The reason why there are fewer clauses in Japanese than in English in Table 1 is that some English transitive clauses are translated into *stative* clauses in Japanese, as shown in (8):

(8)   These therapies <u>alleviate symptoms</u>, not causes.
      Chiryoohoo wa   izure.mo <u>taishoo-ryoohoo   de</u>, konponteki.na
      treatment   TOP each-one symptomatic-treatment COP fundamental
      chiryoohoo de   wa   nai.
      treatment   COP TOP not
      Backtranslation: 'The therapies <u>are all symptomatic treatments</u>, not fundamental ones.'

In (8), the English original uses the transitive VP *alleviate symptoms*, but the Japanese translation is stative, *taishoo-ryoohoo de* 'are symptomatic treatments'. We discarded Japanese clauses that do not denote any change of state in our analysis.

As shown in Table 1, English does not necessarily use DO-type descriptions significantly more frequently than Japanese does. Regarding this phenomenon, Kondo's commentary (1986: 2, cited by Uchimura 1991: 408) is particularly relevant:

> "One salient feature of English syntax, although often neglected by native speakers of English (and of other European languages) is a frequent and almost unlimited use of inanimate entities (things, time, space, collectives, abstract concepts etc.) as subjects for verbs that indicate intentional acts. To treat these uses as peripheral to mainstream English constructions fails to reflect an important characteristic of English, especially as viewed from the vantage point of a Japanese speaker." (Translation by Uchimura)

If we take Kondo's phrase "verbs that indicate intentional acts" as referring to verbs that *can* express an agentive act when occurring with a human subject, as in (9), then, Ikegami's claim is at least interpretable.

(9)   This lightning-fast channel jumping should <u>permit</u> [DO] cognitive radio systems to transmit voice and data streams at reasonable speeds.
      Kono denkoo-sekka.no chiiki-henkoo   ni.yotte, onsei ya   deeta o
      this   lightning-fast   channel-jumping by   voice and data   ACC
      shikarubeki sokudo de <u>yaritori   dekiru   yoo.ni-naru</u>. [BECOME]
      reasonable speed   at exchange be.able become
      Backtranslation: 'By this lightning-fast channel jumping, we <u>will become able to</u> exchange voice and data at reasonable speeds.'

Of course, the meaning of *permit* in (9) is quite different from a situation of one human being giving another human being permission to do something. By recognizing *permit* as meaning 'enable' we can see that 'X enables Y' and 'by X, Y

becomes possible' are two shapings of the same propositional form. The new count reflecting this re-categorization of the DO-type and the BECOME-type of encoding (i.e. if the verb *can* be used to depict an intentional act, the clause is categorized as the DO-type) is shown in Table 2.

Table 2

	English	Japanese
DO (re-categorized)	260	187
BECOME (re-categorized)	104	165
Total	364	352

In Table 2, the ratio of DO to BECOME in English is 2.5:1, whereas in Japanese is 1.1:1. That is, if we re-categorize the predicates in the way explained above, we find that, while Japanese uses DO type and BECOME type equally frequently, English uses more than twice as many DO type descriptions than BECOME type ones. Therefore, Table 2 would support Ikegami's hypothesis ($\chi^2 = 25.56$, $df = 1$, $p < 0.001$). However, this cross-linguistic difference is not likely to impress English speakers, because they do not consider such formally transitive sentences as those in (10) to be agentive:

(10)   a.   The popularity of Wi-Fi also <u>brings</u> problems.
      b.   The alternative possibility — that living cells or their precursors arrived from space — <u>strikes</u> many people as science fiction.

Because many Japanese transitive verbs necessarily or strongly imply agency (Hasegawa 1996: 60, 70–84), Japanese speakers tend to assume that the same is true with English transitive verbs, and they sometimes even conclude that English speakers conceive the world differently. The "however" that introduces the last sentence in the following excerpt suggests that its author believes that speakers of English have marvelous ways of observing events in the world. That is, the difference is claimed to be cognitive rather than purely linguistic.

> "In English, one very commonly attributes actions to inanimate subjects. A telephone, for example, can wake one up; a stone can break a window, etc. However, *the Japanese normally find it difficult to conceive of an inanimate subject as performing or undertaking a conscious act of will or action of its own volition, or instigating a process.*" (Uchimura 1991: 406, emphasis ours)

In English, verbs like *kill* can take such inanimate subjects as *accident*, *earthquake*, *illness*, and *war*, whereas the Japanese counterpart *korosu* cannot.[7] For example, (11a) is perceived as anomalous, or understood figuratively as an instance of personification; (11b) is the more idiomatic way to describe such events.

(11)   a.   *Jishin   ga   takusan.no hito   o   koroshita.*
             earthquake NOM many   people ACC killed
             'The earthquake killed many people.'
       b.   *Jishin   de   takusan.no hito   ga   shinda.*
             earthquake LOC many   people NOM died
             'Many people died in the earthquake.'

Therefore, if one equates *kill* with *korosu*, one will conclude that English speakers construe inanimate entities as performing conscious acts. Anthropomorphism gone wild is exciting; a claim that differences are merely matters of lexical meanings and subject selection is boring.

   In fact, Ikegami's contention (1982: 101) seems to be that although the actor in the *actor-action* structure is typically a human, the pattern itself is so strongly preferred that English enables inanimate entities, or even the names of event types, relations, or abstract properties to appear as the sentence subject. In our parallel corpus, the transitive clauses with an inanimate subject number 147 in English and 76 in Japanese.[8] Furthermore, some inanimate subjects are abstract, i.e. not referring to concrete objects. With intransitive clauses, the Japanese translations have 53 abstract subjects, surpassing 38 in English. By contrast, with transitive clauses, we found 50 abstract subjects in English and only 17 in Japanese ($\chi^2 = 16.895$, $df = 1$, $p < 0.001$). Here, it seems valid to conclude that transitive constructions with inanimate subjects are less favored in Japanese, although the difference in intransitive clauses is not as clear-cut.

   Tokieda (1950) proposes yet another typology: *object-centeredness* (*mono chuushin*) vs. *event-centeredness* (*koto chuushin*).[9] In his analysis, a situation can be described by selecting an entity (typically the actor) as a focus and expressing

---

7. Regarding agentivity, *korosu* is semantically closer to *murder*. However, *murder* is pragmatically a marked verb, but *korosu* is not.

8. Humans, animals, social organizations, and robots are included in the category of animate subject; natural forces are excluded.

9. An example to support this idea is frequent uses of *koto* 'thing' in places where a simple NP would suffice: e.g. *anata ga suki* [you-NOM-like] vs. *anata no koto ga suki* [you-GEN-thing-NOM-like] '(I) like you'; *watashi shitteru?* [I-know] vs. *watashi no koto shitteru?* [I-GEN-thing-know] 'Do (you) know me?'; *watashi o mite!* [I-ACC-look] vs. *watashi no koto o mite!* [I-GEN-thing-ACC-look] 'Look at me!'

the situation surrounding it (object-centered encoding), or the entire situation can be described without focusing on any particular entity (event-centered encoding). Western languages are said to prefer the former, whereas Japanese is said to favor the latter. Tokieda also claims that speakers of Western languages prefer to perceive the world as objects. This claim seems to imply that the NP *the recognition of this fact* in (2) is heard by the English-speaker as the name of an object, whereas the clause *we understand this* in (3) is heard by the Japanese-speaker as referring to an event. The claim about English-speakers' experience is at best untestable.

Toyama (1987: 10–11) expresses the difference in strictly grammatical terms; he contends that sentences in Western languages are fundamentally noun-centered, e.g. (2), whereas the Japanese language exhibits a strong inclination towards verb-centeredness, e.g. (3).[10] He even considers the noun-centered construction a more adequate medium for careful and objective reasoning.

What exactly is meant by *noun-centered* or *verb-centered* is unclear. Most modern theories of grammar de-emphasize the semantic tendencies that are associated with nouns and verbs. We can interpret Toyama's typology in terms of Langacker's (1987) understanding of the core difference between nouns and verbs. On Langacker's account, nouns pick out *regions*, "set[s] of interconnected entities," where an entity is intended to be "maximally general," including "things, relations, sensations, interrelations, points on a scale, locations in the visual field, etc." (pp. 62–63). Verbs, on the other hand, pick out processes: sets of relations between entities, aligned along a temporal axis and understood or construed by sequentially scanning the relation.

Langacker argues that even nouns derived from verbs (*discussion*, *contribution*, *evaporation*, etc.) fit the region vs. process categorization. A process, as a sequence of coordinated relations across time, may be understood as a temporally-delimited region (p. 90): For instance, *explode* in its physical sense denotes a process in which, very roughly, some whole item comes apart due to a great force that pushes fragments of the whole outward. These various parts (the whole, the pieces, the force) and the relations between them (the force acts upon the whole, the pieces come apart and move, etc.) are temporally and conceptually bounded, but this is not profiled by the verb. What the derived noun *explosion* does is to "raise this [bounded] region to the level of explicit concern …" (p. 90).

Given Langacker's understanding, one way to interpret the claim that English is more noun-centered is that certain events are naturally expressed in English by stating some fact about the event "object." On the other hand, the same situation might be preferentially depicted in Japanese not as a fact about an object, but as

---

10. The distinction between noun-centered and verb-centered style is observable within a language. For example, noun-centered sentences are more common formal registers of English.

a relation between processes. While the construal of the situation would differ between the two languages, it is reasonable to believe that at some level the same meaning is expressed by both conceptualizations.

It is this meaning (or at least part of this meaning) that can be analyzed by use of FrameNet. Because FrameNet does not consider that the conceptual differences outlined above necessarily rise to a difference in frame-level understanding, a given frame may contain both nouns and verbs (as well as adjectives, prepositions, etc.) that evoke it. This holds not only in the case of support verbs — *we decided* and *we made a decision* are analyzed with the same frame — but in cases of simple NPs evoking a notion that could be expressed with a verb, such as *their discoveries of fossils* and *they discovered fossils*. These two types of phrases certainly have different syntactic functions and, as mentioned above, the NP may participate in additional predications (… *were disputed*), but the VP may not. According to Langacker, they additionally differ in their conceptualization or profiling of the event. Nevertheless, FrameNet recognizes the common semantic content provided by the two phrases and analyzes them in the same frame with the same frame elements. They both contribute to the content of the `Becoming_aware` frame (via *discovery* or *discover*) and the fillers of two of its frame elements, namely Cognizer and Phenomenon (FEs are designated in small-capitals).

> `Becoming_aware` definition: A Cognizer adds some Phenomenon to their model of the world. It is similar to `Coming_to_believe` except the latter generally involves reasoning from evidence.

The upshot is that FrameNet in essence abstracts out certain characteristics idiosyncratic to English and, therefore, can apply to other languages, although some modifications will be occasionally called for. We will demonstrate this possibility shortly.

Those researchers who subscribe to the object (noun) centeredness and event (verb) centeredness typology do not mean that this characterization applies to all sentence types; rather, the distinction applies when some kind of causation is involved. When Situation1 causes Situation2, or when Situation1 results in Situation2, both situations are likely to be expressed by clauses in verb-centered Japanese, but frequently Situation1 is referred to by an abstract NP in noun-centered English. Sentence (12) from our corpus illustrates this type of encoding difference:

(12)   Better diagnosis has made experts aware that Parkinson's disease can attack those younger than 40.
Shindan hoohoo ga shinpo-shita kotoni.yotte, 40-sai.miman   demo
diagnosis   method NOM   advanced   NMLZ   by 40.below   even

> *paakinson-byoo o   hasshoo-suru   kotoga wakatte.kita.*
> Parkinson's disease   acc acquire   nmlz   nom   aware.became
> Backtranslation: 'Due to the fact that diagnostic methods advanced, we've
> become aware that even those who are under 40 can have symptoms of
> Parkinson's disease.'

Capturing this rhetorical difference is not an easy task, requiring a firm grasp of syntactic, semantic, and stylistic differences between the two languages. No automatic translation algorithms have even attempted to deal with it, and it is quite challenging for human novice translators as well. In the following, we will demonstrate how we can analyze and represent the causal relation in (12) in terms of frames developed in FrameNet.

3.   Frames as a tool for translation assessment

In this section, we will apply a method for evaluating translation accuracy using FrameNet's frames. But before that, a brief discussion of proposals for translation quality assessment would be useful. House (1997: 1–27) contends that such evaluation presupposes a theory of translation that determines (i) the relationship between a source text and its translation, (ii) the relationship between features of the text and how they are perceived by humans (author, translator, recipients), and (iii) the consequences these relationships have for determining the borders between a translation and other textual operations, e.g. creative transposition of poetry.

House identifies three types of approaches to translation quality assessment: anecdotal, behavioral, and text-based. Anecdotal approaches are based on generalizations offered by professional translators, poets, philologists, philosophers, and other groups of writers; they tend to deny the legitimacy of efforts for deriving general principles for assessing translation quality and instead discuss concrete and random examples of translation problems and suggestions on optimal solutions (see also the discussion on p. 2).

Representing behavioral approaches is Nida's (1964: 166) requirement of *dynamic equivalence*, i.e. the requirement that the relationship between the target-language reader and the target-language message should be substantially the same as that between the source-language reader and the source-language message. Several tests have been proposed along this line of approach, e.g. the Cloze Test for assessing readability,[11] elicitation of readers' reaction to several transla-

---

11. A Cloze Test consists of a text with certain words removed, and examinees are asked to supply them by inferring from context and their linguistic knowledge. Words are deleted from

tion alternatives and equivalence in informativeness. House criticizes behavioral approaches for simplistically equating overall translation quality with degrees of informativeness and intelligibility.

The text-based approaches are divided into several subtypes. We introduce here what House calls *linguistically-oriented approaches*, which are most relevant to our investigation. Reiß (1971) contends that the most important criterion in translation is the text type, which influences all subsequent choices that the translator has to make. There are four types: (i) content-oriented texts, e.g. news, scientific, and technical texts, (ii) form-oriented texts, e.g. literary genres, (iii) conative texts, e.g. advertisements, texts of a persuasive bent, and (iv) audio-media texts, e.g. operas, radio plays. Different rules are needed for each text type for producing or assessing translations. As stated earlier, we are concerned in this work with only content-oriented texts.

Koller (1972) asserts that a comprehensive model for translation quality assessment should consider these three functions: (i) source text criticism concerning transferability into the target language, (ii) translation comparison in which the method used in the production of a particular translation is described, and (iii) evaluation of the translation according to adequacy with respect to the limitation established in (i) that is measured by native speakers' metalinguistic judgments. We consider FrameNet's frames to be a good candidate that can serve partially as the model envisioned by Koller.

3.1 Example 1

Let us examine sentence (12), whose matrix predicate is *make*, evoking the `Causation` frame (frame-evoking elements are shown in all-capitals):[12]

> `Causation` definition: A Cause causes an Effect. Alternatively, an Actor, a participant of a (implicit) Cause, may stand in for the Cause.

(13) [Better diagnosis]$_{\text{Cause}}$ has MADE [experts aware that Parkinson's disease can attack those younger than 40]$_{\text{Effect}}$

Better (or rather, *good*) evokes simultaneously the `Desirability` frame and, because it is a comparative adjective, the `Comparison` frame. The entity modified by *better* is the Evaluee (judged as good) and also the Item being compared. The

---

the text according to a word-count formula (every n-th word), or selectively depending on the purpose of the test.

12. In this study we are not concerned with tense and aspect.

`Comparison` frame specifies that the ITEM must be compared against something else (the STANDARD). These two frames are defined below:

> `Desirability` definition: This frame concerns an EVALUEE being judged for its quality, i.e. how much it would probably be liked. In many cases, the EVALUEE is implicitly judged good or bad relative to other instances of its type.
>
> `Comparison` definition: An ITEM is compared against a STANDARD with respect to some ATTRIBUTE.

The comparative construction in English specifies that in the absence of an explicit mention of the STANDARD (e.g. *than other ones*) one possibility is the `Item` in an earlier state (e.g. *The house I want is cheaper now*). Putting this together with the `Desirability` frame, we compositionally understand *better diagnosis* as meaning "diagnosis [techniques] which are better than they were before". Notice that the idea of something being better than it was before is essentially the same as improvement, which FrameNet analyzes with the `Progress` frame, and for present purposes we analyze the sentence as involving `Progress`, defined as:[13]

> `Progress` definition: An ENTITY changes from a PRIOR_STATE to a POST_STATE in a sequence leading to improvement.

Diagnosis is identified as the ENTITY of this frame: BETTER [diagnosis]$_{\text{ENTITY}}$. Thus the CAUSE in this sentence is the progress (improvement) in diagnoses.

Aware evokes the `Awareness` frame:

> `Awareness` definition: A COGNIZER has a piece of CONTENT in their model of the world. The CONTENT is not necessarily present due to immediate perception, but usually, rather, due to deduction from perceivables.

This results in the following frame-element assignment:

(14)   Better diagnosis has made [experts]$_{\text{COGNIZER}}$ AWARE [that Parkinson's disease can attack those younger than 40]$_{\text{CONTENT}}$

Can evokes the `Possibility` frame:

> `Possibility` definition: A POSSIBLE_EVENT is deemed to have some probability of occurrence, if some (generally implicit) further CONDITION pertains.

---

13. In general, interpretation of comparatives where the STANDARD is understood as "than before" requires a notion of state change; hence, in the case of *better* and *older* the notions of improvement and aging, respectively. At present, FrameNet provides an analysis of the pieces (`Desirability` and `Comparison`) but not any further interpretation arising from their composition (in this case, `Progress`). This issue is further discussed in Section 5.

Here the possibility is that "Parkinson's disease attacks those younger than 40," which we bracket as:

(15)   Better diagnosis has made experts aware that [Parkinson's disease]$_{\text{POSSIBLE\_EVENT}}$ can [attack those younger than 40]$_{\text{POSSIBLE\_EVENT}}$

Because of the syntax of modals, the frame element is split into the subject and non-finite predicate.

Finally, we note the `Attack` frame:

> `Attack` definition: An ASSAILANT physically attacks a VICTIM (which is usually but not always sentient), causing or intending to cause the VICTIM physical damage.

This frame is used metaphorically to express how Parkinson's disease affects people:

(16)   Better diagnosis has made experts aware that [Parkinson's disease]$_{\text{ASSAILANT}}$ can attack [those younger than 40]$_{\text{VICTIM}}$

Several other frames are also involved here (e.g. *young*: `Age`; *-er*: `Comparison`; *expert*: `Expertise`), but since our present purpose is to examine event structure and larger scenes, we put them aside. The major frames to be transferred via translation are: `Causation`, `Progress`, `Awareness`, `Possibility`, and `Attack`.

We now analyze the Japanese translation of the given sentence and examine whether or not each frame is maintained in the process of translation, and if it is, how it is realized. We recognize that the `Causation` frame includes as its lexical item *ni.yotte*:

(17)   [*Shindan hoohoo ga   shinpo-shita koto*]$_{\text{Cause}}$ NI.YOTTE [*40-sai.miman*
          diagnosis method NOM advanced   NMLZ   by   40.below
          demo paakinson-byoo   o   hasshoo-suru koto   ga   wakatte.kita]$_{\text{Effect}}$
          even Parkinson's disease ACC acquire   NMLZ NOM aware.became
          Backtranslation: 'Due to the fact that diagnostic methods advanced, we've become aware that even those who are under 40 can have symptoms of Parkinson's disease.'

This structure can schematically be represented as:

> BECAUSE [fact: diagnosis has improved] [(people) understand fact: even people under 40 can get Parkinson's disease]

In English, the `Progress` frame is evoked by *better*, but denoting an event by an adjective is rare in Japanese; therefore, this event needs to be expressed explicitly by including an evoker of the `Progress` frame, e.g. *shinpo-shita* 'progressed':

(18)   [*Shindan   hoohoo ga*]$_{\text{ENTITY}}$ shinpo-shita *kotoni.yotte* [*40-sai.miman*
          diagnosis   method NOM   advanced   NMLZ   by   40.below

demo paakinson-byoo   o   hasshoo-suru koto   ga   wakatte.kita]$_{\text{POST\_STATE}}$
even Parkinson's disease ACC acquire   NMLZ NOM aware.became

The A WARENESS frame contains as its evoker *wakaru* 'understand'; the C OGNIZER frame element is implicit here:

(19) *Shindan   hoohoo   ga   shinpo-shita koto   ni.yotte* [*40-sai.miman demo*
diagnosis method NOM advanced   NMLZ by   40.below   even
paakinson-byoo   o   hasshoo-suru koto   ga]$_{\text{CONTENT}}$ *wakatte.kita*
Parkinson's disease ACC acquire   NMLZ NOM   aware.became

We then need to consider a major rhetorical difference between English and Japanese, namely the topic-worthiness phenomenon. Other things being equal, the following hierarchy of topic-worthiness is normally followed in Japanese:[14]

(20) Human (first/second person) > Human (third person) > Animate
Nonhuman > Inanimate

Therefore, when translated into Japanese, sentences like the following, in which a non-human entity is selected as the subject (occupying a more salient syntactic position) and a human is downgraded as the object as exemplified in (21), are likely to be reconstructed in such a way that the human occupies the subject position:

(21) But nothing prepared me for the curious challenges involved in figuring out what Washington actually looked like.
Shikashi,   Washinton ga   jissai.ni dono-yoo.na sugata   o
but   NOM   actually what   kind-of   appearance ACC
shite-ita ka o   suitei-suru to-iu   kyoomi-bukai choosen   o
was   Q   ACC imagine   QUOT interesting   challenge ACC
hajimeru ni-atari, watashi wa   nan.no yobi.chishiki-mo nakatta.
start   at   I   TOP no   preparation   there.was.not
Backtranslation: 'But when I started the interesting challenge of imagining what Washington actually looked like, I had no preparatory knowledge.'

Similarly, in (16), the subject of *attack* is *Parkinson's disease* and the direct object is humans; therefore, we need to paraphrase it along the lines of *those younger than 40 can acquire Parkinson's disease*, which evokes the G ETTING_DISEASE frame:[15]

---

14. Determination of topic-worthiness involves several factors: the natural topic hierarchy of Hawkinson & Hyman (1974), Givón's case hierarchy (1976) and intrinsic topicality hierarchy (Givón 1979), the agency hierarchy of Silverstein (1976) and Comrie (1981), and the topic acceptability scale of Lambrecht (1986).

15. The frames of A TTACK and G ETTING_DISEASE are related, but not closely. A TTACK (in its literal sense) is related via inheritance to T RANSITIVE_ACTION, and finally to

> `Getting_disease` definition: A Victim starts off without the Disease, and then comes to suffer from it. If the Disease is infectious, then the Source from which the Disease is transmitted may be mentioned.

The `Getting_disease` frame includes as its frame evokers *(byooki ni) kakaru* 'contract (a disease)', *(byooki ni) naru* 'become (sick)', *kansen-suru* 'get infected', *hasshoo-suru* 'acquire (symptoms)', etc.

(22)   *Shindan   hoohoo   ga   shinpo-shita koto   ni.yotte* [*40-sai.miman*]_{Victim}
　　　 diagnosis method NOM advanced   NMLZ by   40.below
　　　 demo paakinson-byoo   o]_{Disease} *hasshoo-suru koto   ga   wakatte.kita*
　　　 even Parkinson's disease ACC   acquire   NMLZ NOM aware.became

As demonstrated, all major frames and frame elements of the original sentence (12) are encoded in its translation; therefore, according to the FrameNet's frame test, this translation is judged as highly accurate.

3.2 Example 2

The translation of the second example is less straightforward than the first one:

(23)   Developments over the past decade have given new credibility to the idea that Earth's biosphere could have arisen from an extraterrestrial seed.
　　　 Kono 10 nen de   kenkyuu ga   susunde-kuru   to, chikyuu no seibutsu
　　　 this   year over research NOM has.progressed as earth   GEN life
　　　 wa chikyuu.gai   no   seimei.tai kara hassei-shita to-iu aidea
　　　 TOP earth.outside GEN life.form   from emerged   QUOT idea
　　　 mo hi.genjitsuteki.na o.hanashi to   wa ienakunatte-kita.
　　　 also unrealistic   story   QUOT TOP cannot.say-became
　　　 Backtranslation: 'As research has progressed over these 10 years, the idea that life on Earth sprang from extraterrestrial organisms can no longer be said to be a fanciful tale.'

The matrix predicate of (23) is *give (new) credibility*, which evokes the `Evidence` frame:

`Objective_influence`, which is a perspective on a general frame of `Influence`. The other perspective on `Influence` is `Be_influenced`. This is the frame from which `Getting` inherits; `Getting_disease` is a subtype of `Getting`. The metaphorical *attack* in the example sentence describes a situation more general than the literal `Attack` frame does. A full metaphorical analysis of this case will place the English sentence closer to the general `Transitive_action` frame and thereby closer to the evoked Japanese frame of `Getting_disease`.

Evidence definition: The Support, a phenomenon or fact, lends support to a claim or proposed course of action, the Proposition, where the Domain_of_relevance may also be expressed. Some of the words in this frame (e.g. *argue*) are communication words used in a non-communicative, epistemic sense.[16]

(24)   [Developments over the past decade]_{Support} have given new credibility to [the idea that Earth's biosphere could have arisen from an extraterrestrial seed]_{Proposition}

This frame assignment is notable in that neither of the words *give* nor *credibility* evokes the Evidence frame. Rather, *credibility* evokes the Trust frame, which describes situations in which some source of information is believable (cf. *that idea has no credibility*).

Trust definition: A Cognizer thinks that the Information given by a particular Source is correct. The specific Content or Topic of the Information may also be described.

(25)   [Developments over the past decade]_{Source} have given new credibility [to the idea that Earth's biosphere could have arisen from an extraterrestrial seed]_{Information}

Give is here acting as what FrameNet identifies as a *causative support verb*. As a support verb, it allows a noun's semantic arguments to be expressed as its own arguments. It is a *causative* support because it additionally evokes the Causation frame (A Cause causes an Effect).[17] In this case, the fact that some information is correct (i.e. *the idea that …* in (23)) is the Effect, and the Cause is the subject of *give*, namely *developments over the past decade*.

(26)   [Developments over the past decade]_{Cause} have given new credibility to [the idea that Earth's biosphere could have arisen from an extraterrestrial seed]_{Effect}

---

16. As discussed in Section 2, some Japanese scholars assume that words that are used as communication verbs always express communication even when they occur with an inanimate subject. It is essential to recognize that most such verbs are polysemous and can also be used as epistemic markers without any assumption of a communication agent.

17. The phrase *have credibility* evokes only the Trust frame. *Have* is a (non-causative) support verb, allowing the Information frame element to be expressed as its subject: [That idea]_{Information} has CREDIBILITY. In general we find *have*, *get*, and *give* combine with nouns to describe related events: *have an idea*, *get an idea*, *give someone an idea*. Some nouns allow only one or two of these verbs: *have one's revenge*, *get one's revenge*, ??*give one's revenge*.

The combination of `Causation` and `Trust` is semantically equivalent to `Evidence`, as described above. We thus analyze the multiword expression *give credibility* as evoking the `Evidence` frame.[18]

This complex construction can be realized in Japanese as follows (details will be discussed shortly):

(27)   [X] *wa*   [Y] *ni aratana shinpyoosei o   ataeta.*
          TOP   to new   credibility   ACC gave
       X = developments over the past decade
       Y = the idea that Earth's biosphere could have arisen from an extraterrestrial
          seed
       'X have given Y new credibility.'

Development as an abstract noun normally evokes the `Progress` frame; however, *developments* (plural) here refers to research results, evoking the `Achieving_first` frame.

> `Achieving_first` definition: A Cognizer introduces a New_idea into society.

Both the Cognizer and New_idea frame elements are null-instantiated.[19] The evokers of this frame include: *coin.v, coinage.n, discover.v, discoverer.n, discovery.n, invent.v, invention.n, inventor.n, originate.v, originator.n, pioneer.n, pioneer.v, pioneering.a.*

Decade evokes the `Calendric_unit` frame:

> `Calendric_unit` definition: Words in this frame name the different parts of the calendric cycle, both man-made and natural. Frame elements include Whole for the whole of which the target is a part, Relative_time for locating the time with respect to an identifiable reference point, and Name for the name of the day (month, etc.) of a specially named unit. Words in this frame figure into a variety of temporal schemas, realized as constructions.

---

18. FrameNet currently does not have the capability to render this sort of complex analysis; either the sentence is analyzed separately in the `Trust` and `Causation` frames, or the multiword expression *give credibility* is placed directly in the `Evidence` frame.

19. A frame element which is conceptually salient may go unexpressed in a sentence (Fillmore et al. 2003). This is called *null instantiation*. It may be licensed by a construction (e.g. imperatives in English allow omission of the subject) or by a lexical item, as in the case of *development*. If the missing frame element is necessarily recoverable from linguistic or extralinguistic context, this is *definite null instantiation*. In contrast, if the filler of the frame element is not recoverable, or need not be located in the context, this is called *indefinite null instantiation*.

(28) Developments over the [past]$_{\text{RELATIVE\_TIME}}$ decade have given new credibility to the idea that Earth's biosphere could have arisen from an extraterrestrial seed

Japanese does not have a lexical equivalent of *decade*; therefore, the term must be interpreted as *10 years* and then translated. *The past decade* can be translated straightforwardly as *kako* 'past' *10-nen* '10 years'; however, the translator of this magazine article preferred *kono* 'this/these' *10-nen*.

Japanese words that evoke the `Achieving_first` frame include *hakken(suru)* 'discovery, discover' and *hatsumei(suru)* 'invention, invent'. Thus, "developments over the past decade" can be translated as *kono 10 nen no hakken*:

(29) *Kono 10 nen no   hakken   wa* [Y] *ni aratana shinpyoosei o   ataeta*
     this   year GEN discovery TOP   to new   credibility ACC gave
     Y = the idea that Earth's biosphere could have arisen from an extraterrestrial seed
     'Developments over these 10 years have given Y new credibility.'

However, as discussed in Section 2, causative sentences with an abstract subject are highly marked in Japanese. Therefore, the original text is first paraphrased along the lines of (30):

(30) As research has progressed over these 10 years, the idea that Earth's biosphere could have arisen from an extraterrestrial seed has gained new credibility.

When translated into Japanese, this paraphrase is still somewhat unnatural because the subject of *gain* is abstract. We, therefore, paraphrase (30) further:

(31) As research has progressed over these 10 years, the idea that Earth's biosphere could have arisen from an extraterrestrial seed can no longer be said to be a fanciful tale.

This construction can be transferred into Japanese by means of the connective *to* 'as':

(32) *Kono 10 nen de kenkyuu ga   susunde-kuru   to,*   [Z]
     this   year in research NOM has.progressed as
     Z = the idea that Earth's biosphere could have arisen from an extraterrestrial seed can no longer be said to be a fanciful tale
     'As research has progressed over these 10 years, Z.'

Idea evokes the `Opinion` frame:

Opinion definition: A Cognizer holds a particular Opinion, which may be portrayed as being about a particular Topic.

(33) Developments over the past decade have given new credibility to the idea [that Earth's biosphere could have arisen from an extraterrestrial seed]_{Opinion}

The Cognizer frame element here is an instance of indefinite null instantiation. This frame is realized in the Japanese translation as:

(34) [*chikyuu no seibutsu wa chikyuu.gai   no seimei.tai kara hassei-shita*
      earth   GEN life   TOP earth.outside GEN life.form from emerged
      to.iu]_{Opinion} aidea
      QUOT   idea
      'the idea that life on Earth sprang from extraterrestrial organisms'

Within the Opinion frame-element, the matrix predicate is *could*, which evokes the Possibility frame, as seen in the previous example:

(35) Developments over the past decade have given new credibility to the idea that [Earth's biosphere]_{Possible_event} could [have arisen from an extraterrestrial seed]_{Possible_event}

This frame is not realized in the Japanese translation, which can be backtranslated as: 'life on Earth sprang from extraterrestrial organisms'. However, Possibility is in effect incorporated into the notion of *idea*.

   Arise evokes the Coming_to_be frame:

   Coming_to_be definition: An Entity comes into existence at a particular Place and Time which may take a certain Duration_of_endstate, have a Cause, or be formed from Components.

(36) Developments over the past decade have given new credibility to the idea that [Earth's biosphere]_{Entity} could have arisen [from an extraterrestrial seed]_{Components}

This frame has been transferred straightforwardly into Japanese:

(37) *Kono 10 nen de   kenkyuu ga   susunde-kuru to*, [*chikyuu no   seibutsu*
      this   year over research NOM has.progressed as earth   GEN life
      wa]_{Entity} [*chikyuu.gai no   seimei.tai kara*]_{Components} HASSEI.SHITA *to.iu*
      TOP   earth.outside GEN life.form from   emerged   QUOT
      aidea mo hi.genjitsuteki.na o.hanashi to   wa ienaku.natte-kita
      idea also unrealistic   story   QUOT TOP cannot.say-became

As was the case with Example 1, we do not delve into minor frames that are evoked by *earth*, *biosphere*, *extraterrestrial*, and *seed*.

Within the Theme frame element, *allow* evokes the `Make_possible_to_do` frame:

> `Make_possible_to_do` definition: An Allower exists to provide the environment for which an Allowed_action may occur.

(41)   Wi-Fi provides [fast communications links]_{Allower} [that]_{Allower} allow [e-mail messages to appear almost instantly]_{Allowed_action} and [Web pages to paint computer screens quickly]_{Allowed_action} — all with the mobility and freedom that has made cell phones nearly ubiquitous [20]

`Make_possible_to_do` is the causative of the `Possibility` frame. That is, the words that evoke `Make_possible_to_do` indicate that a situation of `Possibility` has been brought about. Again, in order to avoid an abstract subject in a causative construction when translating into Japanese, this part of the sentence is paraphrased as "If we use the fast communication facility of Wi-Fi, e-mail messages appear almost instantly and Web pages paint computer screens quickly."

Appear evokes the `Coming_to_be` frame:

> `Coming_to_be` definition: An Entity comes into existence at a particular Place and Time which may take a certain Duration_of_endstate, have a Cause, or be formed from Components.

(42)   Wi-Fi provides fast communications links that allow [e-mail messages]_{Entity} to appear almost instantly and Web pages to paint computer screens quickly — all with the mobility and freedom that has made cell phones nearly ubiquitous

This frame has not been transferred into the translation as such; the information has been framed based on a different perspective. Our real-world knowledge enables us to interpret *e-mail messages to appear* as *to receive e-mail messages*, but the translation takes the opposite perspective, i.e. *to deliver e-mail messages*, which is strictly speaking inaccurate, although these two events are factually equivalent.

> `Delivery` definition: A Deliverer hands off a Theme to a Recipient or (more indirectly) a Goal location, which is accessible to the Recipient.

---

20.   According to the FrameNet annotation protocol, this sentence would be bracketed as: allow [e-mail messages]_{Allowed_action} [to appear almost instantly]_{Allowed_action} and [Web pages]_{Allowed_action} [to paint computer screens quickly]_{Allowed_action}. This is because "e-mail messages" and "Web pages" are both the objects of allow as well as the subject of the corresponding predicate.

(43) … [*denshi-meeru o*   ]_{THEME} *sokuza.ni* [*aite   ni*]_{RECIPIENT}
      e-mail   ACC   quickly   addressee to
      TODOKERU *koto* …
      deliver   NMLZ
      '… that (it) delivers emails to the addressee immediately …'

Paint evokes the `Inchoative_filling` frame:

> `Inchoative_filling` definition: A thing or substance, the THEME, comes to fill a container or cover an area. The area or container can appear as the direct object with all these verbs, and is designated GOAL because it is the goal of motion of the THEME. Corresponding to its nuclear argument status, it is also affected in some crucial way, unlike goals in other frames.

(44) Wi-Fi provides fast communications links that allow e-mail messages to appear almost instantly and [Web pages]_{THEME} to paint [computer screens]_{GOAL} quickly — all with the mobility and freedom that has made cell phones nearly ubiquitous

This frame is transferred directly into Japanese:

(45) *Wi-Fi no   koosoku tsuushin   o   riyoo-sure.ba, denshi-meeru o*
      GEN fast   communication ACC if.use   e-mail   ACC
      sokuza.ni aite   ni todokeru koto ga   dekiru shi [*webu-peeji wa*]_{THEME}
      quickly   addressee to deliver   NMLZ NOM can   and web-page TOP
      shunji.ni [*gamen ni*]_{GOAL} HYOOJI.SARERU
      instantly screen on   is.displayed

In the adverbial modification at the end of the sentence, *make* (*… made cell phones nearly ubiquitous*) evokes the `Cause_change` frame:

> `Cause_change` definition: An AGENT or CAUSE causes an ENTITY to change, either in its category membership or in terms of the value of an ATTRIBUTE. In the former case, an INITIAL_CATEGORY and a FINAL_CATEGORY may be expressed, in the latter case an INITIAL_VALUE and a FINAL_VALUE can be specified.

(46) Wi-Fi provides fast communications links that allow e-mail messages to appear almost instantly and Web pages to paint computer screens quickly — all with [the mobility and freedom]_{CAUSE} [that]_{CAUSE} has made [cell phones]_{ENTITY} [nearly ubiquitous]_{FINAL_VALUE}

This frame has not been transferred into Japanese. Rather, the translation backtranslates as 'Wi-Fi can provide any mobile device with the mobility and freedom that rivals cell phones, which can be used anywhere anytime'. It misses the information that it was the mobility and freedom of cell phones that made them virtually ubiquitous.

4.   Concluding remarks and future research directions

We outlined in this paper several rhetorical differences between English and Japanese as characterized by Japanese researchers, and explored their validity using a bilingual corpus consisting of English magazine articles and their Japanese translations. Our corpus supports some of their claims, while failing to support others. We then selected from the corpus three translationally related pairs of sentences and demonstrated how the conceptual frames developed by FrameNet can be used to analyze both the English originals and their Japanese translations.

We identified the major frames encoded in the source text and investigated whether they reappear in the Japanese translation. By comparing the frames evoked by major constituents of each pair of texts, we were able to assess translation accuracy more objectively than would have been possible with hitherto proposed translation evaluation methods, some of which are discussed below. This is mainly because many kinds of morphosyntactic differences between the two languages can be abstracted away from the basic frame structures. That is, frame semantic information can be expressed by using different parts of speech or — as we have seen with the causative relation — can be incorporated into the meaning of a verb in one context and expressed as a type of subordination in another, both within the same language and across languages. We have shown that FrameNet frames are quite versatile even when applied cross-linguistically to languages that prefer different event-encoding strategies.

In Example 1, *Better diagnosis has made experts aware that Parkinson's disease can attack those younger than 40*, the translation contains all major frames either straightforwardly, maintaining the original grammatical structure, or, when such a method results in conflict with a stylistic norm of Japanese, a paraphrase of the source text has been translated. Therefore, in terms of the FrameNet frame test, Example 1 is judged as highly accurate.

In Example 2, *Developments over the past decade have given new credibility to the idea that Earth's biosphere could have arisen from an extraterrestrial seed*, we have found that the `Possibility` frame is absent from the translation: *the idea that Earth's biosphere could have arisen from an extraterrestrial seed* is translated into Japanese that backtranslates as "the idea that Earth's biosphere has arisen from an extraterrestrial seed." However, the concept of possibility is part of the very notion of "idea" (vis-à-vis "fact") in this context; thus no omission is recognized in this translation.

In Example 3, *Wi-Fi provides fast communications links that allow e-mail messages to appear almost instantly and Web pages to paint computer screens quickly — all with the mobility and freedom that has made cell phones nearly ubiquitous*, our test has revealed that *e-mail messages to appear*, which is understood as a partial

perspectival variant of "to receive e-mail messages" had been translated as another perspectival variant of that, i.e. "to deliver e-mail messages." Furthermore, the information that the mobility and freedom are the causes that made cell phones nearly ubiquitous is not included in the translation. Rather, the translation back-translates as "Wi-Fi can provide any mobile device with the mobility and freedom that rivals cell phones, which can be used anywhere anytime."

These examples have demonstrated how FrameNet frames can be utilized in assessing the accuracy of translation. Of course, accuracy is not the sole criterion for translation quality assessment, and, as discussed earlier, the importance of accuracy *per se* can differ significantly according to the text types. In conative texts like advertisements, for example, translation accuracy might simply be irrelevant. That is, the overall quality assessment should depend on the *skopos* in the sense of Vermeer (1978) and Reiß &Vermeer (1984).

In the Skopos Theory, translation is viewed as *a chain of human actions*, not as a process of transcoding. A text is viewed as an offer of information made by a producer to a recipient. Translation is then characterized as offering to the target-language audience information that is similar to the information originally offered to the source language audience. Typically, a translation project begins with an *initiator* who commissions a translation to accomplish a particular purpose or function when the translation is read by the target audience. Such a purpose or function is called the *skopos* of the translation project. In the Skopos Theory, the determiner of appropriate method and strategy is the skopos specified by the initiator, not the source text itself or the function assigned to it by the original author, nor its effect on the source-text audience (as claimed by Nida 1964).[21]

Although accuracy is merely one of the criteria in translation quality assessment, it is a significant one. And, arguably, the most significant criterion in assessing content-oriented texts, e.g. scientific translation. Several diagnostic tests for translation accuracy have been proposed, but, to our knowledge, they all seem to sanction the assumption that the ultimate measurements must rest on experts' subjective judgments. Carroll (1966), for instance, evaluated the accuracy (as part of adequacy) of translation in terms of the informativeness of the original *relative to the translation*. That is, if the translation conveys the same amount of information, reading the original afterwards should not be informative at all. In one variation of his tests, English and Russian bilinguals first read an English translation of a Russian scientific text and then read the Russian original. He divided the translations to be measured into small parts so that a substantial number of independent

---

21. For example, Jonathan Swift's *Gulliver's Travels* was originally meant as a satire of contemporary social ills, but today, it is translated and read as a fantasy adventure tale. Therefore, the translation should adopt the style appropriate for fantasy tales (Reiß 1971/2000: 162).

judgments could be obtained (p. 56). His subjects were asked to rate the informativeness of the original of each unit on a 10-point scale (p. 58), the description of which is provided below:

(47) 0. The original contains, if anything, *less* information than the translation. The translator has added certain meanings, apparently to make the passage more understandable.

1. Not informative at all; no new meaning is added nor is the reader's confidence in his/her understanding increased or enhanced.

2. No new meaning is added by the original, either at the word level or the grammatical level, but the reader is somewhat more confident that s/he apprehends the intended meaning.

3. By correcting one or two possibly critical meanings, chiefly on the word level, it gives a slightly different "twist" to the meaning conveyed by the translation. It adds no new information about sentence structure.

4. In contrast to 3, adds a certain amount of information about the sentence structure and syntactic relationships. It may also correct minor misapprehensions about the general meaning of the sentence or the meaning of individual words.

5. Between 4 and 6.

6. The original is clearly informative. Adds considerable information about the sentence structure and individual words, putting the reader "on the right track" as to the meaning intended.

7. Between 6 and 8.

8. The original is very informative. Contributes a great deal to the clarification of the intended meaning. By correcting sentence structure, words, and phrases, it makes a great change in the reader's impression of the intended meaning, although not so much as to change or reverse the meaning completely.

9. After reading the translation, the original is extremely informative. Makes "all the difference in the world" in comprehending the meaning intended. (A rating of 9 should always be assigned when the original *completely* changes or reverses the meaning conveyed by the translation.)

This is a daunting task, including highly subjective judgments (e.g. point 3: the original gives a slightly different "twist" to the meaning conveyed by the translation) as well as judgments that require adequate knowledge of linguistic analysis (e.g. point 6: the original adds no new information about sentence structure). This test may appear at first glance decently objective, but when the description of each point on the scale is examined seriously, it is deemed close to a black box. It is not inferable on what bases the experiment subjects could make such difficult

decisions. It also does not seem to be very useful to a linguist-translator, since it fails to identify specific lexical or phrasal contributions to each judgment.

Another assessment guideline worth mentioning is one used in the certification program of the American Translators Association. It consists of three-hour proctored examinations in a specific source-target language pair. Each examination is evaluated by two graders, who are certified translators and mark "errors" on a scale of 1, 2, 4, 8, or 16 points according to their intuition. The maximum points for deduction are, for example, 1 point if errors are not apparent to a casual source-language reader; 4 points if errors do not result in a loss of meaning; 8 points for errors whose consequences are not catastrophic; 16 points if they are. Final scores of 18 or higher are marked as 'fail'. The checking criteria include addition, omission, word choice, too freely translated, too literal, ambiguity. However, no objective measurement guideline is available for each criterion; characterized by House (1997) as anecdotal assessment, what is depended upon is solely the experience of qualified translators.

We believe that tools developed by FrameNet can be used as a tool that is at least one degree closer to objective accuracy assessment of translation, by providing the frames according to which addition and omission are identified. However, a number of striking problems emerged from this study that complicate the applicability of FrameNet concepts and practices in cross-language comparison.

First, frame semantic information should be describable in a way that recognizes the difference between semantic information that is directly encoded in a lexical or grammatical form, on the one hand, and information that can be compositionally derived from the elements of a phrase, on the other. Since FrameNet itself is a lexical resource, it does not provide a complete account of frame semantics. Consider, for example, the case of comparison of degree. Comparative adjectives can be used to compare objects that are being evaluated on the same scale (*this is better than that*, *I am older than you*), but they can also be used for comparing present states with past states of the same object (*this is better now*, *we are older now*), and that interpretation requires a notion of state change; hence, in the case of *better* and *older*, the notions of improvement and aging, respectively. The quasi-paraphrase relation between *better diagnosis methods* (i.e. "better now than before") and *diagnostic procedures have improved* (example 12) cannot be directly displayed by lexical annotations.

A similar issue arises with *give credibility* in (23–26), where the epistemic Evidence frame was seen as the compositional result of causing ([Developments over the past decade] caused [the idea that Earth's biosphere could have arisen from an extraterrestrial seed]) and justified belief (a Cognizer thinks that the Information given by a particular Source is correct). An analogous but simpler problem arises within the FrameNet lexicon of commercial transactions. Here the

combination of `Getting` with an expression of money-exchange evokes the same situation as `Commerce_buy`: *I got the book for $19.99* conveys the same situation as *I bought the book for $19.99,* where *bought* directly evokes the buying concept. A polysemy solution could treat this as a lexical problem by simply including the verb *get* within the `Commerce_buy` frame, in addition to its appearance in the `Getting` frame.

The second problem in the applicability of FrameNet concepts in cross-language comparison is that the relation may be expressed metaphorically in one context and with frame-appropriate language in another. This is the case in the description of a disease and a person who comes to suffer the disease. Where English spoke of a disease attacking the victim, as in (16), Japanese spoke of the victim acquiring (or catching) the disease, as in (22), using a verb appropriate to just that concept, *hasshoo-suru* 'acquire/have symptoms of'. The Japanese choice is more consistent with the type-ranking that places humans over non-humans within the same clause. That a lexical solution is also possible here is suggested by the fact that some dictionary entries for *attack* include the case where a disease-agent is the subject.

Third, a situation can be expressed by asserting P in one case and negating the denial of P in another case. For example, we saw in (23–26) that research made a particular belief reasonable in English, but made it impossible for people to say that it could be doubted in the Japanese translation in (31–32). Most linguistic resources designed for participation in language understanding applications lack an appropriate means for interpreting negation, and the existing FrameNet database is no exception.

An important result of this study is an awareness of both the utility and limitations of applying a lexical resource to analyze and compare translations. FrameNet takes a frame semantic approach to meaning description, and so it is revealing of certain types of differences between idiomatic English and Japanese, as in preferences regarding the expression of event causation. Notions such as frame-evoking expression, frame element, and frame-to-frame relations are necessary for understanding the correspondences (or lack thereof) between a translation and the original. At the same time, a lexical resource is limited in its inability to recognize the relation between a lexically-encoded meaning and that same meaning created by compositional processes, not to mention the possibility of non-lexical material (grammatical patterns, or constructions) contributing to the understanding of a sentence. Paraphrase relations such as those mentioned above, which range from relatively simple (`Causation`+`Trust`=`Evidence`) to quite complex ("give credibility" translated into "can no longer be said to be a fanciful tale"). Although FrameNet in the current state does not provide the means to explicitly represent

these inter- and intra-language relations, by highlighting areas of great divergence across texts, it does provide a firm base upon which to conduct a deeper analysis.

Moreover, turning the analytical framework embodied by FrameNet towards cross-linguistic texts highlights intriguing avenues in cross-linguistic constructional analysis. Frame semantics provides a useful dimension within which to understand how to compare similar-seeming constructions in different languages, such as comparisons or causatives. It may also highlight similarities between seemingly dissimilar constructions, or constructions that exist in a paraphrasal relationship (e.g. giving + exchange on the one hand, and commerce on the other).

A full-fledged frame semantic account of sentence — and text — meaning, with FrameNet as a core component, will ideally provide a detailed enough specification or description of the meaning of a sentence such that even more detailed and precise comparative analysis can be carried out. What we have shown here is the crucial role that lexical-semantic analysis plays in this larger endeavor.

References

Bloomfield, L. (1933). *Language*. New York: Henry Holt.

Carroll, J. (1966). An experiment in evaluating the quality of translations. *Mechanical Translation and Computational Linguistics*, 9, 55–66.

Comrie, B. (1981). *Language universals and linguistic typology*. Chicago: University of Chicago Press.

Fillmore, C. J. (1982). Frame semantics. In Linguistic Society of Korea (Ed.), *Linguistics in the morning calm* (pp. 111–137). Seoul: Hanshin.

Fillmore, C. J. (1985). Frames and the semantics of understanding. *Quaderni di Semantica*, 6, 222–254.

Fillmore, C. J. (1994). The hard road from verbs to nouns. In M. Chen & O. Tzeng (Eds.), *In honor of William S-Y. Wang: Interdisciplinary studies on language and language change* (pp. 105–129). Taipei: Pyramid Press.

Fillmore, C. J., & Atkins, B.T.S. (1992). Towards a frame-based organization of the lexicon: The semantics of RISK and its neighbors. In A. Lehrer & E. Kittay (Eds.), *Frames, fields, and contrasts: New essays in semantic and lexical organization* (pp. 75–102). Hillsdale: Lawrence Erlbaum Associates.

Fillmore, C.J., & Baker, C.F. (2010). A frames approach to semantic analysis. In B. Heine & H. Narrog (Eds.), *The Oxford handbook of linguistic analysis* (pp. 313–340). Oxford: Oxford University Press.

Fillmore, C. J., Johnson, C. R., & Petruck, M. R. L. (2003). Background to FrameNet. *International Journal of Lexicography*, 16(3), 235–250. DOI: 10.1093/ijl/16.3.235

Givón, T. (1976). Topic, pronoun and grammatical agreement. In C. Li (Ed.), *Subject and topic* (pp. 149–188). New York: Academic Press.

Givón, T. (1979). *On understanding grammar*. New York: Academic Press.

Hasegawa, Y. (1996). *A study of Japanese clause linkage: The connective TE in Japanese*. Stanford, Calif.: CSLI Publications; Tokyo: Kurosio Publishers.

Hasegawa, Y. (2011). *The Routledge course in Japanese translation*. London: Routledge.

Hawkinson, A., & Hyman, L. (1974). Hierarchies of natural topic in Shona. *Studies in African linguistics*, 5, 147–170.

House, J. (1997). *Translation quality assessment: A model revisited*. Tübingen: Gunter Narr.

Ikegami, Y. (1981). *"Suru" to "naru" no gengogaku: gengo to bunka no taiporojii e no shiron* [The linguistics of "do" and "become": An essay on the typology of language and culture]. Tokyo: Taishukan Shoten.

Ikegami, Y. (1982). *Kotoba no shigaku* [The language of poetics]. Tokyo: Iwanami Shoten.

Ikegami, Y. (1988). What we see when we see flying cranes: Motion or transition. *The Japan Foundation Newsletter*, 15, 1–9.

Koller, W. (1972). *Grundprobleme der Übersetzungstheorie* [Basic problems of translation theory]. Bern: Francke.

Kondo, M. (1986). Eigo ni okeru museibutsu shugo no yoohoo to shakai kagaku no hoohoo-ron [Inanimate subjects in English and the methodology of Social Science]. *Daito Bunka Daigaku Kiyo* [Bulletin of Daito Bunka University], 24, 1–21.

Lambrecht, K. (1986). *Topic, focus, and the grammar of spoken French*. Ph.D. dissertation, University of California, Berkeley.

Langacker, R. (1987). Nouns and verbs. *Language*, 63, 53–94. DOI: 10.2307/415384

Maynard, S. (1997). *Japanese communication: Language and thought in context*. Honolulu: University of Hawai'i Press.

Newmark, P. (1981). *Approaches to translation*. New York: Prentice Hall.

Nida, E. (1964). *Toward a science of translating*. Leiden: E. J. Brill.

Reiß, K. (1971). *Möglichkeiten und Grenzen der Übersetzungskritik* [Translation criticism — The potentials and limitations]. München: Hueber.

Reiß, K. (1971/2000). Type, kind and individuality of text: Decision making in translation. In Lawrence Venuti (Ed.), *The translation studies reader* (translated by Susan Kitron) (pp. 160–171). London: Routledge.

Reiß, K., & Vermeer, H. (1984). *Grundlegung einer allgemeinen Translationstheorie* [Towards a general theory of translational action]. Tübingen: M. Niemeyer. DOI: 10.1515/9783111351919

Seidensticker, E., & Anzai, T. (1983). *Nihonbun no hon'yaku* [Translating Japanese]. Tokyo: Taishukan.

Silverstein, M. (1976). Hierarchy of features and ergativity. In Robert Dixon (Ed.), *Grammatical categories in Australian languages* (pp. 112–171). Canberra: Australian Institute of Aboriginal Studies.

Tokieda, M. (1950). *Nihon bunpoo: Koogo hen* [Japanese grammar]. Tokyo: Iwanami Shoten.

Toyama, S. (1987). *Nihongo no ronri* [The logic of Japanese]. Tokyo: Chuo Koronsha.

Uchimura, H. (1991). Problems caused by word order when interpreting/translating from English into Japanese: The effect of the use of inanimate subjects in English. *Meta*, 36, 404–413. DOI: 10.7202/004516ar

Vermeer, H. (1978). Ein Rahmen für eine allgemeine Translationstheorie [A framework for a general theory of translation]. *Lebende Sprachen* [Living Languages], 23, 99–102. DOI: 10.1515/les.1978.23.3.99

Author's address

Yoko Hasegawa
Department of East Asian Languages and Cultures
3413 Dwinelle Hall
University of California, Berkeley
Berkeley, CA 94720–2230

hasegawa@berkeley.edu