Constructions across Grammars

Edited by

Martin Hilpert
Université de Neuchâtel

Jan-Ola Östman
University of Helsinki

John Benjamins Publishing Company
Amsterdam / Philadelphia
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 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 Mono-spaced), 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, 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.

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, 为了 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 与る and くれる, 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.

It is widely agreed that (Newmark 1981:137), and an author's culture, are bound and experience on the part of cultural differences; and their Japanese translation is based on the assumptions of factual specificity of aesthetic, and on the expectations of fact-specific translations. We expect scientific translation to be linguistically applicable, serve as a tertium comparationis, and in such areas as aesthetics.

Influenced by comm and Japanese, which will show passages involving cause and effect, of causal relationships as in stylistic preference, or performative differences, we can see their speakers of English.

The organization of differences in causal expressions as empirical hypotheses for the purpose of differentiating the two languages, data taken from our parallel corpus, and exhibiting the kinds of constructions developed in FrameNet, and their implications for translation.

2. Typological differences

In 1930 Japan, a silent movie industry and achieved box-office success.

(1) ある 女 ご わたし に わたしわ きわめて
what 男 に 男 's what she

"What made her
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 kook-suru.
   'The recognition of this fact will contribute to the resolution of the problem.'

(2) Initial the denial of what 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 wakaru eba, mondai wa zutto kaiketsu shi naru.
   '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 Sainetu 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. That is, of all the English clauses that were translated fairly straightforwardly into Japanese, approximately 75% maintained their transitivity, but 25% switched it. Of the 119 unmatched clause-pairs, 99 English transitive clauses were translated into Japanese intransitive clauses, e.g. (4):

(4) Initially the brain can function normally as it loses dopaminergic neurons.  
\[\text{Doopamin-sadoosei nyuuron ga shooshitsu-shite mo toosho wa dopaminergic neuron NOM disappear even initially TOP sehoo-ni kino-suru.}\]  
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.  
\[\text{Guribekku wa rinshoo no ba de ooki na seikoo o osameta.}\]  
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 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),

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.
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. 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 o tsukutta.
   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.
   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>
<thead>
<tr>
<th></th>
<th>English</th>
<th>Japanese</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO</td>
<td>110</td>
<td>104</td>
</tr>
<tr>
<td>BECOME</td>
<td>255</td>
<td>248</td>
</tr>
<tr>
<td>Total</td>
<td>364</td>
<td>352</td>
</tr>
</tbody>
</table>

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 all
   Chiryoohoo wa iz treatment TOP e...treatment COP TC
   Backtranslation: ‘These fundamental ones.

In (8), the English original Japanese translation is statutively discarded Japanese clause.

As shown in Table 1, significantly more frequent Japanese transitive clauses are translated into stative clauses in Japanese, as shown in (8):

If we take Kondo’s phrasal verbs that can express an exchange (9), then, Ikegami’s claim

(9) This lightning-fast systems to transmit
   Kono denkoo-sekk, this lightning-fast
   shikarubeki sokudc reasonable speed
   Backtranslation: ‘E

Of course, the meaning of recognizing permit as mean human being giving another becomes possible’ are two reflecting this re-categorization (i.e. if the verb can be used the DO-type) is shown in "

---

6. When the clause in question is negated, we considered the affirmative counterpart.
in English is actor-action, and as actions involving active-language, preferring actor-verbs, we could not simply assign respectively to the do-what verbs in English indicating non-agentive events (e.g., ag-intransitive verbs indicating, run, work). Therefore, we determine that Japanese expresses type expression. The latter.

Table 1 describes in Table 1, do not simultaneous DO-type and Japanese the main difference in English in Table 1 is that Japanese clauses in Japanese, which is not the English clause type equivalent. The English clause type equivalent is shown in Table 2.

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 indicate 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 *permit* [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 yaritori dekiru yoo ni-naru. [BECOME] reasonable speed at exchange be.able become

Backtranslation: "By this lightning-fast channel jumping, we will become able to 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

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th>Japanese</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DO (re-categorized)</strong></td>
<td>260</td>
<td>187</td>
</tr>
<tr>
<td><strong>BECOME (re-categorized)</strong></td>
<td>104</td>
<td>165</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>364</td>
<td>352</td>
</tr>
</tbody>
</table>

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 brings problems.
b. The alternative possibility — that living cells or their precursors arrived from space — strikes 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. 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**

   earthquake 'Many people '

Therefore, if one expects that construe inanimate gone wild is exciting; a

In fact, Ikegami’s claim that English speakers preferred that English events, or abstract principles, the transitive clause: 76 in Japanese. Further:

76 abstract subjects, subjects, we found 50 abstract subjects, $df = 1, p < 0.001.$ Here, inanimate subjects are more active clauses is not as clear as the former.

Tokieda (1950) points out that Western languages are more comfortable with the latter. Tokieda also observes that people conceive the world as objects that are described by selecting the situation surrounding the event. The claim above supports this fact in (2) is heard as an event. The claim above supports the latter.

Toyama (1987:10–12) contends that sentence

8. Humans, animals, social

9. An example to support his claims would suffice: e.g. **anata ga like** ‘I like you’; **watashi no look** ‘Look at me!’

---

7. Regarding agentivity, **korosu** is semantically closer to **murder.** However, **murder** is pragmatically a marked verb, but **korosu** is not.
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. 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*). In his analysis, a situation can be described by selecting an entity (typically the actor) as a focus and expressing 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.

Togama (1987: 10–11) expresses the difference in strictly grammatical terms; he contends that sentences in Western languages are fundamentally noun-centered,

---

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 sukī* [you like] vs. *anata no koto ga sukī* [you like thing] *(I)* like you; *watashi shitteru* [I-know] vs. *watashi no koto shitteru* [I-know thing] 'Do (you) know me?'; *watashi o mite* [I-look] vs. *watashi no koto o mite* [I-thing-look] 'Look at me!'
e.g. (2), whereas the Japanese language exhibits a strong inclination towards verb-centeredness, e.g. (3). 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, “sets” 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-defined 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 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.

...
long inclination towards verb-centered construction a more

verb-centered is unclear. Most

semantic tendencies that are as-
stated by a typology in terms of

tense between nouns and verbs.

ines) of interconnected esti-

tional," including "things, relations

sitions in the visual field, etc."

cess: sets of relations between
tod or construed by sequen-

a verbs (discussion, contribu-

torization. A process, as a

be understood as a tempo-

nal physical sense denotes a
tunes apart due to a great force

or various parts (the whole, the

one acts upon the whole,

lly and conceptually bounded,

ted noun explosion does is to

s concern ..." (p. 90).

interpret the claim that English

erally expressed in English by

other hand, the same situation

fact about an object, but as

e situation would differ

in that at some level the same

s exact same meaning) that can be analyzed by

t that the conceptual differ-

frame-level understanding,

well as adjectives, preposi-

case of support verbs — we

he same frame — but in cases

ed with a verb, such as their

versal style is observable within a lan-

on formal registers of English.

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 W 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 ele-

ments. They both contribute to the content of the Becoming_aware frame (via dis-

covery or discover) and the fillers of two of its frame elements, namely COGNIZER

and PHENOMENON (FES are designated in small-caps).

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 in-

volves reasoning from evidence.

The upshot is that FrameNet in essence abstracts out certain characteristics idio-
syncratic 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 Situation 1 causes Situation 2, or when Situation 1 results in Situation 2,

both situations are likely to be expressed by clauses in verb-centered Japanese, but

frequently Situation 1 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 treathose younger than 40.

Shindan hoocho ga shinpō-shita kotoni-yotte, 40 sai minman demo
diagnosis method nom advanced NMLZ by 40 below even
paakinson-byoo o hasshu-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 au-

tomatic 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 dem-

onstrate 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 translation 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.

---

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 the text according to a word-count formula (every n-th word), or selectively depending on the purpose of the test.
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-capsitals): 12

\[
\text{Causation definition: A CAUSE causes an EFFECT. Alternatively, an ACTOR, a participant of a (implicit) CAUSE, may stand in for the CAUSE.}
\]

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

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

\[
\text{Desirability definition: This frame concerns an EVALUEE being judged for its quality, i.e. how much it would probably be liked. In many cases, the EVALUEE is implicitly judged good or bad relative to other instances of its type.}
\]

\[
\text{Comparison definition: An ITEM is compared against a STANDARD with respect to some ATTRIBUTE.}
\]

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

---

12. In this study we are not concerned with tense and aspect.
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]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]COGNIZER AWARE [that Parkinson’s disease can attack those younger than 40]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.

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]POSSIBLE_EVENT can [attack those younger than 40]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]ASSAILANT can attack [those younger than 40]VICTIM

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.

Several other frames (e.g., Expertise), but larger scenes, we put in other item ni.yotte:

(17) [Shindan hoc diagnosis me demo paakins even Parks Backtranslation become aware Parkinson’s disease]

This structure can still be

BECAUSE [fact under 40 can]

In English, the Progress adjective is rare in Japanese, namely the following hierarchy:

(18) [Shindan hoc diagnosis me demo paakins even Parks Backtranslation become aware Parkinson’s disease]

The Awareness frame element is impossible.

(19) Shindan hoc diagnosis me paakinson-by Parkinson’s disease

We then need to convert

Japanese, namely the following hierarchy:

14. Determination of to
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:

\[(17) \text{[Shindan hoohoo ga shinpo-shita koto]} \text{Cau} \text{SE ni.yotte [40-sai.miman diagnosis method NOM advanced NMLZ by 40.below}\text{ demo paakinson-byoo o hasshoo-suru koto ga wakatte.kita]} \text{E FF Ec oN T wakatte.kita even Parkinson's disease ACC acquire NMLZ NOM aware.became} \]
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:

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

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':

\[(18) \text{[Shindan hoohoo ga shinpo-shita koto ni.yotte [40-sai.miman diagnosis method NOM advanced NMLZ by 40.below\text{ demo paakinson-byoo o hasshoo-suru koto ga wakatte.kita}]}} \text{E FF Ec oN T wakatte.kita even Parkinson's disease ACC acquire NMLZ NOM aware.became} \]

The Awareness frame contains as its evoker wakaru 'understand'; the COGNIZER frame element is implicit here:

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

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

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...
(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, Washington ga jissai ni dono-yoo na sugata o but NOM actually what kind-of appearance ACC shite ita ka o suiter-suru to ikyoimi-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 *Getting disease* frame;\(^\text{15}\)

`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) Shinden hoo hoo ga shinpo-shita to o ni yotte [40-sai mimana] VICTIM diagnosis method NOM advanced NMLZ by 40.below

\(^\text{15}\) The frames of Attack and *Getting disease* are related, but not closely. **Attack** (in its literal sense) is related via inheritance to **Transitive action**, and finally to **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**.

---

\(^\text{16}\) As discussed in Section 3.2, communication verbs always have epistemic markers without
the following, in which a more salient syntactic structure is exemplified in (21), are like-
theses involved in figuring out the meaning: 15

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.

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:

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).

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.
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]\_\text{SOURCE} have given new credibility [to the idea that Earth's biosphere could have arisen from an extraterrestrial seed]\_\text{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).\(^\text{17}\) 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]\_\text{CAUSE} have given new credibility to [the idea that Earth's biosphere could have arisen from an extraterrestrial seed]\_\text{EFFECT}

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.\(^\text{18}\)

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

(27) \text{X} wa \text{Y} ni aratana shinpyoosei o ataeta.
\hspace{1cm} X = developments over the past decade
\hspace{1cm} Y = the idea that Earth's biosphere could have arisen from an extraterrestrial seed
\hspace{1cm} '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.

---

\(^\text{17}\) 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] 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.

\(^\text{18}\) 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.

---

Both the COGNIZER evokers of this frame invent.v, invention.n, pioneering.a.

Decade evokes the calendric_un for the whole calendaric cycle or the year (month, etc.) of temporal scale.

(28) Kono 10 nen wa to new shinpyoosei o ataeta.
\hspace{1cm} X = developments over the past decade
\hspace{1cm} Y = the idea that Earth's biosphere could have arisen from an extraterrestrial seed
\hspace{1cm} 'X have given Y new credibility.'

Japanese does not have a straightforward way to interpret these nouns as in English, magazine article prefixes are highly marked in this way. However, as discussed along the lines of (30):

(29) Kono 10 nen ni omoedatte.
\hspace{1cm} X = developments over the past decade
\hspace{1cm} Y = the idea that Earth's biosphere could have arisen from an extraterrestrial seed
\hspace{1cm} 'Development over the past decade...'

---

\(^\text{19}\) A frame element which is definite null instantiation is called a definite null instantiation; it need not be located in the sentence.
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, pioneers.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.

(28) Developments over the [past] 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 shinpyooset o atae
this year GEN discovery TOP to new credibility ACC give
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):

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.
(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]OPINON

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 hassai-shita earth GEN life TOP earth.outside GEN life.form from emerged to.iu]OPINON 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

3.3 Example 3

This final example references:

(38) Wi-Fi provides services virtually all over the place, — all with the ubiquitous. Wi-Fi no kiki ni atai keitai-denwa cellphone to can
The idea that Earth’s seed has gained new credibility in the Japanese translation, which can be backtranslated as: ‘life on Earth sprang from extraterrestrial organisms:’ However, ssibility 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 an 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] could have arisen [from an extraterrestrial seed].

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.ga no seibutsu] COMPONENTS hassei-shita to.iu TOP earth.outside GEN life form from emerged QUOT aidea mo hi.genjitsu-teki.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.

3.3 Example 3

This final example represents the case that involves deviation in frame correspondences.

(38) 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.

Wi-Fi no koosokuitsuushin o riyo-sure.ba, denshi-meiru o GEN fast communication ACC if.use e-mail ACC sokuse ni atte ni todokeru koto ga dekiru shi webu-peeji wa quickly address to deliver NMLZ NOM can and web-page TOP shunji, ni gamen ni hyooji-sareru. Wi-Fi nara, itsu.demo doko.demo tsukaeru instantly screen on is.displayed if anytime anywhere usable keitai-denwa ni hitteki-suifu idooset to jiyuu, do o arayuru moba-tru-cell.phone to rival mobility and freedom ACC all mobile kiki ni ataeraru-no-da.
device to can.give
Backtranslation: 'If (we) use the fast communication facility of Wi-Fi, (we) can deliver emails to the addressee immediately and Web pages are displayed on screens instantly. Wi-Fi can provide any mobile device with the mobility and freedom that rivals cell phones, which can be used anywhere anytime.'

The matrix verb provide evokes the Supply frame:

Supply definition: A SUPPLIER gives a THEME to a RECIPIENT to fulfill a need or purpose (PURPOSE_OF_RECIPIENT) of the RECIPIENT.

(39) [Wi-Fi] SUPPLIER 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] THEME

This frame is realized in the Japanese translation as:

(40) ... [Wi-Fi] SUPPLIER nara, [itsu demo doko demo tsukaeru keitai denwa ni if anytime anywhere usable cell phone to hitteki-suru idosei to jiyuu do o] THEME [arayuru mobairu-kiki ni] RECIPIENT rival mobility and freedom ACC all mobile device to ATAERARERU-NO-DA can give

Backtranslation: '... Wi-Fi can provide any mobile device with the mobility and freedom that rivals cell phones, which can be used anywhere anytime'

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

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 f; appear almost instantly and make it possible to put into action. Wi-Fi provokes to appear almost instantly and makes it possible to put into action. This is because e-mail messages and Web pages can be used anywhere anytime anomalously" (42) Wi-Fi provides to appear almost instantly and makes it possible to put into action. This frame has not been framed before, but it enables us to interpret the translation as that strictly speaking it is not an automatic delivery.

Paint evokes the Inchoative_container or inchoative complement of the THEME. Conversely, in a crucial way, we need to make make it possible_to_do.

(43) ... [dentshi-ma e-mail to dokkeru kiki ni can deliver '... that (it) deliver...'

(44) Wi-Fi provides to appear almost instantly and makes it possible_to_do to paint computer screens quickly. This frame is transformed into Japanese as "If we use the Wi-Fi, it is possible to paint computer screens quickly and display messages instantly, which is nearly ubiquitous."
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] 
   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.

(43) … [denshi-meeru o ]Theme sokaza ni [aite ni]Recipient e-mail ACC quickly addressee to 

**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] 

This frame is transferred directly into Japanese:

(45) Wi-Fi no koosoku tsushin o riyou-sure ba, denshi-meeru o 


shunji ni  (gamen ni) GOAL HYOOJISARERU
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:

\begin{itemize}
  \item \textbf{CAUSE \_CHANGE definition:} An agent of \textit{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 \textbf{INITIAL \_CATEGORY} and a \textbf{FINAL \_CATEGORY} may be expressed, in the latter case an \textbf{INITIAL \_VALUE} and a \textbf{FINAL \_VALUE} can be specified.
\end{itemize}

\begin{enumerate}
  \item [46] Wi-Fi provides fast \textit{communications links} that allow e-mail messages to appear almost instantly and Web pages to paint computer screens quickly --- all with \textit{the mobility and freedom} of cell phones, which can be used anywhere anytime. It misses the information that \textit{it was the mobility and freedom of cell phones that made them virtually ubiquitous.}
\end{enumerate}

\section{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 frames are quite vary prefer different ever

In Example 1, B can attack those you straightforwardly, n a method results in source text has been
Example 1 is judged

In Example 2, L the idea that Earth's have found that the in Earth's biosphere co Japanese that backtranslates extraterrestrial seed of "idea" (vis-à-vis the translation.

In Example 3, Wsages to appear almost all with the mobility test has revealed the perspectival variant perspectival variant information that the nearly ubiquitous is translates as "Wi-Fi that rivals cell phones"

These examples assessing the accuracy for translation quality accuracy \textit{per se} can differ like advertisements, That is, the overall quality Vermeir (1978) and

In the Skopos Theory as a process of translation, producer to a recipient language audience is referred to the source language as an \textit{initiator} who com
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 backtranslates 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 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.

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).
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; and 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 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, hashshoo-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 situational denial of P in another particular belief related to P could be done by appropriate means; is no exception.

An important affordance of applying a FrameNet model takes a frame semantic approach. Certain types of differences regarding the interpretation of expression, frame (e.g., understanding the concept of original. At the same time, the relation between the roots by compositional properties (grammatical parts of a sentence, Part 2) and derived from relatively similar semantic “in the credibility” translates into the FrameNet lexicon these inter- and intra-language differences across texts, it does not have to be ascribed as a phonological or textual analysis. Frajzyngk understands how to express concepts, such as compare, seemingly dissimilar cases, and understand the crucial role that
that complicate the application of a linguistic comparison.

Analogous but simpler examples could have arisen from developments in the sphere of business (e.g. "better now than before") where the epistemic adjectives (i.e. "better now than before") cannot be directly translated into Japanese. Here the English phrase evokes the concept of an exchange evoked the same type evokes the buying concept. The Japanese equivalent is expressed simply by including the phrase "better now than before" to its appearance in the sentence.

This is the case in the description of the buying concept. Where English speakers spoke of the victim of the disease. Where English speakers spoke of the victim, Japanese choice is more appropriate to just that situation. This is suggested by the fact that non-humans within the disease-agent is

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 + evidence = 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 meaning — 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.
Acknowledgements

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 Ashllyn Moehle.

References


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


