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Nominalization in the Japanese and English Languages Vol. 1

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日本語要旨

本稿は、同じトピックを扱った英語と日本語のテクストを分析することで、両言語で「名詞化（nominalization）」がどの程度用いられているかを比較するものである。名詞化とは、例えば「彼は空港に着いた」のような、主語（誰が）と述語（どうした）を備えた節で表わすべきできごとを、「彼の空港への到着」という、意味と本来的に結びついた文法手段とは別の、名詞群で表現することである。

名詞化は、個々の具体的な事例を抽象的表現に一般化したり、これまでに述べた内容を圧縮することで次の論理展開の前提とすることを可能にするなど、ことばによって知識を生産・伝達するのに欠かせない文法資源である。

しかし、名詞化をどの程度頻繁に用いるのが「自然」かは、言語によって異なる。例えば英語で自然に感じられる名詞化表現をそのまま日本語で直訳すると、非常に不自然な、あるいは分かりにくい訳になるのは日常的によく経験することである。そのため、英語教育という観点から見ると、学生に英文和訳を指導する際は、名詞化表現を、なるべく本来的な意味に近い形に戻して訳すことを教える必要がある。

本稿は、こうした教育への応用を前提に、実際に、英語に比べ日本語では名詞化の利用頻度がどの程度少ないかを調査する。また、名詞化と同等のはたらきをする別の文法資源（本稿はこれを「意味圧縮装置（condensing devise）」と呼ぶ）の利用状況も調査することで、日本語は、名詞化以外の手段を用いて、名詞化を利用したのと同等の論理展開を可能にしていることを明らかにする。

0. Introduction

The aim of this paper is to develop a linguistic description of Japanese science textbooks, focusing on the use of nominalization. The description and evaluation of educational language has been one of the major subjects of the Systemic Functional Theory (hereafter SF Theory) (e.g. Halliday and Martin 1993 ; Martin and Veel 1998 ; Painter 1999 ; Rose 1997). While such works focus on the English language, this paper adopts a comparative perspective, and focuses on the Japanese academic genre as well as the English one. The purpose of this research is to investigate how the features of scientific Japanese are similar to those of English, and in what ways Japanese scientific discourse

is distinctive.

The motivation for doing this analysis was the perception that Japanese science textbooks use far less nominalization than English ones. Nominalization, which semiotically turns events into things, is a key linguistic device for constructing academic discourse in English (Halliday and Martin 1993 ; Halliday 1998). This paper pursues the following two questions : "Is it true that Japanese scientific discourse rarely uses nominalization?" and "If so, how does it organize text without nominalization?"

In pursuit of these questions, I will analyze scientific text from introductory level biology textbooks in both Japanese and English. The textbooks are currently used by Japanese and American students, respectively, at the high school and early university levels. Section 1 introduces the data for analysis. Section 2 surveys the use of nominalization in the data. Section 3 presents the grammatical analysis of the Japanese discourse in question, and describes the actual linguistic choices made to construct logical connections between events. The analysis will show that academic text in both English and Japanese provides a wide range of linguistic resources for constructing and conveying logical connections. However, they deploy these resources in their own specific ways which result in their distinctive linguistic patterns. This point will be pursued in the volume 2 of this paper.

1. Data

1.1 Data for this Analysis

This is a comparative examination of textbooks of natural science, specifically of biology, written in Japanese and English. The reason for using textbooks as the data is to make the contextual conditions the same for both languages. In other words, to prevent variation in linguistic features due to variation in context allows us to observe linguistic variations derived solely from differences between English and Japanese in ways of constructing meaning. The contextual condition of textbooks, in the framework of SF Theory, consists of the following three aspects :

1. field : subject-matter, or topic, that the textbook deals with
2. tenor : the academic level of the intended readers
3. mode : the medium of delivery and the form of language

Based on these three aspects, the following textbooks were chosen as the data :

Japanese Textbooks

T. Fujii, K. Akita, N. Ekami, T. Mizuno, H. Kobayashi, S. Kinoshita, H. Tazawa, M. Hara, S. Takeuchi, T. Kanamaru, Y. Maruko, T. Momose, and H. Moriya. (1993) *Kaitei Seibutsu* (Revised Biology). Tokyo : Tokyo Shoseki, pp.18-19, 133-154. (Hereafter *Kaitei Seibutsu*)

T. Tanaka, K. Konishi, T. Kuroiwa, S. Oosawa, M. Tamura, A. Tanaka, A. Garai, K. Iiyama, M. Izawa, H. Ikeda, S. Ono, I. Kajikawa, Y. Kajino, H. Kajiyama, F. Katoo, T. Kubota, M. Hisaya, S. Kurizono, T. Tsukahira, A. Tsujimoto, K. Tomioka, S. Hiraoka, T. Hirosawa, H. Fujimoto, K. Matsuzawa, H. Miyamoto, H. Yasui, Y. Yonezawa, and M. Watabe. (2000) *Kootoogakkoo Kaitei Seibutsu IB* (High School Revised Biology IB). Tokyo : Daiichi Gakushu-sha, pp.102-105, 138-145. (Hereafter *Seibutsu IB*)

English Textbooks

Charles R. Coble, Dale R. Rice, George S. Fichter, and Vera Webster. (1980) *Life Science.* New Jersey : Prentice-Hall, pp498-502, 528-531, 536-548, 557-558. (Hereafter *Life Science*)

Trefil, James. and Robert M. Hazen. (1995) *The Sciences : An Integrated Approach.* New York : John Wiley & Sons, Inc, pp357-361, 382-401. (Hereafter *The Sciences*)

For field, I picked sections related to the subject matter, 'heredity'. As for the tenor aspect of context, the chosen textbooks share the same academic level (i.e. the students aimed at by the textbooks are approximately the same age and studying at the same level). The two Japanese textbooks are aimed at Japanese high school students, generally from 16 to 18 years old. One of the English textbooks (*Life Science*) is used in American high schools, and the other (*the Sciences*) is used in introductory science courses for university nonscience majors in the U.S.A. Finally, for mode, all of these textbooks are written through the graphic channel in the written form of language.

1.2 Generic Properties of the Data

This paper aims to describe the lexicogrammatical properties of the Japanese science textbook. The science textbook, however, is not a single genre ; it constitutes what Martin and Rose (2008 : 218-225, 250-258) call a "macrogenre." They observe that English science textbooks usually consist of several genres including reports, explanations, procedures and procedural recounts (ibid : 221). This seems to be the case with Japanese science textbooks, as well. The expressions "scientific discourse" and "academic language" used in this paper, therefore, refer not to specific genres, but to the tendency, or the patterns of meaning, made in a particular type of text. This

tendency cannot be attributed to any particular contextual element in which the text is produced. Rather, it is the result of the collective effect of the three aspects of context we saw in the previous section : the text is used to represent and talk about the scientific world (field), written by science specialists for beginning students (tenor) and conveyed through the graphic channel in a written form (mode).

Any text taken from this type of discourse is a special variety of language that differs from the everyday uses of language. Many scholars have already pointed out that the main contributor to the particular linguistic patterns in academic text is nominalization (Halliday and Martin 1993 ; Lemke 1990 ; and Halliday 1998). Roughly speaking, nominalization is an expression that represents an event or a series of events as a 'thing' by realizing it as a nominal group. In the example below, the nominal group, chemical analyses, nominalizes an event, say, *somebody* (in this case, *scientists*) *analyzed something* (in this case, *DNA*) *chemically*.

> Careful chemical analyses indicate that damage to DNA in humans goes on at the rate of about 100,000 "hits" per cell per day.
>
> (from *The Sciences*. p.558 ; emphasis by Hayakawa)

In everyday expression, such an event would have been realized as a clause such as *scientists analyzed DNA chemically*. Textbooks contain many cases of this kind of nominalized expression. What is more important than the frequent use of nominalization itself is that the use of nominalization affects the choice of other lexicogrammatical resources and orients the entire linguistic pattern of text in a particular direction. For instance, in everyday contexts, the logical relations between one event and another would have been realized by a conjunction or a conjunctive adverb as in *If scientists analyze DNA chemically, then they will find that*...or *Scientists analyzed DNA chemically. Then it turned out that*···. In the above extract where an event is nominalized and realized by a nominal group, the event itself acts as a Participant in a clause, and its logical relation with another is realized by a Process, *indicate*, in which the nominalized Participant takes a part.

It is easy for this type of construction to go one step further and to realize the other event as a nominal group, too. Actually, the above extract is followed by a clause in which two nominalized events are constructed as Participants :

> Fortunately, the body has developed repair mechanisms that take care of almost all of this damage as soon as it happens.
>
> (from *The Sciences*. p.558 ; emphasis by Hayakawa)

The construction of one event as a nominal group, *repair mechanisms*, requires its logical

relation with another event to be realized as a Process, *take care of*, and this in turn requires the resulting event to be realized as another Participant, or a nominal group, *this damage*.

The examples above illustrate co-evolutional relations among a number of linguistic features. If one language evolves in a way to represent events as nouns, then it also develops the linguistic resources to represent logical relations as verbs. Halliday (1993 : 54-56) refers to such patterns of co-occurrence among features which characterize a particular register as *syndrome*. The term indicates that each register has its distinctive set of language features. This kind of interlocking nature of lexicogrammatical choices is one of the main themes of this paper, and the analysis will give us with many examples observed in the actual data.

The use of nominalization has a rhetorical purpose. It expands the flexibility of grammar so that we can choose packaged events as starting points for other pieces of messages, and construct logical connections between messages to build effective argumentation. The typical example is the underlined clause in the following passage :

> High-speed flash photographs show that once a raindrop has reached its full falling speed, it flattens out at the bottom, taking on a shape something like that of a parachute – or perhaps a hamburger bun is a better comparison. The flattening is caused by the pressure of the air against the raindrop passing through it. Air pushes against the bottom of the drop and pulls out its sides, increasing pressure as the drop increases in size and speed, and actually tearing it apart if it reaches the quarter-inch limit.

(from Guy Murchie. 1960. *The World Aloft*. Science Research Associates, Inc.; emphasis by Hayakawa)

The nominalized expression, *the flattening*, packages the whole stretch of the previous part of the text, *once a raindrop··· a better comparison*. Once nominalized, the whole sequence of events can be taken up as the Theme, or departure point, of the subsequent clause. Then, that clause, with this nominalized and summarized information as its Theme, gives us the new information, which is the cause of *the flattening*. This type of Theme development, where the Rheme of the preceding clause is summarized and taken up as the Theme of the subsequent clause, is called the "linear pattern of development" by Daneš (1974) and is one of the important rhetorical devices used to organize text logically. Nominalization plays a central role in forming the linear pattern of development and in effectively and logically explaining various phenomena.

2. Nominalization

2.1 The Japanese Nominal Group

The grammatical basis of nominalization is the complex internal structure of a nominal group. A nominal group has a number of components—Deictic, Numerative, Epithet, Classifier, and Qualifier used to modify the head Thing (Halliday 1994 : 180-196). The structure is shown as Figure 1.

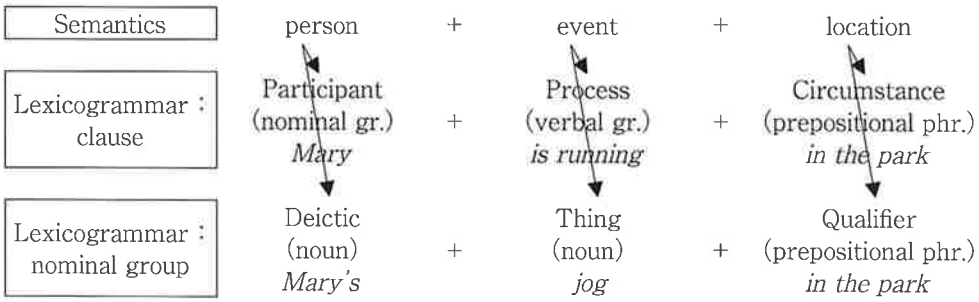
Figure 1 : English Nominal Group Structure

these	two	splendid	electric	trains	with pantographs
Deictic	Numerative	Epithet	Classifier	Thing	Qualifier
Premodifier				Head	Postmodifier

(adapted from Halliday 1994 : 191)

This organization provides a nominal group with semantic potential to take in the complex phenomenon congruently realized by a clause. For example, the same phenomena can be realized by a clause consisting of Participant^Process^ Circumstance, *Mary is running in the park*, or by a nominal group consisting of Deictic^Thing^Qualifier, *Mary's jog in the park*. See Figure 2 below.

Figure 2 : Realization of a Phenomena as a Clause and as a Nominal Group



The nominal group structure proposed by Halliday, however, is based on English nominal group structure and requires some modification when applied to the Japanese language. The Japanese nominal group has an internal structure as complex as the English one, and we can find Deictic, Numerative, Epithet, Classifier, and Qualifier, as well as the Thing in it. It also has the ability to use clauses as its components by embedding them. Examples 1-4 show Japanese nominal groups. See the Appendix for the interlinear notation key.

Example 1 : Japanese Nominal Group (Classifier^Epithet^Thing)

iden inheritance	*no* NO	*juuyoo na* important NA	*hataraki* function
nominal group	postposition	adjectival group	nominal group
Classifier		Epithet	Thing
important function of inheritance			

Example 2 : Japanese Nominal Group (Deictic^Classifier^Thing)

kono yoo na this state NA	*kotai* individual	*no* NO	*keitoo* lineage
demonstrative	nominal group	postposition	nominal group
Deictic	Classifier		Thing
important function of inheritance			

Example 3 : Japanese Nominal Group (Embedded Clause as Qualifier)

DNA o DNA o	*tsuku-tte iru* construct-susp ASP	*nukureochido* nucleotide	*no* NO	*enki* base
Goal	Process : material			
clause				
Qualifier (embedded clause)		Thing		
nominal group			postposition	
Classifier				Thing
bases of a nucleotide constructing DNA				

Example 4 : Japanese Nominal Group (Successive Use of Postpositional Phrases)

senshokutai chromosome	*no* NO	*kazu* number	*no* NO	*henka* change	*ni yoru* NI YORU	*totsuzenhen'i tai* mutation
nominal group	post-position					
Classifier (postpositional phrase)		Thing				
nominal group			post-position			
Classifier (postpositional phrase)				Thing		
nominal group					post-position	
Qualifier (postpositional phrase)						Thing
mutant (caused) by the change in the number of chromosomes						

The most significant difference between Japanese and English nominal groups is the order of components. Japanese nominal groups have the following characteristics (Thomson 2000 : 331-333):

(i) The dominant element of a nominal group typically occurs at the final position in the group. Thus, in a nominal group, it is the head, or Thing, that always occurs in final position, and in a hypotactic group complex, the dominant group comes after the dependent groups.

(ii) Unlike in English, the order of the modifying components is relatively free. Thus in Japanese, to mean "two splendid freight trains," as long as the head, *ressha*, is placed at the group final position, we can say

subarashii	*ni dai no*	*kamotsu yoo no*	*ressha*
splendid	two CNT NO	freight use NO	train

splendid two freight trains

and

kamotsu yoo no	*subarashii*	*ni dai no*	*ressha*
freight use NO	splendid	two CNT NO	train

freight splendid two trains

as well as

ni dai no	*subarashii*	*kamotsu yoo no*	*ressha*
two CNT NO	splendid	freight use NO	train

two splendid freight trains

as long as the head *ressha* is placed at the group final position.

With such an intricate internal structure, Japanese nominal groups also have the ability to package and to nominalize phenomena congruently constructed by a clause or clause complexes. Example 5 shows the grammatical analysis of a Japanese nominalized expression. It nominalizes the preceding clause complex, *S gata no kin… de aru*.

tatoeba, haien sookyuukin ni wa, S gata to R gata to ga aru. S gata no kin wa byoogensei de, saiboomaku no sotogawa ni tatoorui no himaku o tsukuru ga, R gata no kin ni wa kono himaku ga naku, hibyoogensei de aru. *himaku no umu ya, byoogensei* *wa iden keishitsu de ari…*

(For example, there are S and R type pneumococci. Type S pneumococci are virulent and produce polysaccharide capsules on the outer side of their cell

membranes, while type R pneumococci do not have these capsules and are non-virulent. The existence of capsules, and virulency, are genetic traits, and…)
(from *Kaitei Seibutsu*. p.131 ; emphasis and translation by Hayakawa)

Example 5 : Japanese Nominalized Expression

<table>
<tr><td>himaku
capsule</td><td>no
NO</td><td>umu
existence</td><td>ya
COMJ</td><td>byoogensei
virulency</td></tr>
<tr><td>nominal group</td><td>postposition</td><td>nominal group</td><td rowspan="3"></td><td rowspan="2"></td></tr>
<tr><td colspan="2">Qualifier</td><td>Thing</td></tr>
<tr><td colspan="3">nominal group</td><td>conjunction</td><td>nominal group</td></tr>
<tr><td colspan="5">nominal group complex</td></tr>
<tr><td colspan="5">the existence of capsules and virulency</td></tr>
</table>

2.2 Nominalization in the Japanese Data

The examples in Section 1.2 illustrated how English scientific discourse utilizes nominalization to package an event or a sequence of events into a single nominal group so that the piece of information gains more flexibility in its grammatical capacity for organizing text. Contrastingly, Japanese science textbooks, even if they deal with the same topics and are aimed at students of the same academic level, use considerably fewer nominalizing resources. Table 1 shows the number of nominalizations per clause found in the data.

Table 1 : Nominalization in the English and Japanese Data

	cases of nominalization	number of clauses	nominalization per clause
English	235	880	0.27
Japanese	53	572	0.09

In the English data, which consists of 880 clauses, I found 235 cases of nominalization. In average, each clause has 0.27 nominalized expressions. The Japanese data has 53 cases of nominalization in text consisting of 572 clauses. On average, each clause has 0.09 nominalized expressions. This rate of frequency is only one third what we found in the English data.

The fact that the Japanese data uses little nominalization, however, does not mean that Japanese science textbooks are disorganized, or that the Japanese language does

not have options in its grammatical system for effectively using nominalization. Rather, it has its own way of organizing text that doesn't depend on the nominalization of phenomena. The next section analyses the Japanese data and examines how it organizes text with relatively less dependence on nominalization. The factors seem to be twofold :

1. Japanese scientific discourse tends to organize information using grammatical resources which do not require packaging of phenomena (i.e. grammatically changing events into things) .
2. When it needs to package information, it uses grammatical devices other than nominalization.

I pursue point 1 in Sections 3.1 and 3.2, and in Section 3.3 I'll pursue point 2.

3. Analysis : Grammatical Resources for Explaining Phenomena

When we try to explain scientific phenomena through language, it's necessary to arrange several events into sequences of actions logically connected to each other. Grammar realizes them as clause complexes, where each clause is logically and semantically connected to others by various conjunctive elements. Grammar, however, provides other options for realizing these logico-semantic relations as well. For instance, Figure 3 lists several lexicogrammatical resources for realizing the relation of 'reason'. The resources are ordered here according to the "the drift towards 'thingness' " proposed by Halliday (1998 : 211).

Figure 3 : The Drift towards 'Thingness'

(i) As cohesion between clause complexes : *She worked too hard. So she got ill.*
(ii) As interdependency between clauses in a clause complex : *She got ill because she worked too hard.*
(iii) As Circumstance (a prepositional phrase) in a clause : *She got ill because of overwork.*
(iv) As Process (a verbal group) in a clause : *Overwork caused her illness.*
(v) As Participant (a nominal group) in a clause : *The result of her overwork was her illness.*

"The drift towards 'thingness' " is the term Halliday uses to express a general drift in the choice for realizing phenomena. It moves from the most congruent one, which utilizes a clause complex, to the most metaphorical one, which utilizes a noun. In the above examples, (i) realizes the causal relation between events by the most congruent

form, that is, as a conjunctive (*So*) between two clause complexes. Gradually, the realization moves towards the metaphorical end. Events, which are congruently realized by clauses (e.g. *She worked too hard*), come to be realized as Participants (*overwork*), and the relations between events, which are congruently realized by conjunctive elements (*So / because*), come to be realized by Processes (*caused*) which connect the events now realized as Participants. Example (v) is the terminal point of the drift, where the causal relation itself is realized as a Participant (*result*). Modern English discourse, especially academic discourse, favors the options near the metaphorical end, that is, expressions like (iv) and (v) (Halliday 1993 : 64-67).

The above examples demonstrate that the English language has developed a variety of options to realize causality using various degree of 'thingness'. The fact that the Japanese data uses less nominalization does not mean that the language system does not provide as rich a variety of options as the English language. In fact, the research shows that

(i) The Japanese language system has the same options as the English language system.

(ii) Japanese text however, for each specific instance, tends towards the options near the congruent end of the continuum. In other words, it tends to favor different degrees of 'thingness' from English text.

I will pursue point (i) in this section. In order to demonstrate that Japanese has the variety of options in its language system to construct causality, I will make a list of examples from the Japanese data. In total, 160 instances of causality were found in the Japanese data.

1. As Cohesion between Clause Complexes

This is the most congruent way to realize causality. Events are realized by clauses or clause complexes, and the causal relationship is realized as a Conjunctive, which is often explicitly realized by a conjunctive adverb such as *shitagatte* (therefore), *kono tame* (because of this), *kono yoo ni shite* (in this way), *sore ni yotte* (by that), *kono kekka* (as a consequence of this), *shikasi* (but) and *soredemo* (even though) at the head of subsequent clauses. One of the characteristics of these Japanese conjunctive adverbs is that they often include demonstrative elements such as *kono* (this) and *sono* (that). The function of these demonstratives in organizing text will be discussed in the final section. An example from the data is shown as Example 6.

Example 6 : Clause Complex

senshokutai wa sorezore [[tsuigoos-hita]] chromosome WA each connect-PAST *men de bunris-hi, kaku soodoo* side DE separate-SUSP each homologous *senshokutai ga [[boosuishi ni hik-areru]]* chromosome GA spindle : fiber NI pull-PSV *yoo ni s-hite ryoo kyoku e idoosuru.* state NI do-SUSP both end E move	*shitagatte* accordingly	*[[ryoo kyoku ni* both end NI *idoos-hita]]* move-PST *senshokutai no* chromosome NO *kazu wa bosaiboo no* number WA mother : cell NO *han suu ni naru.* half number NI become
clause complex 1 **reason**	Conjunctive	clause complex 2 **result**
Each chromosome separates at its point of synapse, and the homologues move to opposing ends of the cell as if pulled by the spindle fibers. Accordingly, the number of chromosomes that move to either pole is half the number in the mother cell.		

2. As Interdependency between Clauses in a Clause Complex

When this category is chosen, events are realized by clauses that are combined into a paratactic or hypotactic clause complex. The Japanese causal realization within clause complexes can be classified into two types : those which explicitly realize causality with conjunctions such as *kara* (because), *node* (because), *tame ni wa* (in order to), *tame* (because), *yoo ni* (so that), *ba* (if), *bai or baai ni wa* (in case…), *toki wa* (when), *to* (if), *te mo* (even though) and *ga* (even though) ; and those which implicitly realize causality by chaining two clauses. The chaining function depends on the use of non-finite tactic inflection of verbs (i.e. the *ren'yoo* form and the *-te* form). These two types are illustrated as Examples 7 and 8 respectively.

Example 7 : Hypotactic Relation (Explicit Realization)

[[[[kesshitsus-hita]] bubun ni be : deleted-PST part NI *fukum-are-te i-ta]] DNA mo* include-PSV-SUSP ASP-PST DAN MO *ushinaw-areru* lose-PSV	*tame* CONJ	*tampakushitsu no* protein NO *goosei mo* synthesis MO *deki-na-ku nar-i* can : do-NEG-SUSP ASP-SUSP
dependant clause **reason**	conjunction : hypotactic	dominant clause **result**
Because the DNA included in the deleted part is also lost, protein synthesis will not take place, and		

As the example shows, the Japanese conjunction is placed at the end of the dependent clause, not at the beginning.

Example 8 : Hypotactic Relation (Implicit Realization)

<table>
<tr><td>3 tsu gumi angoo ga
3 CNT group code GA

1 ko henkas-hite,
1 CNT change-SUSP</td><td>[[[[aminosan ga 1 tsu dake chiga-tta]]
amino : acid GA 1 CNT only differ-PST

tampakushitsu ga tsukur-areru]] koto ni naru
protein GA produce-PSV KOTO NI become</td></tr>
<tr><td>dependent clause
reason</td><td>dominant clause
result</td></tr>
<tr><td colspan="2">As one triplet code changes, a protein with one different amino acid will be produced.</td></tr>
</table>

The above clause complex chains two clauses by inflecting the verb *henkasuru* (change) into the *-te form henkashite*. In Japanese, such non-finite tactic inflection of verbs realizes a variety of logico-semantic relations including time, cause, and means (Okuda (1989) and the *Koobunron Guruupu* of *Gengogaku Kenkyuu Kai* (Sentence Structure Group, Linguistics Society) (1989) refer to these two forms of inflection as *nakadome* (suspension form), and discuss their functions in detail.).

3. As Circumstance in a Clause

When this category is chosen, the resulting event is realized by a clause, and the causing event is realized by a noun within a postpositional phrase which functions as Circumstance of the resulting clause. (In English, of course, this function is served by a prepositional phrase, not a postpositional one.) Examples of the postposition include *ni yoru* (due to), *kara* (from), *ni yori* (by), *de* (through), *ni motozuite* (based on), *ni oojite* (according to), *ni shitagatte* (following) and *de wa* (under). Most of these postpositions are derived from verbs ; *yori is the ren'yoo* form of *yoru* (to be due to), *motozuite* is the *-te* form of *motozuku* (to base), and *oojite* is the *-te* form of *oojiru* (to accord). One example is shown as Example 9.

Example 9 : Causality as a Postposition

<table>
<tr><td>kono yoo na machigai
this state NA mistake</td><td>ni yori
NI YORI</td><td rowspan="2">enki no hairetsu ga
base NO sequence GA</td><td rowspan="2">henkasuru
change</td></tr>
<tr><td>nominal group
reason</td><td>postposition</td></tr>
<tr><td colspan="2" rowspan="2">Circumstance (postpositional phrase)</td><td>Participant</td><td>Process</td></tr>
<tr><td colspan="2">result</td></tr>
<tr><td colspan="4">clause</td></tr>
<tr><td colspan="4">Due to such a mistake the sequence of bases changes.</td></tr>
</table>

4. As Process in a Clause

When this category is selected, two events are realized by nominal groups, and the causal relation between them is realized by a verbal group such *as shimesu* (indicate), *tashikameru* (confirm), *yuuhatsusuru* (promote), *hikiokosu* (cause), *kankeisuru* (relate to), and *shoozuru* (produce). This verbal group functions as a Process to link the two nominal groups. Here, two events are packaged and realized as 'things' that participate in another event, and this choice is even nearer to the metaphorical end of the "drift towards 'thingness' ". Consider Example 10. *Shoosha* is a nominalized form of a verb *shooshasuru* (irradiate), and realized as a noun, it can act as a Participant in a Process, *yuuhatsusuru* (promote).

Example 10 : Causality as a Process

hooshasen no shoosha wa radioactive : ray NO irradiation WA	*totsuzenhen'i o* mutation O	*yuuhatsusuru* promote
Participant 1 : nominal group **cause**	Participant 2 : nominal group **result**	Process : verbal group
clause		
Irradiation promotes mutation.		

Japanese allows another option that uses the attributive relational process, such as *A wa B no tame de aru* or *A wa B dakara de aru* (A is because B), as the agnate form of these causal verbs. When this category is chosen, a resulting event is often realized by a demonstrative like *kore* (this) and occupies slot A. A causing event is realized by a clause with a conjunction like *kara* or *node* (because). The two events are related through a relational process *de aru* (be). This category is unique in that a clause itself functions as a participant in another clause. I found seven cases where the causal relation is realized through this structure. An example is shown as Example 11.

Example 11 : Causality as an Attributive Relational Process

<table>
<tr><td colspan="3">shiro mayu no aru keitoo to ki mayu no keitoo o ryooshin to shite koozatsu suru to, F1 wa subete shiro mayu ni na] ri, F2 de wa shiro mayu to ki mayu ga oyoso 13 : 3 no hi ni bunri suru.
(If we cross one parent from a lineage of yellow cocoons with one from a linage that has some white cocoons, the F1 generation will all be white, and in the F2 generation, white cocoons and yellow cocoons will appear at around the rate of 13 to 3.)</td></tr>
<tr><td>kore wa
this WA</td><td>[[mayu o kiiro ni suru]] idenshi Y ga
cocoon O yellow NI change gene Y GA

a-tte mo, [[sono hataraki o osaeru]]
exist-SUSP even : if that function O suppress

idenshi I ga aru-to, shikiso ga dek-inai
gene I GA eixst-CND pigment GA be : formed-NEG

tame ni shiro mayu ni naru kara
CONJ NI white cocoon NI become CONJ</td><td>de aru
be</td></tr>
<tr><td>Participant : Attribute (0nominal group)
result</td><td>Participant : Carrier (clause)
reason</td><td>Process : Relational (verbal group)</td></tr>
<tr><td colspan="3">clause</td></tr>
<tr><td colspan="3">This is because, even in the presence of gene Y, which makes cocoons yellow, if gene I, which suppresses that function, is also present, pigmentation cannot be expressed.</td></tr>
</table>

5. As Participant in a Clause

This is the most metaphorical realization, where not only the two events but also the causal relation itself is nominalized by such nouns *as kikkake* (catalyst), *itoguchi* (clue), *shikumi* (mechanism), and *hikigane* (trigger). The whole clause is an identifying relational process such as *A wa B no kekka de aru* (A is the result of B) or *A wa B no kikkake to naru* (A becomes the catalyst for B). Event A functions as the Token, the causal relation functions as the head Thing of Value, and Event B functions as part of a modifier (Qualifier) to the head. An example is shown as Example 12. In this example, *hatsugan* is a nominalized form of a clause "*gan o hikiokosu* (to cause cancer)." Realized as a noun, it can act as part of a postpositional phrase that functions as a Qualifier of a nominal group.

Example 12 : Causality as a Noun

<table>
<tr><td>totsuzenhen'i ga
mutation GA</td><td colspan="2">hatsugan
causing : cancer</td><td>no
NO</td><td>hikigane ni
trigger NI</td><td>naru
become</td></tr>
<tr><td rowspan="3">Participant : Token
(nominal group)
cause</td><td colspan="2">nominal group
result</td><td>postposition</td><td></td><td rowspan="3">Process :
Relational
(verbal group)</td></tr>
<tr><td colspan="3">Qualifier (postopsitonal phrase)</td><td>Thing</td></tr>
<tr><td colspan="4">Participant : Value (nominal group)</td></tr>
<tr><td colspan="6">clause</td></tr>
<tr><td colspan="6">Mutation becomes a trigger for causing cancer.</td></tr>
</table>

6. Causality within a Nominal Group

Sometimes events and the causal relation between them all function as components within a nominal group. In most cases, one event is realized as the head, or Thing, of the nominal group, the other as part of the modifier, and the causal relation as the postposition within the modifying phrase. An example is shown as Example 13.

Example 13 : Causality within a Nominal Group

<table>
<tr><td colspan="3">senshokutai no kazu no henka
chromosome NO number NO change</td><td>ni yoru
NI YORU</td><td>totsuzenhen'i tai
mutation</td></tr>
<tr><td colspan="3">nominal group
reason</td><td>postposition</td><td rowspan="2">Thing
result</td></tr>
<tr><td colspan="4">Classifier (postpositional phrase)</td></tr>
<tr><td colspan="5">nominal group</td></tr>
<tr><td colspan="5">mutation (caused) by the change in the number of chromosomes</td></tr>
</table>

Table 2 summarizes the Japanese lexicogrammatical options for realizing causality. The resources shown in lower rows are more metaphorical. The table shows that the Japanese language has as wide a range of grammatical options for constructing causality as the English language, and that these resources range from the most congruent ones to the most metaphorical ones.

Table 2 : Japanese Lexicogrammatical Resources for Constructing Causality

		CAUSE	CONDITION
between clause complexes		*A. shitagatte B.*	*A. soredemo B.*
within a clause complex	explicit (asconjunctions)	*A no tame B.*	*A dato B.* *A naraba B (daroo).*
	implicit (by chainingverbs)	*A shi, B. (ren'yoo* form) *A shite, B. (-te* form)	
within a clause	as Circumstance (postposition)	*A ni yori B.* *A kara B (ga wakaru).*	*A de wa B.*
	as Process (verbal group)	*A ga B o hikiokosu.* *A ga B o shimesu.*	
	as Participant (nominal group)	*A wa B no hikigane de aru.* *A wa B no itoguchi de aru.*	
within a nominal group		*A ni yoru B*	

The difference between Japanese and English, therefore, lies not in the systems themselves, but in the likelihood of selection for each individual instance. We will pursue this point in the volume 2 of this paper, focusing on the degree of 'thingness' preferred by these two languages.

Note

This paper is a revised version of the unpublished doctoral thesis presented to the Department of Linguistic Functions, the Graduate School of International Cultural Studies, Tohoku University in 2006. This paper reconsiders the same data and examples from a new pedagogical perspective focusing on the use of nominalization.

Interlinear notation key

ASP	aspect
ATP	attempt : [*-te*] *miru*
CJT	conjecture : V-*daroo*
CND	conditional : V-to
CNT	counter : [number] *ko, dai, do*
CONJ	conjunctive
COP	copula : da, aru
DE	nominal marker (Circumstance ; "in")
ENU	enumerative : [*-shi*] *tari*
GA	nominal marker (Participant ; nominative)
INT	interrogative : V-ka

KARA	nominal marker (Circumstance : "from")
KOTO	rankshifted nominal clause marker
MADE	nominal marker (Circumstance : "from")
MO	nominal marker
NA	adnominal marker
NEG	negative : [*-shi*] *nai*
NI	nominal marker (Circumstance "in / to", Participant)
NI*	adverbial marker
NO	nominal marker (Participant : possessive)
O	nominal marker (Participant : accusative)
PST	past
PSV	passive
SHITE	postposition ("as")
SUSP	non-finite, tactic verb form : *-shi, -shite*
TO	postpositional quotative clause marker
TO*	nominal marker (Circumstance "in / to")
TSUITE	postposition ("about")
WA	nominal marker
YOTTE, YORI, YORU	postposition ("by")

adapted from Teruya (1998 : xxiii-xxiv)

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