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ON THE CATEGORIZATION OF "APPROPRIATENESS" PREDICATES IN ENGLISH AND JAPANESE PROPERTY-PREDICATING SENTENCES*

1 INTRODUCTION

No one will dispute that our linguistic expressions are driven by two types of cognitions: event cognition ("what happens") and property cognition ("concerning an entity, what property it has") (henceforth EC and PC, respectively). As canonical examples, take the sentences of *John broke the glass* and *John is gentle*. They are motivated by, and reflections of, EC and PC, respectively.[1] Since each of these sentences seems to be motivated exclusively by one of the two cognitions, it might be inferred that all the linguistic sentences are to be clearly divided into two types; so to say, EC-based and PC-based sentences. However, this is not the case. Most, if not, all sentences are motivated by BOTH of them. And it is such sentences that we are concerned with in this paper. First, consider the sentences in (1):

(1) a. This book is easy to read.
b. This book reads easily.

(1a) is an example of a so-called *tough* construction, and (1b) is that of a middle construction. These expressions are similar in that both reflect EC and PC. As for (1a), its structure is analogous to the canonical PC-based sentences like *John is gentle*. It is comprised of two parts: the one describing the property (*is easy to read* ϕ) and the one to which that property is attributed (*this book*). However, it is hasty to regard (1a)

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[1] The present argument on two types of predication largely depends upon Masuoka's (1987, 2000: Ch. 4) theory, denying the clear distinction between EC and PC. A more detailed discussion awaits 2.1.

as purely PC-based, because to some degree EC (= *reading this book*) contributes to the property the predicate describes (= *easy*). In other words, EC is conceptually "built into" PC. (1b), on the other hand, seemingly corresponds to the typical "pure" EC-based sentences like *John broke the glass*. However, it describes not only an event (*this book reads*), but also a property *this book* has, that of being quite readable. The idea that (1b) is somewhat PC-based is evidenced by the omissibility of the adverbial phrase. Compare:

(2) a. John broke the glass (easily).
b. This book reads ??(easily).

In the canonical EC-based sentence, (2a), the adverb *easily* just modifies the verb *broke* and the sentence makes sense without it. (2b), in contrast, *easily* is more than a mere modifier of the verb. Actually, middle construction sentences are expected to invoke "property reading" (Taniguchi 1995), and it is the adverb *easily* that denotes property and makes the sentence possible.[2] Thus, we have the ability to combine the two modes of cognitions in various ways. In cases like (1a), PC structures a basic frame and EC complements it, and the opposite is true for cases like (1b).[3]

In this paper, focusing on English and Japanese, I would like to analyze the former case, whereby PC plays a primary role and EC supports it in the property predication. To do this completely, it is necessary to build up a comprehensive cognitive model that appropriately integrates EC and PC. It is, however, beyond the scope of this paper. As an initial step toward this goal, the present study will just touch on, and describe the distributions of, the predicates of "appropriateness", "possibility", and "necessity" (henceforth PA, PP and PN, respectively) in English and Japanese, in the context of the sentences of property predication with some related action linguistically expressed in some way. For the present purpose, two contrastive constructions are sampled from each language. In English, we will take up "*tough* construction (= TC)" (= 3a) and "purposive *to* infinitival construction[4] (= PUC)" (= 4a). As their counterparts, we will observe two Japanese constructions, which are tentatively dubbed as "*no-ga* construction (= NGC)" (=3b) and "*no-ni* construction (= NNC)" (= 4b), respectively:

(3) a. This book is easy to read.
b. Kono hon wa yomu-no-ga muzukasii.
This book-TOP read-N-NOM difficult[5]
(4) a. This book is necessary to understand that theory.

[2] The test of omissibility is also applicable to *tough* construction. If you intend to say *This book is easy to carry*, the omission of *to carry* will lead to a communicative failure, because saying simply *This book is easy* probably evokes the action of reading. In any event, in order to interpret this type of sentences, you must evoke some action involved in the property described even if it is linguistically covert due to its default value (see Langacker 1984, 1995 for the omissibility of *to* infinitives in *tough* construction).

[3] See Sakamoto (2002b) for more detailed discussion on the difference between *tough* and middle constructions.

[4] This is my own label.

[5] Abbreviations: TOP for topic; N for nominalizer; COP for copula; ACC for accusative; PUR for purposive; DAT for dative; NOM for nominative.

b. Kono hon wa sono riron-o rikaisuru-no-ni hituyo-da.
This book-TOP the theory-ACC understand-N-PUR necessary-COP

It is worth noting that English and Japanese are parallel in that PP and PN are in complementary distribution; i.e. PP is compatible with the construction of (3) type and not with (4) type, and the opposite is true for PN. Concerning PA, on the other hand, the picture varies across the two languages. In English, most PA instances are accepted only in TC. In Japanese, at first glance, PA is compatible only with NNC, but a closer look reveals that there exists an "intermediate" construction that instantiates itself typically with PA, not with PP or PN. The details will be discussed in 2.2.

Last but not the least are a few terminological clarifications. The first one is for "property". In the narrowest sense, it could mean what an entity seems to have, which manifests on its own, almost independent of conceptualizer's[6] any cognitive manipulation (see Croft 1991 for this usage; whereby "property" is thought to be the basic meaning designated by prototypical adjectives). In the broadest sense, on the other hand, this term covers not only what some entity appears to have, but also what is "imposed upon some entity" through the conceptualizer's certain cognitive processes. The present research uses "property" in the latter sense, and concentrates on the properties owing much to the conceptualizer's role, rather than the entity itself. As we may intuitively notice, such properties are inevitably more abstract than the properties in the former sense.

The second is concerned with "object". Throughout this paper, I will use this terms at two distinct levels. At the linguistic level, it is used in the usual sense. At the conceptual level, I will use it to refer to the target/purpose of action. To avoid confusion, the first letter is capitalized in the latter sense, like "Object", which is applied also to the other term "Means", which is paired with Object (see 3.1 for the detail).

This paper is structured as follows. In section 2, we will go over a few preliminary conceptions and observations. Section 3 will be devoted to explaining PA from a cognitive perspective. Finally, section 4 concludes with a plan for future research.

2 PRELIMINARIES

This section presents a few basic concepts and observations. First, we will review in 2.1 what property-predication sentences are like. 2.2 will posit some essential observations on the behavior of PA in English and Japanese. Finally, I will introduce one of the most essential notions in cognitive linguistic enterprise, "conceptual content vs. its alternate construals".

[6] Following Langacker's definition, I use this term to refer to the language user beyond the distinction of speaker/hearer.

2.1 On the Sentences of Property Predication

In Masuoka (1987, 2000: Ch. 4), predications are divided into two types: event predication and property predication. The former describes some event at some time and space. The latter is, on the other hand, to refer to the fact that some entity has some property. According to Masuoka, sentences of property predication have "thematic" structure. Namely, the sentence is comprised of *two* parts: the one describing the property and the one describing the entity to which that property is attributed (= the property-attributed entity). In Japanese, this thematic character is linguistically manifested by the topic marker *wa*. In case of (3a), *seitoni-kibisii* is the property part and *Suzuki sensei* is the "owner of that property" part, and the two parts are linked by the topic marker *wa*:

(5) a. Suzuki sensei-wa seito-ni kibisii. (Masuoka 2000: 39)
Suzuki teacher-TOP students-DAT strict
b. Mr. Suzuki is strict with his students.

The present study adopts this characterization as its basis and assumes that the same is true of English sentences of this kind, though the thematic character is not as clear as in Japanese, since the English counterpart lacks the topic marker like *wa* as in (5b).[7]

Now we must draw closer attention to the "property" part. This part can be divided further into two parts: the main predicate and its modifying phrase. The main predicate is essential to the property description, while its modifying phrase may be optional depending on contextual factors or other conditions. In sentences (5), *strict* (*kibisii*) is the main predicate and *with his students* (*seito-ni*) is the modifying phrase. Note at this juncture that the modifying phrase could be the one designating some action related to the property that the main predicate describes. Consider the sentences in (6):

(6) a. Suzuki sensei-wa ronbun-o kaku-no-ni nessin-da.
Suzuki teacher-TOP papers-ACC write-N-PUR eager-COP
b. Professor Suzuki is eager to write papers.

Here, the main predicate is *eager* (*nessin*), and the modifying phrase is *to read papers* (*ronbun-o yomu-no-ni*). It is obvious that the latter includes the action of reading papers, which specifies in what respect Professor Suzuki is eager.

In this connection, the next point to note is how the action described in modifying phrases is related to the property-attributed entity. In case of (6), the property-attributed entity is *Professor Suzuki* (*Suzuki sensei*) and it serves as the undertaker of the "reading papers" action. However, this does not exhaust all the possibilities. Look at (7):

[7] Thus, to be precise, the first element of these sentences should be called the "theme/topic", not the "subject". In this paper, however, I use the term "subject".

(7) a. Kono mondai-wa toku-no-ga muzukasii.
This problem-TOP solve-N-NOM difficult
b. This problem is difficult to solve.
(adapted from Asakawa and Miyakoshi 1996: 121)

In this pattern, the property-attributed entity *this problem* (*kono mondai*) is not the undertaker of the action "solve (*toku*)". It is the *Object* of "solving". Lastly, consider (8):

(8) … and Iran's good offices were necessary to deal with them.
(from BNC: ADL 1450)

In this case, the property-attributed entity (*Iran's good offices*) is neither the undertaker nor the Object of "dealing with them". What then is the status of this entity? This point will be discussed in 3.1.

In this paper, we will concentrate on the last two patterns, putting aside the pattern wherein the property-attributed entities are the undertakers of the actions designated by the modifying phrases, as exemplified in (6). I hasten to add, however, that this does not mean (6) pattern is categorically irrelevant to (7) or (8) pattern. My hypothesis is that all three patterns are somehow associated with one another, because they are at least common in that some action makes a contribution to property predicating. Anyway, comprehensive study will be reserved for future research.

2.2 Behavior of PA

Now let us observe the distribution of PA, which has been mysteriously overlooked so far in the literature. PA's peculiar behavior manifests itself in comparison to PN and PP. First, I would like to list the examples of each class. The following (9), (10), and (11) are examples of PA, PP, and PN, respectively. a. sentences are English and b. sentences are Japanese:

(9) a. (in) appropriate, fit, proper, suitable, useful, etc.
b. at-te-iru, chodo-yoi, pittari, (fu) tekisetu, tekisi-te-iru, etc.
(10) a. a breeze, a cinch, difficult, easy, impossible, simple, tough, etc.
b. fukano, kantan, kon'nan, muzukasii, yasasii, youi, etc.
(11) a. essential, imperative, important, necessary, significant, etc.
b. fukaketu, hituyo, juyo, kakase-nai, taisetu, etc.

Next, let us turn our attention to how these three predicates are distributed in constructions. Let us begin with English TC. As shown in (12) and (13), this construction accepts only PA and PP, excluding PN (see Yasui et al. 1976: 239). In (13), we may not understand that *John* or *this paper* is the Object of convincing or finishing:

(12) a. The book is easy to read.
b. Items appearing on this bibliography are appropriate to read and discuss. (http://www.aaaai.org/professionals/resources/tpd/Interpersonal/ComCultComp.html)
c. In general, antibiotics are appropriate to use when….
(http://healthlink.mcw.edu/article/1031002356.html)

(13) a. *John is necessary to convince.
b. *This paper is significant to finish. (Yasui et al. 1976: 239)

Concerning PUC, on the other hand, only PN is acceptable:

(14) a. *This book is easy to understand the theory of evolution.
b. *This book is appropriate to understand the theory of evolution.
(15) This book is important to understand the theory of evolution.

Let us move on to Japanese NGC. In this pattern, similar to English TC, the property-attributed entity is construed as the Object of the modifying action. As shown below, PP is readily accepted, while PA and PN are infelicitous:

(16)	Kono	hon-wa	rikaisuru-no-ga	muzukasii.
	This	book-TOP	understand-N-NOM	difficult.
(17) a.	??Kono	heya-wa	sumu-no-ga	chodo yoi.
	This	room-TOP	live in-N-NOM	just fit
b.	*Kono	hon-wa	yomu-no-ga	hituyo-da.
	This	book-TOP	read-N-NOM	necessary-COP

In contrast, the situation dramatically changes regarding NNC, the assumed counterpart of PUC. Following examples demonstrate that only PP is excluded from this construction:

(18)	*Sono hon-wa	sono riron-o	rikaisuru-no-ni	muzukashii.
	The book-TOP	the theory-ACC	understand-N-PUR	difficult
(19) a.	Sono hon-wa	sono riron-o	rikaisuru-no-ni	chodo yoi.
	The book-TOP	the theory-ACC	understand-N-PUR	just fit
b.	Sono hon-wa	sono riron-o	rikaisuru-no-ni	juyo-da.
	The book-TOP	thetheory-ACC	understand-N-PUR	important-COP

However, unlike English, this is not the whole picture. We should consider one more possibility, the case where the modifying phrase is *no-ni* pattern but the property-attributed entity conceptually serves as the Object of the described action (I dub this "half-and-half" construction as NNC' since it looks like NNC at first glance). In this pattern, again the distributional pattern changes slightly:

(20)	? Kono hon-wa	yomu-no-ni	muzukashii.
	This book-TOP	read-N-PUR	difficult

(adapted from Asakawa and Miyakoshi 1996: 121)

(21) Kono hon-wa yomu-no-ni chodo yoi.
This book-TOP read-N-PUR just fit
(22) *Kono hon-wa yomu-no-ni juyo-da.
This book-TOP read-N-PUR important

It is important to note that unlike the last two patterns, only PA is readily accepted in this environment. The observations above are summarized in Table 1:

		PP	PA	PN
Eng.	TC	√	√	*
	PUC	*	*	√
Jap.	NGC	√	*	*
	NNC'	*?	√	*
	NNC	*	√	√

Table 1. the distributions of English and Japanese PP, PN, and PA

Common to English and Japanese, PP and PN are in complementary distribution, while PA is fluctuating between the two. In English, PA is grouped together with PP. In Japanese, PA has its own pattern NNC', which has the blended character of NGC and NNC. Now that we got the relevant data, let us move on to some basic concepts for analysis.

2.3 Construal and Construction

First and foremost, I would like to emphasize that linguistic meaning is conceptual and subjective in nature.[8] Even when you believe that you are describing a situation objectively, the words you use are never independent of your *construal*. The following example illustrates this well:

> … a speaker who accurately observes the spatial distribution of certain stars can describe them in many distinct fashions: as *a constellation*, as *a cluster of stars*, as *specks of light in the sky*, etc. Such expressions are semantically distinct; they reflect the speaker's alternate construals of the scene, each compatible with its objectively given properties. (Langacker 1990: 61)

Thus, in other words, regarding the same *conceptual content*, we have the ability to construe it in various alternate ways (= *a constellation, a cluster of stars, specks of light in the sky, etc.*).

With this in mind, turn to the definition of *construction*. In the present study, a construction is defined as follows. On the formal side, a construction is a schematic structural *type* that is to instantiate a considerable number of *tokens*.[9] On the

[8] This is the basic tenet in cognitive semantics. See Lakoff and Johnson (1980) for detailed discussion.
[9] This might not be totally precise since complete idioms like *kick the bucket* with no lexical slot are to

conceptual side, *one constructional pattern corresponds to one construal*. Put differently, this is a hypothesis that each construction has its own meaning that cannot be reduced to any other one.

In addition, more often than not, more than one construction is based on a single conceptual content (e.g. active vs. passive constructions on paraphrasing terms, causative alternation, locative alternation, etc.). Still, however, we have to admit that this argumentation has predominantly been applied to EC-based constructions, the ones intended to describe some situation or event. Therefore, if we turn our attention to the constructions we are concerned with, which are mainly driven by PC, a question arises if this "conceptual vs. construal" paradigm is also applicable to them. In point of fact, my answer to this question is in the affirmative. I will try to prove the validity of this idea in the next section.

3 FURTHER DISCUSSION

In the following, I will explore motivating factors of the facts observed in 2.2. from a cognitive perspective. The puzzle is that in English, PA is largely grouped with PP under *tough* construction while in Japanese, PA is generally grouped with PN under *no-ni* construction. It surely does not suffice to state that unlike PP and PN, the way of categorizing PA varies across languages (probably across constructions) and PA is a less prototypical (or less basic-level) concept. The question we have to ask is WHY PA shows such diversity in its distribution. To tackle this problem, I will make further observations on TC and PUR in 3.1, and then attempt to explain PA's behavior in 3.2.

3.1 Where Do the Two Constructions Meet?

In 2.2, we have seen PA's peculiar behavior, and as to Japanese NGC and NNC, it was clear that they form a continuum category. But one might still wonder whether there is any conceptual connection between TC and PUR. The "conceptual content/construal" distinction introduced in 2.3 is helpful to solve this problem. In fact, TC and PUR are connected at the level of conceptual content, but diverge at construal-level (since they are different constructions). To clarify this point, let us consider the following examples. (23a), (23b), and (23c) are instances of PP, PA, and PN, respectively:

(23) a. This knife is difficult to cut hard things {with/* ϕ }.
b. This knife is appropriate to cut hard things {with/* ϕ }.
c. This knife is necessary to cut hard things {*with/ ϕ }.

It is obvious that (23a) and (23b) are instances of TC and (23c) is that of PUR. They

be excluded. For a more discussion on the definition of "construction", see Croft (2001).

are totally different in linguistic terms. This is, for example, evidenced by fronting *to* infinitival clauses, as in (24):

(24) a. *To cut hard things with, this knife is difficult.
b. *To cut hard things with, this knife is appropriate.
c. To cut hard things, this knife is necessary.

However, it is also obvious that the subjects in sentences (23) are all construed as "instruments." At the conceptual-content level, these three sentences share at least the concept of using a specific knife. In fact, it is in relating the instruments to the actions that TC and PUR diverge. In TC, the action designated by *to* infinitival clause is construed as the "Means" to access the property of the target entity (= *this knife*, in this case).[10] Of course, it may be conceptually more natural if knife is regarded as Means rather than Object. However, I would like to emphasize again that what counts here is *construal*. In TC, the target entity is *to be construed* as Object, no matter how trivially Object-like that entity may be. In other words, the expressive purpose of this construction is not to describe an entity as it is, but to pick out an entity from an event and to describe its property (Shinohara 1993, 2002; Langacker 1995). As for PUR, in contrast, the action is construed as the Object (as it is expressed by purpose clause), and the property-described entity is supposed to be the Means to attain that Object. The main property predicate in this case specifies to what extent the entity serves for that Object.

At this juncture, one may notice that considering the nature of the instrument as a Means for some Object, the subject position of PUR is more appropriate for them to appear in. This intuition is to be captured from the viewpoint of prototype category. The idea is that the less discrepancy there is between a concept and its construal, the more prototypical the relevant expression is. For example, *motion* is a less prototypical noun than *chair*. As for the former word, there is a gap between the natural concept it corresponds to (= process) and the construal specified by the category noun (= thing), while concerning *chair*, there is no such conflict.[11] Now back to our examples. By the analogy of the *motion/chair* contrast, examples like (23a, b) are less prototypical TC instances because the entities designated by the subjects are conceptually instrumental, which somewhat conflict with the TC's construal of seeing the subject entity as Object.

Note finally that as we have seen in (23), most if not all less prototypical instances of TC are not to be alternated into PUR instances, and vice versa. This leads us to the assumption that it is the semantic class of the predicates that determines which of the two constructions should be used. In English, as mentioned earlier, PP and PA are rigidly used in TC, no matter how instrument-like the sentential subjects seem to be. In summary, prototypical TC and less prototypical TC share the same construal and differ in their conceptual contents, while less prototypical TC and PUR share the same conceptual content and differ in their construals.[12]

[10] Schachter (1981), Sakamoto (2002b), Yonekura (2004), and others provide a similar view on TC, though the concept of "means" is not used therein.

[11] For further discussions on this track, see Croft (1991: Ch. 2, 2001: Ch. 2).

[12] The same thing also holds for Japanese NGC and NNC, but the boundary is less clear than English

In this connection, it follows from the above argument that as for the constructions in question, EC determines a conceptual content and PC specifies how to construe it. With this hypothetical idea in mind, we will go further into PA's distribution and try to seek its cognitive motivation in the next subsection.

3.2 More on PA and its Implication

Now we are in the position to explain PA's peculiar behavior. One tempting answer might be that PA is conceptually less basic than PP and PN. If this is correct, it is already demonstrated in 2.3, and there is no need to go further into this issue. However, obviously it is a gratuitous discussion because we have no experimental data or psychological evidence for it. What we can do for now is (i) to observe slightly more data and (ii) to take relevant EC into account. In the following, we will take up these one by one.

Let us begin with the first point. As for English, as far as our observations with TC and PUC are concerned, it could be concluded that PA's status is not as obscure as I argue, because a clear cut-off point is identified between PA and PN. Once you turn to another construction, however, it turns out that PA's straddling behavior is observable also in English. Look at (25):

(25) a. *This book is difficult for understanding that theory.
b. There are good reasons why a historical, or at least a diachronic, approach is particularly appropriate for studying implicit attitudinal meaning and… (BNC: FA9 1641)
c. This book is necessary for understanding that theory.

Both PA and PN are to be accompanied by *for-ing* phrase while PP is excluded in this pattern. This might indicate that PA and PN are also conceptually close in some respect. If you add this construction to our list, the complete picture is as follows:

	PP	PA	PN
TC	√	√	*
for-ing	*	√	√
PUR	*	*	√

Table 2.

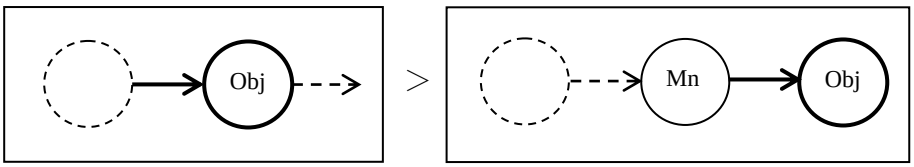
This is thus further evidence to support our claim that PA is conceptually intermediate between PP and PN, at least in the context of action-involved property predication.

Now let us turn to our second task. The crucial assumption we have adopted so far is that not only PC but also EC conceptually contributes to action-involved

because Japanese less typical NGC does not have any overt linguistic device like preposition stranding of less prototypical TC. Besides, in Japanese we can identify the go-between pattern of NNC', as we have seen in 2.2.

property-predication sentences. That is to say, the entity designated by the sentential subject corresponds to a participant of the backstage EC. In 3.1, I have proposed the "Object vs. Means" paradigm. In TC or NGA, the subject is regarded as Object of the involved action. In PUC and NNC, on the other hand, the subject is seen as the Means for some purpose. Interestingly, especially in Japanese, we have identified NNC', the status of which is intermediate between NGC and NNC. Therefore, it stands to reason that the subject entity is construed as both Object and Means at the same time. At this juncture, I would like to emphasize again that only PA is readily compatible with NNC'. Thus, our plausible conclusion is that *the concept of PA allows us to see the relevant entity both as an Object and a Means.*

Yet, this might be a mere description of facts. What does it actually mean that an entity is construed as both Object and Means? To answer this, I would like to suggest a "role shifting model", which is intended to capture our daily experience that the same thing shifts its role from an Object to Means to do something. Let us give an example. Suppose you encounter a stick on the mountain trail. You pick it up and try doing various things to it (e.g. swinging). As you continue, you gradually get to know the "affordance" of that stick, i.e. what is doable or undoable with regard to the stick[13] Then, without notice, the stick stops being a mere Object and begins to function as a Means to do something (e.g. to help you walk). This situation is roughly schematized in Figure 1, building upon Langacker's (1990) action chain model. The circles represent entities, arrows correspond to actions, and thickness of line expresses the high degree of attention (i.e. "profile" in Langacker's term):



<Figure 1> the image of role shifting from "Object" to "Means"

Generally, the left-hand diagram corresponds to prototypical TC and NGC, while the right-hand one to PUC and NNC. Note that the profile shifts from the original Object to the new Object in combination with the role shifting. This is reflected in (24), where only PUC allows *to* infinitival clause, action-denoting modifying phrase, to be fronted.

Now recall again the aforementioned assumption that PC specifies how to construe the content determined by EC, and let us integrate it into this role shifting model. We then get an idealized schema of PC that when we encounter an entity and perceive it, judgment follows the order of "possibility => appropriateness => necessity." And it is when you are judging appropriateness that the status of the target entity as an Object changes its role into a Means. This might be so radical a hypothesis that linguistic evidence would not at all be sufficient to verify it. However, it is at least certain that the role shifting model will capture some aspect of our real

[13] In my understanding, the theory of affordance (Gibson 1979; Sasaki 1994) is intended to explain this phase, where the entity is regarded as the Object of actions.

cognitive process and the linguistic phenomena it motivates.

4 Concluding Remarks

In this brief paper, as the linguistic phenomena in which both PC and EC are involved, we have observed two types of property-predicating sentences in English and Japanese. Through the observation, it was revealed that PA's distribution was, as it were, the half-and-half mixture of PP and PN. If this is also true of other languages, it might show that the concept of appropriateness is universally less-prototypical than PP or PN, or at least that the conceptual hierarchy of "PP<PA<PN" is universal across languages.

As the next step, adopting the notion of conceptual content/construal, I have tried to explain the facts in question by integrating PC and EC, but the work is fragmentary for now. It must be left for future research to establish a more appropriate and comprehensive cognitive model that integrates PC and EC. Anyway, the shifting process from object to instrument I introduced in 3.2 will hopefully be a stepping stone to the goal.

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