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研究発表

Cross-space connectors and interpretations of the change predicate *naru* in Japanese

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1. Introduction

The purpose of this paper is to account for various interpretations of the change predicate *naru* (*become*) in Japanese, illustrated in (1), within the Mental Space Framework (Fauconnier 1985, 1997).

(1) Mitterand ga Chirac ni naru.
NOM COP become

a. Interpretation 1: Mitterand is transformed into Chirac.

b. Interpretation 2: The image of Mitterand resembles Chirac. (Context: In Luc's painting _ or In Len's movie _)

c. Interpretation 3: Mitterand plays the role of Chirac. (Context: In Len's movie _)

d. Interpretation 4: As a result of an election, Mitterand is replaced by Chirac.

e. Interpretation 5: In reality the president is Mitterand, but in Len's movie it is Chirac. (Context: In Len's movie _)

It will be shown that this predicate can best be characterized as a trans-spatial operator in the sense of Fauconnier (1985).

Section 2 will briefly present the syntactic structures associated with *naru*. In Section 3, we will clarify how the syntactic structures are mapped onto space configurations and an analysis of the temporal interpretation of the change predicate will be proposed. Section 4 will deal with the relationship between connector types and space types. Section 5 will give an account of various atemporal interpretations of *naru* on the basis of the properties of cross-space connectors identified in Section 5. In Section 6 another interpretation of *naru* will be analyzed in the same vein.

2. Syntactic Structures

We assume that the predicate *naru* is associated either with the unaccusative structure (2) or with the transitive structure (3)[1].

(2) [$_{S1}$[$_{S2}$Daitooryoo ga Bush ni] naru]
president NOM COP become
Lit: The president becomes Bush.
"Bush becomes the president."

(3) [$_{S1}$Ken$_i$ ga [$_{S2}$PRO$_i$ bengosi ni] naru]

NOM lawyer COP become

"Ken becomes a lawyer."

In (3) the predicate *naru* has its own subject, which is not the case in (2). This distinction is motivated by the difference in acceptability between (4) and (5)[2].

(4) a. *Daitooryoo ga Bush ni nari tagatte iru.
president NOM COP become want PROG
"*The president wants to be Bush."
b. *Bush ni nare!
COP become-IMP
"*Become Bush!"

(5) a. Ken ga bengosi ni nari tagatte iru.
NOM lawyer COP become want PROG
"Ken wants to be a lawyer."
b. Bengosi ni nare!
lawyer COP become-IMP
"Become a lawyer!"

But the distinction between accusative and transitive structures is irrelevant to the discussion below. What is important here is that the predicate *naru* is subcategorized for a sentential complement. In (2) and (3), the copular sentences (6) and (7) are embedded respectively[3].

(6) Daitooryoo wa Bush da.
president TOP COP
"The president is Bush."

(7) Ken wa bengoshi da.
TOP lawyer COP
"Ken is a lawyer."

Consider the following sentence here.

(8) Otamazyakusi ga kaeru ni naru.
tadpole NOM frog COP become
"The tadpole becomes a frog."

What is the structure of (8)? To the extent (9) is deviant, one might conclude that (10) is not an adequate structure.

(9) #Otamazyakusi wa kaeru da.
tadpole TOP frog COP
"The tadpole is a frog."

(10) [$_{S_1}$[$_{S_2}$Otamazyakusi ga kaeru ni] naru]
tadpole NOM frog COP become

But the oddness of (9) is due to a semantic or pragmatic factor, not a syntactic one. As we will see in Section 3, one can derive an adequate

semantic representation from the syntactic structure shown in (10). (2), (3) and (8) can thus be associated with an identical constructive rule, which will be introduced in the next section.

3. Constructive Rule

We propose the constructive rule (11) for the change predicate *naru*.

(11) Constructive Rule of the sentence [$_{S1}$ (NP) [$_{S2}$P] naru][4]

a. M1: ? ¬P[5], where M1 is a viewpoint space

b. M2: P, where M2 is a focus space and M1 < M2[6]

c. The spaces M1 and M2 are linked by connectors.

Although the clauses (11a) and (11b) are essentially identical to the analysis of the French change predicate *devenir* proposed by Vandeloise (2000), the operation shown in (11c) is characteristic of the Mental Space Framework adopted here.

When applied to (2) and (3), the rule (11) gives rise to the space configurations (12) and (13) respectively.

(12) ? M1: ¬[RVC (R) = x],
where R = president, x = Bush, RVC = role-value connector
M2: RCV (R') = x', where C (R) = R', C (x) = x' and M1 < M2

(13) ? M1: x = Taro, ¬lawyer (x)
M2: x' = Taro, lawyer (x'), where C (x) = x' and M1 < M2

These are indeed the adequate representations of (2-3).

Now how about (8)? According to (11), the configuration (8) constructs should be something like (14).

(14) ?M1: tadpole (x)
¬frog (x)
M2: tadpole (x')
frog (x'), where C (x) = x' and M1 < M2

The space M2 illustrated in (14), however, is not coherent in normal situations, since the implication (15) holds.

(15) ∀x [frog (x) → ¬tadpole (x)]

The two predications in M2 are contradictory. But this does not mean that (11) is inappropriate here because there is a general solution to such contradictory situations: when the subject and predicate descriptions are incompatible, the former may be encoded only in the viewpoint space[7]. In the famous example (16) given by Fauconnier (1985), the subject description can be introduced only in the space M1 if one wants to avoid the contradiction.

(16) In Len's picture, the girl with blue eyes has green eyes.

Given this strategy, the space configuration in (14) can be converted into (17), where M2 is coherent.

(17) ?M1: tadpole (x)
¬frog (x)
M2: frog (x'), where C (x) = x' and M1 < M2

Note that (17) can be further simplified as in (19), since the predication ¬ frog (x) in M1 is redundant given the equivalence between (15) and (18).

(18) ∀x [tadpole (x) → ¬frog (x)]

(19) ? M1 : tadpole (x)
M2 : frog (x'), where C (x) = x' and M1< M2

As one can see, (19) is an adequate representation of (8).

4. Relationship between connector types and space types

In (11) types of connectors which link M1 and M2 are not explicitly specified. This is because connector types are generally determined by types of spaces they link. The Mental Space system developed by Fauconnier (1985) assumes the relations shown in (20), though he does not explicitly discuss them. In (20) C represents the connector(s) linking M1 and M2.

(20) a. If both M1 and M2 are time spaces, then C is an identity connector.
b. If M1 is a reality space and M2 is a belief space, then C is a mental image connector.
c. If M1 is a reality space and M2 is an image space, then C is an image connector.
d. If M1 is a reality space and M2 is a drama space, then C is a drama connector or an image connector.
e. If both M1 and M2 are domains of the same role function, then C is an identity connector or an analogy connector[8].

In (11), as suggested by the temporal condition M1 < M2, the two spaces are time spaces. According to (20a), they are linked by identity connectors, that is, (11) represents a change that one and the same individual undergoes through time.

5. Atemporal interpretations of *naru*

The constructive rule (9) can apply to atemporal spaces if the condition M1 < M2 is deleted. In this case the change predicate *naru* does not represent a change in the literal sense of the term. Consider the following sentences:

(21) Ken no sinnen dewa {a. (2) / b. (3) / c. (8)}.
GEN belief in
In Ken's belief, {(2) / (3) / (8)}.

(22) Ken no e dewa {a. (2) / b. (3) / c. (8)}.
GEN painting in

In Ken's painting, {(2) / (3) / (8)}.

(23) Ken no eiga dewa {a. (2) / b. (3) / c. (8)}.
GEN movie in
In Ken's movie, {(2) / (3) / (8)}.

These sentences have several interpretations. First, they can be given the temporal interpretation shown in (24).

(24) Interpretation 1 of (21-23)
M1: a time space embedded in Ken's belief / painting / movie
M2: another time space embedded in Ken's belief / painting / movie
C: identity connector

This interpretation is not particularly interesting. In this case, (21b), for example, means that Ken thinks that he will become a lawyer and (23c) means that Ken's movie describes the transformation of a tadpole into a frog.

Second, they can be uttered when the reality and a (mental) image are compared, as shown in (25).

(25) Interpretation 2 of (21-23)
M1: reality space
M2: Ken's belief / painting / movie space
C: (mental) image connector

Here (21b) means that Ken thinks he is a lawyer while it is not true in reality. (23c) means that the image of the tadpole does not resemble the model and looks rather like a frog. This type of interpretation does not imply any change and only the difference between the reality and the (mental) image is at issue.

Given the relation described in (20d), (23b) and (23c) have a third interpretation where the element in M1 and its counterpart in M2 are linked by a drama connector:

(26) Interpretation 3 of (23b-c)
M1: reality space
M2: Ken's movie space
C: drama connector

The configuration shown in (26) corresponds to the situation in which the actor Ken plays the role of a lawyer or a tadpole plays the role of a frog. The latter situation is of course difficult to imagine but possible in principle. The configuration in question is totally ruled out for (23a), since the role function denoted by the subject, an abstract entity, cannot be an actor and hence cannot serve as an input of the drama connector.

Sentences (23b) and (23c) have a fourth reading which emerges when an analogy connector comes into play. This connector links two different

values of a role. For example, it links François Mitterand and Jacques Chirac because they are both values of the role "president of France". With this connector available, sentence (23b) might be interpreted as in (27):

(27) Interpretation 4 of (23b)
M1: reality space
M2: Ken's movie space
Role function which has x and x' as values: leader of the rebellion
C: analogy connector

Following the relation shown in (20e), M1 and M2 serve as domains of the role function "leader of the rebellion" in (27). This function returns the value Ken in reality and a lawyer in Ken's movie. In this case, (23b) means that while the leader of the rebellion is Ken in reality, it is a lawyer in Ken's movie.

Similarly, (23c) might have an interpretation such as (28):

(28) Interpretation 4 of (23c)
M1: reality space
M2: Ken's movie space
Role function which has x and x' as values: the animal which Ken has
C: analogy connector

In this context, (23c) says that in reality Ken has a tadpole while in his movie he has a frog. Note that this reading does not imply the identity of the tadpole and the frog. They can be different individuals.

6. A special interpretation based on the analogy connector

Sakahara (1996) notes that sentence (29) has a reading where Ken bought a Siamese cat which is bigger than that he had before, besides the normal individual reading where one and the same cat grew bigger[9].

(29) Ken ga katte iru syamuneko ga ookiku nat-ta.
NOM have PROG Siamese-cat NOM big become-PAS
"The Siamese cat Ken had became / has become bigger."

In the system developed here, this reading emerges when the two occurrences of the category Siamese cat are linked by an analogy connector. This implies that such a reading is only possible when there is a role function which has the two individuals as values. In the context described above, the role is "the Siamese cat Ken has". The configuration constructed by (29) is shown in (30).

(30) M1 : RVC (R) = x, where R = the Siamese cat Ken has
¬big (x)
M2 : RVC (R') = x',
big (x'),

where IC (R) = R', AC (x) = x'

In (30), x and x' are different individuals but are both values of the role "the Siamese cat Ken has". This role level identity is sufficient to license the change predicate, which leaves unspecified the type of connector it introduces. The role reading discussed here is due to the possibility for the change predicate to introduce an analogy connector.

In general it is possible to identify an element by pointing to another element with which it is linked by a connector. This fact is stated by the Access Principle (31):

(31) If two elements a and b are linked by a connector F (b = F (a)), then element b can be identified by naming, describing, or pointing to its counterpart a. (Fauconnier 1997: 41)

As Sakai (2000) notes, an individual can be identified by describing the kind it is a member of because the two elements are linked by a kind-individual connector. Note here that if an element x is a value of the role "the Siamese cat Ken has", then x is a member of the category of cat, which makes it possible to identify x and x' in (30) by the description *cat*, as in (32).

(32) Neko ga ookiku nat-ta.
cat NOM big become-PAS
"The cat became / has become bigger."

Sentence (32) can be uttered instead of (29). Suppose that you visit Ken's house and find that he has bought a bigger Siamese cat. In this context you can utter (32) to mean what (29) means. The configuration which (32) constructs is illustrated in (33).

(33) M1 : RVC (R) = x, where R = the Siamese cat Ken has
cat (x),
¬big (x)
M2 : RVC (R') = x',
cat (x'),
big (x'),
where IC (R) = R', AC (x) = x'

In (33), x and x' are identified by the name of the kind they belong to, but it is important to note that they are still linked by an analogy connector, otherwise the non-individual reading would not be possible. It is then necessary to recover the role function which has x and x' as values in order to understand (32) correctly in the context in question.

This last example clearly shows the importance of meaning construction taking place at a cognitive level that cannot be directly observed. Sentence (32) only says that there are two elements x and x' such that x and x' are cats and that x' is bigger than x. The full interpretation shown in (33)

should be constructed on line in context.

7. Concluding Remarks

In this article we have argued the three points shown in (34):

(34) a. The change predicate in Japanese *naru* is a trans-spatial operator.
b. Types of connectors depend on types of spaces they link.
c. Various interpretations of the change predicate are functions of connectors it introduces in context.

The interpretations of (1) can now be accounted for without difficulty. The connectors which come into play are illustrated in (35):

(35) a. (1a): identity connector
b. (1b): image connector
c. (1c): drama connector
d. (1d): analogy connector
e. (1e): analogy connector

(1d) and (1e) are distinguished by the spaces linked by the analogy connector. In (1d) it links two time spaces while in (1e) it links the reality space and a movie space.

In the system developed here, the possibility of an interpretation depends on that of the connector to be introduced. For example, if the element x in M1 cannot be an actor, then it cannot be an input of the drama connector. The drama connector interpretation is ruled out accordingly. In this way, our system correctly predicts the possibility or the impossibility of interpretations of the change predicate.

Abbreviations

AC: analogy connector
COP: copula
GEN: genitive
IC: identity connector
IMP: imperative
NEG: negation
NOM: nominative
PAS: past
PROG: progressive
RVC: role-value connector

Notes

[1] The distinction between these two types of syntactic structures is proposed by Kageyama (1993).

[2] In fact there is no reason (3) must be assigned a transitive structure; (3) may allow for both structures.

Note also that only the unaccusative structure is possible when the embedded clause is negative or marked by *yoo* (manner). (ii-iii) and (iv-v) are ruled out.

(i) Ken ga bengosi de naku naru.
NOM lawyer COP NEG become
Lit: Ken becomes not a lawyer.
"Ken is not a lawyer any longer."

(ii) *Ken ga bengosi de naku nari tagatte iru.
NOM lawyer COP NEG become want PROG
Lit: Ken wants to become not a lawyer.
Intended: Ken wants to give up his job as a lawyer.

(iii) *Bengosi de naku nare.
lawyer COP NEG become-IMP
Lit: Become not a lawyer!

(iv) Ken ga mazimeni benkyoo suru yoo ni naru.
NOM hard study do manner COP become

[3] As is well known, the topic marker *wa* is generally replaced by the nominative marker *ga* in embedded clauses. This is why the subject is marked by *ga* in (2). As for *ga* in (3), it is licensed by the predicate *naru*.

[4] "P" represents the embedded clause.

[5] "?" represents a precondition in the sense of Dinsmore (1991).

[6] In general "Mn < Mm" means that the space Mn precedes the space Mm temporarily.

[7] This is a general strategy resorted to in order to avoid contradictions, not an absolute rule.

[8] The analogy connector, proposed by Fauconnier (1985), is a connector which links two different values of a role. By definition, when two elements are linked by an identity connector, they cannot be linked by an analogy connector.

[9] Sakahara (1996) also notes the same kind of reading for French. His example is (i).

(i) Le président est devenu vieux.
the president be become old
"The president became old."

Sentence (i) can mean that an older man was elected president. This non-individual reading is pointed out for English by Sweetser (1996a, 1996b).

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<要旨>

スペース間コネクターと変化述語の解釈

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この論文では、メンタル・スペース理論におけるコネクターの概念を精緻化することにより、変化述語「なる」の多様な解釈を記述する。

統語的側面に関しては、「なる」は補文を要求する述語であり、影山 (1993)のいう非対格型補文構造(1)、(3)、または他動詞型補文構造(2)をとる。

(1) [大統領がブッシュに]なる。
(2) 太郎 i は[PROi 弁護士に]なる。
(3) [オタマジャクシがカエルに]なる。

こうした補文構造に基づき、変化文のスペース構築規則を次のように定義する。

(4) 変化文[s_1 (NP) [s_2P] なる]のスペース構築規則 (P は補文)
a. M1 : ? ¬P (?は Dinsmore 1991 のいう前提条件を表す)
b. M2 : P ただし、M1 < M2
c. M1 と M2 はコネクターで結合される。

(4)と一般原則との相互作用により、(1-3)は最終的にそれぞれ(5-7)のスペース構成を作る。(C は何らかのコネクター)

(5) ? M1 : RVC (R) = x
ここで、R = 大統領、x = ブッシュ、RVC = 役割・値コネクター
M2 : RCV (R') = x' ただし、C (R) = R', C (x) = x'
(6) ? M1 : x = Taro, ¬lawyer (x)
M2 : x' = Taro, lawyer (x') ただし、C (x) = x'
(7) ? M1 : tadpole (x)
M2 : frog (x') ただし、C (x) = x'

(4)では M1 と M2 を結合するコネクターの種類に指定がないが、一般に二つのスペースを結合するコネクターの種類はその二つのスペースの性質により決まる。これは変化述語とは独立の原則である。

(8) a. M1 = 現実かつ M2 = 現実ならば、C = 同一性
b. M1 = 現実かつ M2 = 信念ならば、C = 心的イメージ
c. M1 = 現実かつ M2 = 絵ならば、C = イメージ
d. M1 = 現実かつ M2 = 映画ならば、C = ドラマまたはイメージ
e. M1 = M2 = 役割 R の変域ならば、C = 同一性または類推

これにより変化述語の時間以外の解釈が説明できる。例えば(2)には太郎(登場人物)が映画の中で弁護士として描かれているという解釈(C = イメージ)、太郎(俳優)が映画で弁護士の役を演じているという解釈(C = ドラマ)があり、(3)には太郎の飼っている動物がオタマジャクシから別個体のカエルになるという解釈(C = 類推)がある。

以上のように、変化述語の意味記述(4)が未指定部分を含んでいるにもかかわらず、コネクターに関する一般原則により、文脈における具体的な解釈が導出できる。