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<table>
<thead>
<tr>
<th>項目</th>
<th>题目</th>
<th>論者</th>
<th>頁数</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>概念化のID追跡モデルの提案 —「認知文法」の図法を制約し、概念化の効果的な視覚化を実現するために一</td>
<td>黒田 航</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>ID追跡モデルの有効性</td>
<td>黒宮公彦</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>The Authority of Root Must: from a Standpoint of Prototype</td>
<td>賀田敬介</td>
<td>23</td>
</tr>
<tr>
<td>4</td>
<td>予期的認知と形容表現：不安に基づく状況把握</td>
<td>仲本隆一郎・小谷原則・井佐原均</td>
<td>34</td>
</tr>
<tr>
<td>5</td>
<td>身体運動意味論 — 実験認知言語学へ向けて一</td>
<td>月本 洋</td>
<td>45</td>
</tr>
<tr>
<td>6</td>
<td>助詞「に」の定量的分析の試み— 言語研究の新たな手法を求めて一</td>
<td>李 良文</td>
<td>55</td>
</tr>
<tr>
<td>7</td>
<td>格助詞の放射状カテゴリー構造と習得との関係</td>
<td>森山 新</td>
<td>66</td>
</tr>
<tr>
<td>8</td>
<td>個体と部分の連続性と日本語の「種類名詞」</td>
<td>西田光一</td>
<td>77</td>
</tr>
<tr>
<td>9</td>
<td>英語教育での名詞のく数の規定に関する指導</td>
<td>岸本秀子</td>
<td>88</td>
</tr>
<tr>
<td>10</td>
<td>'共感的的表現'の動機付けに関する整理と分類</td>
<td>武藤(酒井) 彩加</td>
<td>99</td>
</tr>
<tr>
<td>11</td>
<td>A Constructional Approach to Transitive Transferred Epithet Constructions</td>
<td>木原(岩本) 和義</td>
<td>110</td>
</tr>
<tr>
<td>12</td>
<td>言語を通して見る記述的ジョイントアテンションの仕方と表現</td>
<td>宇野良子・池上雄志</td>
<td>119</td>
</tr>
<tr>
<td>13</td>
<td>志向性の文法論へ</td>
<td>本多 啓</td>
<td>129</td>
</tr>
<tr>
<td>14</td>
<td>認知意味論における概念化の主体の位置づけについて</td>
<td>阿部 宏</td>
<td>140</td>
</tr>
<tr>
<td>15</td>
<td>'多かれ少なかれ'における尺度の性質について</td>
<td>野澤 元</td>
<td>150</td>
</tr>
<tr>
<td>16</td>
<td>主体的概念的主体面と客体面：主体性の理論的考察と言語学的適用</td>
<td>酒井智宏</td>
<td>161</td>
</tr>
<tr>
<td>17</td>
<td>Cross-space Connectors and Interpretations of the Change Predicate *naru in Japanese</td>
<td>横山 宏</td>
<td>172</td>
</tr>
<tr>
<td>18</td>
<td>Conceptualization of Attributive and Predicative Adjectives: A Frame</td>
<td>石崎進子</td>
<td>183</td>
</tr>
<tr>
<td>19</td>
<td>Activation Analysis</td>
<td>柴谷 星</td>
<td>193</td>
</tr>
<tr>
<td>20</td>
<td>「かたい」とフランス語 dur の比較</td>
<td>長谷川玲子・上原聡・加藤陽子</td>
<td>204</td>
</tr>
<tr>
<td>21</td>
<td>日本語の比較構文に関する認知言語学的分析—空間のメタファーに基づく動的認知</td>
<td>小田宏美</td>
<td>215</td>
</tr>
<tr>
<td>22</td>
<td>Gesture Language Game を用いた空間表現発生の研究</td>
<td>山澤美由起</td>
<td>221</td>
</tr>
<tr>
<td>23</td>
<td>テキストマイニングを用いた商品/モノに関するイメージ分析</td>
<td>金丸敏幸</td>
<td>232</td>
</tr>
<tr>
<td>24</td>
<td>言語的主体的側面に関する認知言語学的アプローチ—動詞「つける」を中心に一</td>
<td>石崎進子</td>
<td>242</td>
</tr>
<tr>
<td>25</td>
<td>スペイン語再構文による受身に見られる主体性</td>
<td>必藤真季</td>
<td>253</td>
</tr>
<tr>
<td>26</td>
<td>&quot;The Mind Is a Container&quot;: Metaphoric Transfer from Space to Emotions as Cause in From and Out of</td>
<td>辻本智子</td>
<td>263</td>
</tr>
<tr>
<td>27</td>
<td>英語における導入メタファーの概念領域としての〈液体〉</td>
<td>龍美也子</td>
<td>274</td>
</tr>
<tr>
<td>28</td>
<td>数量詞の類関 (動静) 構文の日英比較—英語史研究がもたらす視点一</td>
<td>北村 久</td>
<td>285</td>
</tr>
<tr>
<td>29</td>
<td>Reference-Point Construction and Pronominal Anaphora in the Case of the Indefinite Noun Phrase Embedded in the Complex Sentence</td>
<td>遠藤智子</td>
<td>296</td>
</tr>
<tr>
<td>30</td>
<td>On the Double Subject Construction of Emotion and Sensation</td>
<td>宮田明子</td>
<td>307</td>
</tr>
<tr>
<td>31</td>
<td>結果句移動と不変化課移動のかかわり—焦点化と有標性の観点から一</td>
<td>草山 学</td>
<td>318</td>
</tr>
<tr>
<td>32</td>
<td>いつ「着点」が「受け手」と認識されるのか—二重目的語構文と</td>
<td>江副美智子</td>
<td>329</td>
</tr>
<tr>
<td>33</td>
<td>To使役移動構文の場合を中心に一</td>
<td>金杉義雄</td>
<td>330</td>
</tr>
</tbody>
</table>
線条的類像性 (Linear Iconicity) — 自然界の秩序と語順のマッピングに関する
日英対照研究

指示詞における類像性：きこえの階層に関して

モンゴル語の空間表現の多義性と遊牧地域における特徴的な使いわけ

上下・前後・左右—身体の方向性とその意味拡張をめぐる—考察

いわゆる「が・の交替」の認知的再考

日本語被害受身文と参照点構造

参照点構造と他者の心

特別講演

The Cognitive Base of Grammar: A Grammaticalization Perspective
Bernd HEINE 414

シンポジウム

認知類型論：認知言語学が言語類型論と相互にどのように貢献できるか
司会：堀江 麦 429

写像、メンタルロジック、類型論的起動
大堀聡夫 431

形式と意味の対応関係の類型論的変異の認知的基盤：補文現象再考
堀江 麦 437

認知への扉としての意味図 (semantic map) の含意的尺度
ナロック・ハイコ 442

ワークショップ

認知言語学と関連性理論の接点と課題：＜類似性＞に基づく表現 Like と
「よう」を中心に

類似性を表すヨウ (ダ) とNon-identical Resemblance
尾谷昌則 458

〈類似性〉に基づく表現 like の比較過程と程度
古牧久典 463

関連性理論から見た〈類似性〉に基づく表現 like と「よう」を中心に
井門 亮 467

比喻が関わる言語現象の諸相—対照研究的な視点から—
代表：菅井三実 471

文法現象の換喻分析—客観主義的分析を超えて—
菅井三実 472

メタファーはどこまで普通的か—日英対照による「希望」「使役」「問題」
の概念化から—
鋼島弘治朗 476

比喻としてのオノマトペ「ころころ」と「くわくわ」—
呂 佳蓉 480
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):

(2) [s₁[s₂Daitooryoo ga Bush ni] naru]
   president NOM    COP become
   Lit: The president becomes Bush.
   "Bush becomes the president."

(3) [s₁Ken; ga [s₂PRO; 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.

    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 respectively³.

(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) [s₁[s₂Otamazyakusi 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 \([S_1 (NP) [S_2 P] naru]\)

a. M1: \(\neg P^5\), 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) \(? M1: \neg [RVC (R) = x],\)

\quad where \(R = \) president, \(x = \) Bush, \(RVC = \) role-value connector

\quad M2: RCV (R') = x', where \(C (R) = R', C (x) = x'\) and M1 \(<\ M2\)

(13) \(? M1: x = Taro, \neg lawyer (x)\)

\quad 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)

\quad \neg frog (x)

\quad M2: tadpole (x')

\quad 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) \(\forall x [frog (x) \rightarrow \neg tadpole (x)]\)

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. 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) \( ?M1 : \text{tadpole} (x) \)
\[ \neg \text{frog} (x) \]
\( M2 : \text{frog} (x') \), where \( C (x) = x' \) and \( M1 < M2 \)

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

(18) \( \forall x [\text{tadpole} (x) \rightarrow \neg \text{frog} (x)] \)

(19) \( ?M1 : \text{tadpole} (x) \)
\( M2 : \text{frog} (x') \), 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 de 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'),

- 166 -
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),
     - \neg 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

-168-
Notes

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

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 *ruo (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

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.

"P" represents the embedded clause.


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

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

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.

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

(i) Le president 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).
References


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 [s1 (NP) [s2P] なる]のスペース構築規則 (P は補文)
   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) には太郎の動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。