An Analysis of Metaphorically Extended Concepts Based on Bodily Experience:

A Case Study of Temperature Expressions (2)

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1. Introduction

In the previous issue, we have first observed a cognitive perspective on metonymy and metaphor by examining their definitions and examples. Through this observation, we have realized that metonymy and metaphor are powerful cognitive tools for our conceptualization of abstract categories. We have subsequently learned that among many source categories, a concept of temperature is one of the most effective categories as a source domain of metaphor. Temperature expressions we have examined demonstrate that the concept of temperature originally has the potential to draw a scale and set a typical scale applied to each context.

At the latter part of the previous issue, we have classified various metaphors using temperature expressions into three types. The first type is represented by a metaphor based on heat spontaneously rising from the human body: EMOTIONS ARE HEAT. This metaphor is developed from one of physiological metonymies, INCREASE IN BODY TEMPERATURE STANDS FOR EMOTIONS. The second type is a metaphor grounded on warmth felt by retaining body heat: POSSESSION IS WARMTH/LACK IS COLD. The third type includes metonymies based on concrete experiences: HEAT STANDS FOR DANGER and HEAT STANDS FOR FRESHNESS. Yet, in this type, HEAT only carries out a referential function and does not develop into a source category of a metaphor having the power mapped to other concepts.

We have also observed the metaphorical development of the first type. It originally started from an excitement in the whole body and changed to heat in a part of the body, in a concrete thing and then in an abstract object. All of these patterns involve a meaning of temporality as the same as the momentariness of excitement.

In this paper, we will observe other patterns of this first type. The following chapter will propose the patterns which do not retain the original temporal excitement and have a permanent tendency. We will also understand the differently

far-extended way of these patterns in each culture. In the third chapter, after surveying the original characteristics of temperature expressions, we will examine whether the far-extended patterns keep the original characteristics. The fourth chapter presents the reasons why we use a word *hot* to represent far-extended concepts. The concluding chapter, in addition to being a summary, presents a chart which understandably illustrates functions of the concept of temperature for conceptualizing abstract categories.

2. Heat with a permanent tendency

Some extended patterns of temperature expressions do not retain the original temporal excitement, and eventually they become permanent abstract concepts far-extended from a moment rising body heat, shown in the following patterns:

(e) a permanent impression

extended to →(e-1) PASSION

(f) desired by a lot of people

extended to →(f-1) POPULARITY

→ (f-2) A WELL-INFORMED, SKILLFUL OR LUCKY PERSON

(g) desired urgently

extended to →(g-1) URGENCY

[**Figure 1**: far-extended concepts having permanent tendencies][1]

These far-extended patterns develop differently in each culture. In Japanese, heat is commonly used for passion, as we know a lot of *jukugo* expressions which mean passion. On the other hand, "popularity", "a well-informed, skillful or lucky person", or "urgency" is signified by *hot* in English.

We will start with picking out an extended pattern which means passion. Japanese often use temperature expressions of passion and apply these metaphors to various domains (e.g. passion for business, hobbies, interests or religion).

<PASSION IS HEAT>

(1) Kare wa   shigoto ni   *jounetsu* o   *moyashite* ita

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[1] This paper wants to propose that these types of far-extended concepts should be added after (d) of type (1) in Figure 6 in the previous issue.

he TOP job   DAT   passion ACC burning   be-PAST

'He was burning with passion for his job.'

(2) Kanojo wa   sono kashu ni   *netsu*   o   agete   ita

    she   TOP   the   singer DAT heat   ACC   raising be-PAST

    'She was hot on the singer.'

(3) Kare wa   kitte atsume   no   *netsu* ga   *samete* shimat-ta

    he TOP   stamp collection POSS heat   NOM   cold   have done

    'His passion for stamp collection has cooled down.'

In Japanese, *netsu* just meaning "heat," even if not a form of *jukugo*, can be generally realized as a word expressing "passion." This metaphor on passion is so commonly used in Japanese also by a lot of *jukugo*, that is, *netsui, netsuen, nesshin*, and *necchuu*, and some predications meaning "being hot" or "burning." This proves that passion is usually looked upon as heat.

On the other hand, in English, this pattern of temperature expression does not have such a vast expanse of use. As the following examples, it is difficult for us to find a use of "cold" in the sense of passion.

(4) He is *hot* on tennis.

(5) He is *hot* for reform.

(6) a *hot* baseball fan

In English, the sense of *hot* as "desire" has developed so widely that it now means popularity, a well-informed skillful ability or urgency extended from the meaning of "desired by the public."

<POPULARITY IS HEAT>

(7) The Beatles were a *hot* group in the 1960's. (Random House)

(8) the *hottest* show in Las Vegas (Progressive)

(9) *hot* music, *hot* seller, *hot* design

<A WELL-INFORMED, SKILLFUL OR LUCKY PERSON IS HEAT>

(10) He is *hot* at math. (Random House)

(11) a *hot* pilot (Random House)

(12) The book is good on methodology but not so *hot* on linguistic theory.
    (Collins)

(13) Walsh is not the only *hot* surfer in New Plymouth. (*Surf* 70 17/3 1970 O.E.D., 422)

(14) A poker player has to have a *hot* hand to win the pot. (Random House)

<URGENCY IS HEAT>

(15) The *hot* freight must be delivered by 10 a.m. tomorrow. (Random House)

As we can see in the English and Japanese examples I gave above, the far-extended patterns develop very differently in each culture. The difference between passion and public desires can be identified as difference of necessary expressions. In Japanese, an individual mental state is more needed to be explained understandably. On the other hand, in English, a public tendency is often under the necessity of being expressed vividly. In response to each cultural need, temperature expressions may have been characteristically developed.

When we compare all the extended patterns of Japanese and English, we will find the difference of four far-extended patterns between two languages remarkable.

		Japanese		English	
		hot, warm	cold	hot, warm	cold
<type (1)>	(a) ANGER	O	O	O	O
	(b) JEALOUSY	O	△	O	△
	(c) A GREAT IMPRESSION	O	O	O	O
	(d) DESIRE				
	(d-1) DESIRE FOR LUST	O	O	O	O
	(d-2) DESIRE FOR VICTORY	O	△	O	△
	(e) PASSION	O	O	△	?
	(f) Desire by a lot of people				
	(f-1) POPULARITY	–	–	O	–
	(f-2) A WELL-INFORMED, SKILLFUL OR LUCKY PERSON	–	–	O	–
	(g) Urgent desire				
	(g-1) URGENCY	–	–	O	–

[**Figure 2**: The comparison of extended patterns in English and in Japanese]

In the chapters from 4.3.1 to 4.3.5 in the previous issue, we have discussed several levels of extended patterns based on excitement. The levels can be lined up according to their bodily characteristics, that is, from expressions with some bodily meaning, to expressions with some abstract meaning. This can be characterized as the line from metonymy to metaphor, or from metonymic descriptions tightly connected by cause-effect relations, to extended ones in which it is difficult to observe a clear connection with original temperature.

The figure showed as Figure 7 in the previous issue can be revised by adding far-extended concepts. Since these far-extended concepts have permanent characteristics, they can be depicted below momentary concepts such as ANGER, JELOUSY, DESIRE and A GREAT IMPRESSION:
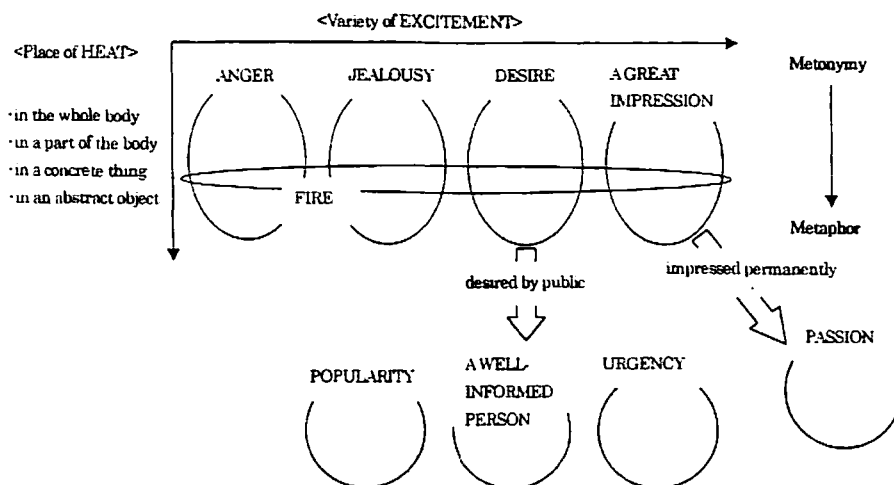
[Figure 3: The development in type (1)]

3. How temperature expressions retain the original characteristics

In chapter 2.3 in the previous issue, we have learned that a metaphor is a way of conceptualizing the so-called "target" category via the "source" category. In this process, the attributes of the concrete source category are mapped onto the abstract target category. If this principle is applied to temperature expressions, the metaphorically extended patterns should naturally retain the original characteristics of temperature expression. Indeed, we have realized that several temperature levels exist in each emotion of temporal HEAT. However, we should raise one question on far-extended concepts, such as PASSION, POPULARITY, A WELL-INFORMED PERSON and URGENCY: Do they retain the characteristics as a quantitative scale?

Before discussing this problem, we have to survey the original characteristics of temperature expression as a quantitative scale.

3.1 Temperature expressions as a case of quantitative scales

Temperature expressions, such as, hot, warm, cool, cold and so on, can be conceived as a case of quantitative scales. Here let us pick out some characteristics of scalar predication, which is also contained in temperature expressions. First, we will consider the semantic definition and the pragmatic definition of quantitative scales, yet we do not have to decide which definition is better or only which of them must be postulated. When people use temperature expressions, they usually understand the expressions as naturally containing both of the two meanings, even if the strength of implications changes according to the context.

3.1.1   Semantic definition

As one way of definition, quantitative scales can be defined by entailment:

Pj outranks Pi on a given scale iff a statement containing an instance of the former unilaterally entails the corresponding statement containing the latter. As examples of such scales, I can cite those in (16), where <. . . , Pj, Pi, . . .> indicates that Pj>Pi, that is, that Pj outranks (is stronger than) Pi on the relevant scale:

(16)<all, most, many, some>	<always, usually, often, sometimes>
<and, or>	<. . . , 6, 5, 4, 3, 2, 1>
<must, should, may>	<necessary, (logically) possible>
<certain, {probable/ likely}, possible>	<obligatory, permitted>
<u><boiling, hot, warm></u>	<u><freezing, cold, cool, (lukewarm)></u>
<beautiful, pretty, attractive>	<hideous, ugly, unattractive, plain>
<adore, love, like>	<loathe, hate, dislike>
<excellent, good, OK>	<{terrible/ awful}, bad, mediocre>

(Horn 1989: 231-232; underlining mine)

Quantitative scales are correlated with syntactic frames as follows, where Pj>Pi throughout. In each case, the order of the scalar predicates cannot be reversed without incoherence or anomaly. (ibid., 234-235)
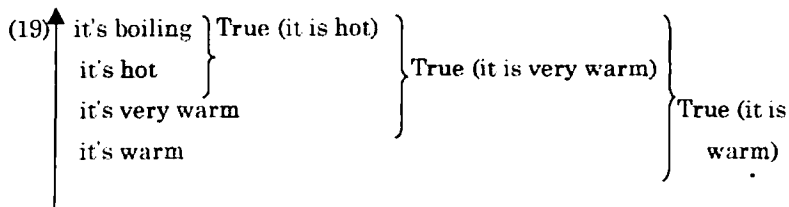
(17) a. SUSPENDERS: b. CANCEL or BLOCK

    (at least) Pi, if not (downright) Pj   Pi, {indeed/ in fact/

    Pi, {or/ and possibly} even Pj   and what's more} Pj

    Pj, or at least Pi   not only Pi but Pj

    not even Pi, {let alone/ much less} Pj

These familiar diagnostics require the construction of separate but parallel scales for contrary values, for example, <boiling, hot, warm> vs. <freezing, cold, cool, lukewarm>. (ibid., 239)

(18) a. It's cool, if not {cold/ freezing/ #lukewarm/ #warm/ #hot/ #boiling}.

     It's warm, if not {hot/ boiling/ #lukewarm/ #cool/ #cold/ #freezing}.

   b. It's cool, in fact { cold/ freezing/ #lukewarm/ #warm/ #hot/ #boiling}.

     It's warm, in fact {hot/ boiling/ #lukewarm/ #cool/ #cold/ #freezing}.

The ordinary negation of scalar predication is characteristically interpreted. *Not-P* is interpreted as 'below P on P's scale.' This is easily explained in the following way:

    A proposition pi containing a scalar operator Pi (in an appropriately simple occurrence) will be true whenever any proposition pj is true, where pj is just like pi except for the substitution of the stronger Pj for the weaker Pi. But the reverse, of course, is not the case. Thus, the weaker the scalar item, the wider the conditions under which its containing proposition is true, as exemplified in (19):

(19)
```
 ↑  it's boiling ⎤ True (it is hot) ⎤                       ⎤
 |  it's hot     ⎦                  |True (it is very warm) |
 |  it's very warm                 |                        ⎰True (it is
 |  it's warm                      ⎦                        | warm)
 |                                                          ⎦   .
```

The negation of a scalar predication, ~pi, is true if its contradictory pi is

false; this amounts to the claim that no proposition of this type containing pi or any stronger value on its scale is true just as follows:

(20) *it is warm*   means (entails)   it is at least warm

      it is not warm   means (entails)   it is not at least warm

                                               = it is less than warm

                                                   (ibid., 243)

As argued above, we can deduce two facts from the scalar entailment relations. One of them is that scalar predication is constructed of "separate but parallel scales for contrary values," and the other is that the ordinary negation of scalar predication means "less than," just as *not warm* designates a position below *warm* on the <hot, warm> scale.

However, these facts point out a kind of contradiction. Why does *not warm* so often designate a temperature which should be positioned on the <cold cool> scale?

Horn (1989: 243) explains this fact by "recognizing that whenever we are dealing with paired contrary gradables, for example, *warm/cool, attractive/unattractive, like/dislike,* and the paired scales they define, the tail of each scale automatically extends through the excluded middle between the contraries into the rival scale."

(21)
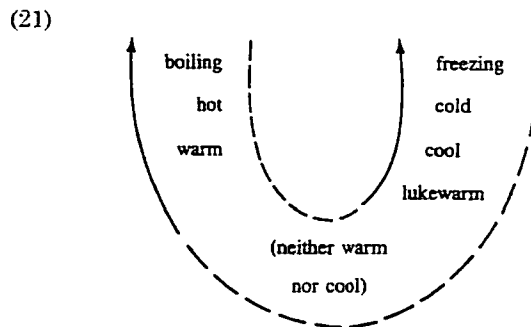
                                                   (ibid., 244)

3.1.2 Pragmatic definition

Fauconnier and Hirschberg stress that scales may be defined not only universally by virtue of the meaning (entailment) relations definable on the elements involved, but also locally, where a given context establishes the pragmatic implications on which the scale is based. (ibid., 240)

The importance of Faucconier's insight in generalizing the notion of scale to the pragmatically as well as semantically defined cases is brought out when we begin to collect examples of the pi-if-not-pj construction and its analogues. (ibid., 241)

> (22) In the Netherlands the crowds [for the Pope] were small, the welcome lukewarm if not cold. (*New York Times*, 19 May 1985, Horn 1989: 241)
>
> (23) The picture of Chiang Kai-Shek that emerges is one that rivals Mussolini, if not Hitler, as the very model of a modern major dictator. (from a review of Sterling Seagrave's *The Soong Dynasty*, Horn 1989: 241)

From the examples above, Horn explains that the pragmatic implications are important because we clearly draw the implication from example (23) that there does indeed exist a scale on which dictators can be ranked, as Hitler clearly outranks Mussolini.

Even in example (22), while it might be maintained that, *cold* and *lukewarm* are situated on a semantically defined scale, we can assert that the scale is not a literal, climatological one, but an extended one established on the concept of welcome. We can draw an extended scale of welcome depending on the given context. Therefore, we should attach importance to pragmatic definitions, when we discuss extended concepts of temperature expressions.

3.2 Retention of scalar characteristics by far-extended patterns

We will go back to the question raised at the beginning of chapter 3. We tried to argue about whether far-extended concepts, such as PASSION, POPULARITY, A WELL-INFORMED PERSON and URGENCY, retain the characteristics as a quantitative scale. In order to examine this point, we will pick out four diagnostics from the characteristics of a quantitative scale I mentioned in chapter 3.1.1.

[1] whether *cold* can be used in each concept
[2] whether the following sentence can be used in each concept:
   "It is warm, if not hot."
[3] whether the following sentence can be used in each concept:
   "It is warm, in fact hot."
[4] Whether "it is not hot" means "it is less than hot (=warm or lukewarm)."

In each example of the four far-extended concepts as shown in the following, we will examine the four diagnostics above:

[a] PASSION → Kare   wa   shigoto   ni   atsuku   natte   iru.

                         he   TOP   job   DAT   hot   become   be-PRES

                         'He is hot on his job.'

[b] POPULARITY → "The singers are a hot group."

[c] A WELL-INFORMED PERSON → "He is hot at math."

[d] URGENCY → "The hot freight must be delivered by 10 a.m. tomorrow."

First, we will examine on the example of PASSION.

(24)(a-1) *Kare   wa   shigoto   ni   tsumetaku   natte   iru.

                he   TOP   job   DAT   cold   become   be-PRES

                'He is cold on his job.'

The sentence above is incorrect in Japanese, but we can express the meaning in another way as noted below:

(a-1') Kare wa   shigoto ni   taishi-te   no   jounetsu   ga

          he   TOP   job   DAT toward   POSS   passion   NOM

          'His passion for the job has become cold.'

          samete   shima-tta.

          become cold   have done

From this sentence, we might conclude that *cold* can be used in the concept of PASSION. However, this sentence does not imply the existence of a cold point on the passion scale. The phrase, "*samete shima-tta* (has become cold)," only means that there is no heat of passion anymore, even if there originally was. This can be proved by the fact that the meaning of this sentence does not change even if "*samete shima-tta* (has become cold)" is reworded as follows:

(a-1") Kare wa   shigoto ni   taishi-te   no   jounetsu   ga

          he   TOP   job   DAT toward   POSS   passion   NOM

          'His passion for the job has lost.'

                nakunatte   shima-tta.
                be lost   have done

Therefore, we consider PASSION as a united concept with heat. Cold PASSION has
no existence, because when the heat is lost, PASSION is also lost.

        (a-2) *Kare   wa   shigoto ni   atui   to   iwa-nai-mademo
                he   TOP   job   DAT hot   COP   say-not-even if
                'He is warm on his job, if not hot.'
                atatakaku   natte   iru.
                warm   become   be-PRES

        (a-3) *Kare   wa   shigoto ni   atatakaku, iya-jissai-wa atsuku
                he   TOP   job   DAT   warm   in fact   hot
                'He is warm on his job, in fact hot.'
                natte   iru
                become   be-PRES

        (a-4) Kare   wa   shigoto ni   atsuku natte   i-nai
                he   TOP   job   DAT   hot   become   be-not
                'He is not hot on his job.'

The sentence of (a-4) seems to signify the middle level of intensity for job, not so hot
and not quite cold. However, (a-2) and (a-3) are not correct as natural Japanese.

    Next, we will examine the concepts of POPULARITY, A WELL-INFORMED
PERSON and URGENCY.
        (25) (b-1) *The singers are now a cold group, even if they were a hot one ten
                    years ago.
             (b-2) *The singers are warm, if not hot.
             (b-3) *The singers are warm, in fact hot.
             (b-4) "The singers are not hot." means "The singers are less than hot
                    (=less than popular)."

        (26)(c-1) *He is now cold at math, even if he was hot at math in junior high
                    school.
            (c-2) *He is warm at math, if not hot.

(c-3) *He is warm at math, in fact hot.

(c-4) "He is not hot at math." means "He is less than hot at math (=less than well-informed)."

(27)(d-1) *The freight changed for cold, even if it had been hot and had to be delivered by 10 a.m. tomorrow.

(d-2) *The freight is warm, if not hot.

(d-3) *The freight is warm, in fact hot.

(d-4) "The freight is not hot." means "The freight is less than hot (=less than urgent)."

I asked a native English speaker whether these twelve sentences are correct or not. She answered that although the three sentences of (b-4), (c-4) and (d-4) are almost correct, the others are wrong.

These facts show that we can deny the *hot* situation, but that we can not observe the *warm* or *cold* point on the four far-extended concepts. Therefore, we arrive at the conclusion that the four far-extended concepts have no more the characteristics of the quantitative scale. We can also see that we are not conceptualizing these four concepts as having a form of scale, even if we use temperature expressions to represent them.

4. Reasons why we use *hot* to represent far-extended concepts

From our results in chapter 3.2, we will raise the following question: Why do we use temperature expressions for far-extended concepts? Obviously, we do not use them for expressing a typical scale applied to each concept, because only *hot* is used for the far-extended concepts. Why does the word *hot* reflect PASSION, POPULARITY, A WELL-INFORMED PERSON and URGENCY?
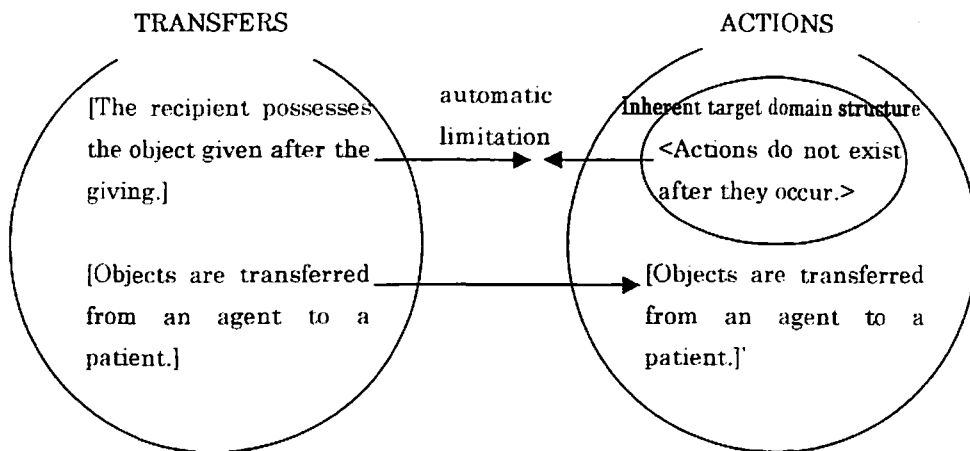
This will be explained by "The Invariance Principle," which Lakoff (1993) introduced. "The Invariance Principle" is defined in the following way:

Metaphorical mappings preserve the cognitive topology (that is, the image-schema structure) of the source domain, in a way consistent with the inherent structure of the target domain.   (ibid., 215)

Lakoff observes that a corollary of the Invariance Principle is that image-

schema structure inherent in the target domain cannot be violated, and that inherent target domain structure limits the possibilities for mappings automatically (ibid., 216). This general principle explains a large number of previously mysterious limitations on metaphorical mappings.

For example, Lakoff (ibid.) explains by this principle why you can give someone a kick, even if that person does not have it afterward, and why you can give someone information, even if you do not lose it. To understand this example properly, we will consider the ACTIONS ARE TRANSFERS metaphor. In this metaphor, actions are conceptualized as objects transferred from an agent to a patient, as when one gives someone a kick or a punch. We know (as part of target domain knowledge) that actions do not continue to exist after they occur. In the source domain, where there is a giving, the recipient possesses the object given after the giving. But this cannot be mapped onto the target domain since the inherent structure of the target domain says that no such object exists after the action is over.

[Figure 4: The target domain override in the ACTIONS ARE TRANSFERS metaphor]

As Figure 4 shows, the reason why you can give someone a kick without his having it afterward is explained by the target domain override in the Invariance Principle.

Next, we will consider how the Invariance Principle works on the far-extended concepts of temperature expressions. The four concepts, PASSION, POPULARITY, A WELL-INFORMED PERSON and URGENCY, usually indicate an extreme state of each attribute. For example, even if some people like a certain singer, we can not say that the singer is popular. It was not until a large number of people show their interest towards that singer that we can use the word "popular." In the case of POPULARITY, only the extreme state is highlighted and the middle levels do not

need to be expressed. It is the same with the other far-extended concepts. Metaphorical temperature expressions usually map the original attributes as a quantitative scale onto the abstract target domains. However, the scalar attributes cannot be mapped onto the far-extended concepts, because inherent structure of the four far-extended concepts says that only an extreme state needs to be described. The target domain override in the Invariance Principle explains why *hot* is only used to represent the four far-extended concepts and why the words, *warm* and *cold*, have disappeared.

As I mentioned in chapter 4.1 in the previous issue, temperature expressions easily reflect levels of intensity on an applied concept. *Hot* is especially effective to describe an extreme state, because the word strongly appeals to the five senses. This is the reason why we use temperature expressions to express PASSION. POPULARITY, A WELL-INFORMED PERSON and URGENCY, even if the scalar characteristics are made to disappear.
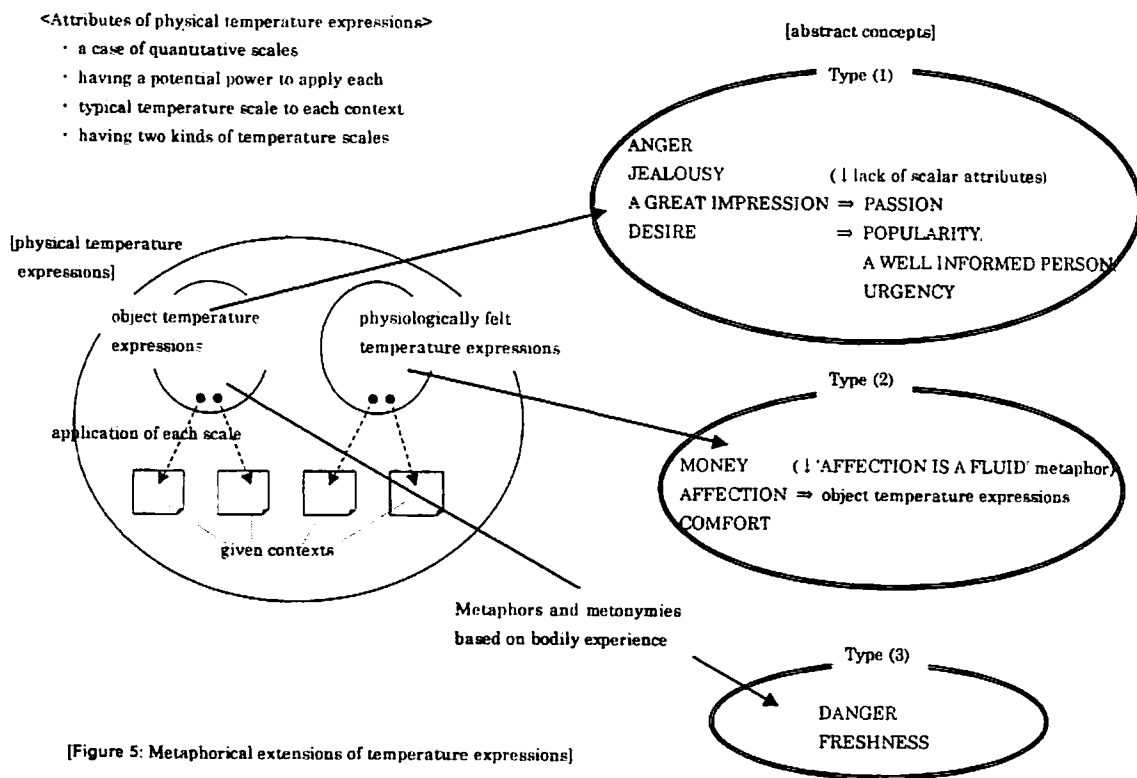
5. Concluding remarks

As we have discussed in the previous issue, various kinds of abstract concepts receive mappings from the temperature source domain. This variety can be divided into three types according to their bases in our temperature experiences: the first type is based on spontaneous rising heat from the body during excitement, the second is rooted on retaining body temperature, and the third is grounded on experiences about fire or hot things. The first type of metaphorical temperature expressions include metaphors of various emotion concepts: ANGER, JEALOUSY, A GREAT IMPRESSION, and DESIRE. These concepts reflect a series of developmental processes from metonymy to metaphor: heat in the whole body which is firmly attached to the original base, INCREASE IN BODY TEMPERATURE, heat in a certain part of the body, heat in a concrete object, and heat in an abstract object which has separated from the body's temperature.

Furthermore, in this paper, we have understood that not only for these temporal emotions, temperature expressions are far-extendedly used for concepts with a permanent tendency, such as PASSION, POPULARITY, A WELL-INFORMED PERSON and URGENCY. Since these four concepts originally contain the characteristics of only indicating an extreme attribute, the middle and low levels of original temperature expressions have fallen off when the concept of temperature is mapped to the four concepts. In this way of applying the target domain override in the

Invariance principle which Lakoff (1993) have postulated, we can explain the reason why only the word *hot* is used to represent the four far-extended concepts.

Temperature expressions originally possess the characteristic of applying each typical scale to each context, as I illustrate in the left part of Figure 5. We are effectively utilizing this peculiar attribute for conceptualizing various abstract categories, as shown in the bold mapping arrows from the left part to the right part of Figure 5. As we see in this case of temperature expressions, we can understand abstract categories through metaphorical extensions of bodily experience.

<Attributes of physical temperature expressions>
· a case of quantitative scales
· having a potential power to apply each
· typical temperature scale to each context
· having two kinds of temperature scales

[abstract concepts]

Type (1)

ANGER
JEALOUSY   (1 lack of scalar attributes)
A GREAT IMPRESSION ⇒ PASSION
DESIRE   ⇒ POPULARITY.
                                    A WELL INFORMED PERSON
                                    URGENCY

[physical temperature expressions]

object temperature expressions

physiologically felt temperature expressions

application of each scale

given contexts

Type (2)

MONEY   (1 'AFFECTION IS A FLUID' metaphor)
AFFECTION ⇒ object temperature expressions
COMFORT

Metaphors and metonymies based on bodily experience

Type (3)

DANGER
FRESHNESS

[Figure 5: Metaphorical extensions of temperature expressions]

Conventions of glosses on Japanese examples

Hepburn type of Latin letters is used for glossing.

<abbreviations>

TOP = topic,	NOM = nominative,	ACC = accusative,
DAT = dative,	POSS = possessive,	COP = complementizer,
PAST = past,	PRES = present,	

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