An Analysis of Metaphorically Extended Concepts Based on Bodily Experience:

A Case Study of Temperature Expressions (1)

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1. Introduction

When we use temperature expressions such as "He is so cold to me," we view them as conventionalized metaphors. However, we can not easily draw a clear connection between physical temperature and the kind of attitude which we want to describe. Besides, it is difficult to replace the word 'cold' with other adjectives. If we substitute 'unkind' or 'wicked' for the word 'cold,' we will feel that the nuance has slightly changed. These facts prove that there are some concepts which we can vividly describe only by metaphorical temperature expressions, and that these concepts are so deeply rooted in our everyday lives that we can feel them some of the closest ones.

Johnson (1987) postulates that there are possible connections between putatively very different uses of the same term.

> We do not find a large number of unrelated concepts that all just happen to make use of the same word and related terms. Rather, we use the same word for all of these domains for the reason that they are structurally related by the same set of underlying schemata, metaphorically elaborated. (Johnson 1987: 95)

If we accept that there is a connection between different concepts that are described by the same word as Johnson claims, what is the connection which metaphorical temperature expressions are grounded on? In other words, what is the connection between the source domain of temperature and an abstract target domain? Why does it seem appropriate to use temperature expressions for an abstract category?

Searle (1983) argues about metaphors, such as those based on taste and temperature, which seem not to be grounded on any similarities at all.

> It just seems to be a fact about our mental capacities that we are able to interpret certain sorts of metaphor without the application of any underlying "rules" or "principles" other than the sheer ability to make certain associations. I don't know any better way to describe these abilities than to say that they are nonrepresentational mental capacities. (Searle 1983: 149)

We should not be satisfied with this Searle's simple description of 'nonrepresentational mental capacities.' If there is certainly something about our sensibility, whether culturally or naturally determined, that we can perceive, then we should do some research on this unexplicated mental capacity.

In this paper, I want to analyze the connections underlying metaphorical temperature expressions, and the reasons why people feel that it is appropriate to use temperature expressions for describing abstract concepts.

When we think about metaphors, it will come into our head that there are two kinds of metaphors. One is the more inventive, expressive and unexpected metaphors devised by poets, and the other is the *head-of-department* type which is usually not even recognized as being metaphorical by language users (Ungerer and Schmit 1996: 117). The latter type has been called conventionalized, lexicalized or 'dead' metaphor. Ungerer and Schmit explain why we use these labels to describe the latter type, as follows:

> The logic behind these labels is that through its frequent association with a certain linguistic form, the figurative meaning of a word has become so established in the speech community (i.e. conventionalized) that it is entered in the lexicon as one sense of the word in its own right (i.e. lexicalized). When a unit of linguistic form and meaning is conventionalized and lexicalized, the metaphorical force of the word is no longer active, the metaphor is 'dead.'   (ibid.)

When I give a lot of examples for metaphorical temperature expressions in chapter 4, I want to deal mainly with the conventionalized type of metaphor. Those things in our cognition that are most alive and most deeply entrenched, efficient, and powerful are those that are so automatic as to be unconscious and effortless, although we sometimes mistakenly assert that those that are most alive and most active are those that are conscious (Lakoff and Turner 1989: 129). The conclusion from a cognitive perspective is that the metaphors that have unconsciously been built into the language by long-established conventions are the most important ones.

When we consider metaphorical extensions of temperature expressions, we had better exclude examples such as '*nurui.*' 'lukewarm,' or 'tepid,' because these words quite frequently imply disappointment at something's not reaching to an expected temperature. We will now try to explain the connections between objective physical temperature expressions as source domains and abstract extended temperature expressions as target domains, so it is inappropriate and even misleading for this discussion to consider the words which naturally contain other meanings besides the simple physical temperature.

This paper has to begin by providing the reader with a cognitive perspective on metonymy and metaphor. In the following chapter, we will examine the cognitive definitions and examples of metonymy and metaphor. We will also see whether temperature concepts are one of the most powerful source domains for metaphors. The third chapter provides a detailed account of the characteristics of temperature expressions. The fourth chapter presents the reasons why temperature concept triggers off various kinds of metaphors, and also provides a variety of metaphorical extension patterns for temperature expressions. The concluding chapter presents an understandable summary.

2. Metonymy and Metaphor

Traditionally, metonymies and metaphors have been regarded as figures of speech. i.e. as more or less ornamental devices used in rhetorical style (Ungerer and Schmid 1996: 114). However. many researches on cognitive linguistics have shown that metonymies and metaphors are powerful cognitive tools for our conceptualization of abstract categories.

2.1 Definition and examples of metonymy

Metonymy involves a relation of 'contiguity' (i.e. nearness or neighbourhood) between what is denoted by the literal meaning of a word and its figurative counterpart (ibid., 115). The best-known cases are those like the following:

(1) One waitress says to another, "The ham sandwich just spilled beer all over himself." (Lakoff 1987: 77)

Here *the ham sandwich* is standing for the person eating the ham sandwich. A kind of relation of 'contiguity' makes this expression understandable. Typical examples of such contiguity-relations are given in Figure 1.

[Figure 1: Types of contiguity-relations in metonymies
(Ungerer and Schmid 1996: 116)]

PART FOR WHOLE	all hands on deck
WHOLE FOR PART	to fill up the car
CONTAINER FOR CONTENT	I'll have a glass
MATERIAL FOR OBJECT	a glass, an iron
PRODUCER FOR PRODUCT	have a Löwenbräu, buy a Ford
PLACE FOR INSTITUTION	talks between Washington and Moscow
PLACE FOR EVENT	Watergate changed our politcs
CONTROLLED FOR CONTROLLER	the buses are on strike
CAUSE FOR EFFECT	his native tongue is German

Even if metonymy is based on contiguity-relations, we do not express anything near what we want to denote. We use metonymic expressions by focusing on one typical aspect of what we want to refer to. Any outstanding part is not necessarily chosen as the characteristic aspect. We pick out and highlight an aspect related to a category we want to mean. Such a highlighting function of metonymy can clearly be seen in the following examples:

THE PART FOR THE WHOLE (Lakoff and Johnson 1980: 36)
(2) a. We need a couple of *strong bodies* for our team.
    b. There are a lot of *good heads* in the university.
    c. We need some *new blood* in the organization.

In each of these three examples, a different part of the human body is used to refer to people. Although there are many parts that can stand for people, metonymy is used by picking out a particularly characteristic part which can be easily associated

with an abstract faculty which we want to mean. Since the words, body, head and blood, are tightly connected as a PART of the WHOLE concept for 'person,' we can call the connection underlying this metonymy a part-whole relationship.

THE PART STANDS FOR THE WHOLE
WHOLE		PART
person (strength)	$\rightarrow$	body
person (intelligence)	$\rightarrow$	head
person (freshness)	$\rightarrow$	blood

One of the contiguity relations that metonymy involves is a cause-effect relationship. We can see this relationship in the following examples:

> (3) His native *tongue* is German. (Ungerer and Schmid 1996: 116)
> (4) a letter written in a neat *hand*. (ibid., 131)

THE EFFECT STANDS FOR THE CAUSE
CAUSE		EFFECT
speech	$\rightarrow$	tongue
writing	$\rightarrow$	hand

In these two examples, we might think that their converses are more reasonable, as Ungerer and Schmid (1996: 116) have suggested. However, the mental faculty of speaking or of writing first exists in one's brain, and as a result of an idea in the brain, a trilling pronunciation by the tongue or a wonderful use of the hand becomes possible. This way of thinking about speaking or writing makes the cause-effect relation understandable as shown above.

However it is difficult for us to discuss which is first, a mental faculty in the brain or a bodily action related to that faculty. Our actions are decided by mental faculties every day, but we can often improve a mental faculty by training a part of the body. So each of them can be considered as either a cause or an effect.

With regards to speaking and writing, the problem is which of these two facts connected by cause-effect relationship can be a cause or an effect. Besides, as a peculiar character of metonymies involving cause-effect relationship, we can not assert that only effect stands for cause. We have many examples for both ways of representation in everyday life, as Yamanashi (1988: 101) has mentioned.

> (5) A straw shows which way the wind blows. (ibid.)
> (6) Iruka   no   haneru   hi   wa   umi   ga   areru. (ibid.)
>   dolphins NOM   jump up   day   TOP   the sea NOM   get stormy
>   'On the days that dolphins jump around, the ocean becomes stormy.'

In the example (5), the effect stands for the cause, on the other hand, the example (6) shows that the fact stands for the consecutive situation.

Therefore, in the case of cause-effect relationships, we had better think that both of the following metonymies are possible: THE CAUSE STANDS FOR THE EFFECT, or THE EFFECT STANDS FOR THE CAUSE.

2.2 Definition and examples of metaphor

Metaphor has traditionally been based on the notions of 'similarity' or 'comparison,' between the literal and the figurative meanings of an expression. (Ungerer and Schmid 1996: 115) We can see this idea in the following example:

(7) The sun is the *eye* of heaven.

Since we can easily intuit the similarities between the categories EYE and SUN, we can use the phrase *eye of heaven* instead of the word *sun*. As common attributes of these two categories, we might state that both are round, perceived as 'standing out' from the face or sky, cover the world with glances or rays, are 'open' during the day and 'closed' at night. (ibid., 116)

Through developing this traditional conception of metaphor, we now arrive at a cognitive conception of metaphor. This means that metaphor is not just a way of expressing one entity by another, but an important way of conceptualization. Lakoff and Johnson (1980: 7) argue that we do not just exploit the metaphor TIME IS MONEY linguistically, but we actually think of, or conceptualize, the so-called 'target' category TIME via the 'source' category MONEY, when we use the following English phrases:

TIME IS MONEY (Lakoff and Johnson 1980: 7)
    (8) a. You're *wasting* my time.
       b. I don't *have* the time to *give* you.
       c. How do you *spend* your time?

These examples also show that the attributes of the 'source' category MONEY, that is, a valuable commodity and limited resource, are mapped to the 'target' category TIME, and that we are conceptualizing an abstract category TIME by using these attributes. From such a cognitive perspective, we can define metaphor as a mapping from one concept to another concept.

2.3 Differences between metonymy and metaphor

Metaphor and metonymy are different kinds of processes. Metaphor is principally a way of conceiving of one thing in terms of another, and its primary function is understanding. Metonymy, on the other hand, has primarily a referential function, that is, it allows us to use one entity to stand for another. (Lakoff & Johnson 1980: 36)

The main difference between the two is that while metaphor involves a mapping across different cognitive models, metonymy is a mapping within one model. One category within a model is taken as standing for another category within the same model. (Ungerer and Schmid 1996: 128)

In the case of the metonymic example of THE PART FOR THE WHOLE which I mentioned in chapter 2.1, different parts are picked out according to abstract faculties which we want to signify. However, all of the parts are included within the concept 'person,' which is the literal word any sentence of the metonymic examples wants to indicate. The difference in the examples depends on which aspect of the 'person' is

focused on.

[Figure 2: a metonymic process]
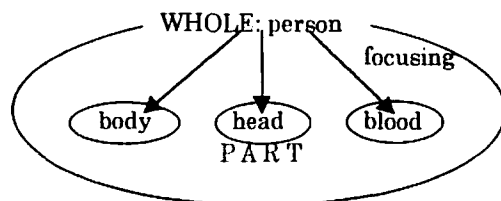
By contrast, as the examples of TIME IS MONEY show, metaphor is a mapping between independent categories. There is no clear connection underlying these two categories, except for the fact that a metaphorical mapping is one of the most effective ways of understanding and experiencing an abstract concept.

[Figure 3: a metaphorical process]
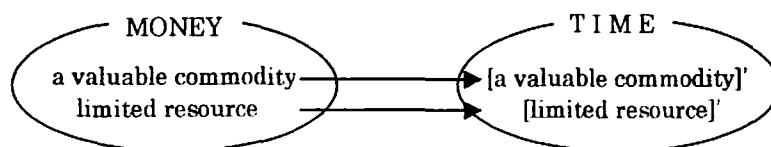
We may summarize the definitions of metaphor and metonymy in the following way:

Metonymy = a mapping within one concept based on a relation of 'contiguity'

Metaphor = a mapping from one concept to another concept based on a relation of 'similarity'

2.4 Development from metonymy to metaphor

One field where a co-occurrence of metaphors and metonymies is particularly frequent is the field of emotion categories. We find that the link between emotions and physiological symptoms reminds us of certain metonymic mappings, especially a cause-effect relationship, when we hear the following English sentences. (Ungerer and Schmid 1996: 131)

(9) He was flushed with anger. (Kövecses 1990: 52)
(10) She turned pale. (ibid., 70)

This type of expressions are all grounded on a general metonymic principle, THE PHYSIOLOGICAL EFFECTS OF AN EMOTION STAND FOR THE EMOTION, which Kövecses and Lakoff (Lakoff 1987: 382) have postulated.

CAUSE   EFFECT
anger   →   being flushed
fear   →   turning pale

One of the metonymies based on this general metonymic principle is INCREASE

IN BODY TEMPERATURE STANDS FOR ANGER. The basic metaphor which is triggered off by this physiological metonymy is ANGER IS HEAT. This rather abstract metaphor is made much more accessible if we imagine the heat in the forms of a fire and a hot fluid. The two metaphors, ANGER IS FIRE a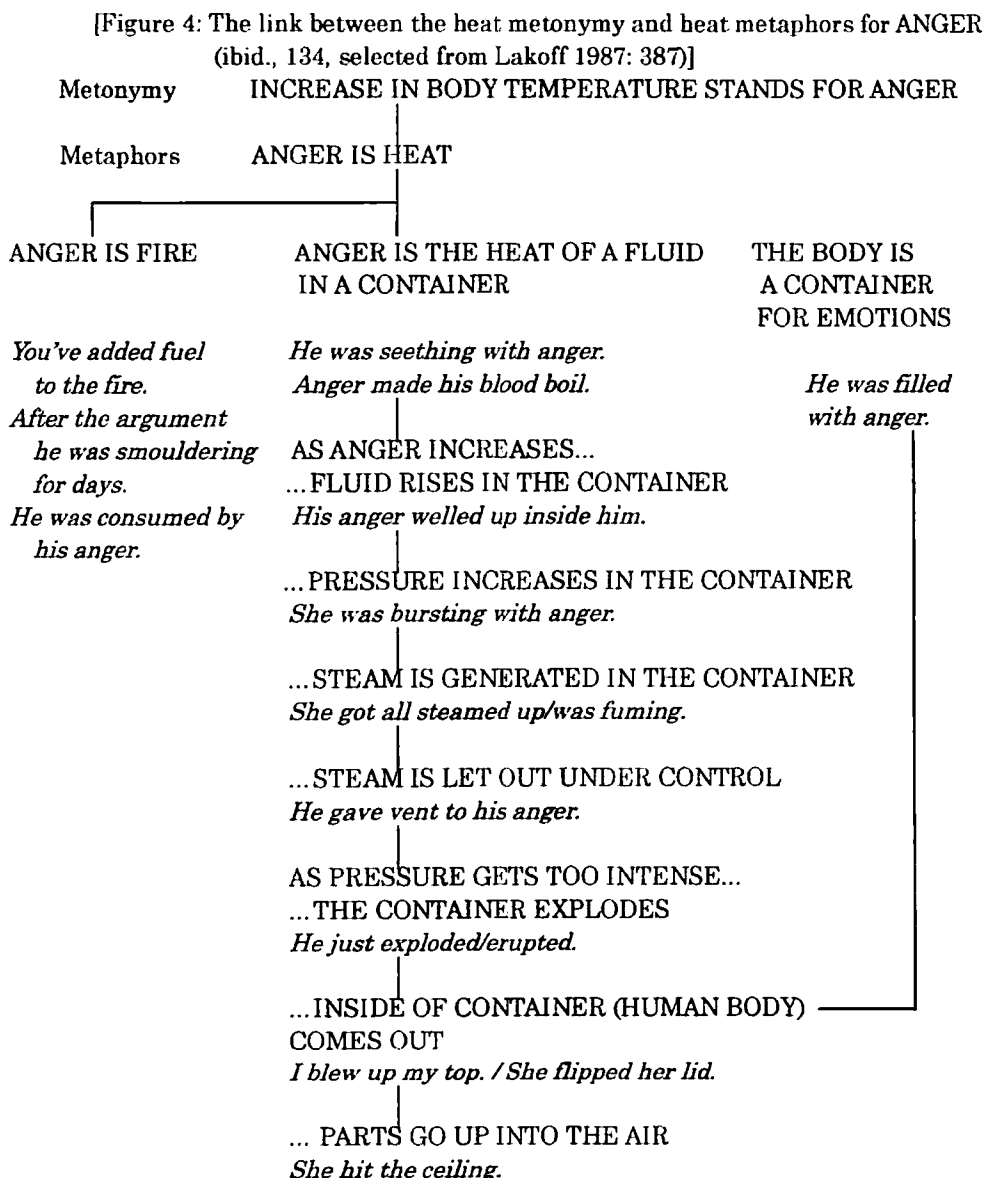nd ANGER IS THE HEAT OF A FLUID IN A CONTAINER, are brought out next as showed in Figure 4 (Ungerer and Schmid 1996: 133).

[Figure 4: The link between the heat metonymy and heat metaphors for ANGER (ibid., 134, selected from Lakoff 1987: 387)]

Metonymy   INCREASE IN BODY TEMPERATURE STANDS FOR ANGER

Metaphors   ANGER IS HEAT

ANGER IS FIRE   ANGER IS THE HEAT OF A FLUID   THE BODY IS
                        IN A CONTAINER   A CONTAINER
                                                                FOR EMOTIONS

You've added fuel   *He was seething with anger.*
  to the fire.   *Anger made his blood boil.*   *He was filled*
After the argument   *with anger.*
  he was smouldering   AS ANGER INCREASES...
  for days.   ...FLUID RISES IN THE CONTAINER
He was consumed by   *His anger welled up inside him.*
  his anger.

                         ...PRESSURE INCREASES IN THE CONTAINER
                         She was bursting with anger.

                         ...STEAM IS GENERATED IN THE CONTAINER
                         She got all steamed up/was fuming.

                         ...STEAM IS LET OUT UNDER CONTROL
                         He gave vent to his anger.

                         AS PRESSURE GETS TOO INTENSE...
                         ...THE CONTAINER EXPLODES
                         He just exploded/erupted.

                         ...INSIDE OF CONTAINER (HUMAN BODY) ———
                         COMES OUT
                         I blew up my top. / She flipped her lid.

                         ... PARTS GO UP INTO THE AIR
                         She hit the ceiling.

However, Kövecses and Lakoff did not explain the reason why one of the physiological metonymies, INCREASE IN BODY TEMPERATURE STANDS FOR ANGER, can produce such a lot of metaphors and even a kind of scenario.

When we return to the metonymic relations between emotions and physiological

effects, we find that anger is not only connected with increase in body temperature. Moreover, when we see the opposite direction, increase in body temperature is not only caused by anger as showed in Figure 5.

[Figure 5: A selection of physiological metonymies for emotions (Ungerer and Schmid 1996: 132, based on various publications by Kövecses. Davitz 1969 and Shaver et al. 1987)]

Physiological effect (source)	Emotion (target)	Example
Increase in body temperature	ANGER, JOY, LOVE	Don't get hot under the collar.
Drop in body temperature	FEAR	I was chilled to the bone.
Redness in face and neck area	ANGER, JOY	She was flushed with anger.
Blood leaves face	FEAR	She turned pale/white as a sheet.
Crying and tears	ANGER, SADNESS, FEAR, JOY	Tears welled up in her. She cried with joy.
Sweat	FEAR	There were sweat beads on his forehead. His hands were damp.
Dryness of mouth	FEAR	His mouth was dry.
Increased pulse rate and blood pressure, palpitations	ANGER, DISGUST, FEAR, LOVE	His heart pounded. He almost burst a blood vessel.
Lapses of heartbeat	FEAR	You made my heart miss a beat.
Erect posture, chest out	PRIDE	He swelled with pride.
Drooping posture	SADNESS	My heart sank.
Inability to move	FEAR	She was paralysed with fear.
Flight	FEAR	He ran for his life.
Jumping up and down	JOY	He was jumping for joy.
Hugging	JOY, LOVE	I could hug you all.
General physical agitation	ANGER, DISGUST, FEAR, JOY, LOVE	She was quivering/excited/ keyed up/overstimulated.

Going through Figure 5, we find that there are indeed some bodily symptoms which are peculiar to one particular emotion: drop in temperature, sweat, dryness in the mouth, blood leaves face for FEAR, erect posture for PRIDE, drooping posture for SADNESS, jumping up and down for JOY. However, as the example FEAR shows, an emotion category can attract conflicting metonymies, and more seriously many metonymies apply not just to one or a few closely related emotions but to a range of quite different emotions. (Ungerer and Schmid 1996: 132)

Therefore, emotions and physiological effects are not necessarily connected with one-by-one correspondence. ANGER is not only one cause of INCREASE IN BODY TEMPERATURE, and INCREASE IN BODY TEMPERATURE is not only one effect of ANGER. After understanding this idea, we should raise the following question: When we can get a metonymic relation between some emotions and some physiological effects, even if it does not work necessarily, can the metonymy be developed into a lot of metaphors?

First, we should consider possibilities of other physiological metonymies developing. Please note the examples which I mentioned above.

(9) He was flushed with anger. (Kövecses 1990: 52)
(10) She turned pale. (ibid., 70)

CAUSE		EFFECT
anger	→	being flushed
fear	→	turning pale

We can call the effects of the examples COLOR. We indeed recognize a physiological metonymy, COLOR OF FACE STANDS FOR EMOTION, based on this cause-effect relationship. However, can we draw a general metaphorical mapping between 'emotion' and 'color,' developed from the metonymy? Of course, we can recognize concepts such as 'anger is red' and 'fear is blue' from facial features, or we can sometimes get such impressions in some paintings. Generally speaking, however, such metaphors between emotions and colors can not be postulated.

After this consideration, we will find that some of the physiological metonymies for emotions showed in Figure 5 have been developed into metaphors, while others have not. Even if both are the effects from ANGER, HEAT has triggered off a lot of metaphors, but COLOR has not any. What is the reason for this difference? We can attribute this to the peculiar characteristics of the concept HEAT. HEAT has the potential as a source category for a metaphor. We can conceptualize a lot of abstract categories by using the concept of temperature.

In chapter 3, I will argue original characteristics of temperature expressions, and after that, in chapter 4, I will show how many metaphorically extended concepts are related to temperature.

3. Previous Research on Temperature Expressions

3.1 Original senses of temperature: two kinds of temperature expressions

What is the original sense of temperature? Even if on original physical temperature not on extended temperature concepts, we have two senses of temperature. We are communicating properly by using these two meanings according to each context. I am going to analyze these senses based on certain aspects of temperature expressions.

Kageyama (1980: 53) argues about two kinds of temperature expressions. Different from English, Japanese distinguishes the temperature words between the two meanings as shown in the following:

		low temperature ⟵		⟶ high temperature	
Japanese	(A)	*tsumetai*	?	*atatakai*	*atsui*
	(B)	*samui*	*suzushii*	*atatakai*	*atsui*
English	(A)	cold	cool	warm	hot
	(B)	cold	cool	warm	hot

(In Japanese, *atsui* of (A) and *atsui* of (B) have different *kanji* characters.) (ibid.)

It seems clear that (A) are type of words expressing temperature which are felt on some part of the human body, on the other hand, (B) are type of words expressing temperature felt by the whole body (Kunihiro 1965). But against this sense, there are many exceptions in Japanese. For example:

(11) Aki   no   yokaze   wa   *tsumetai.* (Kageyama 1980: 54)
     autumn   of   night-breeze   TOP   cold
     'A night breeze of autumn is cold.'

Even if this sense is felt by the whole body, it can be expressed by the words in (A).

The difference between (A) and (B) can be more suitably analyzed in the following way:

(A)·····words expressing temperature of an object (*buttai ondo*)(ibid.)
(B)·····words expressing temperature felt physiologically (*seiri ondo*) (ibid.)

Even if most of the cases in (A) are felt by a part of the human body, this can be attributed to the secondary extension by its prototypical acts in a person feeling an object's temperature.

Two kinds of temperature expressions are defined as follows:

(A) object temperature expression: (Kageyama 1980: 58)
        NP [BE WITH a TEMPERATURE which is X than the STANDARD]
(B) physiologically felt temperature expression: (ibid.)
        NP [FEEL a TEMPERATURE which is X than the STANDARD]

3.2 Unconscious establishment of typical temperature scales

When we use the temperature expression, hot or cold, we judge the appropriateness of the expression by applying each typical temperature scale to each context, whether we are conscious about it or not. Both of the following examples can be correctly understood from this point of tacit typical temperature scale:

(12) a. Alaska is a cold region.
     b. (in Alaska) It is warm this winter.

For each sentence above which uses a temperature expression, there is a tacit scale of the air temperature. Similarly with regards to the cases of air temperature, when we feel a temperature of an object, we take it for granted that there is a typical temperature scale of the object. All of these typical temperature scales are determined relative to our feelings based on the human body temperature. We sometimes mistakenly think that these scales are grounded on each typical air temperature of an area at the time. This is a misunderstanding, since our temperature expressions would change dramatically if we assumed that our body temperature was 100℃.

The following sentence can be interpreted in two ways.

(13) This coat is warm.
     (a) This coat has high temperature.
     (b) We will feel warm when we wear this coat.

Kageyama (1980: 68) concludes that all of meanings for temperature adjectives must be given in dictionaries. However, the difference between (a) and (b) can be said to be the difference of where we unconsciously place the typical temperature scale of the word 'warm.' If we see the speaker taking out a coat from the drier, we will place the scale on a typical object's temperature. On the other hand, if we see the speaker taking the coat off a coat hanger, we will place the scale on a typical physiological temperature when we wear a coat. Such typical temperature scales are unconsciously established in each context, even for physical temperature expressions.

Let us think of main factors which we unconsciously consider in establishing a typical temperature scale in each context. We may raise the conceivable factors in the following way:

1. object temperature or physiologically felt temperature
2. scope of time
3. scope of place

The second and the third numbers indicate how wide a scope of time or place should be included in each scale. For example, in the case of the sentence, 'Alaska is a cold region,' the scope of place is world wide, and the scope of time is the whole year. On the other hand, when we say in Alaska 'It is warm this winter,' the scope of place is limited to Alaska and the scope of time includes several winters which have passed.

Anyway, from each given context, we automatically judge what kind of scale should be established, that is, which one of the two kinds of temperature expressions is appropriate and how wide the implied scope is.

4. Extended Patterns of Temperature Expressions

4.1 Reasons why temperature expressions represent abstract concepts

In chapter 2, we learned about the importance of HEAT as a source concept of a metaphor. In chapter 3, we demonstrated that temperature expressions originally have the potential to draw a scale and set a typical scale applied to each context.

Before arguing about extended patterns of temperature expressions, we should return to the question I proposed at the end of chapter 2: Why does the concept of temperature have the potential to trigger off various metaphors? I will raise a few possible reasons for this question.

1. Since people frequently experience an increase or a decrease in the temperature of the body or the air temperature, the concept of temperature is one of the closest to us as the material utilized for people's conceptualizing an abstract concept.
2. Since temperature expressions apply each typical scale to every context, we can use them for a lot of different abstract concepts.
3. Since temperature expressions originally have the characteristics as a quantitative scale, they easily reflect several different levels of intensity to an applied abstract concept.
4. Since people have roughly the same body temperature, they can accurately communicate each value signified by a temperature expression.

I picked out an emotional metaphor ANGER IS HEAT to exemplify metaphors which have temperature concepts as the source domains. However, there are also some temperature metaphors not related to emotions. We will investigate the variety of temperature metaphors.

4.2 Variety of extension

When we use the words 'hot', 'warm' and 'cold' to express abstract things, not concrete or physical things, the expressions can be called metaphors having temperature concepts as the source domains. The metaphors are classified into different types according to the original core meanings of the temperature concepts.

I will present three core meanings of expressions used when people react to heat. The first is heat which rises spontaneously from the human body, e.g. the rising of body temperature when a person is excited. The second is warmth felt by retaining body heat, e.g. the body temperature is retained when the body is covered by a fur coat. The third is heat felt in experiences on fires or hot things, e.g. a person feels heat when the body touches something hot.

These three points are postulated in different forms of metonymies.

1) INCREASE IN BODY TEMPERATURE STANDS FOR EMOTION
2) RETAINING BODY TEMPERATURE STANDS FOR POSSESSION
3) HEAT STANDS FOR DANGER or HEAT STANDS FOR FRESHNESS.

These metonymies are all based on a cause-effect relationship. Yet, the temperature concepts in the first and the second cases are connected to THE EFFECT in THE EFFECT STANDS FOR THE CAUSE. On the other hand, the temperature concept in the third case is THE CAUSE in THE CAUSE STANDS FOR THE EFFECT. Both representations are possible in a cause-effect relationship, as we observed in chapter 2.1.

These metonymies are characteristically developed to metaphors shown in the following figure:

[Figure 6: Variety of extension in temperature expressions]
[type (1)] HEAT rising from the human body[1]
    INCREASE IN BODY TEMPERATURE STANDS FOR EMOTIONS (metonymy)
    → EMOTIONS ARE HEAT (metaphor)
    (a) ANGER IS HEAT
    (b) JEALOUSY IS HEAT
    (c) A GREAT IMPRESSION IS HEAT
    (d) DESIRE IS HEAT
            (d-1) DESIRE FOR LUST IS HEAT
            (d-2) DESIRE FOR VICTORY IS HEAT
                ···(d-2-1) VICTORY in battle
                ···(d-2-2) VICTORY in a dispute

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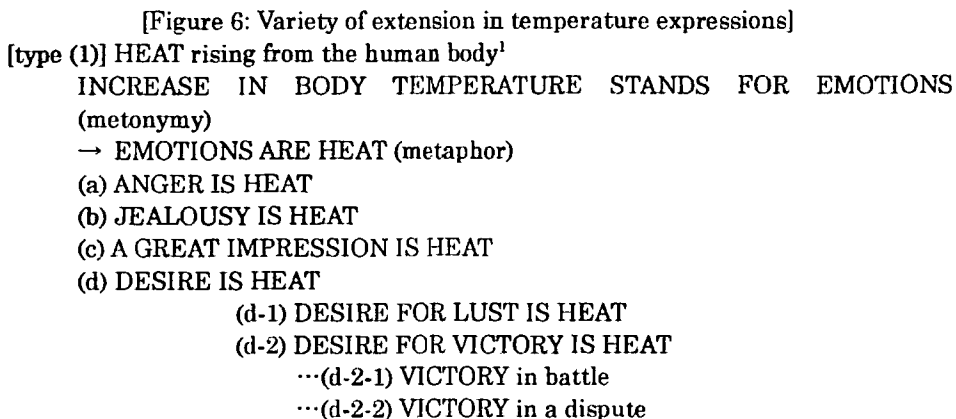
[1] A lot of emotion concepts are included in type (1). I did not arbitrarily propose the classification. I consulted some papers on concept of emotion: Fehr &Russell 1984. Shaver *et al.* 1987, Wierzbicka 1986.

[type (2)] HEAT which is felt when the body is covered by something
RETAINING BODY TEMPERATURE STANDS FOR POSSESSION
($\longleftrightarrow$ LOSING BODY TEMPERATURE STANDS FOR LACK)   (metonymy)
$\rightarrow$ POSSESSION IS WARMTH ($\longleftrightarrow$ LACK IS COLD)   (metaphor)
(a) money ····· RICHNESS IS WARMTH[2] $\longleftrightarrow$ POVERTY IS COLD
(b) affection ····· AFFECTION IS WARMTH $\longleftrightarrow$ HOSTILITY IS COLD
(c) comfort ····· COMFORT IS WARMTH[3] $\longleftrightarrow$ FEAR IS COLD

[type (3)] HEAT which is felt when the body touches something hot
(a) heat which is felt when a man is on the point of burning himself
$\rightarrow$ HEAT STANDS FOR DANGER   (metonymy)
(b) heat which is felt when a man eats a dish just cooked
$\rightarrow$ HEAT STANDS FOR FRESHNESS   (metonymy)

4.3   The characteristics of type (1): several levels from metonymy to metaphor

Excitement in the human body underlying type (1) originally causes several physiological effects all over the body. Therefore, one of the physiological effects of excitement, increase or decrease in body temperature, also temporally affects the whole body. If the extended patterns of type (1) are firmly based on human excitement, their temperature expressions should be expressed by descriptions characteristic of the whole body. However this original tendency is different on each level from metonymy to metaphor. We will discuss the metaphorical development of the original meaning of type (1).

4.3.1   Heat in the whole body

There is a good example of heat which concerns the entire body.

(14) Kare   wa   ikari   de   karada-juu   ga   *atsuku*   naru
     he   TOP   anger   with   body-whole   NOM   hot   become
     'He felt that his whole body became hot with anger.'
     no   o   kanji-ta
     COP   ACC   feel-PAST

This is a metonymic expression, because this sentence only describes an increase in body heat, one of physiological effects caused by anger, in order to designate the emotion. In this sentence, we can see a clear connection based on metonymic cause-effect relationship.This sentence is correct, even if a term of another emotion which

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[2] (Random House E.-J.D.) warm 14.(1)(old) *(hito-ga)kane no aru, yuufukuna,yutakana, rakuna kurashimuki de.* (O.E.D.) warm 8. Comfortably off, well to do; rich, affluent. Now chiefly *colloq.*
[3] (Random House E.-J.D.) warm 14.(2) *anteishita, kirakuna, shinpai no nai,* (O.E.D.) warm 7. Comfortable, comfortably settled (in a seat, throne, office); securely established in (possession of). Also, with converse construction, *to feel the crown warm upon one's head. Obs.*

accompanies with excitement is substituted for 'anger,' such as jealousy. desire, or a great impression.

This type of metonymic expression can be seen in other examples in English and Japanese. Heat from the whole body is sometimes depicted by blood circulating around the whole body.

<ANGER IS HEAT>
     (15) He makes my *blood boil.*
<A GREAT IMPRESSION IS HEAT>
     (16) (ellipsis) Yorokobi   ni   manshin   no   chi   ga   *nessuru*
            (I)   joy   with all over my body POSS blood NOM   heating
            'The blood all over my body is heating with joy.'
     (17) Enzetsusha   wa   mina   shidaini   *netsu*   o   obite   kita
            speakers   TOP   all   gradually   heat   ACC wearing be-PAST
            ' All the speakers gradually became hot.'

4.3.2   Heat in a part of the body

Heat in some part of the body is often expressed in order to designate an emotion. We can assert that a part of the body represents excitement caused by an emotion. The commonly expressed part, which is considered to be the place most easily affected by each emotion, is decided by each culture.

<ANGER IS HEAT>
     (18) Sukoshi atama   o   *hiyase*-yo
            a little   head   ACC   cool
            'Cool your head a little.'
     (19) *Cool* your head.
<A GREAT IMPRESSION IS HEAT>
     (20) (ellipsis) Ureshisa   ni   mune   ga   *atsuku*   naru
            (I)   joy   with   breast   NOM   hot   become
            'My chest becomes hot with joy.'

In both English and Japanese, the word 'head' can be typically used to represent the place of heat caused by anger. However, 'breast' can only be hot with joy in Japanese. The phrase 'My chest becomes hot with joy,' does not sound natural in English.

4.3.3   Heat in a concrete object

Heat in concrete objects can often be used to symbolize emotions. The process of emotions, from its emergence to reaching the climax and sometimes even to calming down, is described by a consecutive change of a concrete thing. This type of expression can be asserted to be metaphorical, not to be metonymic, because a concrete object has nothing to do with an emotion or a caused excitement. Some clear connections can not be identified, so we can not but call them metaphorical concepts which are mappings from one domain to another domain.

<ANGER IS HEAT>
    (21) (ellipsis)   Omae   niwa   harawata ga   *niekurikaeru.*
        (I)   you   at-TOP stomach NOM be boiling
      'My stomach is boiling at you.'
    (22) Watashi-wa hara   no   nakani *atsui* uneri ga
        I-TOP   stomach POSS in   hot   wave NOM
      'A hot wave rose in my stomach.'
      tat-ta
      rise-PAST

    (23) *Cool* your jets.

In Japanese, anger is often expressed by just some boiling fluid in the stomach. On the other hand, in English, anger is described as several steps of boiling fluid in the body, as Kövecses and Lakoff have asserted in Figure 4 in chapter 2.4.

4.3.4 Fire: a special case of heat in a concrete object

When an emotion has the possibility of causing danger, the intensity of the emotion is described not only by a hot thing but by fire. A typical example of this type of pattern involves jealousy. Intense jealousy is likely to hurt the people involved, not only himself or herself. Jealousy is often expressed by fire, because fire can give a vivid impression of burning anything around.

<JEALOUSY IS HEAT>
    (24) Kanojo wa   shitto   no *honoo* ni mi   o   *kogashite*
        she   TOP   jealousy of flame DAT body ACC burning
      'She was burning with flames of jealousy.'
      i-ta
      be-PAST

    (25) She was *burning up* with jealousy.

Fire seems to be commonly used when the emotion process resembles the process of fire. A small fire grows bigger and bigger, until it burns out. This is similar to the process of ANGER or A GREAT IMPRESSION.

<ANGER IS HEAT>
    (26) He felt *a fire* in his belly.
<A GREAT IMPRESSION IS HEAT>
    (27) The crowd was all *fired up.*

The process of fire is also very similar to the process of lust in the sense that both of them burn up and then go out. For this reason, lust is often described by fire.

<DESIRE FOR LUST IS HEAT>
    (28) Kare wa   hajimete-no koi ni   *moeteiru*
        he   TOP   first   love with be burning

'He was burning with first love.'

(29) She is an old *flame*.

In the case of love, the dangerous characteristic is also the reason for many metaphorical expressions which use fire for love, because descriptions as the following are often seen in general:

(30) Kare   wa   *hi*-asobi   ga   sugiru
    he   TOP   fire-playing   NOM   too much
    'He plays with fire too much.'

'Playing with fire' in this sentence signifies a dangerous love affair. In these kinds of expressions of love, the probability of burning up suddenly and hurting anything around, that is one of characteristics of fire, is used effectively to depict the person's dangerous love affairs.

4.3.5   Heat in an abstract object

We sometimes indicate the intensity of an emotion by expressing the existence of heat in an abstract object, which the emotion is directed toward, as the following examples show:

<A GREAT IMPRESSION IS HEAT>

(31) Kare   no   hanashi   niha   *netsu*   ga   komotte   ita
    he   POSS   tale   TOP   heat   NOM   full   be-PAST
    'His tale was full of heat.'

(32) Sono kenka   de   sukkari   kyou   ga   *samete*   shimatta
    the   quarrel   by   thoroughly atmosphere NOM   cold   have done
    'The atmosphere has thoroughly cooled down because of the quarrel.'

(33) He spoke with much *heat.*

<DESIRE FOR LUST IS HEAT>

(34) Karera   wa   *atsui*   naka   da
    they   TOP   hot   relationship   COP
    'They are in heat.'

(35) Don't be *cold* to me.

<DESIRE FOR VICTORY IN BATTLE IS HEAT>

(36) Kouto   de wa   *hakunetsu-shita*   shiai   ga   tsuduite   ita
    court   in TOP   heated   game   NOM continuing   be-PAST
    'In the court, a heated game was going on.'

(37) This was an indication of just how *hot* the contest for the leadership had become. (Collins)

(38) The battle over Kevin was likely to grow even *hotter.* (Collins)

<DESIRE FOR VICTORY IN A DISPUTE IS HEAT>

(39) Kaigi   de   wa   *hakunetsushita*   giron   ga
    conference   in   TOP   hot   discussion   NOM
    'In the conference, a hot discussion was progressing.'
    tenkaishite   ita.
    progress be-PAST

(40) He debated with much *heat.*

(41) A *heated* discussion evolved.

When we examine these examples, we will realize that in general, tales, discussions, debates, and battles such as games or contests, are likely to be described by heat. Of course, physically speaking, tales or battles, which are not concrete substances, can not be heated. All of the 'heats' in the examples above originated in rise in body temperature of the person involved in excitement. When an emotion becomes intense, not only the person's body but also an object which the emotion is directed toward, can also be expressed as 'heated,' as if the intensity of the emotion is transferred to the abstract object involved.

This type of extended pattern seems to be the same as the following poetic expression:

(42) Kanojo   wa   sabishii   sora   o   miage-ta
     she   TOP   lonely   sky   ACC   look up-PAST
     'She looked up the lonely sky.'

In this sentence, we have an impression that her loneliness is transferred to the sky by her glance, so we are not troubled by this creative description.

In the cases of 'hot tale', 'heated discussion', and 'heated game' which I raised above, they might have been creative metaphors at first, but, after frequent use, they have been approved in general as dead metaphors which have no creative nuance.

4.3.6   The figure of development in type (1)

I discussed several levels of extended patterns based on excitement in the chapters from 4.3.1 to 4.3.5. 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 of the development can be depicted as follows:

[Figure 7: The development in type (1)]

4.4   The characteristics of type (2)

4.4.1   Type (2) based on retaining body temperature

When we do not wear clothes, we feel cold. When we wear a fur coat, we feel warm. Type (2) consists of extended patterns which this feeling of warmth and cold underlies. In this type, we cannot see the many levels of development of type (1). The patterns of this type have developed from a simple metonymy connected with warmth or cold of the body, into several independent abstract concepts. The case of 'money,' however, is closer to a metonymy, since the lack of money sometimes brings about a shortage of clothes and a house, and causes the body to become cold.

We will examine the examples of type (2):

<RICHNESS/ POVERTY>

(43) Kyou   wa   futokoro   ga   *atatakai (samui)*
today   TOP   breast   NOM   warm (cold)
'Today my pocket is rich (poor).'

(44) Kore   wa   *osamui*   shisetsu   da
this   TOP   cold   institution   COP
'This is a shabby institution.'

(45) a *warm* man (= a rich man)

(46) In 1836 he was presented .. to the very snug vicarage of Cheddar, and a year later he took to himself the still *warmer* benefice of Wiveliscombe. (*Guardian* 5 Nov. 1920 1034/4 O.E.D.(p.915))

In English, we cannot find a use of 'cold' in the meaning of 'poor,' and the use of 'warm' to signify 'rich' is now obsolete. However, RICHNESS IS WARMTH and POVERTY IS COLD seem quite reasonable as metaphors in a metonymic sense.

<AFFECTION/ HOSTILITY>

(47) Kanojo wa   haha-no   *atatakana*   manazashi   o   kanjite   ita
she   TOP   mother's   warm   a look   ACC   feel be-PAST
'She felt her mother's warm gaze.'

(48) Sore   wa   kokoro   no   *atatamaru*   koukei   dat-ta
it   TOP   heart   NOM   warm   sight   be-PAST
'It was a heart-warming sight.'

(49) Cinderella   wa   mama-haha   no   kotoba   o   kiite
cinderella   TOP   step-mother   POSS   word   ACC   to hear
'Cinderella felt cold to hear what her stepmother was talking.'
. *samuzamushii*   omoi   ga   shi-ta
cold   feeling   NOM   be-PAST

(50) She is a *warm* person.

(51) They gave me a *warm* welcome.

(52) Sally is a block of *ice.*(Searle 1979)

(53) She was decidedly *cool.*

(54) He gave me the *cold* shoulder.

(55) He is a real *cold* fish.

These uses of 'warm' and 'cold' as affection and hostility are quite common both in English and Japanese. When we are satisfied with our parents' affection, we feel warm as if we are surrounded by comfortable warm air. On the other hand, when we are aware of a person's hostility, we feel severely cold.

<COMFORT/ FEAR>

(56) [According to *Kojien*, 'warm(*atataka*)' was used in the meaning of 'not making trouble, calm' in old Japanese.]

(57)(ellipsis) kare ga   himitsu o   morasu nodewa naika to
     (I)   he NOM secret ACC divulge COP   would COP
     'It gave me chills to think that he would divulge the secret.'
     hiyahiyashi-ta
     feel cold-PAST

(58)(ellipsis) sono osoroshii koukei o mite   sesuji-ga *samuku* nat-ta
     (I)   the frightful scene ACC to see   spine   cold be-PAST
     'My spine chilled to see the frightful scene.'

(59) Scarcely had the worthy Mynheer Beekman got *warm* in the seat of authority on the South River than enemies began to spring up all around him. (O.E.D. 1809)

(60) enjoy a *warm* life in old age (Random House)

(61) Just the face of the monster was enough to *make my blood run cold.* (Kövecses 1990)

(62) It *chilled my blood* to hear the voice of a man I thought had been dead for years. (ibid.)

(63) I felt *icy* fingers going up my spine. (ibid.)

Both Japanese and English use 'warm' to signify 'comfort.' This usage is now obsolete, but the use of 'cold' to signify 'fear' is quite common. When we are protected, we feel warm and comfortable, as if we are surrounded by warm air. On the other hand, when this protection is tore off and we are exposed to danger, we feel cold and fear.

4.4.2   The use of object temperature expressions in 'affection'

In type (2) represented by POSSESSION IS WARMTH, the latter pattern (*atsui, samui*) of the two types of Japanese temperature expressions is used, because it is useful to show whether the situation around us is tranquil or not. However, with regards to concepts of AFFECTION/HOSTILITY, there are some common expressions using the former pattern (*atsui, tsumetai*).

(64) Kare wa   boku o   *tsumetaku* misue-ta
     he TOP   me   at   coldly   stare-PAST
     'He stared coldly at me.'

Unlike the concepts of RICHNESS/POVERTY and COMFORT/FEAR which express only an individual state, AFFECTION/HOSTILITY can not be conceptualized

until we perceive other people's presence. If a person is alone living on an island and does not know other people, he cannot conceive affection or hostility. Therefore, with regards to the concept of AFFECTION/HOSTILITY, we need to describe giving and taking affection or hostility. In such cases, we so frequently regard the concepts as objects which can be given or taken. This is represented by a metaphor, AFFECTION IS A FLUID FLOWING FROM ONE CONTAINER TO ANOTHER CONTAINER, as the following examples show:

> (65) Kare   wa   musume   ni   oshimi-naku   aijou   o
> he   TOP   daughter   DAT   unsparingly   affection   ACC
> 'He unsparingly poured his affection on his daughter.'
> *sosoi*-da
> pour-on PAST

> (66) Sono   toki   hakkirito   *tsumetai*   mono   ga   wareware   no
> that   time   clearly   cold   thing   NOM   we   POSS
> 'Then, a chill wafted from him to me.'
> aidani   *nagare*-ta
> between   flow-PAST

When we use such conventionalized metaphorical phrases, we unconsciously consider AFFECTION/HOSTILITY to be a flowing fluid. If a fluid of affection flows into us, we feel warm and comfortable. On the other hand, if a fluid of hostility is poured onto us, we feel cold and unpleasant. This metaphor is rooted on such feelings that almost everybody holds.

As we have seen, when expressing states of giving and taking affection or hostility, we indeed imagine the concept as a fluid. However we can more precisely recognize temperature expressions on AFFECTION/HOSTILITY by considering them to be based on retaining body temperature. Because the warmth we feel towards affection is very similar to the warmth we feel when we are surrounded by comfortable air. Therefore, with regards to concept of AFFECTION/HOSTILITY, we should consider the physiologically felt temperature expressions as the main representaion and the object temperature expressions as the occasional one.

4.4.3   The use of 'cold' in the sense of 'lack'

In Japan, 'cold' (*samui*) is commonly used in slang as a lack of something such as romance in a student's life or humor in a comic play. This use is probably extended from type (2), POSSESSION IS WARMTH and LACK IS COLD, which originates in RETAINING BODY TEMPERATURE STANDS FOR POSSESSION. As a common pattern of this metaphor, we can recognize the following sentences: lack of money is cold, lack of affection is cold, lack of comfort is cold. This way of regarding vacancy as 'cold' is often used in other patterns by young people, because it vividly impresses the situation in question by calling type (2) to mind.

> (67) 'Koko-no   tokoro   kanojo   ga   i-nai-nda.'   '*Sammuu!*'
> this-POSS   place   a girl-friend NOM   be-not-COP   cold (slang)
> 'Lately, I have no girl-friend.' 'It is so cold!'

(68) 'Sakki   no   jugyou   wa   *samu*-katta.'
     Last   POSS   class   TOP   be-cold-PAST
     'The last class was cold.'

Example (67) describes the cold of the boy's heart, since he lacks affection. Example (68) does not mean that the air temperature of the last class' room was low. *Cold* in this example can be rephrased as 'not interesting.' Therefore it is used to mean a 'lack of interest' or a 'lack of humor.' When we have lost something desirable, such as warm air surrounding us, our hearts feel cold. Young people use this concept, not only in traditional expressions on money, affection or comfort, but in new slang expressions.

We may assert that Japanese use physiologically felt temperatures more effectively to conceptualize abstract categories, if we take it into consideration that *samui* and *atsui* are used distinctively for indicating this sense of temperature. Physiologically felt temperature expressions, such as *samui* and *atsui*, can vividly appeal to our five senses when describing a mental situation, and not only when expressing a condition of the whole body. This feeling is reflected in examples (67) and (68). The use of *samui* to represent 'a lack of interest' or 'a lack of a girl-friend' requires creative metaphors. Even with such creative metaphors, we can find cognitive thought processes. The cognitive perspective we use in this thesis is an effective method for analyzing and even predicting such creative metaphors which are now produced.

4.5 The characteristics of type (3)

Type (3) including HEAT STANDS FOR DANGER and HEAT STANDS FOR FRESHNESS is dependent on simple metonymies based on concrete experiences, and it is not developed to other vast areas.

When the body touches fire or something hot, we feel danger. Since we frequently encounter these kinds of experiences, we start to express something dangerous through the words 'hot' or 'fire.' Besides, fire can burn anything around it. Therefore, we can more vividly convey the danger involved in 'hot' situations by metaphors expressing the processes of burning, than by uttering the phrase 'it is dangerous' literally. The metonymy, HEAT STANDS FOR DANGER, is grounded on such a common thought process. Yet, in this pattern, HEAT carries out only a referential function and does not have the power mapped to other concepts which are not concerned with original heat. This is the reason why we can assert that this metonymy is not developed into other vast areas.

<DANGER>
     (69) Kare wa   sono   satsujin   jiken no shinsou   o   *momikeshi-ta*
          he TOP   the   murder   case of truth   ACC snuff out-PAST
          'He snuffed out the truth of the murder case.'
     (70) Kare wa   hotobori   no   *sameta*   koro   o
          he TOP   remaining heat   NOM   become cold   time   ACC
          'He came back to the town when he thought the heat was off.'
          mihakaratte   machi   ni   kaetteki-ta
          look upon   town   to   come back-PAST

(71) Kare wa   mou   shiri-ni   *hi*   ga   tsuite   iru
     he TOP   already   buttocks-on fire   NOM   catch   be-PRES
     'His ass is on fire.'

(72) a hot situation

(73) a hot diamond necklace[4]

(74) You are getting warm.[5]

(75) The teacher said my answer was wrong. but it was warm.

Like DANGER, we frequently encounter an experience that a dish which is just cooked is hot. From this experience, we can express something just produced by 'hot.' This expression is not just applied to cooked dishes, but frequently to a domain of information, such as news and publications like newspapers, magazines, and books. Yet, the metonymy, HEAT STANDS FOR FRESHNESS, is distinct to English. Japanese does not have such metonymic expressions.

<FRESHNESS>

(76) a hot information

(77) a dozen new mystery stories hot from the press (Random House)

4.6   The differences between three kinds of extended concepts

The differences of type (1) and type (2) from type (3) are that (1) and (2) have expanded the physiological experience to the whole body of each concept through metonymy and metaphor, and they have a vast area of expressions of heat independent of the first concrete experience. On the other hand, type (3) is dependent on a simple metonymy from a concrete experience, and the meaning is not metaphorically mapped onto other target domains.

The differences between type (1) and type (2) are the foci of the concept. In type (1), heat rises from normal body temperature according to the excitement, and goes down again to normal temperature when the excitement has gone. So the focus of this concept is the rising temperature, that is, 'hot.' The simple return to the normal temperature is expressed by 'cold'.

[Figure 8: the image of type (1)]

cold   **hot**

(n̄):the normal temperature
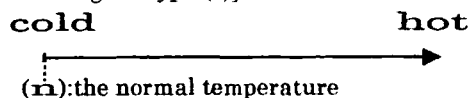
In type (2), the focus is put on both sides of 'warm' and 'cold.' In a normal state,

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[4] (Random House) hot 20(1)*touhin no, fusei nyuushu shita, mitsuyu no,* (2)*shimei tehai chuu no, otazune mono no,* (3)*(joukyou nado ga)kikenna, yabai.* (O.E.D.)hot 7e. Of stolen property: easily identifiable and so difficult to dispose of. In extended use: stolen. Also applied to a person wanted by the police.

[5] (Random House)warm 12.*(geimu nado de)<oni ga>mokuhyou ni chikai, mou sukoshi de mokuhyou ni tassuru, <shitsumon ni taisuru kotae ga>seikai ni chikai,* (O.E.D.) warm 6.Of the person chosen to seek or guess, in children's games. Being near the object sought; being on the verge of finding or guessing.

since people think neither of money nor affection, they feel neither heat nor cold. Possession of money or affection leads us to feeling warm, and its loss leaves us cold. However this is no longer a normal state. This means that cold as well as warmth is also an important focus in type (2). What is common between (a), (b) and (c) of (2) is that 'possession' is warm and 'lack' is cold. In chapter 4.4.3, we saw examples which extend the meaning of coldness as 'lack' to another domain.

[Figure 9: the image of type (2)]

cold   **warm**

$$\longleftarrow \text{———————} \;\vdots\; \text{————} \longrightarrow$$

(n): the normal temperature

The differences between type (1) and type (2) can also be said to be the differences between typical scales in the temperature concepts. Type (1) places the typical scale on object temperature by regarding human emotion or feeling as an object. We will prove this from the application of Japanese temperature expressions of type (1). As I proposed in chapter 3.1, Japanese temperature expressions can be divided into two types: words expressing temperature of an object, which are felt by a part of the human body, and words expressing temperatures which are felt physiologically by the whole human body. The former (*atsui, tsumetai*) and latter (*atsui, samui*) have different *kanji* characters.

The use of the former pattern (*atsui, tsumetai*) in type (1), which we found in many examples in chapter 4.3, shows that the feelings are looked upon as objects, not necessarily controllable by us and separated from our reason. Few uses of the latter pattern (*atsui, samui*) in type (1) proves that type (1) takes on a characteristic of its own independent from its original meaning, because the latter pattern (*atsui, samui*) is more suitable for the original purpose of describing the body temperature rising from excitement.

Type (2) places the typical scale on physiological temperature by focusing on the matters' functions for human beings, as we found the latter pattern of Japanese temperature expressions in the examples of type (2) in chapter 4.4. Type (2) also differs verbally from type (1) because it originates in retaining body temperature. Since temperature words in type (1) are used in order to depict intensity, they tend to be words with high temperatures such as 'hot' or ' fiery'. On the other hand, since words in type (2) express whether a person's physical and mental condition is calm or stormy, tranquil words such as 'warm' are often used.

The two kinds of ways of placing typical scales which I proposed by giving an example of 'This coat is warm' in chapter 3.2, are reflected in extension patterns of temperature expressions. Even if the same word as hot, warm or cold is used, we are usually judging its meaning from the given context, which metaphorical pattern is suitable for each meaning.

5. Concluding Remarks

Metonymies and metaphors are powerful cognitive tools for our conceptualization of abstract categories, as many researches of cognitive linguistics have shown. We frequently and unconsciously use concrete experiences in everyday life to understand abstract concepts which we cannot experience directly. Yet, it is not

appropriate to assert that we utilize just any concrete experience for conceptualization. As effective tools, we are choosing experiences which are close to us and have potential power to be easily applied to abstract categories. One of such experiences is temperature. Since we are very frequently experiencing an increase or a decrease of temperature of the body or of the air, the concept of temperature is one of the closest experiences to us. Therefore temperature expressions can appeal to the five senses and lead us to a full realization of the applied concept. Besides, since the concept of temperature originally has the characteristic of urging us to apply typical scale to various situations, we can precisely understand the meaning of the temperature word by measuring it against each typical yardstick, even if the same word is used for some different abstract concepts. Therefore, we can assert that the concept of temperature is one of the most desirable source domains of metaphors.

Next, we will raise the question of whether the concept of temperature in fact functions as a tool for conceptualization. To answer this question, we have to examine many metaphorical expressions of temperature. Through our examination, we have discussed that 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.

The second type includes metaphors representing concepts of RICHNESS/POVERTY, AFFECTION/HOSTILITY and COMFORT/FEAR. All of these metaphors are commonly expressed by a set of metaphors: POSSESSION IS WARMTH and LACK IS COLD. With regards to the concept of AFFECTION/HOSTILITY, we see an interesting phenomenon in Japanese. When expressing giving and taking 'affection' and 'hostility,' the object temperature expressions, *tsumetai* and *atsui* are used, even though the concepts included in the second type are generally represented by the physiologically felt temperature expressions, *samui* and *atsui*. This phenomenon can be explained by hypothesizing that when we express the situations of giving and taking of 'affection' and 'hostility,' we are regarding these emotions as a flowing fluid from one container to another. Another interesting phenomenon of this type is the derivative use of a metaphor, LACK IS COLD, which we can find among young Japanese people's expressions. Developed from the traditional uses showed in the following patterns, LACK OF MONEY IS COLD, LACK OF AFFECTION IS COLD and LACK OF COMFORT IS COLD, lack of something desirable and expected, such as romance in a student's life or humor in a comic play, has recently been represented by *samui* (cold).

The third type of metaphorical extension of temperature expressions includes metonymies which are 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 have the power mapped to other concepts which are

not concerned with original heat. Therefore, we can assert that this type does not show vast extensions of metaphor.

Temperature expressions originally possess the characteristic of applying each typical scale to each context. We are effectively utilizing this peculiar attribute for conceptualizing various abstract categories. As we see in this case of temperature expressions, we can understand abstract categories through metaphorical extensions of bodily experience.

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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