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THE MENTAL REPRESENTATION OF METAPHOLICAL MEANINGS OF SENSORY ADJECTIVES¹

1 INTRODUCTION

The aim of this paper is to discuss various types of metaphorical meanings of sensory adjectives. Lakoff and Johnson (1980) claim that for these adjectives, a property is understood in terms of another which belongs to a different domain as in (1):

(1) a. Sally is *cold*.
b. (The writer always applies for jobs following a standard procedure.)

On the doormat, there were a few late Christmas cards plus the inevitable letter from the bank, but no offers of job interviews. As I had never actually made a *cold application* for a job before, I didn't really know what to make of this. [BNC]

As (1a, b) show, metaphorical uses of sensory adjectives convey both context-independent meanings and highly context-dependent meanings. In (1a), the metaphorical meaning of *cold* is context-independent because a person's general state of emotion is conveyed, and the lack of affection is interpreted. In (1b), the metaphorical meaning of *cold* is highly context-dependent, and a more specified aspect of a person is conveyed; thus, the lack of the standard procedure is understood as a pragmatic meaning. Given these examples, the following question emerges; how are metaphorical meanings of sensory adjectives classified? Moreover, how are these meanings represented in our mind? This paper attempts to clarify the distinction between different types of meanings that are represented in our mind.

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2 PREVIOUS ANALYSES

This section reviews previous analyses on how metaphorical meanings are derived. We will also discuss how these meanings are represented in our mind. Specifically, we will address how these analyses are related to the conventional and creative meanings of metaphorical expressions. In addition, we will examine how different types of metaphorical meanings are represented in our mind.

2.1 *Chomsky (1965)*

According to Chomsky (1965), the violation of selectional restriction is involved in the meanings of metaphorical expressions as in (2) and (3):

(2)	Colorless green ideas sleep furiously.	(Chomsky 1965: 149)
(3)	cold light, cold sound, cold heart	

This type of expression is interpreted by a direct analogy to well-formed sentences that observe the selectional rules, and this analogy is carried out if a specific context is provided (ibid: 149). However, as (1a) shows, an expression can convey a metaphorical meaning even if these rules are observed. Therefore, it is not always the case that such an analogy leads to the interpretation of metaphorical meanings. Moreover, as (3) shows, the meaning of some metaphorical expressions are determined even if their interpretation is not highly context-dependent.

2.2 *Nagy (1974)*

Nagy (1974) deals with the metaphorical uses of predicates combined with various nouns. By investigating their possible combinations, the analysis reveals that their uses follow set patterns as in (4):

(4)	a. high price, high wages	(Nagy 1974: 216)
	b. high spirits, high morale	(ibid.: 217)
	c. high status, high reputation	(ibid.)
	d. high wind, high gale	(ibid.)
	e. high primates, high plants	(ibid.)

As these examples show, adjectives are used metaphorically to describe amounts, spiritual state of being, evaluations, levels of intensity, and the developmental stages of animals and plants. These classifications are determined by analyzing various types

of combinations of nouns and predicates such as verbs and adjectives.² By identifying any patterns, we can determine the general tendency in their combinations. However, exceptional combinations are outside the scope of this study. Therefore, we cannot predict what meaning is derived by the exceptional combination in (1b). Moreover, although Nagy carried out a descriptive analysis, it is unclear what factors yield different meanings.

2.3 Lakoff and Johnson (1980) and Lakoff (1987)

According to Lakoff and Johnson (1980) and Lakoff (1987), the metaphorical use of sensory adjectives is motivated by conceptual metaphors. According to Lakoff and Johnson, conceptual metaphors affect our understanding of various abstract notions, and metaphorical expressions are the manifestations of these understandings. If conceptual metaphors motivate the use of these expressions, the co-occurrence of perception and other types of experience also motivate their use:

(5) a. You're in *high* spirits. (Lakoff and Johnson 1980: 15)
b. He is in the *high* command. (ibid.)
c. The number of errors he made is incredibly *low*. (ibid.: 16)
d. Things are at an all-time *low*. (ibid.)
e. *high* primates, *high* plants (ibid.)

(6) a. He was *red* with anger. (Lakoff and Johnson 1987: 381)
b. Don't *get hot under the collar*. (ibid.: 382)

In (5a), the HAPPY IS UP metaphor motivates the use of *high*. This is because erect posture is associated with happiness, and happiness is understood in terms of such a posture. In (5b), the HAVING CONTROL OR FORCE IS UP metaphor motivates the use of *high*. This is because physical size typically correlates with physical strength, and thus one's dominance over others is understood in terms of this physical aspect. For these reasons, these meanings of *high* constitute a network, and these distinct meanings are each represented in our mind. In (5c), the LESS IS DOWN metaphor motivates the use of *low*. This is because the scarcity of an item is understood in terms of the height of a piled-up substance. In (5d), the BAD IS DOWN metaphor motivates the use of *low*. This is because the quality of goodness is associated with height, and the evaluation of something as poor is understood in terms of its physical height. These meanings of *low* also constitute a network, and they are also represented individually in our mind. In (6a, b), on the other hand, the ANGER IS HEAT metaphor motivates the use of *red* and *hot under the collar*. This is because anger

² These patterns are found by investigating the use of various predicates describing height. While amount and emotion are expressed by a diverse set of predicates, evaluation, intensity, and evolution are described by a smaller set of predicates. When amount and emotion are described, predicates such as *boost*, *plummet*, *sink*, and *soar* are used. For the description of evaluation, intensity and evolution, these predicates cannot be used. For more detailed behaviors of various predicates see Naoy (1974: 216-220).

increases a person's body temperature and reddens his or her face, and the notion of anger is understood in terms of the bodily reactions. These bodily reactions motivate the use of these expressions. For that reason, words related to heat convey anger and the information about anger is stored in our mind as their lexical meanings.

If we look at (1a, b), the conventionality of (1a) is explained because lower bodily temperature is associated with the lack of affection or enthusiasm. However, it is unclear what kind of association is established between the application method and the bodily state of the applicant because specific details about the applicant are involved with this expression. Moreover, it is unlikely that the physical coldness of the applicant co-occurs with the non-standard procedure. Instead, the similarity between these two conditions depends on a particular context. For these reasons, a conceptual metaphor is unlikely to motivate the use of *cold*. In addition, if we assume that some kind of conceptual metaphor motivates the use of such a context-dependent expression, we have to assume that many conceptual metaphors motivate the use of these types of expressions. However, this is a singular interpretation, and it is likely that individuals have a diverse set of conceptual metaphors that motivate the meanings of these expressions. Moreover, if we assume that the meanings of such singular metaphorical expressions are represented in our mind as their individual meanings, we have to assume that a large set of concepts is associated with each adjectival expression. We also must assume that a polysemous network contains a number of meanings. However, it is unlikely that our mind can represent all of these meanings because memory places a considerable burden on us.

2.4 Sperber and Wilson (1986/95)

This section discusses Sperber and Wilson's (1986/95) account of metaphorical expressions. In their analysis, their interpretations involve deductive reasoning. As for conventional expressions, they look for a strong implicature, which is derived from more limited and accessible encyclopedic entries as in (7a). When we interpret creative expressions, on the other hand, we utilize more varied encyclopedic entries to develop weak implicatures as in (7b). For these reasons, the interpretation of (7a) is based on the stereotypical information about a pigsty, that is, a pigsty is filthy and untidy. In this way, the filthiness and untidiness of the room is understood. When we interpret (7b), we rely on various pieces of information about a bulldozer. For example, since a bulldozer is a machine, it is inflexible. Therefore, Robert's stubbornness is understood. In this case, since the information needed for the interpretation is not determined, the implicatures are indeterminate:

(7) a. This room is a pigsty.
b. Robert is a bulldozer. (Sperber and Wilson 1986/1995: 236)

Following this analysis, the interpretation of (1a) also requires deduction, which increases the hearer's processing effort. This increase of processing effort is

counterintuitive because we can easily interpret the meaning of *cold* without a concrete context. Instead, if we assume that such a meaning is disambiguated, we cannot explain the relationship between the physical coldness and the emotional coldness in (8). In (8), the use of *cold* conveys both types of coldness:

(8) Both the weather and his heart were *cold*.

Therefore, we have to assume another mechanism of interpretation so that we can solve these two problems. However, if we assume that this word has some original lexical meanings, we have to assume that a large amount of information is represented in our mind, and this is incompatible with Sperber and Wilson's argument against polysemy. For this reason, we have to assume that deductive inference contributes to the understanding of both context-independent metaphorical meanings and highly context-dependent metaphorical meanings. In particular, we have to devise a method of inference that involves less processing effort in order to explain the metaphorical meaning in (1a). Moreover, if a deductive inference is at work in their interpretation, we have to devise a method that also restricts inference. Otherwise, this process would result in unusual interpretations.

2.5 Traugott (1985)

Traugott (1985) explains the degree to which an expression is metaphorical. In this analysis, the concept of extension, the degree of conceptualization, and the closeness of the relationship between two elements determine the degree to which an expression is metaphorical:

(9) a. Mary is a block of ice.
 b. Mary left before Jane. (Traugott 1985: 22)

(10) a. She is a worm.
 b. She is a crumpled sheet of a print-out. (ibid.: 23)

In (9a, b), while *a block of ice* denotes an object, *before* is non-referential in the description of temporal relationship. Thus, (9a) is more metaphorical. As for (10a, b), while a person is compared to an animate entity in (10a), a person is compared to an inanimate object in (10b). Therefore, the degree of the similarity between the two items is greater in (10a). Since the degree of similarity is greater, the degree of conceptualization is smaller, and these two items have a close relationship. For these reasons, (10b) is regarded as a more metaphorical expression. Following this analysis, the extension of a word is not involved in the metaphorical expression in (1a, b), because they both employ an adjective. Moreover, when we compare (1a) and (1b), the degree of creativity cannot be predicted in relation to the degree of conceptualization because the creative expression in (1b) describes the physical action

of the job applicant. As a result of this description, less conceptualization is involved in (1b), but this expression is actually more creative. Therefore, it is unclear how we should distinguish various types of metaphorical meanings in relation to these three factors given by Traugott.

2.6 *Grady (2005)*

Grady (2005) discusses metaphorical expressions about abstract concepts from the point of view of primary metaphors. According to him, image schemas are representations of fundamental units of sensory experience, and the information about these schemas is included in the source domain. He has proposed that the source concepts of primary metaphors have image content while the corresponding target concepts have response content. Between these two schemas, there is a shared super-schematic structure, and this structure is a necessary condition for primary metaphors. For example, there are image schemas about concepts such as heaviness, upward movement, and heat. On the other hand, the response schemas include concepts such as difficulty, increased amount, and anger. Between these two types of schemas, scalar properties are shared. Moreover, unbounded entity superschema is shared between heat and anger because heat and anger is not a concrete entity (Grady 2005: 44-50).

According to this claim, the image schema for temperature, the response schema for affection, and the super-schema for scalar property motivate the conventional metaphorical use of *cold* in (1a). The image schema for height, the response schema for increased quantity, and the super-schema for scalar property motivate the conventional metaphorical use of *high* in (4a). Moreover, these super-schemas also motivate the metaphorical use of adjectives in the creative expressions in (11):

- (11) a. On other occasions Rita found, as she did with the children, that a *sharp authority* was more effective. Today she decided that ‘house clearances’ lettered on a junk shop window was intolerable. [BNC]
- b. Bill turned upon him. ‘Don’t recognize me yet?’ Rex gaped at the cab driver in the soiled jumpsuit. The cab driver who now displayed a big black muscular right arm about four feet long, curtained by torn Lycra and ribbons of human flesh. ‘Let’s give you another clue. Tell me when you think *you are getting warm*.’ Bill began to bulge in all directions. [BNC]

In (11a), the image schema for tactile stimuli, the response schema for accurate work, and the super-schema for scalar property motivate the use of *sharp*. In (11b), the image schema for temperature, the response schema for the answering method, and the super-schema for scalar property motivate the use of *warm*. Therefore, the involvement of primary metaphor also motivates creative metaphorical uses of

sensory adjectives. If we assume that primary metaphor motivates metaphorical uses of sensory adjectives, the same mechanism motivates both their creative and conventional uses. Thus, it is difficult to distinguish between conventional and creative metaphorical expressions. Moreover, since primary metaphors determine how the general meaning changes, it is also difficult to explain how specific information is derived from a creative expression. Furthermore, if we assume that highly context-dependent metaphorical meanings are also motivated by primary metaphors, how many types of correspondences between source concepts and target concepts should be devised in order to explain various meanings? If we assume that context also yields creative meanings to a certain degree, to what extent do primary metaphors affect these meanings?

2.7 Wilson and Carston (2006)

According to Wilson and Carston (2006), sensory adjectives like *cold* and *hard* convey lexicalized superordinate concepts (COLD* and HARD*) which apply both to objects that we find cold or hard to the touch and to people whose personalities we would describe as cold or hard. These concepts are deployed in the interpretation of metaphorical expressions. In these expressions, their metaphorical meanings are entrenched and the two different types of meanings are lexicalized. Thus, the metaphorical meaning of (1) can be explained.

Following this analysis, we do not assume that the representation of the meanings of these adjectives involves the listing of their multiple meanings. Instead, their representation is simplified, and thus it can be assumed that individuals do not store all the lexical meanings of these expressions. However, it is probable that a lexicalized superordinate concept may contain other information in addition to the information about emotion. For example, the information about evaluation, degree, and difficulty is likely included because sensory adjectives are also used in these types of descriptions (e.g., *harsh years*, *heavy wind*, and *stiff competition*). Therefore, we have to explain to what degree such a concept is abstracted so that the involvement of more varied meanings can also be explained.

To address the various questions raised in this section, we will analyze metaphorical uses of sensory adjectives using Relevance Theory. In this way, the conventionality of metaphorical expressions can be explained without assuming that their multiple meanings are represented in our mind. In addition, the creativity of these expressions can be analyzed by taking into consideration context-dependent assumptions about our sensory experiences. This examination of various metaphorical uses of sensory adjectives shows that a conventional metaphorical use of an adjective like (1a) is interpreted through inference that involves common properties shared by various stimuli. In these kinds of expressions, the meanings of sensory adjectives are extended in a set pattern. In addition, more general information is conveyed through these kinds of expressions. In a creative metaphorical use of an adjective like (1b), more specific information is transmitted. Moreover, their meanings are deduced from various highly context-dependent assumptions. Taking into consideration the

characteristics of sensory adjectives in metaphorical expressions, we will determine what kinds of meanings are context-independent and what types of meanings are highly context-dependent. Adopting such an approach, we will classify lexical meanings and pragmatic meanings of metaphorical uses of sensory adjectives. We will also examine how these two types of meanings are represented in our mind.

3 THEORETICAL PREMISE: RELEVANCE THEORY

In this paper, we assume that the creativity of metaphorical expressions affects their interpretation and the processing effort needed to interpret them. To interpret the meanings of creative expressions, individuals must access the assumptions that lead to an understanding of the intended meaning in a particular context. We can understand this process by investigating the roles played by different types of assumptions and inferences in these interpretations. Therefore, we will analyze various metaphorical uses of sensory adjectives from the point of view of Relevance Theory. Prior to the analysis, we will outline this theory and show how deduction is carried out.

According to Relevance Theory, a hearer follows a path of least effort to interpret utterances. Along this path, the meanings of semantically ambiguous expressions like *bank* are disambiguated. The referent of pronouns and other deictic expressions are also resolved. Moreover, the hearer infers what information is omitted in an utterance. Through these steps, the hearer understands what is explicitly communicated and infers what is implicated in an utterance (Wilson 2002: 4). In this way, the hearer derives explicatures and implicatures.

When we derive implicatures, we draw an inference by utilizing an explicature and various contextual assumptions as premises. For example, consider (12):

(12) Caroline is our princess.

(Carston 2002: 347)

If the hearer knows that Caroline is the princess of Monaco, then (12) conveys a truism. However, if the hearer does not know how Caroline was brought up, he carries out a deductive reasoning by using the explicit content of this utterance as a premise. The hearer also draws on an assumption about how a princess is raised as another premise. Namely, the hearer has access to the assumption that a princess is an indulged and spoiled person. From these premises, it is understood that Caroline is an indulged and spoiled person. In this case, the information about a princess and the derived conclusion are considered implicatures.

In addition to giving rise to implicatures, an ad hoc concept is also constructed in the interpretation of (12). When an ad hoc concept is constructed, a concept denoted by a word is broadened or narrowed (ibid.: 321-334). For example, the word *princess* denotes a female member of a royal family, but the concept PRINCESS is broadened in relation to the implicature given above. In this way, the broadened concept PRINCESS* is constructed, and includes indulged and spoiled women who do not belong to a royal family. This process shows how an implicature is derived from the

content of an explicature. Moreover, an ad hoc concept is constructed in relation to the content of an implicature, and the explicit content of an utterance is adjusted. This process of utterance interpretation is called mutual adjustment.

4 ANALYSIS OF THE METAPHORICAL MEANINGS OF SENSORY ADJECTIVES

Section 4.1 considers the frequency of conventional metaphorical expressions and creative metaphorical expressions. Section 4.2 examines what types of lexical meanings are interpreted in metaphorical uses of sensory adjectives. Next, section 4.3 verifies that sensory adjectives have two core meanings. Finally, section 4.4 shows how deduction leads to the understanding of creative metaphorical meanings.

4.1 *The Frequency of Sensory Adjectives in Metaphorical Expressions*

It is possible to distinguish between the creative metaphorical uses of sensory adjectives and their conventional metaphorical uses by investigating their frequency in the British National Corpus. As (13) shows, conventional expressions are used more frequently in contrast to the creative expressions given in (14):

- (13) cold light (50), soft light (43), heavy heart (39), warm welcome (180), sharp increase (62), heavy losses (71), low quality (41), bitter experience (38), upright man (11)
- (14) cold application (1), sharp authority (1), getting warm (the description of finding an almost correct answer) (5)

As (13) shows, when sensory adjectives convey various lexical meanings, these adjectives occur more frequently. On the other hand, as (14) shows, when these adjectives transmit pragmatic meanings, they are used less frequently. Therefore, the metaphorical meanings in (14) are understood in relation to each context.³

In addition, compared with the expressions in (14), the expressions in (13) apply to a more diverse set of items and situations as in (15):

- (15) a. *Cold light* of the fluorescent tube. [BNC]
- b. The clouds passed from the face of the moon, which now threw a clear *cold light* on the two adjoining yards. [BNC]

³ As Sadamitsu (2002, 2004) points out, adjectives describing smell are rarely used to describe other senses. For this reason, the meaning of these kinds of adjectives, such as *fragrant* does not change. Therefore, *fragrant portrait* is not interpreted metaphorically. Instead, this expression is understood as the description of a portrait on which perfume is sprayed.

In (15), *cold light* serves as the description of a fluorescent tube and the moonlight. Compared with these expressions, the expressions in (14) are used to describe more limited situations. Thus, the uses of conventional expressions are more widely distributed and depend on contexts to a lesser extent.

4.2 On Lexical Meanings

In 4.1, we examined the frequency of various metaphorical uses of sensory adjectives. In this section, we analyze the lexical meanings by taking into consideration the pattern of meaning changes in the metaphorical uses of sensory adjectives. Then, we discuss how the findings in 4.1 are related to the observations given below.

4.2.1 The Description of Emotion and Sensation When sensory adjectives are used to describe a sensation, their meanings change in a set pattern. As Ullmann (1951) and Williams (1976) point out, their semantic change occurs in the following pattern: [Touch] → [Taste] → [Smell] → [Vision] → [Sound]. Accordingly, the metaphorical meanings in (16) follow this pattern. Moreover, an adjective that originally describes a strong stimulus can describe other strong perceivable stimuli in its metaphorical sense. Similarly, an adjective that originally evaluates the quality of a stimulus can evaluate other perceivable stimuli in its metaphorical sense:

(16) a. sharp taste, sharp smell, sharp colour, sharp sound [BNC]
 b. sweet smell, sweet sight, sweet voice [BNC]

In addition, these adjectives are also used to describe emotion and its transmission. For these purposes, adjectives that originally evaluate or intensify perceivable stimuli are used. Therefore, their meanings also change in a set pattern (Kusumi 1988, Yamada 1994):

(17) a. heavy heart, warm heart [BNC]
 b. bitter mood, sour mood, sweet heart [BNC]
 c. black mood, dark mood [BNC]
 d. hot love, hot anger, hot passion [COCA]
 (18) a. warm reception, warm message, warm response [BNC]
 b. sour remarks, bitter words [BNC]
 c. bright conversation, bright greetings [BNC]
 d. hot talk, hot debate, hot words [COCA]

In these types of expressions, various nouns are used with sensory adjectives, and their metaphorical meanings do not vary across different combinations of nouns and adjectives. In (19)-(21), for example, the evaluation of stimuli is involved in both its

original meaning and metaphorical meanings. Similarly, in (22), the description of intensity is involved in both its original and metaphorical meanings:

(19)	heavy sound, heavy silence, heavy feeling	[BNC]
(20)	cold grey, cold light, cold heart	[BNC]
(21)	warm light, warm voice, warm feeling, warm tribute	[BNC]
(22)	hot color, hot love, hot debate	[COCA]

In (19), for example, a negative evaluation is applied to sound, silence, and mood. Additionally, in (20), this evaluation is applied to color, light, and feeling. Positive evaluation is applied to light, voice, emotion, and paying tribute in (21). Similarly, in (22), intensity is applied to color, love, and debate.

Furthermore, the metaphorical meanings of these kinds of expressions are understood without specific contexts as in (23). For this reason, the combination of these adjectives and nouns sounds natural without specific contexts:

(23)	cold light, cold sound, cold heart, cold welcome	[BNC]
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These observations reveal that certain sensory adjectives allow the hearer and reader to access assumptions about the evaluation and intensity of our experiences. Since these assumptions are obtained from various sensory adjectives, readers or hearers can access these assumptions without detailed contexts.

An example of an inference carried out by using this type of assumption is presented in (24a, b):

(24)	a. Danish Blue cheese, with its distinctively <i>sharp taste</i> , is another versatile product from MD Foods.	[BNC]
b.	Mr McAuley polled just 94 votes and was in <i>bitter mood</i> with the electors who deserted him.	[BNC]

In (24a), the reader has access to the content of the explicature and an assumption about sharpness, that is, the reader has access to the assumption that a sharp tactile stimulus is an intense stimulus. By accessing this assumption about an intense stimulus, the reader can understand the implicature that Danish Blue cheese has an intense flavor. If such an implicature is understood, an ad hoc concept SHARP* is adjusted so that it can include other intense stimuli. In (24b), on the other hand, the reader has access to the content of the explicature and an assumption about bitterness, that is, the reader has access to the assumption that bitter taste is an unpleasant stimulus. By accessing this assumption and negative evaluation, the reader can understand the implicature that Mr. McAuley's feelings are negatively evaluated. If such an implicature is understood, an ad hoc concept BITTER* is constructed so that it can include other unpleasant experiences, including one's mood. As these two inferences indicate, the reader or hearer has access to assumptions about the

evaluation or intensity of stimuli. By drawing these assumption-based inferences, lexicalized metaphorical meanings of sensory adjectives are understood, and the strength and evaluation of other perceivable stimuli and emotions are also understood.

We should note however that the information about evaluation and the information about intensity are not represented independently. Instead, there is a continuum between these two types of information. Therefore, some metaphorical uses of adjectives have both types of information. This continuity is seen when the use of a noun evokes an evaluation and intensity of feeling as in (25):

(25) That was how she'd done it—she'd touched them with her *warm love*
and it had been too much for the Worm's heart of hatred. [BNC]

In this example, the reader has access to the content of the explicature and the assumption about warmth, that is, that warmth is pleasant and provides a moderate thermal stimuli. Thus, the reader can understand the implicature that suggests positive evaluation of love and its moderateness. If such an implicature is understood, an ad hoc concept WARM* is constructed so that it can include a positive and moderate feeling. This inference shows that some emotions possess intensity and evaluable aspects. In these cases, metaphorical adjectives convey these aspects at the same time.

4.2.2. The Evaluation of Quality When sensory adjectives are used to describe the evaluation of quality, their meanings also change in a set pattern. Therefore, adjectives originally evaluating perceivable stimuli are used. Specifically, adjectives describing pleasant sensations are employed to describe positive evaluations, and those describing unpleasant sensations serve to communicate negative evaluations:⁴

(26) a. harsh years, rough life, dull days [BNC]
b. bitter situation, sour experience, sweet home, sweet nothings [BNC]
c. crooked deal, gloomy news, upright man, bright future [BNC]

These examples show that these expressions are used to evaluate affairs, quality, and situations. In these cases, general information about writer's estimations is conveyed.

In these types of expressions, various nouns are used with sensory adjectives, but their metaphorical meaning does not vary across different combinations of nouns and adjectives as in (27):

(27) bitter situation, bitter world, bitter experiences [BNC]

⁴ Specifically, the uses of *sweet* and *bitter* have this tendency. See Oda (2003), and Yamazoe (2003).

In (27), for example, unpleasantness is applied to situations, the world, and experiences.

Furthermore, the metaphorical meanings of these kinds of expressions are understood without specific contexts as in (28). For this reason, the combination of these adjectives and nouns sounds natural without specific contexts:

(28) harsh years, low quality, crooked deal [BNC]

These observations show that the uses of various sensory adjectives allow the hearer and reader to access assumptions about other kinds of evaluation. Since these assumptions are obtained from various sensory adjectives, readers or hearers can access these assumptions without detailed contexts, and they can understand the evaluation of items other than emotion and perception.

This method of inference making is the same in (24b) and (29). Consider (29) for example:

(29) Some Muslims have had a very *bitter experience* with Christians. The majority of Muslim countries were occupied by the European colonial powers. [COCA]

In this example, the reader has access to the assumption about unpleasantness caused by bitterness. According to this assumption, an unpleasant experience is understood as an implicature derived from *bitter experience*. As a result, an ad hoc concept BITTER** is constructed that is applicable to various kinds of other unpleasant experiences.

Thus far, we have analyzed various metaphorical uses of sensory adjectives that convey evaluation. Their metaphorical meanings are interpreted by understanding pleasantness and unpleasantness associated with perceptions. However, in other cases, sensory adjectives evoke values and they contribute to the understanding of evaluation. This type of understanding is involved in the metaphorical interpretation of adjectives originally describing height and straightness as in (30):

(30) a. In the past, the fall from grace of the flat roof was due to series of problems: inappropriate combinations of waterproofing material, insulation and decking; low durability waterproofing materials; poor design and detailing; and *low quality installation*. [BNC]
 b. A *crooked civil servant* sold 100 British passports to people wanting to leave Hong Kong before the colony is handed back to China, a court heard yesterday. [BNC]

In (30a), the reader has access to the explicature and assumption about height, that is, that items located in lowered places are inferior. Following this assumption, an implicature is derived that the quality of the roof installation is bad. Thus, an ad hoc

concept LOW* is constructed that is applicable to inferiority. In (30b), on the other hand, the reader has access to the explicature and assumption about shape, that is, that a crooked object is improper. Following this assumption, an implicature is derived that the civil servant is an improper person. Thus, an ad hoc concept CROOKED* is constructed that is applicable to impropriety. These two examples show that the descriptions of some visual experiences evoke neither pleasant nor unpleasant feelings. In this case, our values related to these experiences contribute to the evaluations. Therefore, evaluation of quality is understood as a lexicalized metaphorical meaning of sensory adjectives.

4.2.3 The Description of Degree Sensory adjectives are also used in describing degree as (31a-c) show. In these cases, adjectives originally describing intense stimuli are used to describe high degrees of natural phenomena, activity, and comparisons. Adjectives originally describing highly conspicuous appearances also tend to convey the intensity of affairs. Likewise, adjectives that originally convey weak stimuli and lack of prominence describe lack of intensity:

(31) a. heavy wind, light wind, light drowse, sharp contrast [BNC]
 b. bitter industrial confrontation, bitter wind [BNC]
 c. thin scope, vague recollection, vivid contrast, clear recollection [BNC]

In these types of expressions, various nouns are used with adjectives, and their metaphorical meanings do not vary across combinations of nouns and adjectives as in (32):

(32) heavy wind, heavy damage, heavy fighting [BNC]

Intensity is expressed in all of these examples, and the same meaning of the word *heavy* is shared in all of these phrases.

Furthermore, the metaphorical meanings of these kinds of expressions are understood without specific contexts. Therefore, the combinations of nouns and adjectives in (33) sound natural even without particular contexts:

(33) dim memory, vague recollection, vivid contrast [BNC]

These observations show that uses of various sensory adjectives allow the hearer and reader to have access to assumptions about intensity. Since these assumptions are obtained from various sensory adjectives, readers or hearers can access these assumptions without detailed contexts, and they can understand the intensity of items than sensation and emotion.

An example of an inference made using this type of assumption is presented in (34a, b):

(34) a. While *heavy fighting* along the border areas did not break out until the sixth round in 2009, intermittent clashes between the Yemeni army and smugglers were common. [COCA]
 b. I have a very *clear recollection* of sitting there, not being able to move and hearing the approaching sirens. [BNC]

In (34a), the reader has access to the explicature and the assumption about heaviness, that is, a heavy entity causes an intense impact. Thus, an implicature is derived that the fighting also caused an intense impact. In addition, an ad hoc concept *HEAVY** is constructed to include the intensity of impacts of various phenomenon. In (34b), the reader has access to the explicature and the assumption about conspicuity, that is, if something is clear, its degree of conspicuity is high. Thus, an implicature is made that the conspicuity of the recollection is high. An ad hoc concept *CLEAR** is constructed to include the intensity of the degree of conspicuity.

Thus far, we have discussed how degree is understood from the metaphorical uses of sensory adjectives. In such cases, these adjectives evoke intensity of stimuli or conspicuity. Since both of these properties have degrees, their degrees contribute to the understanding of these lexicalized metaphorical meanings.

4.2.4 The Description of Amount Quantity is also depicted by various metaphorical uses of sensory adjectives. Adjectives describing strong tactile stimuli and an object's outstanding appearance tend to convey amount metaphorically:

(35) a. sharp increase, sharp decline, heavy fines [BNC]
 b. high wage, high unemployment [BNC]

In these uses of sensory adjectives, various nouns occur with adjectives, and their metaphorical meanings do not vary across expressions as in (36):

(36) thick hair, thick mass, thick bush [BNC]

These examples describe a large amount of hair, mass, and plants, and all the uses of *thick* express the meaning of a large quantity.

This type of metaphorical meaning is also understood even without concrete contexts. Therefore, the combinations of nouns and adjectives in (37) all sound natural without specific contexts:

(37) heavy expenditure, high wages, thick hair [BNC]

These observations show that the uses of various sensory adjectives allow the hearer and reader to access assumptions on quantity. Since these assumptions are obtained from various sensory adjectives, readers or hearers can access these assumptions

without detailed contexts, and they can easily understand the quantity of various items.

An example of an inference made using this type of assumption is presented in (38a, b):

- (38) a. By imposing a very *high cost* of borrowing, the Chancellor hopes to reduce our willingness to accept any more bank credit and thereby limit credit creation by the banks. [BNC]
- b. This would involve the governments in *heavy expenditure* but the commissioner said past neglect had reduced railways to a 'Cinderella existence.' [BNC]

In (38a), the reader has access to the explicature and the assumption about height, that is, if something is high, its degree of conspicuity is high. Thus, an implicature is made that the cost is highly conspicuous. As a result, an ad hoc concept *HIGH** is constructed to include the high degree of conspicuity. Since the cost is conspicuous, the reader can understand that the amount of the cost is great. In (38b), the reader has access to the explicature and the assumption about heaviness, that is, a heavy object has a high amount of weight. Thus, an implicature is derived that the expenditure has high amount. An ad hoc concept *HEAVY*** is constructed to include a large amount.

Thus far, we have discussed how amount is understood from the metaphorical uses of sensory adjectives. In such cases, these adjectives evoke intensity of stimuli or conspicuous appearances. Both of these properties have degrees, and their degrees are associated with amounts. Therefore, these adjectives convey amount as their lexicalized metaphorical meaning.

4.2.5 The Description of Difficulty There are other metaphorical meanings of sensory adjectives. This section discusses the metaphorical meanings that describe difficulty. These cases involve adjectives that originally convey unpleasant tactile or gustatory stimuli. Likewise, adjectives that originally describe pleasant tactile stimuli are used in order to convey the ease of activities:

- (39) stiff competition, smooth functioning, smooth production, harsh decision, rough conditions, bitter business, heavy job, tough decision [BNC]

In these uses, various nouns are modified by adjectives, and their metaphorical meanings do not vary across expressions, as in (40):

- (40) smooth action, smooth delivery, smooth victory [BNC]

When we touch a smooth object, its surface feels pleasant. In a similar vein, when we are engaged in the activities stated in (40), we feel pleasant, and we find these tasks

easy. As these examples indicate, the same metaphorical meaning is involved in these three expressions.

When sensory adjectives serve to transmit difficulty, their metaphorical meanings can be derived without particular contexts. Thus, the combinations of nouns and adjectives in (41) all sound natural without specific contexts:

(41) stiff competition, harsh decision, bitter business [BNC]

These observations show that the uses of these kinds of sensory adjectives allow the hearer and reader to access information about difficulty or ease. Since this information is obtained from these sensory adjectives, readers or hearers can access it without detailed contexts, and they can understand the difficulty or ease of various activities without specific contexts.

An example of an inference made using this type of information is presented in (42):

(42) By the end of February, he was on a second hours' [sic] exercise, and Sister Coony, who had watched his restless pacing and had seen that he was bored, found him some *light* work to do. [BNC]

In (42), the reader has access to the explicature and the assumption about lightness of weight, that is, if something is light, it makes one feel pleasant. Thus, an implicature is made that the work is pleasant and easy. As a result, an ad hoc concept **LIGHT*** is constructed to include pleasantness and ease of activities. In this way, the reader can understand that the activity is pleasant and easy.

Thus far, we have discussed how difficulty or ease is understood from the metaphorical uses of sensory adjectives. In these cases, these adjectives evoke the pleasantness and unpleasantness of sensations. Since these two qualities are associated with difficulty or ease, these adjectives convey difficulty or ease as their lexicalized metaphorical meaning.

The metaphorical uses of sensory adjectives occur in descriptions of sensation, emotion, evaluation, quantity, degree, and difficulty. These characteristics are expressed in various combinations of sensory adjectives and their arguments. In addition, the metaphorical meanings are grasped without specific contexts in these cases. For example, a conventional metaphorical use of an adjective such as (1a) is interpreted through inference that involves common properties shared by various stimuli. Moreover, the implicatures obtained in such a process are considered strong implicatures because of these context-independent common properties. Therefore, in these kinds of expressions, the meanings of sensory adjectives are extended in a set pattern, and more general information is conveyed through these kinds of expressions. These metaphorical meanings also contain the lexical meanings of sensory adjectives because of the common sensational properties that are evoked in these words.

4.3 Two Core Meanings of Sensory Adjectives

Thus far, we have discussed how lexical meanings of sensory adjectives are interpreted when they are used metaphorically. To explain their interpretations, we have assumed that the intensity of perceivable stimuli and the evaluation of these stimuli contribute to the understandings of these meanings. Now, we will see if such an assumption is justifiable.

The following example shows how intensity is involved in these interpretations:

(43) And another at the 15th, a hole where so many second shots were being tossed by the {angry/heavy} wind over the clifftop. [BNC]

In this example, strong wind is personified and its intensity is described by the word *angry*. Since this word originally conveys strong feeling of anger, the assumption about an intense feeling leads to the understanding of the intensity of wind. In this way, the notion of intensity discussed in 4.2 is applicable to both emotion and other phenomena. This notion is not unique to the description of sensations, and it is commonly shared among emotion, sensation, and other phenomena.

Next, we will see how the notion of intensity is related to quantity and perception in (44). In (44), intensity is described through the use of an adjective conveying quantity instead of a sensory adjective:

(44) So I'm saying the Church bears a {substantial/heavy} responsibility for that. [COCA]

In this example, the great responsibility can be conveyed by both *substantial* and *heavy*. The use of *substantial* originally evokes quantity, and the notion of quantity also involves the notion of intensity. Moreover, items can vary in terms of weight, and extreme weight evokes intensity. Given these commonalities, these two words are used interchangeably, and the notion of intensity is expressed with these words in (44) and the description of a weight or amount.

The notion of easiness is related to evaluation and sensation, as in (45):

(45) We'd hug and look into each other's eyes, and I'd get a {peaceful/easy/quiet} feeling in my chest. [COCA]

In (45), *peaceful*, *easy*, and *quiet* evaluate a person's feelings. Easiness and quietness both have positive aspects because they are associated with relaxation. Similarly, a person's peaceful feeling also has a positive aspect because it is associated with relaxation. Since all three adjectives express positive evaluation, they are also used interchangeably, showing that positive evaluation is related to the description of easiness and sensation.

Thus far, we have discussed the continuum between sensation, intensity, emotion,

and quantity. If intensity is evoked from adjectives, then these adjectives are able to describe degree, sensation, emotion, and amount. On the other hand, evaluation is involved with descriptions of quality, difficulty, sensation, and emotion. For that reason, sensory adjectives and other adjectives are interchangeable.

Next, we will see how the lack of intensity and evaluative meaning leads to the unnatural metaphorical uses of sensory adjectives. First, consider (46):

(46) a. sweet heart, bitter heart, sharp sadness [COCA]
 b. * sharp heart

If we compare (46a) with (46b), we can see that emotional states can be evaluated by the words *sweet* and *bitter*, as in (46a). In addition, there are varying degrees of sadness, and the use of *sharp sadness* is also possible in (46a). In (46b), on the other hand, the use of *sharp* only describes intensity. However, the use of *heart* does not evoke intense feelings. For this reason, the use of (46b) is impossible.

Moreover, the unnaturalness of (47a) can be explained in a similar vein:

(47) a. * sharp days, *sharp situation (cf. sharp pain)
 b. heavy days, heavy situation (cf. heavy pain) [COCA]

In (47a), *sharp* can be used to describe intensity, but it cannot be used to evaluate days and situations. Unlike pain, days and situations do not evoke qualities that can be intensified. Instead, they evoke qualities that can be evaluated. In (47b), on the other hand, the use of *heavy* is possible because it evokes both intensity and negative evaluation. Therefore, it can be used to evaluate days and situations, and it can also be used to intensify the degree of pain.

In most cases, nouns mainly evoking degree cannot be used with adjectives that are chiefly used for the evaluation of stimuli:

(48) * sour contrast, *bad contrast, large contrast, clear contrast

In (48), *contrast* evokes the notion of intensity or degree, but it is not the object of evaluation. For this reason, adjectives that evaluate qualities cannot be used except in special cases.⁵ Instead, it is possible to describe intensity because *large* and *clear* can metaphorically intensify the degree of contrast, and this meaning is understood because of their core meaning expressing the intensity of stimuli, which is shared by various adjectives. Thus, the use of these two adjectives sounds natural in (48).

However, for the description of quantity, increases or decreases can be evaluated. These changes in quantity also evoke the notion of degree. Thus both uses of adjectives evoking intensity and evaluation are possible in descriptions of quantity:

⁵ The use of *harsh contrast* is possible in a special case because the use of this expression refers to an overexposed strongly marked difference in quality, that is, rich and poor. This type of contrast in people's lives can be evaluated. Thus, *harsh* is used to evaluate the negative aspects of people's lives.

(49) heavy bush, heavy increase, bitter increase, bitter decline (cf. *heavy decline)

In (49), the amount of bush evokes a high degree of growth, and thus the use of *heavy bush* is possible. In a similar vein, the use of *heavy increase* is possible because both *heavy* and *increase* evoke the intensity of amount. The use of *bitter* is also possible in descriptions of changes in quantity because these changes sometimes involve an unfavorable outcome that can be negatively evaluated. The use of *heavy* evokes the presence of an entity because this word originally evokes the weight of an entity. This meaning is incompatible with decline, so the use of *heavy decline* is impossible.

If sensory adjectives lack evaluative meaning, they cannot be used metaphorically to describe difficulties as in (50):

(50) * thick business (cf. heavy business)

In (50), business is evaluated in terms of the effort required. Since *heavy* evokes a negative quality related to effort, its use is possible in descriptions of difficulty. On the other hand, *thick* does not evoke this kind of quality and it cannot be used here.

Thus far, we have discussed how the lack of intensity and evaluation leads to the unnaturalness of metaphorical expressions. Some nouns evoke different degrees of physical or abstract properties. In these cases, adjectives that do not evoke the intensity of stimuli cannot be used metaphorically. Other nouns evoke the target of evaluation. In these cases, adjectives that do not originally evaluate perceivable characteristics cannot be used metaphorically. In this way, the metaphorical meanings of sensory adjectives seen in 4.2 are understood in terms of the intensity of perceivable properties and their evaluation depending on the context.

The same explanation applies to the metaphorical use of sensory adjectives derived from nouns, as in (51):

(51)	a. leaden heart, cloudy emotions	[COCA]
	b. icy light, sugary smell	[COCA]
	c. towering bombast, hazy recollection	[COCA]
	d. sunny moment, leaden premonition, bumpy conditions	[COCA]
	e. towering debt	[COCA]
	f. vinegary marriage	[COCA]

In (51a), the condition of one's heart is evaluated. In addition, perceptual properties of lead and cloud can be negatively evaluated because both weight and gloominess are unfavorable characteristics. Since *leaden* and *cloudy* evoke these properties, the negative evaluation of emotion is possible. In (51b), *icy* intensifies and negatively evaluates coldness. On the other hand, *sugary* evokes sweetness and is positively evaluated. These two adjectives evoke evaluable properties and thus they can evaluate other perceivable experiences. The qualities of perceptions such as brightness and smell are also evaluable. Therefore, the combination of nouns and

adjectives in (51b) is possible. In (51c), *towering* evokes a high degree of height and *hazy* evokes a low level of visibility. In these cases, the notion of degree or intensity is evoked. Moreover, *bombast* and *recollection* also involve different degrees. Therefore, the metaphorical expressions in (51c) are natural. In (51d), sun evokes a pleasant light while lead and bump evoke negative aspects associated with their appearance. Thus *sunny* evokes positive evaluation, while the other two adjectives evoke negative evaluation. Furthermore, time, premonition, and conditions can be evaluated because they have positive or negative aspects. For that reason, the use of the phrases given in (51d) is possible. In (51e), *towering* originally evokes a high degree of height, and *debt* evokes a certain degree of an amount. Since both of these words are associated with degree, they can be combined. In (51f), *vinegary* evokes an unpleasant sour taste and a negative evaluation. The word *marriage* can be evaluated because it has both positive and negative aspects. Thus, the combination of these two words is possible.

Impossible metaphorical uses of derived adjectives are also explained in terms of intensification and evaluation:

(52) *bumpy losses, *towering heart, *bilious wind, *metallic decision

In (52), *bumpy* evokes a negative evaluation but it does not evoke an amount, thus its use is impossible to describe a considerable amount of losses. The word *towering* evokes both a high degree and a positive evaluation, and its meaning is ambiguous. Moreover, the meaning of *heart* is vague because this word does not specify a person's internal state. For this reason, the meaning of these two words cannot be specified and their metaphorical use is impossible. The word *bilious* chiefly evokes a negative evaluation, but it does not evoke intensity because it is originally used for unpleasant bodily conditions. Thus, the intensity of the wind cannot be understood and its use is impossible in this description. The word *metallic* evokes the strength of metal, and this property is associated with intensity or degree. However, this characteristic of metal cannot be negatively evaluated because it is sometimes positively evaluated. For this reason, it is impossible to understand the notion of difficulty from negative evaluation, and the phrase *metallic decision* sounds unnatural.

Thus far, we have discussed how the characteristics of objects contribute to the understanding of the metaphorical meanings of sensory adjectives when adjectives are derived from nouns. In such cases, the intensity and evaluation of perceivable stimuli contribute to the understanding of metaphorical meanings. However, there are some exceptional uses of these adjectives. When adjectives are derived from nouns originally denoting light-weight substances, characteristics other than lightness contribute to the understanding of the metaphorical meanings:

(53) fluffy breads, vaporous presence, grainy voice, dusty memories
(cf. ?fluffy work) [COCA]

The use of *fluffy* evokes extreme softness and a high degree of positive evaluation. While these characteristics are compatible with the description of bread, they are incompatible with the description of work because even pleasant work involves effort to some extent. Thus, *fluffy work* sounds a bit strange in contrast to *fluffy breads*. The use of *vaporous* describes an insubstantial entity that is similar to vapor in its appearance. The use of *grainy* describes a negative evaluation associated with the rough feeling of grain. This word negatively evaluates the characteristic of a croak metaphorically. The use of *dusty* conveys the quality of being old because unused old goods are dusty. Therefore, this word is used metaphorically to description of memories that a person has remembered after a long interval.

Thus far, we have discussed how the intensity and evaluation of stimuli contribute to the combinations of nouns and sensory adjectives. If nouns evoke gradable properties, adjectives evoking a certain degree of stimuli can be used metaphorically in order to describe other sensations, emotions, degrees, and quantities. On the other hand, if nouns evoke evaluable properties, adjectives evaluating the characteristics of stimuli can be used metaphorically in order to describe other sensations, emotions, evaluations, and difficulties. These two claims are also true of the use of sensory adjectives derived from nouns. As these facts indicate, metaphorical meanings of sensory adjectives are derived from these two characteristics of sensory adjectives, and intensity and evaluation are the core meanings of sensory adjectives.

4.4 On Highly Context-Dependent Metaphorical Meanings

As discussed in 4.2, the two core meanings of sensory adjectives lead to the understanding of other sensations, emotions, evaluations, degrees, quantities and difficulties. In these cases, the meanings evoked from the two core meanings are lexicalized and expressed through various metaphorical uses of these adjectives. Sensory adjectives also convey highly context-dependent meanings whose understanding involves more processing effort. In these cases, more specific meanings are derived from the sensory adjectives. This section shows how more specified meanings are interpreted through highly context-dependent deduction.

First, we discuss how a detailed activity is understood through highly context-dependent deduction in (54). Since the core meanings are not involved, more processing effort is required for the metaphorical interpretation:

- (54) On the doormat, there were a few late Christmas cards plus the inevitable letter from the bank, but no offers of job interviews. As I had never actually made a *cold* application for a job before, I didn't really know what to make of this. (= 1b)
- (55) # cold application

In (54), *cold application* describes a method of applying for a job. To describe the non-standard procedure, *cold* is used in the same way as in (55). However, the

expression in (55) sounds unnatural without a particular context. Therefore, this metaphorical meaning is understood through highly context-dependent deduction. When the metaphorical meaning is deduced, the hearer or reader uses the information stated in the explication. Moreover, the hearer or reader derives specific assumptions about low temperatures in relation to this particular context, and employs them as premises. For example, a cold application is an activity in which a person is cold. Additionally, if a person is cold, he or she is not ready for an activity. If he or she is not ready for an activity, he or she does not follow a standard procedure.⁶ Thus, the person does not follow such a step, the person applies for a job without a reference. Given this explication and these context-dependent assumptions, the hearer or reader understands that the writer applied for a job without an appropriate procedure, that is, sending a recommendation. If this meaning is interpreted as a weak implicature, the explication is also adjusted. Accordingly, the ad hoc concept COLD* is constructed to apply to the non-standard method of applying for a job.

Furthermore, when the hearer or reader must infer what activity is carried out, he or she must also understand it in a different way. In the next example, the role of the person in the noun phrase is essential, and this role is understandable in a specific context. In this case, the interpretation of the metaphorical meaning is achieved in relation to a specific context because the description of the manner of activity in (56) is unique to this context. Therefore, the metaphorical meaning of a sensory adjective is understood through highly context-dependent deduction, and involves more processing effort:

(56) On other occasions Rita found, as she did with the children, that a *sharp* authority was more effective. Today she decided that 'house clearances' lettered on a junk shop window was intolerable. [BNC]

(57) # sharp expert, #sharp authority
 (cf. His dedication to public service is well known. As a state senator his interest includes being a very *sharp expert* now in the subject of today's program.
 [<http://new.stjohns.edu/media/3/b7ef97f7bec14642a58e06d0c9ec1c30.pdf>])

In (56), the role of a spelling authority is described. The authority judges whether a spelling is correct. To describe this meaning, the word *sharp* is used. In order to use this word in this way, specific contexts are necessary because the combinations of words in (57) are unnatural. Thus, the interpretation of this metaphorical meaning

⁶ As for the availability of the assumptions related to the lack of preparation, another metaphorical use of *cold* also demonstrates this:

(i) "The era of the *cold call* seems to be on the wane. There's so much consumer skepticism about the telemarketing industry that people are turning down legitimate charities and refusing to answer genuine surveys." [COCA]

In this example, *cold* describes the lack of appointment, and thus *cold call* describes calling somebody without giving notice in advance. Because cold calls are non-standard procedure for contacting others, consumers are skeptical about cold calls even if legitimate charity organizations and genuine research institutions are making the phone calls.

involves highly context-dependent deduction. In deduction, the hearer or reader uses the information given in the explicature and the assumptions about sharpness as premises. For instance, if an expert on spelling is sharp, this person is useful. This assumption is derived because we know that sharpness makes an object, such as a blade, useful. Moreover, if an expert is useful, he or she functions very well. If he or she functions very well, this person can judge the correctness of spelling clearly. By drawing on the explicature and assumptions derived from sharpness depending on this specific context, the hearer or reader derives a weak implicature through deductive reasoning. As a result, the understanding is produced that an authority who can judge the correctness of spelling clearly is effective. When such an implicature is obtained, the reader adjusts the content of the explicature in correspondence to the implicature and the context. Therefore, the ad hoc concept SHARP* is constructed to describe the clear style of judging spelling.

In the next example, the hearer or reader must understand the manner of activity by depending entirely on the context. Here, it is not clearly stated in what activity the person is engaged. In addition, since only the pronoun *you* is used with the adjective *warm*, the words do not provide clues about what activity is being carried out:

- (58) Bill turned upon him. 'Don't recognize me yet?' Rex gaped at the cab driver in the soiled jumpsuit. The cab driver who now displayed a big black muscular right arm about four feet long, curtained by torn Lycra and ribbons of human flesh. 'Let's give you another clue. Tell me when you think you are getting *warm*.' Bill began to bulge in all directions.
[BNC]
- (59) You are {right/#warm} to note that two of your photos were used in the last magazine.
[BNC]

In (58), *warm* is used to convey that a person can almost recognize somebody correctly and almost make a correct judgment. This meaning is dependent on a specific context. To describe this, *warm* is used. When this meaning is understood, the interpretation is dependent on a specific context. In other contexts, *warm* is interpreted as the state of being with a high temperature. As (59) shows, the use of *warm* is restricted. In (59), it is stated that somebody can judge correctly, but the adjective is not used appropriately. Thus, the interpretation of (58) involves the derivation of a more specific implicature that is highly dependent on context. For these reasons, the metaphorical meaning in (57) is interpreted by highly context-dependent deduction that requires more processing effort. When the hearer or reader understands the metaphorical meaning of *warm*, he or she has access to the information stated in the explicature and utilizes the information about warmth in relation to this specific context. Accordingly, the hearer or reader has access to the following assumptions: if a person is *warm*, he or she is engaged in an activity; if a person is engaged in an activity, he or she is likely to achieve his or her goal; if a person is likely to achieve such a goal, he or she almost correctly recognizes who the person is. By using the explicature and these pieces of information as premises, the hearer or reader comes to recognize almost correctly who the person is, and moreover,

that someone is in a situation in which he or she has to make this kind of judgment purposefully. If this conclusion is interpreted as a weak implicature, the content of the explicature is also adjusted. Therefore, the ad hoc concept WARM** is interpreted as the manner of almost recognizing somebody correctly. It follows that more specific information is understood in (58) than (59), for the use of *right* in (59) does not suggest the involvement of a purposeful judgment associated with a more specific activity. Since more specific information is understood in terms of assumptions that are only accessible in this context, the metaphorical interpretation needs more processing effort.

Thus far, we have discussed how sensory adjectives are used to depict detailed manners of action. In these cases, the uses of nouns and contexts evoke various specific activities explicitly or implicitly, and how they are carried out differs in each context. Metaphorical uses of sensory adjectives describe these differences. For this reason, more specific and minute information is understood, and the understanding of the metaphorical meanings of these adjectives is achieved by using more contextual information. The metaphorical meanings of these adjectives are grasped through highly context-dependent deduction, and these meanings are not related to the core meanings of sensory adjectives that are commonly evoked in various contexts. Instead, more specific assumptions are employed for deduction, and they are accessible only in a particular context. The meanings derived through such a deduction vary depending on contexts, and their understanding requires more processing effort.⁷ Accordingly, weak implicatures are also understood through this process, and the metaphorical meanings represented in our mind are highly pragmatically determined.

The frequency of conventional metaphorical uses of sensory adjectives and their creative metaphorical uses has been discussed in 4.1. In 4.2, we examined what types of lexical meanings are interpreted in their metaphorical uses. According to our analysis, sensory adjectives convey the evaluation and intensity of perceivable stimuli as their core meanings. Thus, assumptions about the evaluation and intensity of perceivable stimuli serve as the premises for deduction. From these core meanings, various metaphorical meanings are understood. The evaluation of emotion, sensation, and other qualities are derived from the core meaning of evaluation. The notion of difficulty is derived from this core meaning. On the other hand, the intensity of emotion, sensation, and other phenomena are derived from the core meaning associated with the intensity of stimuli. Quantity is also understood in terms of this core meaning. In these cases, the core meanings contribute to the understanding of metaphorical meanings, and their understanding requires less processing effort, thus resulting in strong implicature. In 4.3, we verified that sensory adjectives have two core meanings that are represented in our mind. If sensory adjectives have a core meaning of evaluation, nouns evoking evaluable qualities can be used together.

⁷ As for other situations in which deduction is involved, see Sperber and Wilson (1986/95: 237) and see Iwahashi (2006). According to Sperber and Wilson, the metaphorical meaning in literary criticism is interpreted by deduction. According to Iwahashi (2006), the meanings of synaesthetic adjectives in the description of art works are also understood by deduction. As for the difference in meaning between these synaesthetic adjectives and other uses of sensory adjectives, see Iwahashi (2007). This study also focuses on the different situations where these adjectives are used.

Thus, the evaluation of sensation, emotions, qualities, and difficulty is possible by the combinations of nouns and adjectives. If sensory adjectives have the core meaning on intensity, nouns evoking gradable properties can be used with these adjectives. That is why the intensification of perceivable properties, emotion, and other phenomena is possible by the combinations of nouns and adjectives. The description of quantity is also possible in the same way. In 4.4, we showed how deduction leads to the understanding of creative metaphorical meanings of sensory adjectives. When these adjectives convey detailed manners of activities, creative metaphorical meanings are understood. In such cases, various nouns and contexts evoke specific activities, and their manners vary depending on contexts. Different manners of activities are understood from more varied assumptions depending on different contexts, and differences in manners are represented in our mind as the pragmatic meanings of sensory adjectives. Therefore, these meanings are considered weak implicatures, and their interpretation involves more processing effort.

5 CONCLUSION

Our analysis shows how metaphorical meanings of sensory adjectives are represented in our mind. Unlike a cognitive linguistic approach, we have assumed that various metaphorical meanings of sensory adjectives are not polysemous. Instead, we have assumed that they originally share core meanings, and that the information about these core meanings provides clues to their metaphorical interpretations. By a process of deduction from the explicature and this information, other lexical meanings of sensory adjectives are understood, as section 4 indicates. Moreover, we have not assumed that conceptual metaphors motivate their respective meanings. Therefore, simpler representations of these meanings are possible. Moreover, in our analysis, we do not need to devise conceptual metaphors that motivate creative metaphorical meanings, which means we do not need to devise an unlimited amount of conceptual metaphors whenever we encounter various creative metaphorical meanings. Accordingly, we do not have to assume that sensory adjectives also have creative metaphorical meanings from the beginning. We do not have to assume that we have various conceptual metaphors that motivate the creative meanings of sensory adjectives in advance. This view is compatible with our intuition, for sensory adjectives convey creative meanings on the spot and singular interpretations are more likely. Creative metaphorical meanings can be explained in relation to more specific information. Since creative metaphorical meanings of sensory adjectives are specified, they cannot be derived from the core meanings, and they are interpreted in relation to more specific assumptions obtained from respective contexts. For this reason, creative meanings are constructed in our mind on the spot whenever we encounter creative uses of sensory adjectives describing a specific manner of action. However, several issues remain that need to be discussed. For example, how are metaphorical meanings of words other than sensory adjectives interpreted? The metaphorical uses of concrete nouns also convey abstract concepts, but it is unclear what core meanings these words have. To explain them, we have to take into consideration both the function and

appearance of objects denoted by them. Moreover, nouns denote both countable and uncountable entities, and this characteristic may be related to the metaphorical uses of concrete nouns. Future studies must undertake elaborative analysis to deal with these aspects of concrete nouns.

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