

# The Cross-modal Representation of Metaphors

**Yu-tung Chang**

Department of English  
National Chengchi University  
ytchang@nccu.edu.tw

**Kawai Chui**

Department of English  
National Chengchi University  
kawai@nccu.edu.tw

## Abstract

This study investigates the habitual expressions of metaphors in language and gesture and the collaboration of these two modalities in conveying metaphors. This study examined 247 metaphoric expressions in Mandarin conversations. The data includes 110 (44.5%) metaphors being conveyed concurrently by speech and gesture as well as 137 (55.5%) metaphors being conveyed in gesture exclusively. Results show that Entity metaphor is the most frequent one expressed in daily conversations. The cooperation of language and gesture enables us to evaluate the various hypotheses of speech-gesture production. Results from this study tend to support the Interface Hypothesis, which suggests that gestures are generated from an interface representation between speaking and spatio-motoric thought.

## 1 Introduction

The thought that metaphor is not restricted to the realm of literature has been widely accepted since Lakoff and Johnson's study of conceptual metaphor in 1980. In Lakoff and Johnson's framework, the word *metaphor* refers to the "metaphorical concept" in thought and is presented in a form with small capital letters, for example, LOVE IS A JOURNEY (Lakoff & Johnson, 1980: 6). Metaphor can be conceived as a conceptual mapping from one domain to another domain (Lakoff, 1993). The Conceptual Metaphor Theory maintains four significant views about metaphors: metaphor is in thoughts; metaphor is based on the

correlations or the structural similarity between two domains; metaphor helps to structure our ordinary conceptual system; and metaphor can be grounded in the body or socio-cultural experiences.

According to Lakoff and Johnson (1980), language is an essential modality for us to understand the metaphors. Although we are not usually aware of our conceptual system, we can explore the system by studying language, since communication shares the same system we use in thinking (Lakoff & Johnson, 1980). Because metaphors are conceptual, language is not the exclusive realization of metaphors. In the past studies (Cienki, 2008; Cienki & Müller, 2008; Müller, 2008; Gibbs, 2008), gesture is regarded as an independent non-verbal modality where we may find the metaphorical expressions. McNeill (1992: 14) states that metaphoric gestures are "like iconic gestures in that they are pictorial, but the pictorial content presents an abstract idea rather than a concrete object or event...[and] presents an image of the invisible—an image of an abstraction". A gestural study may also help to enhance the cognitive reality of metaphors. Therefore, the present study collects metaphoric expressions from conversational data, which allow us to see the cross-modal manifestations of metaphors.

Previous research on metaphors in language (Lakoff & Johnson, 1980; Lakoff, 1993; Kövecses, 2002) and gesture (McNeill, 1992; Cienki, 2008; Müller, 2008; Chui, 2011, 2013) have offered insightful thoughts and visible evidence about conceptual metaphor, such as the common source-domain and target-domain concepts, the correspondences between two domains, the profiles of metaphors, and the embodiment of metaphors. Nevertheless, most of them only take

account of qualitative analysis. This study would like to explore the metaphoric expressions from a quantitative perspective so that we can have reliable information about the habitual expressions of metaphors as well as the synchronization and collaboration of linguistic and gestural modality.

In addition, there are three hypotheses about the production process of speech and gesture: the Free Imagery Hypothesis (Krauss et al., 1996, 2000; de Ruiter, 2000), the Lexical Semantic Hypothesis (Schegloff, 1984; Butterworth & Hadar, 1989), and the Interface Hypothesis (Kita & Özyürek, 2003). The first hypothesis maintains that gestures are independent from the content of speech and that gestures are produced before the formulation of speech. The second one suggests that gestures are generated from the semantics of lexical items. The third one sustains that the information in gesture originates from the representations based on the on-line interaction of spatial thinking and speaking. Kita and Özyürek (2003) have conducted research on the cross-linguistic expressions of motion events to look at the three hypotheses. They focused on the informational coordination between iconic gestures and their corresponding lexical affiliates. Likewise, the present study investigates the relationship between language and gesture, but we will discuss the hypotheses from the perspective of metaphorical expressions.

To discuss (i) people's habitual expressions of metaphors to conceptualize concepts in daily communication, and (ii) the collaboration of language and gesture in expressing metaphors with regard to the hypothesis of speech-gesture production, this study address the following questions. What are the metaphor types people usually convey in daily communication? What is the temporal patterning of speech and gesture in presenting metaphors? What is the relevant linguistic unit accompanying the metaphoric gesture?

## 2 Data

The linguistic data used in this study is taken from the NCCU Corpus of Spoken Chinese<sup>1</sup> (Chui & Lai 2008). Its sub-corpus of spoken Mandarin includes daily face-to-face conversations collected

<sup>1</sup> The website of the NCCU Corpus of Spoken Chinese is <http://spokenchinesecorpus.nccu.edu.tw/>

since 2006. The participants in the conversations were familiar with each other and felt free to talk about any topics in front of a visible camera. From each conversation, a stretch (about twenty to forty minutes) was selected for transcription. The linguistic data used in this study come from twenty-six conversations in the sub-corpus of spoken Mandarin, and these conversations totally take about nine hours and fifty seconds. The gestural data relevant for this study are obtained from the gesture analysis of the twenty-six transcribed conversations.

Since this study has interest in the collaboration of language and gesture in expressing metaphorical concepts, metaphors occurring alone in speech were excluded. This study focuses on the metaphors concurrently manifested in speech and gesture ('language-gesture' or 'L-G') as well as the metaphors merely realized in gesture ('gesture-only' or 'G-only', i.e., a concept is metaphorically expressed in gesture but literally conveyed in speech). There are totally 247 metaphors examined in this study. These metaphors are divided into two main groups: the L-G group and the G-only group. The L-G group contains 110 (44.5%) metaphoric expressions; the G-only group involves 137 (55.5%) metaphors.

## 3 The Habitual Expressions of Metaphors

This study sorts the metaphoric expressions by different metaphor types to discuss people's habitual expression of metaphor in daily conversation. Several metaphor types have been proposed in the past studies (Reddy, 1979; Lakoff & Johnson, 1980, 1999; McNeill, 1992; Lakoff, 1993; Talmy, 1996; Gibbs, 2005, 2006). Based on the past research, this study recognizes nine kinds of metaphors to analyze both the linguistic and gestural data: body-part metaphor, causation metaphor, conduit metaphor, container metaphor, entity metaphor, fictive-motion metaphor, orientation metaphor, personification metaphor, and complex metaphor.

### 3.1 Classification of Metaphor Types

Except for the body-part metaphor and the personification metaphor, the other kinds of metaphors are produced from the current data. The following shows the definitions of these metaphors

and the representative instances obtained from the data examined.

The *causation metaphor* treats causes as forces and causations/changes as movements (Lakoff, 1993). The concept of causation is metaphorically understood as a physical force resulting in motion or change of something. Lakoff and Johnson (1999: 184) proposed that *bring, drive, pull, push, throw* are all verbs of forced movement and they can be used to indicate abstract causation. This study finds an instance of the causation metaphor PSYCHOLOGICAL COMPELLING IS PUSHING in the G-only group as shown in Example 1. The speaker literally expresses the psychological operation with the verb *bī* ‘compel’. Simultaneously, her hands forcefully push forward (Figure 1). The speaker does not physically push her boyfriend, yet a physical force is utilized to conceptualize a psychological force to cause someone to carry out a certain action.

- (1) F1: ..nà wǒ jiù yìzhì **bī** tā  
 ‘Then I keep compelling him.’



Figure 1. PSYCHOLOGICAL COMPELLING IS PUSHING in gesture

The *conduit metaphor* conceptualizes human communication as a conduit which can physically transfer our thoughts or feelings (Reddy, 1979). This kind of metaphor involves an important mechanism in which communication is seen as the action of sending. Example 2 is an instance of the conduit metaphor PROVIDING KNOWLEDGE IS TRANSFERRING OBJECTS which conveyed in both language and gesture. The speaker uses the verb *guànsū* ‘transport’ which indicates that the process of providing knowledge is metaphorically conceived as sending discrete entities. She also

depicts the imagery of transferring something toward herself twice by her hand movement (Figure 2). This gesture does not refer to the physical action of sending but the abstract concept of offering knowledge.

- (2) F: ..jiù jiāo de yǐjīng **guànsū** wǒmen hěn duō le  
 ‘(They) teach and give us much knowledge.’



Figure 2. PROVIDING KNOWLEDGE IS TRANSFERRING OBJECTS in gesture

The *container metaphor* is the metaphor in which its target domain is conceived in terms of a container with a bounded surface and in-out orientation. In Example 3, the container metaphor A BASIN IS A CONTAINER is realized by both language and gesture.

- (3) F: ..táiběi dīshì dīwā ..péndì **zuāng shuǐ**  
 ‘Taipei is in the low-lying area..the basin is filled with water.’



Figure 3. A BASIN IS A CONTAINER in gesture

A bounded surface is imposed to a land area without a physical or delineated boundary. The utterance *péndì zuāng shuǐ* ‘basin is filled with water’ shows that a basin is seen as a container. The physical land area is provided with artificial boundary which enables the land to have the function of a container to keep liquid in its interior. The metaphor is also expressed by the downward movement of the speaker’s hands which depicts the image of pouring water into a container (Figure 3) and shows the in-out orientation about the concept of CONTAINER.

The *entity metaphor* conceptualizes a target domain in terms of discrete object or substances. In Example 4, the entity metaphor SPEECH CONTENT IS AN OBJECT is manifested in both language and gesture. The term *yìxiē* ‘some’ quantify the speech content, showing that SPEECH CONTENT is verbally conveyed as an object. In gesture, the speaker’s right open palm turns up with slightly curled fingers to represent SPEECH CONTENT as a discrete object held in her hand (Figure 4).

- (4) F1: *..jiù nǐ kěnéng jiǎng yìxiē shémo dōngxī*  
 ‘You may say something.’



Figure 4. SPEECH CONTENT IS AN OBJECT in gesture

The *fictive-motion metaphor* refers to the metaphor in which static things or abstract concepts are conceived in terms of dynamic motions. Such motion is called “fictive motion” (Talmy, 1996), since it does not have physical occurrences. Example 5 presents the fictive-motion metaphor THE SHIFT OF SPEECH CONTENT IS A MOTION in both language and gesture. The

speaker states that a teacher’s speech content always changes abruptly. The speech content of a talk does not really move; it is conceptualized in terms of fictive motion when the speaker utters the verb *tiào* ‘jump’. Simultaneously, the speaker’s one hand moves to upper left or upper right position as the other hand moves to the center position for three times (Figure 5). The gestural imagery of the movement to different spaces metaphorically represents the abstract concept SHIFT OF THE SPEECH CONTENT via MOTION.

- (5) F: *..zhèbiān jiǎng yòu tiào nàbiān*  
*..tiào nàbiān ..tiào nàbiān*  
 ‘(He) talked about this and (the speech content) shifts to there, shifts to there, and shifts to there.’



Figure 5. THE SHIFT OF SPEECH CONTENT IS A MOTION in gesture

The *orientation metaphor* is the metaphor in which a target domain concept is conceptualized in terms of spatial concepts, including spatial orientations, path, location, etc. Example 6 shows the orientation metaphor AFTERNOON IS DOWN in both language and gesture. The speaker utters *xiàwǔ* ‘afternoon’ in speech, and the spatial term *xià* ‘down’ show that up-down orientation is used to refer to the abstract concept TIME. Simultaneously, the speaker’s left fingers points down to metaphorically present the concept of AFTERNOON (Figure 6).

- (6) F1: *..xiàwǔ dōushì...déduó nà yíge mā*  
 ‘Are the classes in the afternoon taught by that German?’



Figure 6. AFTERNOON IS DOWN in gesture

The *complex metaphor* refers to the metaphor which has no direct and independent correlation to our sensory-motor experiences. However, we still need the knowledge of our bodily experience or socio-cultural practices to comprehend such metaphor. Example 7 includes the expression of the complex metaphor CHOOSING PASSENGERS IS PICKING OBJECTS in both speech and gesture.

- (7) F: ..*dāng jìchéngchē ..jiǎn sāngē kèrén*  
 ‘(We are) the taxi driver and choose three passengers’



Figure 7. CHOOSING PASSENGERS IS PICKING OBJECTS in gesture

The speaker and her friend plan to attend a conference by car and mention that they can choose three slender girls to go with them. She utters *jiǎn sāngē kèrén* ‘pick three passengers’ to describe the mental process of choosing people to go with them. At the same time, the speaker’s right index finger and thumb make a pinch and move from the rather right position to her left hand at the

center position twice (Figure 7). Such a gesture represents the idea of CHOOSING PASSENGERS as the imagery of picking objects. The physical activity of picking objects is the socio-cultural practice we perform in ordinary life, and it provides the basis for the complex metaphor in this case.

### 3.2 The Cross-Model Manifestation of Metaphors

Distribution of the metaphor types in Mandarin conversations is presented in Table 1. In the L-G group, six metaphor types are found. A large number of the expressions belong to entity metaphor (71.9%). Orientation metaphor accounts for 21.8%. Fictive-motion metaphor, container metaphor, conduit metaphor, and complex metaphor comprise less than 10% of the metaphors in language and gesture. Within the G-only group, four metaphor types are found. Entity metaphor is the overwhelming majority (82.5%), and orientation metaphor takes the second place (13.9%). Causation metaphor and complex metaphor just account for a small portion of metaphors in G-only.

Metaphor type	Group				Total	
	L-G		G-Only			
Entity metaphor	79	71.9%	113	82.5%	192	77.8%
Orientation metaphor	24	21.8%	19	13.9%	43	17.4%
Fictive-motion metaphor	3	2.7%	0	0.0%	3	1.2%
Container metaphor	2	1.8%	0	0.0%	2	0.8%
Conduit metaphor	1	0.9%	0	0.0%	1	0.4%
Causation metaphor	0	0.0%	1	0.7%	1	0.4%
Complex metaphor	1	0.9%	4	2.9%	5	2.0%
Total	110	100%	137	100%	247	100%

Table 1. Types of metaphors in Mandarin conversations

In both the L-G and the G-only groups, entity metaphor is the one that people use more commonly to conceptualize metaphoric thoughts. When we conceive concepts in terms of entity metaphor, we are able to “refer to them, categorize them, group them, and quantify them—and, by this

means, reason about them” (Lakoff & Johnson, 1980: 25). Entity metaphors serve various purposes, so they are widely used in everyday life. The Chi-square test shows that the difference between the L-G and the G-only groups is statistically significant regarding the metaphor types ( $\chi^2 = 12.601$ ,  $df = 6$ ,  $p = 0.049$ ). Entity metaphors are prone to occur in the G-only group rather than the L-G group.<sup>2</sup> No causation metaphor is realized by the metaphor in the L-G group.

Results from current data agree with one of McNeill’s (1992) claims in his study on metaphoric gestures in narratives. He asserted that entity metaphor and orientation metaphor are “instantly available” (McNeill, 1992: 163).<sup>3</sup> He also stated that Chinese lacks the gestures in which abstract ideas are represented as bounded and supported objects. Nevertheless, this study denies such a view. The gestural imagery to represent ideas as the bounded objects held in hand(s) is not rare in the current data. This kind of gestural expression is classified as the entity metaphor in this study. Within the entity metaphors, 73.4% (141 out of the total of 192 entity metaphors) of them involve the gestural representation of a bounded object supported in hand(s). The finding based on the current data then opposes McNeill’s assertion that the image of a bounded and supported object is not a major source of metaphoric expressions in Chinese culture.

#### 4 The Collaboration of Language and Gesture in Metaphoric Expressions

Different theoretical hypotheses about the production of speech and gesture—the Free Imagery Hypothesis, the Lexical Semantic Hypothesis, and the Interface Hypothesis—are proposed in previous studies. According to the Free Imagery Hypothesis, the content of speech will not affect what is encoded in gesture. All the data examined in this study, however, involve the gestures that are affiliated with corresponding lexicons. The referent of a metaphoric gesture is

not the concrete imagery but the abstract concept that is also conveyed in the accompanying speech. While the Free Imagery Hypothesis provides a view about the production process of speech and gesture, this hypothesis is not suitable for discussing the findings based on the analysis taken in this study. Therefore, the present study put emphasis on the Lexical Semantic Hypothesis and the Interface Hypothesis.

To begin with, the temporal patterning of speech and gesture in conveying metaphors is discussed to evaluate the theoretical hypotheses. The Lexical Semantic Hypothesis suggests gestures are generated from the semantics of the lexical items. If a person has difficulty to produce a word for a concept in language, the production of gesture may help he/she to search a lexical item for such a concept. Hence, it is claimed that a gesture usually precedes the lexical component it depicts. The Interface Hypothesis, on the other hand, suggests that gestures are generated from the interactions between speaking and spatial thinking. In McNeill’s (1985; 1992) framework, he proposed that a gesture lines up in time with the equivalent linguistic unit in speech. The temporal synchronization shows that speech and gesture belong to the same psychological structure and share a computational stage.

In order to examine the temporal relationship between speech and gesture in expressing metaphor, this study focuses on the stroke phase which is the relevant part to conveying information in a gesture.<sup>4</sup> There are three kinds of temporal patterning of speech and gestures: the *synchronizing gesture* (i.e., the stroke synchronizes with the associated words), the *preceding gesture* (i.e., the stroke comes before the associated words), and the *following gesture* (i.e., the stroke comes after the associated words). The distribution of each kind of gesture is shown in Table 2. In each group, synchronizing gestures comprise the majority (84.5% in the L-G group and 84.7% in the G-only group). The current data also contains several instances of preceding gestures (12.7% in

<sup>2</sup> The standardized residuals for entity metaphor are -2.0 in the L-G group and 2.0 in the G-only group.

<sup>3</sup> McNeill’s (1992: 163) original words are “[c]onduit and spatial metaphors are instantly available.” The conduit metaphor defined by McNeill is parallel to the entity metaphor in this study, since his definition did not involve the important feature of the conduit metaphor—the process of sending. His spatial metaphor is called orientation metaphor in this paper.

<sup>4</sup> According to McNeill (1992: 83), there are three phases of gesture: (i) the preparation phase in which the limb moves from its rest position to gesture space, (ii) the stroke phase which express the meaning of the gesture, and (iii) the retraction phase in which the limb returns to a rest position. Both the preparation and the retraction phases are optional, but the stroke phase is obligatory.

the L-G group and 15.3% in the G-only group). The following gestures are not common in each group of metaphoric expressions (2.7% in the L-G group and 0.0% in the G-only group). The Chi-square test shows that the differences between the L-G group and the G-only group are statistically insignificant ( $\chi^2 = 4.028, df = 2, p = 0.133$ ), and results from the two groups of metaphors are combined and discussed together.

Temporal patterning	Group				Total	
	L-G		G-Only			
Synchronizing gesture	93	84.5%	116	84.7%	209	84.6%
Preceding gesture	14	12.7%	21	15.3%	35	14.2%
Following gesture	3	2.7%	0	0.0%	3	1.2%
Total	110	100%	137	100%	247	100%

Table 2. Temporal patterning of speech and gestures

The temporal patterning that speech accompanies synchronizing gestures is quite common in conveying metaphors. Since speech plays an important role in interpreting idiosyncratic gestures, speech and gesture should be in close temporal synchrony. Among the 247 metaphoric expressions, 84.6% of them include metaphoric gestures synchronized with their linguistic referent. Only 14.2 % of them comprise metaphoric gestures produced before their associated speech. A small proportion (1.2%) of metaphoric gestures is even performed after the related speech. Results show that gestures commonly synchronize with their associated speech in expressing metaphors, and support the Interface Hypothesis more.

Next, the relevant linguistic unit accompanying the metaphoric gesture is examined. The Lexical Semantic Hypothesis stands for the view that the relevant linguistic unit to affect the content of a gesture is a single word, because gesture can help lexical search. If a person has difficulty to find a lexical item for a concept, he/she may produce a gesture to represent the idea. The production of such a gesture then helps the person utter the word for that concept in language. Thus, gestures are thought to be dominated by the computational stage in which a lexical item is selected from a semantically organized lexicon

(Butterworth & Hadar, 1989). In contrast, the Interface Hypothesis proposes the relevant linguistic unit to affect the content of a gesture can be a unit larger than a single word. This hypothesis suggests that gestures are involved in the process of arranging the spatio-motoric imagery into informational units suitable for speech production (Kita & Özyürek 2003). The informational unit suitable for speech formulation is what can be encoded in a clause in language.

The present study sorts the relating speech of the metaphoric gestures into words or phrases. A word refers to the realization of a lexeme (Katamba & Stonham, 2006), such as *xiàwǔ* ‘afternoon’ in Example 6. A phrase is a group of words, such as *tiào nàbiān* ‘jump there’ in Example 5. Table 3 shows the linguistic unit of the corresponding lexical affiliates of the metaphoric gestures examined in the present study.

Linguistic unit	Group				Total	
	L-G		G-Only			
Word	99	90.0%	105	76.7%	204	82.6%
Phrase	11	10.0%	32	23.3%	43	17.4%
Total	110	100%	137	100%	247	100%

Table 3. Linguistic units of the lexical affiliates

Results concerning the two groups of metaphors are discussed together. Within the 247 metaphoric expressions, the majority of the lexical affiliates associated with the gestures are single words (82.6%). Phrases comprise 17.4 % of the lexical affiliates accompanying the gestures. A substantial portion of the lexical affiliates are phrases. This finding is in opposition to the claim of Lexical Semantic Hypothesis but supports the Interface Hypothesis. Example 5 is an instance where the grammatical unit of the lexical affiliate is a phrase. The speaker manifests SHIFT OF THE SPEECH CONTENT in terms of fictive motion when he utters *tiào nàbiān*. Accompanying the phrase *tiào nàbiān* ‘jump there’, his gesture depicts the imagery of the motion to different places. The gesture not only depicts the manner verb *tiào* but also the trajectories to the different places which are expressed by *nàbiān* in language. In this case, the information encoded in the gesture corresponds to the unit larger than a single word. Contrasting to the prediction of the Lexical Semantic Hypothesis,

the relevant unit to influence the content of a gesture is not obligatory to be a lexical item (a word).

Furthermore, the informational coordination between language and gesture allow us to discuss the theoretical hypotheses as well. In the Lexical Semantic Hypothesis, gestures are generated from the semantics of the lexical items in the corresponding speech (Schegloff, 1984; Butterworth & Hadar, 1989). Thus, this hypothesis predicts that gestures do not convey the information which is not encoded in the accompanying speech. The Interface Hypothesis suggests that gestures are generated from the imagery representations which interact on-line with the linguistic representations (Kita & Özyürek, 2003). The Interface Hypothesis then predicts that gesture may encode the information conveyed in speech or the information which is not included in speech. This study examined two groups of metaphors: metaphors realized in both language and gesture, and metaphors realized in gesture exclusively. In the G-only group, a concept is metaphorically expressed in gesture but literally conveyed in speech. Language merely conveys the target-domain concept; on the other hand, the source-domain concept is conveyed in gesture even though this information is not included in speech. In such kind of expressions, linguistic and gestural modalities encode different semantic contents which are relevant for realizing the metaphorical thought. Concerning the current data, the gesture-only metaphors comprise over a half of all the metaphoric expressions (55.5%) and provide considerable amount of evidence for the Interface Hypothesis, which suggests language and gesture can convey different information.

## 5 Conclusion

This study examined the linguistic and gestural manifestations of conceptual metaphors in conversational discourse. Different metaphor types were classified and their frequency was counted to discuss the habitual use of metaphoric expressions. In both the L-G and G-only groups, entity metaphor is the common metaphor types to be expressed in daily communication. Understanding abstract concepts in terms of objects then allow us to project various experiences of object to the concepts. Thus, it is likely that entity metaphor is

frequently used to conceive abstract concepts. Also, this study based on cross-modal data discusses the collaboration of speech and gesture, which enables us to look at the hypotheses of speech-gesture productions. The findings from the present study support the view of the Interface Hypothesis—gestures are produced from an interface between linguistic and spatio-motoric information.

The investigation of the cross-modal expressions of metaphors can be extended in future study to explore issues which are not discussed in this study. The first issue is how metaphors are embodied in daily experiences. In the past studies, the notion of image schema have been introduced to the research on metaphors (c.f., Johnson 1987; Lakoff 1987). Image schemas, the recurring dynamic patterns of our sensory-motor experience, are seen as the primary sources of metaphors. To see the common experiential bases of metaphors, the source-domain concepts can be analyzed on the basis of different image schemas. The second issue is associated with the semantic coordination of speech and gesture. This study does not put emphasis on the details about what information is profiled in the metaphoric expressions across modalities. When language and gesture manifest the same type of metaphors, the two modalities may profile different aspects of the same concept. In the current data, we can find the instances of such an expression. A speaker utters *néngliàng nàmo dàì* 'the power is so big' to represent POWER with the entity metaphor POWER IS OBJECT. The size of an object (i.e. the strength of the power) is profiled in language. On the other hand, the speaker's left palm faces up as if he held an object. The speaker's manual representation merely focuses on the boundary of an object without referring to the size. In this case, the information encoded in speech is not equivalent to the information encoded in gesture. To explore how language and gesture cooperate to convey metaphors, we need to consider not only the metaphor types but also the profiled aspect in the two modalities in the future.

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