

Do gestures compensate for the omission of motion expression in speech?*

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The present study investigates whether and to what extent motion-event gestures compensate for the omission of linguistic expression in Chinese discourse and across different languages to understand language-specificity/language-universality and the coordination of motion information across the two modalities. The Chinese conversational and narrative data consistently show that manner fog (i.e., manner absent from speech but present in gesture) was not found. Chinese speakers also demonstrate a preference for compensation — gestures tend to compensate for the lack of path content in speaking. These results differ from those for English and Turkish which do not prefer path gestures in manner-only clauses. The cross-linguistic variation provides evidence for language specificity in gestural compensation. The language-specific coordination of information in speech and gesture suggests Chinese speakers' habitual focus of attention on PATH in multimodal communication.

Keywords: gestural compensation, motion event, gesture, linguistic-imagistic representation, cross-linguistic representation

关键词：手势补偿、移动事件、手势、语言—图像表达、跨语言表达

1. Introduction

The use of hands and arms along with speech is indispensable and prevalent in multimodal communication (McNeill, 1992, 2000; Goldin-Meadow, 1999; Kendon, 2004). “The tremendous overlap between neural structures contributing to language and hand/arm movement may help to explain the prevalence of hand gesture in language” (Glenberg, 2007: 363). During speaking, gestures bear a wide variety of functions. They can, among others, facilitate speech production (Rime & Schiaratura, 1991) and help learning (Alibali & Goldin-Meadow, 1993), lexical

retrieval (Krauss et al., 1996, 2000), problem-solving (Alibali et al., 1999), remembering more (Goldin-Meadow et al., 2001), organizing the speaker's thinking for speaking (Özyürek & Kita, 1999; Alibali, Kita, & Young, 2000; Kita, 2000), providing referential meaning (Kendon, 2004), constructing meaning in classroom activity (Singer et al., 2008), and accomplishing conversational coherence (Chui, 2009a).

When the speaker conveys a message, speech and gesture often work in collaboration to express information. Melinger and Levelt's (2004) experiment showed that speakers use gestures intentionally to convey part of their message. The messages represented by manual configurations can be of various kinds. McNeill (1992) found that in narrative discourse iconic gestures and abstract pointing mainly express information contained in narrative clauses; beat gestures indicate the textual shift between the narrative and extranarrative levels; and metaphoric gestures depict information in extranarrative clauses. McNeill also noted that "[s]peech and gesture refer to the same event and are partially overlapping, but the pictures they present are different" (ibid.: 13). In Bavelas et al. (1992:473) 'topic gestures' in conversation were found to enact information directly related to the topic of discourse; 'interactive gestures' were used to address to other participants and function "to aid the maintenance of conversation as a social system" in conversation (Bavelas et al., 1992:470). Some gestures of this kind had parallel verbal references but some did not. With respect to 'communicative dynamism', McNeill & Levy (1993) showed that more complex gestures would be produced along with more complex linguistic expressions to depict the information that functions to push the communication forward. Kendon (1995:247) distinguished between 'substantive gesturing' and 'pragmatic gesturing'. "[The former] contributes to various aspects of the content of the utterance of which it is a part, whether literally or metaphorically... [and the latter] expresses aspects of utterance structure, including the status of discourse segments with respect to one another, and the character of the 'speech act' or interactional move of the utterance." In Kendon (2004), he made a distinction between 'gestures with equivalent verbal expressions' and 'gestures with a non-matching verbal expression' in the discussion of contributions that gestures can make to referential meaning. Based on Chinese conversational data, Chui (2008) investigated different kinds of information represented by complementary gestures which provide additional meanings to enrich speech events or maintain the continuity of a topic under discussion. Finally, for children, Church & Goldin-Meadow (1986) studied the mismatches between gesture and speech in children's explanations of a concept. The 'discordant' children in their study "produced many explanations in which the information conveyed in speech did not match the information conveyed in gestures" (ibid: 43).

The previous studies mostly focused on the kinds of information that can be expressed by gestures. The question as to whether gesture may compensate for the omission of expression in speech was not a main concern. ‘Gestural compensation’ is distinguished from ‘complementarity’, a term used by McNeill (1992). His example was: At the moment the speaker utters *she chases him out again*, “speech conveys the ideas of pursuit and recurrence while gesture conveys the weapon used (an umbrella)” (ibid.: 13). The form of the speaker’s hand in a shape as though to grip something is not associated with any lexical item, and the utterance is grammatically complete without the gesture. Gestures of this type have also been referred to as ‘supplementary’, ‘mismatching’, or ‘non-redundant’ in other studies (as mentioned in Alibali et al., 2009: 291). They do not necessarily compensate for the absence of certain linguistic expression in speech; they can simply provide non-linguistic information via the gestural modality.

Gestural compensation has been mentioned in previous studies with regard to different languages, including Spanish (McNeill & Duncan, 2000), Turkish, Japanese, and English (Kita & Özyürek, 2003; Özyürek et al., 2005). However, these studies did not show the habitual imagistic representation used to compensate for speech in daily communication or about the ways in which the general linguistic-gestural representation and imagistic compensatory representation work together in the coordination of information in speech and gesture. The present study will provide empirical evidence to discuss these two issues with respect to motion events, to understand if a speaker has produced a gesture for the omission of linguistic expression and to understand how information is coordinated across the two modalities. The presence or absence in speech can be clearly determined as the components of motion-events are (near-)universal (Talmy, 1985). Cross-linguistic comparison is also available based on a series of research into the linguistic-imagistic expression of motion across languages. In this study, I first investigate whether and to what extent motion-event gestures may compensate for the omission of linguistic expression. The findings in Chinese will be compared across typologically different languages so as to understand language-specificity/ language-universality and the coordination of motion information across the two modalities.

The next section introduces the data and preliminaries for the study. Section 3 provides a general representation of motion in speech and gesture in Chinese discourse. Section 4 examines gestural compensation across different languages. Section 5 discusses the coordination of motion information in speech and gesture.

2. Data and preliminaries

The data for Chinese used in this study is from The NCCU (National Chengchi University) Corpus of Spoken Chinese. This corpus is part of an archive of language documentation which collects the spoken forms of Mandarin, Taiwanese, and Hakka in Taiwan (Chui & Lai, 2008). The sub-corpus of spoken Mandarin contains short oral narratives and daily face-to-face conversations. The cartoon narrations were produced by twenty-two NCCU undergraduate students in 2002. Each subject viewed a seven-minute cartoon episode of the 'Mickey Mouse and Friends' series. The soundtrack of the cartoon included music and only a very small amount of dialogue. In the episode, Mickey, Minnie, Pluto and a bull are holding a party at the beach, and eating and playing around. They then have a fight with an octopus, which they finally win. The subject immediately recounted the story from memory to a listener after viewing the cartoon. The subject was filmed by a video camera so that speech and manual movements could be recorded. The subjects were not informed about our particular research interests. The elicited cartoon narrations ranged from about two to ten minutes in length; the mean length of narration is four minutes thirty seconds. With regard to conversations, there are two sets of data. The first set was collected during 1994 and 1995; the participants were college students who knew each other. The second set was casual conversations among family members, friends, and colleagues which have been videotaped since 2006, and this portion of data can be accessed online.¹ All the participants were paid, and they were not told the particular focus of the research. The participants were free to find and develop topics of common interest; they were filmed for approximately an hour with a visible camera. One stretch from each talk, of about twenty to forty minutes, in which the participants were comfortable in front of the camera, was then selected for transcription. A further project related to The NCCU Corpus of Spoken Mandarin is a gestural analysis of the transcribed narratives and conversations. The data used in this study consist of ten complete narratives and seven conversational extracts (five from the first set and two from the second set) for a total of 183 minutes of talk. The same narrative data were used in the study of linguistic-imagistic representation of motion in narrative discourse (Chui 2009b); however, because of different research issues, the statistics presented here do not totally accord with those in the former study.

For the purpose of the present study, the occurrence of manner and path gestures will be considered because the lexical-syntactic packaging of MANNER and PATH constitutes a linguistic typology of motion, and the cross-linguistic studies of the linguistic-gestural representation of motion were mainly subject to these two components. The speech and the gesture data relevant for the present study were separately coded by two trained coders. The criterion to identify a motion

event was the linguistic description in the clause which consists of the main predicate and its argument(s), and/or gestural depiction of a protagonist of a movement from one place to another.² The motion-event gestures are the spontaneous movements of hands and arms depicting motion components. In the case of disagreement between the coders, data were re-analyzed and discussed. Data without consensus were not used. Agreement was reached for a total of 180 motion events encoded by a single VP in a clause including manner and/or path gestures in conversations and 124 instances in narratives.³ They form the database for the investigation of gestural compensation during speaking.

3. The representation of motion in speech and gesture

A prototypical motion event “consists of one object (the ‘Figure’) moving or located with respect to another object (the reference-object or ‘Ground’)... [and] the ‘Path’...is the course followed or site occupied by the Figure object with respect to the Ground object. ‘Motion’...refers to the presence *per se* in the event of motion or location” (Talmy, 1985: 61). Chinese is a verb-serializing language in both spoken and written discourse (Slobin, 2000; Huang and Tanangkingsing, 2005; Chen and Guo, 2009, 2010; Chui, 2009b), a type of ‘equipollently-framed’ languages where “both manner and path are expressed by ‘equipollent’ elements — that is, elements that are equal in formal linguistic terms, and appear to be equal in force or significance” (Slobin, 2004: 228). In Example (1) the last clause about Speaker F’s former classmate who had been walking by her side to attract her attention (Line 2) is concerned with a walking event. The covert subject is the FIGURE, the classmate referred to in the pronominal form *tā* in the preceding clause (Line 1); the noun phrase in the prepositional phrase — *wǒ pángbiān* ‘my side’ — is the GROUND; the main serial-verb provides information about MOTION and MANNER in the form of *zǒu* ‘walk’, and about PATH and DIRECTION encoded by *guò* ‘go across’ and *qù* ‘go’, respectively (Line 2).

- (1) 1 F: ...(0.5) hěn qíguài o... tā měi cì... xiàkè jiù kāishǐ...
very strange PRT 3SG every time after.class then start
→ 2 zǒu zǒu zǒu zǒu zǒu... a jiù cóng wǒ pángbiān
walk walk walk walk walk PRT just from 1SG side
zǒu-guò-qù
walk-go.across-go

F: 'It's very strange. Every time after class, he started to walk and walk and walk and walk and walk. He walked by my side.'

In addition to language, gesture also readily and frequently depicts various components of motion during speaking, as illustrated in Example (2). F1 is complaining about her past summer job at school when she had to keep running up and down stairs all day to make just one photocopy of one or two pieces of paper each time. The manner of the running event, encoded by the pro-form *zhèyàngzi* 'like this', the adverbial *yīzhí* 'continuously', and the manner verb *pǎo* 'run' in Line 11, is depicted by the hands: At the time the numeral *yī* 'one' is verbalized, F1 starts raising her right hand with the fingers hanging down at waist level; her left hand also rises slightly. These movements prepare for the next running motion during the production of *zhèyàngzi* 'like this': F1 first moves the right hand toward her own body with the left hand flicking slightly outward. Then, both hands alternate the directions two more times successively till the first mention of *pǎo* has been uttered. These noticeable and discernable gestural configurations, being produced in front of the body for a comparatively long duration of 1.034-seconds in total, enact the manner of running back and forth somewhere again and again, in this case to a photocopy machine.

- (2) 1 F1: ... (1.0) zhè yī fēnzhōng... jiào nǐ ná-qù yìn yí fēn
this one minute tell 2SG take-go print one CL
2 F2: ..Mm
BC
3 F1: ..wǒmen shì pǎo dào yī lóu qù
1PL COP run to first floor go
4 F2: ..Mm
BC
5 F1: ..yìn-wán le... huí-lái yǐhòu
print-finish PRF return-come after
6 F2: ... (0.5) zài ná-qù [yìn yí fēn]
again take-go print one CL
7 F1: [yòu guò méi-duōjiǔ]... zài ná-qù yìn... [[zhè yí cì...
again pass NEG-so.long again take-go print this one time
bú shì yí fēn]]
NEG COP one CL
8 F2: [[o... shénjīngbìng]]
PRT nuts
9 F1: .. yí cì gěi ná gěi nǐ yī zhāng... huò liǎng zhāng
one time give take to 2SG one CL or two CL
10 F2: ..o [biàntài]
PRT sick
→ 11 F1: [ránhòu... yī tiān nǐ jiù] zhèyàngzi... yīzhí pǎo
then one day 2SG just like.this continuously run

yīzhí pǎo
continuously run

- [a] at yī 'one', right hand rises with fingers hanging down at waist level; left hand rises slightly ((a) to (b) in Figure 1)
- [b] from zhèyàngzi to first mention of pǎo, right hand moves toward own body; left hand flicks slightly outward; then right hand out and left hand in; then right hand in and left hand out ((c) to (e) in Figure 1)
- [c] at the second mention of yīzhí, both hands return to thighs ((f) in Figure 1)

F1: 'At that moment, she told you to take the document and make a copy.'

F2: 'Mm.'

F1: 'We had to go down to the first floor.'

F2: 'Mm.'

F1: 'After printing, after we had returned,'

F2: 'She told you to take it and make another copy.'

F1: 'after a short while, I had to take it to make a copy again. But this time I didn't make a copy of the whole document,'

F2: 'Oh, she's nuts.'

F1: 'each time she gave me just one or two pieces of paper.'

F2: 'Oh...she's sick.'

F1: 'Then you had to run upstairs and downstairs continuously all day.'

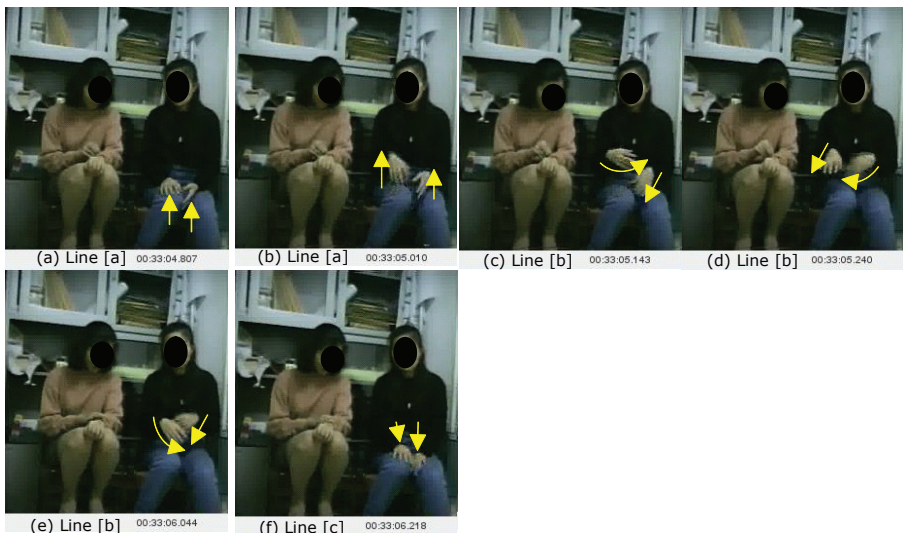


Figure 1. Gestural depiction of running continuously.

Table 1 shows the frequency distribution of manner gestures and path gestures with a total of 180 motion events with gestures in conversations and 124 in

narratives. Based on these statistics, the next section will investigate the coordination of information in speech and gesture when one of the two components is omitted in speech. Does gesture occur to depict information which was not spoken?

Table 1. Gestures for MANNER and PATH

		Conversations		Narrations	
I	Path gestures	114	63.3%	112	90.3%
II	Manner gestures	31	17.3%	5	4.0%
III	Combined manner & path gestures	35	19.4%	7	5.7%
Total:		180	100.0%	124	100.0%

4. Gestural compensation across languages

Gestural compensation has been brought up in previous studies. McNeill & Duncan (2000:150) reported that “[a]lthough Spanish speakers often omit manner from their speech, manner is abundant in their gestures and combines with other linguistic categories, typically path (verb) and/or ground (nominal phrase).” Their study, however, did not provide quantitative data which could be used to compare their findings with those of other related studies, such as those based on the storytellings of the same *Sylvester and Tweety* cartoon or of a set of video clips depicting motion events (Özyürek & Kita, 1999; Kita & Özyürek, 2003; Özyürek et al., 2005; Kita et al., 2007). In Kita & Özyürek (2003), Turkish, Japanese, and English speakers were all found to gesture the lateral direction of a swing event and a rolling event that was not verbalized in their narrations. Özyürek et al.’s (2005:236) experimental data produced by English and Turkish speakers, on the other hand, showed the general tendency that “gestural information was found to fit the semantic encoding of the event rather than compensate or convey meaning not expressed by speech.” In fact, manner gestures were still found in English and Turkish path-only clauses (see Figure 2 in Özyürek et al., 2005:233), and the percentages were even higher for the occurrence of path gestures in manner-only clauses (see Figure 3 in Özyürek et al., 2005:234). It is thus not conclusive whether motion-event gestures compensate for the absence of linguistic representation across typologically different languages.

This section investigates whether there is a compensatory relationship to coordinate information across the two modalities in Chinese discourse. Example (3) illustrates a path gesture without linguistic expression of PATH produced by F1 while she is talking about a walking event. The scenario is: F1 was in a car with

her colleague. As they were going downhill, F1 saw two of her students walking together. The clause about the students consists of the FIGURE in pronominal form *tāmen* ‘they’, the quantifier phrase *liǎng ge* ‘two’, and the simple manner verb *zǒulù* ‘walk’ (Line 2). Whether the two students were walking uphill is not mentioned in the utterance, but rather expressed in gesture. To prepare for the upward movement, F1, during the production of the verb *xiàshān* ‘go downhill’ (Line 1), raises her left hand to shoulder level while moving her right hand leftward and downward to depict the action of going downhill. Then, during the 1.044-second utterance of the next clause in Line 2 about the students walking together, F1 moves her left hand rightward and upward to the central space with noticeable and discernable configurations, signifying the students going uphill.

- (3) 1 F1: .. oh... duì a jiù kāichē xiàshān na
PRT right PRT then drive go.downhill PRT

[a] at *xiàshān*, right hand moves leftward and downward; left hand rises to shoulder level ((a) in Figure 2)

- 2 ..ránhòu tāmen liǎng ge zǒulù
then 3PL two CL walk

[b] from *ránhòu* to *zǒulù*, left hand moves rightward and upward ((b) to (c) in Figure 2)

- 3 ..suǒyǐ wǒmen yíding shì zhèyàng xiàqù
so 1PL must COP like.this go.down

[c] at *suǒyǐ*, left hand starts moving leftward and downward ((d) in Figure 2)

F1: ‘Right, we drove downhill. Then, they both walked. So we must have been going down like this.’



Figure 2. Gestural depiction of upward movement.

Of all of the 180 clauses that include gestures for MANNER and/or PATH in the conversational data (Table 1), 89 (49.4%) of them were either manner-only or path-only clauses. Out of these 89 instances, gestural compensation constituted 42.7% (38 instances). This proportion does not agree with Özyürek et al.'s (2005: 234) finding in English and Turkish that “the information expressed both in

gesture and speech showed strong parallels.” It is still likely, at least in Chinese, that motion components are represented by the manual modality exclusively. More importantly, there is a preference for compensation. First, no manner gestures occurred for all of the 25 path-only clauses without an expression of manner information either lexically or grammatically. In contrast, many more path gestures occurred in manner-only clauses, at 59.4% (38 instances): Among the 64 manner-only clauses without the lexical and grammatical expression of PATH, 23 of which were single path gestures, like the upward direction of walking in Example (3), and 15 of which were manner-path conflated gestures. All these are truly compensatory gestures without path information in speech. In the narrative data, 63.7% of all the 124 clauses (79 instances) were either manner-only or path-only clauses. Gestural compensation occurred 26.6% of the time (21 out of a total of 79). Again, in spite of the quantitative difference, narrators preferred to gesture PATH, rather than MANNER, when it was absent in speech: Path gestures occurred in all of the 21 manner-only clauses without lexical-syntactic expression of PATH. As to the 58 path-only clauses without lexical-syntactic expression of MANNER, none included manner gestures.

The consistency in the results for the Chinese conversational and narrative data show that while MANNER is often omitted linguistically but compensated manually in Spanish (McNeill & Duncan, 2000), manner fog (i.e., manner absent from speech but present in gesture, see McNeill, 2005) was not found in Chinese. Nor do the results in Chinese agree with Özyürek et al.’s (2005: 233–4) claim, based on English and Turkish narrations, that

when speakers of both languages expressed only path in their speech they were more likely to use Path gestures. Likewise when they expressed only manner in their speech, they included gestures that contained manner (both Manner and Conflated gestures), but crucially not Path gestures that would mismatch, or compensate the informational content of the utterance.

However, the occurrence of path gestures in manner-only clauses is quite likely in Chinese discourse, because of Chinese speakers’ overall preference for Path gestures.

In short, do gestures compensate for the omission of motion expression in speech? The answer is not simply *yes* or *no*. Gesture does not necessarily depict the absent content when either MANNER or PATH is not linguistically expressed. Nevertheless, when gesture does so, Chinese speakers demonstrate a preference for compensation. What gestures tend to compensate for is the lack of path content in speaking. Since the results in Chinese are different from those in Spanish, English, and Turkish, the compensatory relationship to coordinate information across the two modalities is thus language-specific.

5. The coordination of motion information across the two modalities

The compensation pattern in Chinese, indeed, aligns with the general pattern of language and gesture use to express motion. First, among all the 180 motion-event gestures in the conversational data, 83.3% (150 instances) occur in clauses with a manner verb such as *pǎo* ‘run’ in Example (2) and *zǒulù* ‘walk’ in Example (3). Despite the prevalence of the manner information in speech, manner gestures just take up 36.7% of the total (Types II and III in Table 1 total 66 instances): Thirty-one instances enact MANNER alone; another thirty-five cases depict PATH simultaneously. In the narrative data, 90.3% (112 instances) of all of the 124 motion-event gestures that accompany motion events were found to occur in clauses with a manner verb. The occurrence of manner gestures is even rarer in narrations: Twelve manner gestures (9.7%) were produced, seven of which convey the path information at the same time.

In contrast, it is much more common to convey path information via the imagistic modality. First, the linguistic expression of path information also prevails: In the conversational data, 76 instances were lexical forms conveying path information, such as path verbs like *zǒu* ‘leave’ and manner-path-deictic verbs like *zǒu-guò-qù* ‘walk-go across-go’ in Example (1). In addition, 67 instances were prepositional phrases indicating location, source, and goal before or after the verbs not including the path component.⁴ In total, the conversational data consist of 143 motion events out of the total 180 (79.4%) expressing PATH either lexically or syntactically. In the narrative data, path information was mentioned 83.1% of the time (103 out of all of the 124 motion verbs). In addition to the pervasive expression of PATH in speech, path gestures were also frequently produced across the two spoken genres: In conversations, out of a total of 180 gestures, 149 instances enacted PATH (Types I and III in Table 1), yielding 82.7%. The high occurrence is also found in narrations: 119 path gestures were produced out of all 124 motion events, at 96%.

Linguistic patterns “arise in the course of language in use” (Slobin, 2004: 253), as do gestural patterns. The high frequency of a certain kind of occurrence exhibits the preferred linguistic-imagistic representation in communicating MANNER and PATH. The statistics show that both components are commonly brought up in the utterance, but that speakers prefer to gesture PATH, be they engaging in a conversational talk or telling a story. According to the cross-linguistic findings based on cartoon narrations (Özyürek & Kita, 1999; Kita & Özyürek, 2003; Özyürek et al., 2005; Kita et al., 2007), English speakers mentioned MANNER and PATH within one clause, and the two components were often represented together in one gesture. In Turkish and Japanese, they were expressed separately in two clauses, and two separate gestures — one for MANNER and one for PATH — were

produced accordingly. Chinese, again, exhibits a language-specific representation of motion.

The congruent linguistic-imagistic patterns in the expression of motion, no matter whether a motion component is present or absent in speech, provide converging evidence for speakers' recurrent practice in coordinating and expressing motion information: In speech, speakers often convey manner and path information; in gesture, speakers prefer depicting PATH with conspicuous, noticeable gestural enactment. The language-specific coordination of information suggests the habitual focus of attention of Chinese speakers on a certain aspect of motion. Although it is beyond the scope of the present study to discuss embodied cognition (Wilson, 2002; Shapiro, 2007; Barsalou, 2008; Glenberg, 2010), the recurrent focus of attention on PATH during online speaking in Chinese discourse can reveal the salience of PATH in the conceptualization of motion embodied in people's perceptual and bodily experiences in daily social interaction. Then, why is PATH more salient to the Chinese but not to speakers of other languages? Why is there a lack of compensation for MANNER in gesture when no manner information is encoded in speech in Chinese, and why do speakers of other languages show different patterns? These issues are worth investigation in future studies.

Finally, since the findings in other languages were based on narrative data, substantial work still needs to be done in conversational discourse across different languages to verify the nature of language specificity in gestural compensation and the variation in cross-linguistic coordination of information in speech and gesture.

Notes

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1. The data from The NCCU Corpus of Spoken Mandarin can be accessed on-line at <http://140.119.172.200>. [accessed December 2010]
2. This study did not distinguish 'self-movement' and 'caused movement' because of their similar lexical-syntactic encodings in Chinese.
3. A few instances include consecutive verb phrases characterizing a single motion. They were not considered due to the rarity of their occurrence.
4. Prepositional phrases indicating location, source, and goal also commonly co-occur with verbs including the path information. They were not separated from the verbs for tabulation.

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Appendix: Gesture and speech transcription conventions, and abbreviations

Transcription of speech

[]	speech overlap
...(N)	long pause
...	medium pause
..	short pause

Transcription of gesture

In examples, the description of the manual movement is given under the line of accompanying speech.

The time code shown at the bottom of each panel in the figures is expressed in *hours: minutes: seconds. milliseconds*.

Abbreviations of linguistic terms

1PL	first person plural
1SG	first person singular
2SG	second person singular
3PL	third person plural
3SG	third person singular
BC	backchannel
CL	classifier
COP	copula verb
NEG	negative morpheme
PRF	perfective aspect
PRT	discourse particle

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