

Linguistic and imagistic representations of motion events

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Abstract

This study investigates the linguistic and imagistic representations of motion events in Chinese discourse. First, manner is most usually conveyed and in the form of single manner verbs, but information of this type is rarely gestured. Second, speakers also mention path very often by means of manner-path-deictic verbs and prepositional phrases indicating location, source, and goal. Speakers more commonly gesture path in contrast to manner. Similar results can be found in English, showing that the way people gesture motion events does not have to do with linguistic typology. However, in a single gesture, while manner and path can be conveyed simultaneously in Chinese and English, manner-ground gestures are found in Spanish. Such difference suggests various conceptualizations of motion event across different languages. Finally, gesturing the reference object and the moving object, being linguistically represented by nominal phrases, has to do with new information.

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1. Introduction

A prototypical motion event “consists of one object (the ‘Figure’) moving or located with respect to another object (the reference-object or ‘Ground’). . . 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. . . . In addition to these internal components a Motion event can have a ‘Manner’ or a ‘Cause’” (Talmy, 1985:61). Consider the event in Example (1). The characters are running to an eating place. The figure refers to a threesome, namely a bull, Mickey, and Pluto; the path is indicated by *dao* ‘to’, and the ground is *chifan de defang* ‘the eating place’. The motion and the manner are realized simultaneously by the verb *pao* ‘to run’.

- (1) W: ..lingwai san zhi... gong de niu haiyou... miqi haiyou bulutuo... jiu...
another three CL male ASSC cow and Mickey and Pluto then
pao dao... yecan... de... **chifan de difang**
run to picnic ASSC eat ASSC place

W: ‘As to another three, i.e., the bull and Mickey and Pluto, then ran to. . .picnic. . .the eating place.’

“The language of motion events is a system used to specify the motion of objects through space with respect to other objects” (Huang and Tanangkingsing, 2005:336). Then, how do different languages express motion events

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linguistically? Talmy (1985) regards Chinese and English as satellite-framed languages, since they have a class of verbs that incorporate the motion and manner information, whereas path is an adjunct; Spanish is a verb-framed language, in that motion and path are lexicalized as a single verb, while manner is an adjunct. Based on these different lexicalization patterns and on the further distinction between English being predicate-prominent and Chinese being topic-prominent, McNeill and Duncan (2000) investigated motion-event gestures across English, Spanish, and Chinese. They then made a claim about the relationship among language typology, gesture, and thought: The gestural differences among the three languages are the results of different forms of thinking being realized in their typologically distinct linguistic structures. This study will show that McNeill and Duncan's claim is problematic. It then investigates the linguistic and imagistic representations of motion events in Chinese, and discusses how the results can shed light on cross-linguistic conceptualizations of motion events.

The next section discusses the motion-event gestures in McNeill and Duncan's (2000) study. Section 3 examines the linguistic and imagistic representations of various motion-event components in Chinese discourse. The last section provides a discussion.

2. McNeill and Duncan's (2000) cross-linguistic study

McNeill and Duncan (2000) in their cross-linguistic study of motion-event gestures find typological differences in both linguistic and imagistic representations of motion events in English, Spanish, and Mandarin, suggesting various forms of thinking-for-speaking. According to the study, English speakers gesture manner when it is a focus. The stroke phase also synchronizes with the manner verb. To downplay manner, the gesture does not convey manner information, but synchronizes with the path or ground words. Spanish speakers, on the other hand, use path verbs. But they often convey manner in their gestures along with path and/or ground. Finally, Mandarin speakers tend to gesture motion-event components at the utterance-initial position, prior to the production of affiliated words, to form a topic frame.

There are two major problems in McNeill and Duncan's study. The first has to do with the synchronization of speech and gesture. According to McNeill and Duncan, whether the obligatory stroke phase of a gesture synchronizes with the manner information in English and Spanish rests upon the notion of focus.

In English, gesture and verb jointly highlight manner when it is part of the speaker's focus. When manner is not in focus, gesture does not encode it and need not synchronize with a manner verb, even if one is present. . . Manner appears in Spanish speech presumably only when it is a focused component, and it is often omitted even when it is potentially significant. (McNeill and Duncan, 2000:151–152)

They provide the following two examples that describe Sylvester being rolled down a drainspout by a ball. In the first utterance (a), a wiggling-hand gesture is produced to synchronize with the verb *rolls* in the utterance, since the focus is on the rolling manner of the ball. In the second utterance (b) when the focus is not on manner, the speaker's hand plunges straight down to convey the path information only. The gesture lacks manner and does not synchronize with *rolls*, but with the path *down* and the ground *drainspout* instead.

- (a) [*but it rolls*] *him out*
- (b) [*and he rolls. . . down the drainspout*]

The problem of the analysis lies in the lack of an independent way of establishing what the "focus" is. In their study, the decision as to what is and what is not a "focus" rests upon the identification of the motion-event component being expressed in gesture, and whether the gestural stroke synchronizes with speech. The whole argument thus becomes circular.

The other problem in McNeill and Duncan's study is concerned with the relation between language and gesture. Given that Chinese is a topic-prominent language, McNeill and Duncan (2000:152) state that the timing pattern of Chinese gestures resembles the topicalizing structure in Chinese, in that "the gesture shifts forward in the surface speech stream, in the direction of the utterance-initial position characteristic of topic statements in Chinese speech." This claim is not borne out, since as many as 51% of motion-event gestures (78 out of a total 153) in our Chinese data synchronize with, rather than precede, their co-expressed words. See Example (2). The speaker is describing the way the bull attempts to jump into the sea. The speaker's right hand, which is high above the head, at the time the associated verb *tiao* 'jump' is produced, descends onto the thigh to signify the motion of jumping (see Fig. 1).



Fig. 1. Gestural depiction of jumping: the gestural stroke synchronizes with the verb *tiao* 'jump'.

- (2) A: ..mini gen.. miqi zai jianghua.. er ta pangbian de na zhi
 Minnie with Mickey PROG talk and 3SG side ASSC that CL
 ..gongniu jiu jiao tamen kan guolai
 bull then request 3PL look come here
 B: ..mhm
 BC
 A: ..ranhou jiu yi fu hen shenyongde yangzi zheyang... zhangkai.. haoxiang
 then then one CL very brave look like this stretch out look like
 tiaosanzhuang nayang **tiao** xiaqu
 like parachuting like that jump down

tiao 'to jump': right hand above the head (pic.1 in Fig. 1) descends onto thigh (pics.2–3 in Fig. 1)

- A: 'Minnie was talking with Mickey. The bull beside her then requested them to look at him.'
 B: 'Mhm.'
 Z: 'Then it, looking very brave, stretched out and jumped down, as if he were parachuting.'

Even when the gestural strokes come before the associated words, they do not necessarily function as a 'sentence-topic'. Chui (2005) finds that strokes coming before the associated words can function to signal that the upcoming new information is noteworthy and deserves attention. In short, the relationship among language typology, gesture, and thought proposed by McNeill and Duncan (2000) cannot be maintained.

3. Gesturing motion events in Chinese discourse

How do Chinese speakers actually gesture motion events in discourse? This question will be addressed in this section with reference to both linguistic and imagistic representations of various motion-event components.

The database consists of 10 short oral narratives produced by undergraduate students of National Chengchi University in 2002. Each subject viewed a 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. Then, they have a fight with an octopus, which they finally win. After viewing the cartoon, the subject immediately recounted the story from memory to a listener. The subject was filmed by a video camera so that speech and manual movements would be recorded. The subjects were not informed about our particular research interests. The elicited cartoon narrations ranged from 3 to 10 min in length. All of the verbs characterizing motion events in the 10 narratives were tabulated, totaling 245 instances. The gestures examined in the present study are the idiosyncratic spontaneous movements of hands and arms which accompany a speech event with context-dependent meaning and use. They take up 62.4% (153 instances) of all the data.

Talmy (1985) has categorized Mandarin and English as S-languages. Both languages have a large lexicon of motion-manner verbs. Examples from Chinese are *zoulu* ‘walk’, *pao* ‘run’, *pa* ‘crawl’, and *fei* ‘fly’. Prepositional phrases also delineate paths in relation to ground elements, as in the following examples (c) and (d):

- (c) English: He ran out [of the house]_{pp}.
- (d) Chinese: ta pao [dao chifan de difang]_{pp}
 3SG run to eat ASSC place
 ‘He ran to the eating place.’

Slobin (2000) rather regards Chinese as a serial-verb language. Each verb in a series is morphologically unmarked and monosyllabic, such as *fei-chu* ‘fly exit’. “Manner is not syntactically subordinated to path. . . [b]ecause the path verbs can occur alone” (Slobin, 2000:228). Huang and Tanangkingsing (2005) show that Mandarin is a strongly verb-serializing language, based on a total of 153 Mandarin motion clauses, and 48.4% use the type M(anter)#P(ath)#D(irection) for describing motion event. The present study also considers Chinese as a serial-verb language because its idiosyncratic morphological patterning of motion-event components suggests a typological difference between Mandarin and other languages.

Table 1 shows the frequency distribution of all the 153 gestures across the various semantic components of a motion event. These various types of motion-event gestures will be discussed accordingly in the following sub-sections.

3.1. Manner

First, what are the linguistic representations of manner of motion in Chinese? “A language provides its speakers with a range of ways of describing motion events – combinations of lexical items and grammatical morphemes in various construction types” (Slobin, 2004:220). The various lexical forms to convey manner are: manner verbs like *you* ‘swim’; manner-path verbs like *pao-hui* ‘run-back’; manner-deictic verbs like *pao-lai* ‘run-come’; manner-path-deictic verbs like *reng-guo-qu* ‘throw-across-go’. At the grammatical level, adverbial and phrasal expressions outside the verbs also “add information about such dimensions as suddenness, rate, force dynamics, inner state, terrain, and so forth – that is, information about factors that suggest manner of movement” (Slobin, 2004:232) In our data, 31 instances are of this type, such as the adverbial phrase *tai yuan* ‘too far away’ modifying the throwing motion in Example (3).

- (3) F1: ..ranhou yinwei... na ge miao **diu tai yuan**.. diu dao
 then because that CL anchor throw too far away throw to
 F2: (0) mhm
 BC
 F1: ..hai limian
 sea inside
 F1: ‘Then because the anchor was thrown too far away, it was thrown to,’
 F2: ‘Mhm.’
 F1: ‘into the sea.’

Of all the 245 motion events in the database, 200 (81.6%) use manner verbs of various types. Similar results can be found in Huang and Tanangkingsing (2005) with a distinct preference for manner verbs, at 83.4%. Table 2, which contains the 31 instances conveying manner without using manner verbs, demonstrates that single manner verbs (147 instances) are the habitual linguistic expressions of manner in Chinese discourse, at 63.6%.

Table 1
 Various types of gestures.

| Manner gestures | Path gestures | Ground gestures | Figure gestures | Manner and path gestures | Total |
|-----------------|---------------|-----------------|-----------------|--------------------------|--------|
| 5 | 112 | 14 | 15 | 7 | 153 |
| 3.2% | 73.2% | 9.2% | 9.8% | 4.6% | 100.0% |

Table 2
Linguistic representations of manner.

| Manner verb | Manner-path verb | Manner-deictic verb | Manner-path-deictic verb | Manner outside the verb | Total |
|-------------|------------------|---------------------|--------------------------|-------------------------|-------|
| 147 | 7 | 4 | 42 | 31 | 231 |

Then, what are the imagistic representations of manner of motion? In Example (4), when the speaker verbalizes the nominal *yangshi* ‘backstroke’, about Mickey Mouse swimming backstroke in the sea, both of her hands, facing down, paddle outward two times to signify swimming (see Fig. 2).

(4) F: ... houlai... (1.5) houlai <L2 mickey L2> hoaxiang shi **you**... **yangshi** ba
later later Mickey seem COP swim backstroke PRT

you yangshi ‘swim backstroke’: both hands are on knees (pic.1 in Fig. 2), then right hand and two fingers of left hand paddle outward one time (pic.2 in Fig. 2), then right hand paddles outward one more time (pic.3 in Fig. 2) and comes back (pic.4 in Fig. 2).

F: ‘Later, later, it seems that Mickey swam backstroke.’

90.2% (138 instances) of all the 153 motion-event gestures that accompany motion events were found to occur in clauses with a manner verb. Nevertheless, just twelve manner gestures (8.7%) were produced (seven instances depict path simultaneously), despite the prevalence of manner. Moreover, McNeill and Levy (1993:365) suggest that “gestures tend to occur at points of topic shift, such as new narrative episodes or new conversational themes. . . highly presupposed linguistic elements would either lack gestures entirely, or would be accompanied by gestures that are specialized for their cohesive function or form.” Chui (2005) also demonstrates that Chinese speakers tend not to gesture for old information. A question thus arises: Is the scarcity of manner gestures related to information state? ‘New information’ is what has not been brought up in the previous context at the moment of speaking; ‘given information’ is what has already been mentioned at the moment of utterance. Table 3 presents the frequency distribution of given and new information across the various types of manner verbs. The overall proportion of given to new information is about equal, suggesting that speakers are not likely to produce manner gestures even though the information is new.

3.2. Path

Table 1 shows that it is very common (73.2%) to convey path information via the imagistic modality. This section investigates the linguistic and imagistic expressions of path. First, just like manner, there are various lexical forms to convey path: path verbs like *hui* ‘return’; deictic verbs like *que* ‘go’; path-deictic verbs like *chu-lai* ‘out-come’;

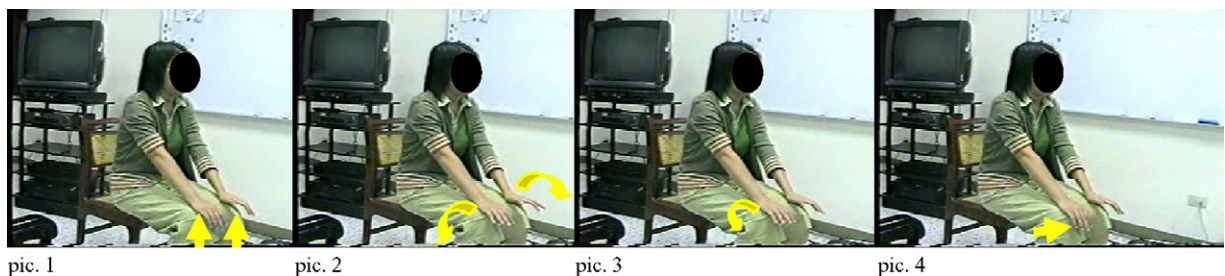


Fig. 2. Manner gesture: depiction of the backstroke style of swimming.

Table 3
Information state and manner.

| | Manner verb | Manner-path verb | Manner-deictic verb | Manner-path-deictic verb | Total | |
|-------|-------------|------------------|---------------------|--------------------------|-------|--------|
| Given | 57 | 3 | 2 | 12 | 74 | 53.6% |
| New | 45 | 2 | 1 | 16 | 64 | 46.4% |
| | 102 | 5 | 3 | 28 | 138 | 100.0% |

Table 4
Linguistic representations of path.

| Path verb | Deictic verb | Path-deictic verb | Manner-path verb | Manner-deictic verb | |
|--------------------------|-----------------------|-------------------|------------------|---------------------|--|
| 2 | 10 | 12 | 7 | 7 | |
| Manner-path-deictic verb | Deictic + manner verb | PP | PP + deictic | Total | |
| 43 | 5 | 67 | 8 | 161 | |

manner-path verbs like *pao-hui* ‘run-back’; manner-deictic verbs like *pao-lai* ‘run-come’, and manner-path-deictic verbs like *reng-guo-qu* ‘throw-across-go’. A deictic word can also come before a motion-manner verb, just like *zhui* ‘chase after’ in Example (5), or after a prepositional phrase, such as *dao hai limian* ‘into the sea’ in Example (6).

- (5) M: ..bulutuo.. jiu yibian... ta ye yibian
Pluto then on the one hand 3SG also on the one hand
qu zhui a
go chase after PRT
- M: ‘Pluto, then, on the one hand, he also went to chase after the sausages.’
- (6) M: ..na zuihou ta jiu.. diu yi chuan xiangchang deshihou
then at last 3SG then throw one string sausage when
..yinwei diu tai yuan.. diao **dao hai limian qu**
because throw too far away fall to sea inside go
- M: ‘Then, at last, when it, then, threw a string of sausages, because it was thrown too far away, it fell into the sea.’

There are 161 motion events in the database that consist of the path component. Table 4 indicates the various linguistic forms conveying path information. Manner-path-deictic verbs (26.7%) and prepositional phrases indicating location, source, and goal (46.6%) are the most frequently used linguistic patterns when speakers talk about path.

Next, how is the path of a motion gesturally expressed? Example (7) is about Mickey and Minnie running to the beach. The speaker’s right hand, dangling at waist level on the right side, starts moving leftward at the time the first *pao* ‘run’ is uttered to depict a route. When she produces the fifth *pao*, her right hand in the central periphery moves downward to signify the endpoint of the path (see Fig. 3).

- (7) F: (0) ranhou tamen jiu..(9) **pao pao pao pao pao**.. pao dao yi ge haitan
then 3PL then run run run run run run to one CL beach
- pao* ‘run’: right hand on the right (pic.1 in Fig. 3) raises to waist level (pic.2 in Fig. 3), and moves to central periphery (pic.3 in Fig. 3).
- F: ‘Then, they ran and ran and ran and ran and ran. They ran to a beach.’

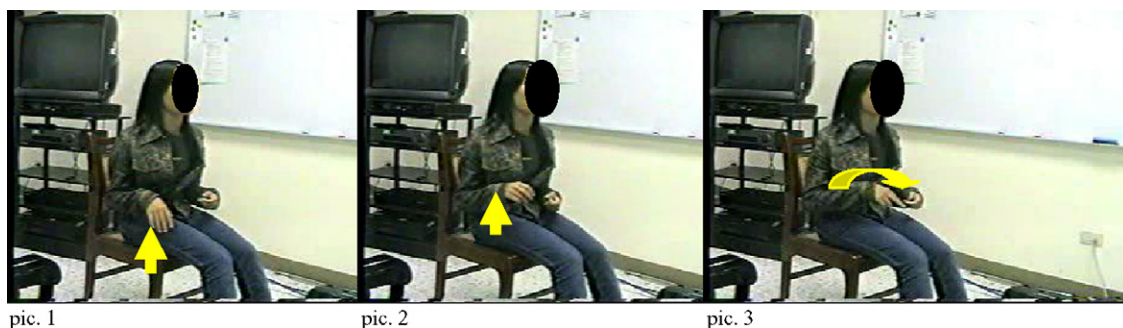


Fig. 3. Path gesture: depiction of the path of running.

Table 5
Information state and path.

| | Path verb | Deictic verb | Path-deictic verb | Manner-path verb | Manner-deictic verb | | |
|-------|--------------------------|-----------------------|-------------------|------------------|---------------------|--------|--|
| Given | 0 | 0 | 0 | 3 | 2 | | |
| New | 1 | 3 | 8 | 2 | 0 | | |
| | 1 | 3 | 8 | 5 | 2 | | |
| | Manner-path-deictic verb | Deictic + manner verb | PP | PP + deictic | Total | | |
| Given | 10 | 1 | 24 | 4 | 44 | 58.4% | |
| New | 14 | 1 | 15 | 3 | 47 | 51.6% | |
| | 24 | 2 | 39 | 7 | 91 | 100.0% | |

Ninety-one gestures (56.5%) were produced out of a total 161 motion events conveying path information, far outnumbering manner gestures by eighteen to one. Again, are such high occurrences related to information state? Table 5, similar to the result in Table 3, illustrates that ‘given’ and ‘new’ are almost equally distributed among all the 91 path gestures. Thus, information state does not play a role in the imagistic representations of either path or manner of motion.

Moreover, 21 path gestures were found to accompany pure manner verbs without path information in speech. The frequency distribution of givens and news are about the same: 10 givens (47.6%) and 11 news (52.4%). Finally, concerning the synchronization of path gestures and associated speech, 17 instances were produced prior to the verbs; one was produced after the path constituents. Forty instances (35.7%) synchronize with the path constituents. What is intriguing is that 48.2% (54 instances) of all the 112 path strokes synchronize with the manner verbs rather than with the path words. This will be brought up again in section 4.

3.3. Ground and figure

The reference object and the moving object of a motion event are linguistically represented by nominal expressions, such as *ye ge zhuzi* ‘a pillar’ in Example (8) and the third person pronominal *ta* in Example (9), respectively. They can also be expressed manually. The speaker depicts the round shape of the pillar to gesture the ground component of the colliding event in Example (8) with a circle made by the thumb and index finger of his left hand at the moment of verbalizing the motion-manner verb *zhuangdao* ‘collide’ (see Fig. 4).

- (8) C: ... na zhi niu... jiu yong na ge... x zuo de jiushengquan
 that CL bull then use that CL REPAIR make ASSC life belt
 jiu zai hai... (2.) hai shang piao a
 then on sea sea on float PRT
 B: ..mm
 BC

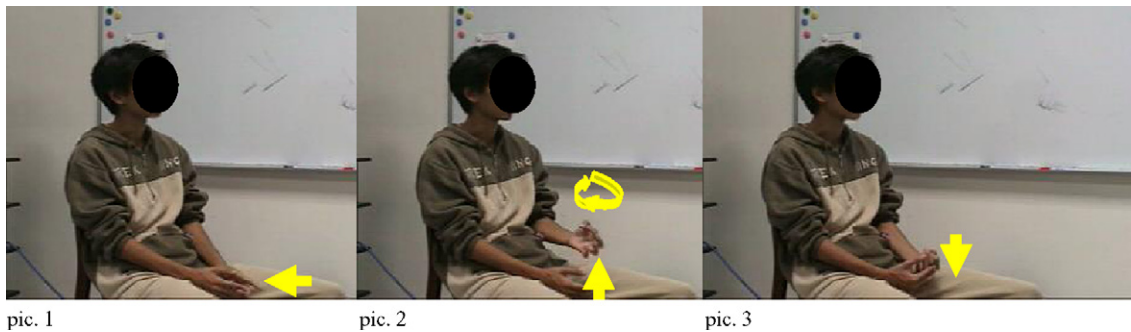


Fig. 4. Ground gesture: depiction of the pillar.

- C: ..ranhou piao yi piao.. jiu.. **zhuangdao yi ge zhuzi**
 then float one float then collide:RESULT one CL pillar

zhuzi ‘pillar’: thumb and index finger of left hand raises from thigh (pic.1 in Fig. 4) and form a circle (pic.2 in Fig. 4), and then return to thigh (pic.3 in Fig. 4).

- C: ‘That bull then used a life belt and on the sea.. floated on the sea.’
 B: ‘Mm.’
 C: ‘Then, it floated for a while, then it collided with a pillar.’

Example (9) describes a horse using watermelon seeds as weapon to fight against an octopus. The speaker gestures the figure component, i.e., the watermelons seeds, bouncing off a tea-kettle at the side. The thumb and the index finger of the speaker’s left hand form a circle when the pronominal subject *ta*, which refers to watermelon seeds as a group, is uttered to represent the shape of the watermelons seeds (see Fig. 5).

- (9) F: (0) dui ta chi xigua... ranhou jiushi tu zi
 right 3SG eat watermelon then that is spit out seed

B: ..heh
 BC

- F: ... ranhou jiu.. yizhi tu.. ranhou..you.. **ta** jiu.. you
 then then continuously spit out then PRF 3PL then PRF
 tan dao.. pangbian de nage.. shenme shuihu a.. shenme de
 bound to side ASSC that whatever water bottle PRT whatever PRT

ta ‘they’: thumb and index finger of her left hand form a circle (pic.1 in Fig. 5).

tan ‘bound’: the circle gesture raises to waist level (pic.2 in Fig. 5) and sweeps down (pic.3 in Fig. 5).

- F: ‘Right, it (i.e., the horse) was eating watermelon. Then, that is, it spit out the seeds.’
 B: ‘Heh.’
 F: ‘Then, it kept spitting out seeds. Then, they (i.e., the seeds) bounded against the side of a water bottle, or whatever.’

Reference objects and moving objects are not frequently brought up, unlike manner and path, in that just 53 motion events (53 out of 245, 21.6%) include ground information and 67 motion events (67 out of 245, 27.3%) have a figure component. Nevertheless, the number of their respective gestural occurrences is much higher than that of manner gestures. The speakers produced 14 ground gestures (out of 53, 26.4%) and 15 figure gestures (out of 67, 22.4%) in the corpus. Table 6 recapitulates the proportions of the total number of motion events including a particular motion-event component to the total number of gestures for that particular component. Gestures for reference objects and moving objects outnumber those for manner by about five times.

Finally, different from manner and path, the occurrences of ground and figure gestures are more likely to be constrained by information state: 71.4% (10 instances) of the reference objects and 73.3% (11 instances) of the moving objects carry new information.



Fig. 5. Figure gesture: depiction of watermelon seeds.

Table 6
Motion-event components and their respective occurrences of gesture.

| Motion events including manner | Manner gestures | Proportion |
|--------------------------------|-----------------|------------|
| 245 | 12 | 4.9% |
| Motion events including path | Path gestures | Proportion |
| 161 | 119 | 73.9% |
| Motion events including ground | Ground gestures | Proportion |
| 53 | 14 | 26.4% |
| Motion events including figure | Figure gestures | Proportion |
| 67 | 15 | 22.4% |

4. Discussion and conclusion

Based on the findings in the previous section, this section will discuss the relationship among language, gesture, and motion-event conceptualization. It was first addressed by McNeill and Duncan (2000), who claim that English, Spanish, and Chinese are typologically different languages and that the speakers also gesture motion events in different ways because they have their own respective conceptualization (see the detailed discussion in section 2). Their claim is subject to Slobin's (1987) "thinking-for-speaking" hypothesis. This hypothesis refers to how speakers organize their thinking to meet the demands of linguistic encoding on-line, during acts of speaking. As speakers are thinking "in terms of a *combination* of imagery and linguistic categorical content" (McNeill and Duncan, 2000:142), their conceptualization of an event can thus be realized simultaneously in speech and gesture.

This study has investigated how Chinese speakers produce manual movements while talking about motion events. Our findings do not bear out McNeill and Duncan's (2000) analysis of "thinking-for-speaking" for Mandarin, since the timing pattern of Chinese gestures by no means resembles the topic-comment patterning of the language. Thus, their claim about the relationship among language typology, gesture, and thought cannot be maintained. Nevertheless, we agree that conceptualization of an event includes both imagery and linguistic content, which can be realized simultaneously in speech and gesture, respectively. Thus, the linguistic and imagistic representations of the motion-event components shed light on how motion events are conceptualized by Chinese speakers. The conceptualization is also embodied in daily social interaction. The findings of this study thus represent the common experience of Chinese speakers talking about motion events. First, manner is most usually conveyed and in the form of single manner verbs, but information of this type is rarely gestured. Second, speakers also mention path very often by means of manner-path-deictic verbs and prepositional phrases indicating location, source, and goal. Speakers more commonly gesture path in contrast to manner. Similar results can be found in English: "Adults, when they describe such motion events, typically produce gestures showing only path. . . or gestures showing in a single gesture both manner and path. . . Manner without path, however, rarely occurs" (McNeill, 2005:185). Since Mandarin and English are typologically different languages, their similarities in gestures for motion events evidence that the imagistic representations of motion events do not have to do with linguistic typology. Gestures enable the speakers to go beyond the structural restriction of language and convey their own thinking about a motion event in verbal communication.

In a single gesture, while manner and path can be conveyed simultaneously in Chinese and English,¹ manner-ground gestures are found in Spanish (McNeill and Duncan, 2000). Such difference seems to suggest various conceptualizations of motion events across different languages. In Chinese, to incorporate more than one motion-event component in a single gesture is rare. Moreover, the high occurrences of path gestures, despite the fact that speakers often mention manner and path in speech, evidence that 'path' is the most salient component in motion-event conceptualization.

¹ Since frequency distribution is not provided in McNeill and Duncan's (2000) study, whether there is any quantitative difference between Mandarin and English concerning the single gestures conveying both manner and path simultaneously awaits future research.

Finally, gesturing the reference object and the moving object, being linguistically represented by nominal phrases, has to do with information state, in that ground and figure gestures usually convey new information. Conceptualization thus has to consider the flow of information in discourse.

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Appendix A. Gesture and speech transcription conventions

Transcription of speech

| | |
|---------|------------------------|
| [] | speech overlap |
| ... (N) | long pause |
| ... | medium pause |
| .. | short pause |
| (0) | latching |
| @ | laughter |
| TSK | a click of the tongue |
| <L2 L2> | code-switch to English |

Transcription of gesture

For the representation of gesture in examples, the underlined part of the utterance is the stroke phase (and the hold phase, if there is any); the lexical affiliate(s), if there is any, is/are in boldface. The description of gesture is given under the line of associated speech. In each gestural description, the word(s) before the colon represent(s) the referent a gesture refers to; the description of the manual movement comes after the colon.

Abbreviations of linguistic terms

| | |
|--------|------------------------|
| 1PL | first person plural |
| 1SG | first person singular |
| 2PL | second person plural |
| 2SG | second person singular |
| 3PL | third person plural |
| 3SG | third person singular |
| ASSC | associative morpheme |
| BA | the morpheme BA |
| BC | backchannel |
| CL | classifier |
| COP | copula verb |
| NEG | negative morpheme |
| PF | pause filler |
| PRF | perfective aspect |
| PROG | progressive aspect |
| PRT | discourse particle |
| QST | question particle |
| REPAIR | repair phoneme(s) |
| SELF | reflexive morpheme |
| RESULT | resultative morpheme |

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