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Producing Fictive Motion Sentences in a Picture-Elicitation Task: A Pilot Study

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ABSTRACT. *This study aims to investigate in what scenarios people prefer to produce the fictive motion expressions in Mandarin. In particular, we expected that people would like to produce fictive motion expressions when describing scenery pictures from the first-person perspective as compared to the third-person perspective. We replicated Blomberg and Zlatev's [4] experiment by instructing participants to see pictures and to write down a sentence to describe each picture. Four types of pictures were designed: (1) the pictures in which figures can afford motion taken from the 1st-person perspective, (2) the pictures in which figures can afford motion taken from the 3rd-person perspective, (3) the pictures in which figures cannot afford motion taken from the 1st-person perspective and (4) the pictures in which figures cannot afford motion taken from the 3rd person perspective. The production results showed that people produced more fictive motion sentences in seeing the pictures involving the affording motion taken from the 1st-person perspective. Our study suggests that the mental simulation of fictive motion will be processed in particular linguistic contexts. That is, the two elements of motion, i.e., the person-perspective taking and motion affordance, affect people to produce fictive motion expressions. The study has implications for natural language processing in dealing with ambiguous word senses of motion in Mandarin.*

Keywords: fictive motion verbs, a production task, frequency, first-person perspective, Mandarin

1. **Introduction.** Motion refers to a person or an object moving from one place to another place. Indeed, motion occurs pervasively in daily conversation and almost has polysemous meanings. Furthermore, motion verbs exist in all languages and show similar patterns of semantic extension cross-linguistically [1-8].

For example, the motion 爬 *pá* "climb" is a high-frequent motion verb in Mandarin Chinese, referring to "climb" or "move forward with hands and feet". In the following two sentences of 學生爬上山頂 *xué shēng pá shàng shān dǐng* "Students climb the summit of a mountain" and 這個嬰兒爬得好快 *zhè gè yīng ér pá dé hǎo kuài* "This baby crawls fast", the motion verb 爬 *pá* in the first sentence refers to "climb" and the motion in the second one means "move forward with hands and feet". The motion of 爬 *pá* in the two sentences are literal meanings, describing an agent moving forward/up with (hands and) feet from one location to another location.

However, the same motion verb 爬 *pá* in the sentence of 牆上爬滿藤蔓 *qiáng shàng pá mǎn téng màn* "Vines are covered on the whole wall" does not express the action of "climb" or "move forward" since the theme 藤蔓 *téng màn* "vines" is an inanimate entity which is not able to move. Indeed, the sentence is semantically acceptable by native speakers of Mandarin Chinese. It means "cover with". It is quite interesting that when people want to express the meaning of "cover with", the motion verb 爬 *pá* will be selected to be used to combine with the word 滿 *mǎn* "completely" to express the meaning of "cover with" even though 爬 *pá* does not contribute its literal meaning to the whole meaning of the sentence. In cognitive linguistics, the non-literal motion verb is called fictive motion.

Indeed, fictive motion does not occur frequently in daily conversation. However, the fictive motions may be produced more often in the context of people describing scenery pictures. Thus, this study aimed to find whether Mandarin native speakers produce fictive motion sentences more frequently when people describe static configurations of scenery rather than other linguistic contexts. In particular, a picture production task was conducted to collect the motion expressions produced by participants when they were asked to describe scenery pictures. We would like to compare the frequencies of fictive motion expressions between the pictures drawn from the 1st-person perspective and from the 3rd-person perspective.

2. **Background.** This section will introduce the theoretical background of motion verbs. In

particular, it will introduce the event structure of motion verbs from the cognitive linguistic perspective. Second, this section will discuss the background of fictive motion and present empirical evidence of the fictive motion sentences in the previous studies. Finally, the rationale of this study will be stated at the end of this section.

2.1. **Motion and Motion events in Mandarin Chinese.** Motion is defined as the change of location of a moving entity. The entity can be an animate one (e.g., "my father", "a bird", etc.) or an inanimate one (e.g., "a pencil", "a stone", etc.). In addition to the entities, some information relating to motion is expressed, including manners of motion (e.g., "go", "run", "jump", etc.), the path (e.g., "from my house through the park"), and the goal (e.g. "to school").

Talmy [7-8] proposed that motion can form an event with four basic semantic components: *motion*, *figure*, *ground*, and *path*. *Motion* involves movements that change places; *figure* conducts the movement; *ground* is the target place an entity moves to; and *path* is the direction or trajectory of the movement. For example, sentence (1) below demonstrates the four components in the motion event of 走 *zǒu* "go":

(1) 張三 走 回 家
zhāng sān *zǒu* *huí* *jiā*
【figure 】 【motion】 【path】 【ground】

Another element—*manner*—indicates the way a figure moves. For example, sentence (2) shows an expression involving the motion verb "fly", where "fly" is the *manner* component, which is conflated with the *motion* component and shows the manner of movement:

(2) 鳥飛到樹上
niǎo fēi dào shù shàng
"The bird flies to the top of the tree."
【motion + manner】

In addition, *path* can either be encoded with motion verbs or exist as a satellite after the motion in Mandarin Chinese. Sentences (3) and (4) below demonstrate that *path* is conflated with a motion verb and exists as an independent component as a preposition, respectively:

(3) 爸爸進房間了
bà bà jìn fáng jiān le
"Father goes into the room."
【motion + path】

(4) 小孩掉到洞裡
xiǎo hái diào dào dòng lǐ
"A child fell into the hole."
【path】

Talmy's study [7] found that languages around the world can be divided into verb-framed language and satellite-framed language, the former of which is *path* conflated with motion verbs and the latter *manner* encoded with motion verbs. Therefore, English is a

satellite-framed language and Spanish and French are classified as verb-framed languages.

However, Mandarin Chinese is an equipollently-framed language, which is similar to both verb-framed and satellite-framed languages [9]. Indeed, Mandarin has two principles to express the *path* component. The first one is the use of directional verbs occurring after motion verbs (e.g., 上 *shàng* "up", 下 *xià* "down", 進 *jìn* "in", 出 *chū* "out", 回 *huí* "back", 過 *guò* "pass", etc.), as shown in sentence (4). The other is the use of directional verbs as motion verbs encoded with the *path* meaning, as shown in sentence (3).

2.2. **Fictive Motion.** As mentioned earlier, fictive motion is the metaphorical motion of an object or abstraction through space [7-8]. Fictive motion sentences involve a motion verb that co-occurs with a figure. However, the figure is often a non-animate object that is not capable of acting out the movement in the physical sense. For example, sentences (5) and (6) below are fictive motion sentences in English and Chinese, respectively:

(5) The highway runs through the city.

(6) 小徑走進森林

xiǎo jīng zǒu jìn sēn lín

"The path goes into the forest."

In sentence (5), the figure "highway" is not capable of performing the motion act of "runs". However, this sentence is syntactically grammatical and semantically acceptable. Similarly, in sentence (6), the figure 小徑 *xiǎo jīng* "the path" is not able to execute the movement 走*zǒu* "goes", but this sentence is not problematic. The purpose of fictive motion is to emphasize the dynamic imagery of things like roads moving from one place to another place. Therefore, these sentences do not involve any actual movement in the physical sense but instead implicitly indicate the dynamic condition of the motion.

2.3. **Empirical Evidence of the Mental Simulation by Fictive Motion.** As mentioned above, motion verbs can describe static spatial situations [1, 10-11]. For instance, the sentence "The mountain range *goes* all the way from Mexico to Canada". Such a sentence has been argued that motion is not actual but mentally stimulated [1, 10-12].

The empirical evidence of dynamic imagery in processing fictive motion has been supported by some psycholinguistic experiments [1-4, 10-12]. In particular, Matlock's [11] study found that fictive motion sentences had longer trajectories than non-fictive motion sentences, even though these two types of sentences were judged to have similar meanings. For example, sentences (7a) and (7b) below are semantically similar:

(7) a. A sidewalk goes along a canal.

b. A sidewalk is next to a canal.

In Matlock's [11] drawing task, fictive motion sentences and non-fictive motion sentences were read, and the participants had to draw the meanings of the two sentences. The results showed that the trajectory for fictive motion (7a) was longer than that for non-fictive motion (7b). It was concluded that fictive motion expressions can evoke dynamic imagery of non-animate figures that allows one to activate the motions mentally.

In addition, Matlock [10] used a drawing task to investigate how the trajectories of moving entities would be depicted. The experimental stimuli included 16 pairs of sentences,

including 8 fictive motion sentences (involving motion, e.g., "run", "go", etc.) and 8 non-fictive-motion sentences (involving "be" without motion verbs). For example, the participants were instructed to read two semantically similar sentences "The military base runs between the two mountain ranges" and "The military base is between the two mountain ranges" and then were asked to draw the pictures. The results showed that the trajectories for fast motion (e.g., "jet", "race", etc.), were longer, thinner, and less crooked than the trajectories for slow motion (e.g., "crawl", "creep", etc.). Thus, Matlock's [10] findings again supported that people mentally stimulated the motions when thinking about and forming the images of fictive motion sentences.

Moreover, Stosic et al. [13] found that fictive motion was often used to characterize the dynamic expressions of static scenes. Stosic et al. [13] tested fictive motion expressions in Romance (French/Italian), Germanic (German/English) and Slavic languages (Serbian/Polish) by comparing linguistic strategies used for expressing static structure/configurations. They expected that the figures of motions, e.g., "roads" and "paths", could encourage people to produce more fictive-motion expressions than the non-fictive motion sentences. In their experiment, participants were instructed to look at the pictures and wrote down a sentence for describing each picture. The pictures included twelve pictures in which the figures did afford motion (e.g., road, bridge, path), twelve in which the figures did not afford motion (e.g., fence, pipe, line of chairs), twelve taken from the first person perspective, and twelve taken from the third person perspective. They found that fictive motion sentences occurred in all the three languages, suggesting that static configurations involving the figures such as "roads" or "path" can elicit people to produce fictive motion cross-linguistically. However, the frequency of fictive expressions was low as compared to the occurrence of literal motion expressions.

Furthermore, Blomberg and Zlatev [4] found that fictive motion preferred to occur in particular linguistic contexts. In particular, Blomberg and Zlatev [4] discussed that two elements involved in motion, i.e., the person-perspectives taking (e.g., the first-person and the third-person perspectives) and motion affordance (i.e., afford, e.g., "roads", and non-afford, e.g., "pipes"), could encourage people to produce fictive motion expressions. Blomberg and Zlatev [4] conducted a picture-elicitation experiment to look at how people produced fictive motion sentences in Swedish, Thai and French. Participants were instructed to read thirty-six experimental pictures, including (1) pictures in which figures can afford motion taken from the first-person perspective, (2) pictures in which figures can afford motion taken from the third-person perspective, (3) pictures in which figures cannot afford motion taken from the first-person perspective, (4) pictures in which figures cannot afford motion taken from the third-person perspective. The results showed that people did not produce fictive motion expressions very frequently in four kinds of pictures. But, there were still some fictive motion sentences elicited, e.g., "A road goes/leads to the house" and "A path enters/goes inside a cave" when participants saw the picture taken from the first-person perspective. It was concluded that the person-perspective taking can induce people to active visual scanning and facilitate ones to use fictive motion sentences. In addition, it was found that actual motion and fictive motion were expressed differently

across languages, which may be an interaction between language and experience.

Finally, Gong & Huang's [14] corpus study found that low frequency of fictive motion sentences in Mandarin Chinese occurred in fiction discourse. They built a corpus of fictions, including detective, romance, horror and fantasy novels, selected 32 motion verbs (e.g., 走 *zǒu* "go/walk", 走出 *zǒu chū* "walk away from") and extracted these motion sentences from this corpus. The extracted motion sentences were classified into three groups: literal motion expressions, fictive motion expressions and metaphorical motion expressions. They found that the literal meaning had the highest frequency among the three senses (82%), while the second-highest frequency was fictive motion with metaphorical meaning (11%), and the lowest frequency was fictive motion with no actual motion (7%). Therefore, fictive motion expressions are not pervasive in written data.

2.4. **Problem Statement and Goal of this study.** Previous studies [4, 13-14] showed that fictive motion sentences did not often occur in daily conversation across languages. Researchers found that the use of fictive motion sentences was constrained in particular contexts. That is, when people described layout/configurations of static scenes, they would like to use fictive motion expressions. In addition, two elements, i.e., the person-perspective taking and motion affordance, involved in the motion influenced the production of fictive motion expressions.

Even though past studies [4, 13] examined the fictive motion sentences via a picture-elicitation task, Mandarin Chinese was not tested in their studies. In addition, the past corpus study [14] showed that fictive motion expressions in Mandarin seldom occurred in daily conversation. The picture elicitation task can be replicated to induce native people of Chinese to produce fictive motion expressions. In addition, it is not clear whether the element of the person-perspective taking affects people to use more fictive motion expressions in Mandarin Chinese. Therefore, the purpose of this study is to examine fictive motion sentences in a picture elicitation task. We would like to know whether Mandarin native speakers produce fictive motion sentences more frequently when elicited by the-first-person-perspective pictures than by the-third-person-perspective pictures.

3. **Methods.** This experiment is to investigate the production of fictive motion in Mandarin by a picture-elicitation task. This study examined whether the person-perspective taking and affordance of motion affect the production of fictive motion sentences. We replicated Blomberg and Zlatev's [4] elicitation task to observe the fictive motion expressions in Mandarin. Participants were instructed to read pictures and then write down a sentence to describe each picture. Four types of pictures were tested: (1) pictures in which figures can afford motion taken from the first-person perspective, (2) pictures in which figures can afford motion taken from the third-person perspective, (3) pictures in which figures cannot afford motion taken from the first-person perspective, (4) pictures in which figures cannot afford motion taken from the third-person perspective.

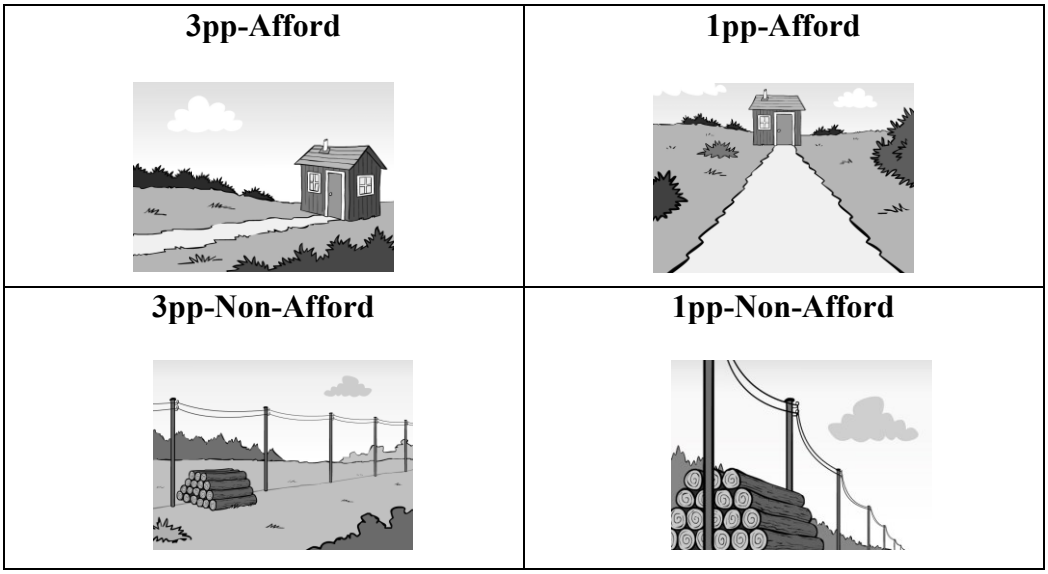
We hypothesize that the elements of the person-perspective taking and motion affordance affect the production of fictive motion expressions. We expect that the pictures

taken from the 1st person perspective and in which figures can afford motion will elicit fictive motion sentences more than other three kinds of pictures.

3.1. **Participants.** There were 10 participants recruited in this experiment. All of them were students of National Chiayi University, Taiwan. All of them were native speakers of Mandarin Chinese and Taiwanese.

3.2. **Materials and Design.** We replicated Blomberg and Zlatev's [4] experiment. A picture-elicitation task was conducted. Participants were instructed to look at pictures and produced one sentence for describing the picture. We selected sixteen pictures from Blomberg and Zlatev's [4] experiment: three pictures taken from the first-person perspective and containing affording motion (i.e., 1pp-Afford), three pictures from the third-person perspective and containing affording motion (i.e., 3pp-Afford), three pictures from the first-person perspective and containing non-affording motion (i.e., 1pp-Non-Afford), three pictures from the third-person perspective and containing non-affording motion (i.e., 3pp-Non-Afford), and four pictures as control. The sample pictures for four types are listed in Figure 1.

FIGURE 1. SAMPLE EXPERIMENTAL PICTURES SELECTED FROM BLOMBERG AND ZLATEV'S [4] STUDY FOR PARTICIPANTS TO PRODUCE SENTENCES IN OUR STUDY



3.3. **Procedure.** In the beginning, the participants were instructed to look at sixteen pictures and then to write down a sentence in Mandarin Chinese for describing each picture. Afterwards, a warm-up picture was given for practice. Participants were instructed that there was no correct answer for each picture. They wrote down their responses based on their intuition. The whole procedure for each participant to produce 16 sentences took around 20 minutes.

4. **Data Analysis**. After participants finished the production task, the sentences for experimental pictures were further analyzed but the sentences for the control pictures, not our target, were ignored. Later, the 120 experimental sentences were judged whether each sentence was a fictive motion sentence or not. Examples (8) and (9) were sample sentences

produced by participants. Example (8) was judged to be a fictive motion sentence because the figure "a path" was the inanimate entity but it co-occurred with the motion verb 進入 *jìnrù* "enter". This sentence referred to the meaning "there is a path through a cave" even though it used the motion verb 進入 *jìnrù* "enter". Thus, it was grouped into the fictive motion expression.

On the other hand, Example (9) was judged to be the non-fictive-motion sentence. In this sentence, no motion verbs were used. The existence verb 有 *yǒu* "exist" occurred in this expression. Indeed, we found that participants frequently produced sentences involving 有 *yǒu* "exist" since this "exist" construction in Mandarin was high-frequent in daily conversation. This construction did not belong to fictive motion expression. Thus, it was grouped into the non-fictive-motion expressions.

(8) 小徑進入山洞

xiǎo jīng jìn rù shān dòng

"A path goes into the cave"

(9) 樹木旁邊有柵欄

shù mù páng biān yǒu shān lán

"There are fences next to the trees"

Afterwards, 120 sentences for describing experimental pictures produced by participants were judged to the fictive motion ones or non-fictive motion ones. Finally, the frequencies of fictive motion sentences for the four types of pictures were counted.

5. **Results and Discussion.** We found that there were three sentential constructions produced occurring very frequently, including the fictive motion expressions, the structure containing the verb 有 *yǒu* "exist" and the adjective noun phrases. In the following, the frequencies of the three kinds of constructions are discussed one by one.

Table 1 shows the tokens of fictive motion expressions participants produced for describing four types of pictures. There were twenty-two fictive motion sentences produced. Furthermore, the frequencies for describing the four types of pictures were 7 tokens for the 3pp-Afford pictures, 9 tokens for the 1pp-Afford pictures, 3 tokens for 3pp-Non-Afford pictures and 3 tokens for the 3pp-Non-Afford pictures, respectively (Table 1). The results demonstrate that fictive motion expressions were produced more often in the context of pictures involving affording motion taken from the first-person perspective as compared to the other three kinds of pictures.

TABLE 1. TOKENS OF FICTIVE MOTION EXPRESSIONS PARTICIPANT PRODUCED FOR DESCRIBING FOUR TYPES OF PICTURES

Fictive motion	3pp	1pp	Total
Afford	7 (23.3 %)	9 (30 %)	16 (26.7 %)
Non-Afford	3 (10 %)	3 (10 %)	6 (10 %)
Total	10 (16 %)	12 (20 %)	22 (18.3 %)

In addition, the results show that participants produced fictive motion sentences more often when reading the pictures involving affording motion (i.e., 16 tokens) than when seeing the

pictures involving non-affording motion (i.e., 6 tokens). Likewise, participants produced fictive motion sentences more often when reading the pictures taken from the 1st-person perspective (i.e., 10 tokens) than when seeing the pictures taken from 3rd-person perspective (i.e., 12 tokens). The results support our hypothesis that the two elements of motion, i.e., motion affordance and the person-perspective taking, affect people to produce fictive motion sentences.

Samples of fictive motion sentences are given in examples (10)-(13), which were produced when participants read the four types of pictures, respectively. The motion verbs produced in examples (10)-(13) include 通往 *tōngwǎng* "go to", 開進 *kāijìn* "drive into, 通過 *tōngguò* "go through" and 穿過 *chuānguò* "go through" and the figures for these motions are all the inanimate entities, i.e., 小徑 *xiǎojīng* "path", 路 *lù* "roads", and 水管 *shuǐguǎn* "water pipes" . In addition, the fictive motion sentences sometimes co-occurred with the "exist" verb 有 *yǒu* "exist" as example (11).

Examples

(10) 這條小徑通往一戶人家 (1pp-affprd)
zhè tiáo xiǎo jīng tōng wǎng yī hù rén jiā
"This path leads to a family"

(11) 有一條路開進山洞 (3pp-afford)
yǒu yī tiáo lù kāi jìn shān dòng
"A road drives into the cave"

(12) 水管通過山洞 (1pp-non-afford)
shuǐ guǎn tōng guò shān dòng
"A pipeline goes through the cave"

(13) 長條水管穿過山 (3pp-non-afford)
zhǎng tiáo shuǐ guǎn chuān guò shān
"Water pipes go through the mountain."

Second, we also found that the construction of 有 *yǒu* "exist" occurred very frequently in describing static configurations. Table 2 demonstrates the tokens of sentences involving the verb 有 *yǒu* "exist" for describing four types of pictures. There are 23 sentences using 有 *yǒu* "exist" structure. In particular, people produced the "exist" construction more often in reading the 3pp-Non-Afford condition (i.e., 9 tokens) rather than the other 3 kinds of picture conditions.

TABLE 2. TOKENS OF SENTENCES INVOLVING THE VERB 有 *YǑU* "EXIST" PARTICIPANTS PRODUCED FOR DESCRIBING FOUR TYPES OF PICTURES

有 yǒu construction	3pp	1pp	Total
Afford	5 (16.7 %)	4 (13.3 %)	9 (15 %)
Non-Afford	9 (30 %)	5 (16.7 %)	14 (23.3 %)
Total	14 (23.3 %)	9 (15 %)	23 (19.2 %)

In addition, when we looked at the two elements (e.g., motion affordance and the person-perspective taking) independently, it was found that the non-affording motion (i.e., 14 tokens) encouraged people to produce the "exist" structure as compared to the affording motion (i.e. 9 tokens). Likewise, the 3rd-person perspective also elicited people to produce the "exist" construction (i.e., 14 tokens) rather than 1st-person perspective (i.e., 9 tokens).

Examples (14)-(17) are sample sentences of the "exist" construction produced by participants when seeing four types of pictures. In the four sentences, the ground is mentioned in the beginning of sentences, e.g., 隧道 *suì dào* "tunnel", 草原 *cǎo yuan* "grassland", and 海灘 *hǎi tān* "beach", and then taking the verb 有 *yǒu* and finally followed by figures, e.g., 馬路 *mǎ lù* "road", 木屋 *mù wū* "wooden house", 柵欄 *shān lán* "fences", and 躺椅 *tǎn gyǐ* "loungers".

Examples

(14) 從隧道出去有一條馬路 (1pp-affprd)
cóng suì dào chū qù yǒu yī tiáo mǎ lù
"There is a road out from the tunnel."

(15) 草原上有一個木屋 (3pp-afford)
cǎo yuán shàng yǒu yī gè mù wū
"There is a wooden house on the grassland."

(16) 一大片草原上有柵欄和樹 (1pp-non-afford)
yī dà piàn cǎo yuán shàng yǒu shān lán hé shù
"There are fences and trees on the grassland."

(17) 在海灘邊有許多海灘傘及躺椅 (3pp-non-afford)
zài hǎi tān biān yǒu xǔ duō hǎi tān sǎn jí tǎng yǐ
"There are many umbrellas and loungers in the beach."

Finally, the third kind of construction frequently occurring in participants' responses was the adjective phrases co-occurring with noun phrases (NP). This kind of expressions were not complete sentences, more like fragments. But this kind of adjective noun phrases were very frequent expressions in describing static scenes. Table 3 demonstrates the tokens of expressions using the structure of adjective taking NP in describing four types of pictures. There were 32 adjective noun phrases produced by participants. The data shows that people would like to produce noun phrases when seeing the pictures containing affording motion taken from the 3rd-person perspective (i.e., 12 tokens) rather than the other three kinds of pictures.

TABLE 3. TOKENS OF EXPRESSIONS USING THE STRUCTURE OF ADJECTIVE +NP FOR DESCRIBING FOUR TYPES OF PICTURES

Adjective + NP	3pp	1pp	Total
Afford	12 (40 %)	6 (205 %)	18 (30 %)
Non-Afford	7 (23.3 %)	7 (23.3 %)	14 (23.3 %)
Total	19 (31.7 %)	13 (21.7 %)	32 (26.7 %)

Furthermore, the data shows that the adjective noun phrases often occurred in the pictures involving the affording motion (i.e., 18 tokens) as compared to the non-affording motion. (i.e., 14 tokens). Likewise, the adjective noun phrases often occurred in the pictures taken from the 3rd-person perspective (i.e., 19 tokens) as compared to the 1st-person perspective (i.e., 13 tokens).

Examples (18)-(21) are sample sentences of the adjective noun phrases produced by participants in describing the four kinds of pictures. The four sentences have similar structure. The ground, i.e., 荒野 "cabin" wilderness, 高速公路 *gāo sù gong lù* "highway", 草場 *cǎo chǎng* "grassland", and 荒野 *huāng yě* "wilderness", are introduced in the beginning of the sentence, then taking a possessor 的 *de* "of" and finally followed by figures in the end of the sentence, i.e., 小木屋 *xiǎo mù wū* "cabin", 山洞 *shān dòn* "cave", 柵欄 *shān lán* "fences", and 管線 *guǎn xiàn* "pipelines".

Examples

(18) 荒野中的小木屋 (1pp-affprd)
huāng yě zhōng de xiǎo mù wū
"A cabin in the wilderness."

(19) 高速公路上的山洞 (3pp-afford)
gāo sù gōng lù shàng de shān dòng
"A cave on the highway"

(20) 草場上的柵欄 (1pp-non-afford)
cǎo chǎng shàng de shān lán
"Fences on the grassland"

(21) 在荒野中的管線 (3pp-non-afford)
zài huāng yě zhōng de guǎn xiàn
"Pipeline in the wilderness"

The experimental results are consistent with the past studies [4, 13]. In Blomberg and Zlatev's [4] research, they found the pictures involving affording motion taken from 1st-person perspective elicited the most frequency of fictive motion sentences, which is similar with our findings. Likewise, Stosic et al. [13] found the elements, i.e., notion affordance and the person-perspective taking, affected the production of fictive motion expressions, which is consistent with our findings, too. Finally, both our study and Stosic et al.'s [13] study supported that fictive motion is often used to characterize the dynamic expressions of static scenes, in particular for describing static configurations.

In addition, the other two frequent constructions were frequently produced by participants in our picture elicitation task, i.e., the 有 *yǒu* "exist" construction and the adjective noun phrases containing 的 *de* "of". Indeed, the two constructions are frequently used to describe static configurations in daily conversation. It is not surprising that people like to use the two kinds of constructions in describing scenery pictures. Moreover, the two

elements of motion, i.e., the motion affordance and the person-perspectives taking, could affect the use of the 有 *yǒu* "exist" construction and the adjective noun phrases. In particular, the pictures with affording motion and taken from the 3rd-person perspective prefer to select the adjective noun phrases while the pictures with non-affording motion taken from the 3rd-person perspective often selects the 有 *yǒu* "exist" construction.

6. **Conclusions.** Fictive motion expressions do not occur very frequently in daily language. However, it is important to examine their distribution and linguistic behaviors since fictive motion in sentences refers to not only the literal meaning but also the metaphorical meaning. The construction of fictive motion expressions, on the surface, is not grammatical because the inanimate feature for the figure and the animate feature for motion co-occur in a sentence. But, their meanings are semantically acceptable by native speakers of Mandarin. Therefore, this is an interesting question to investigate in what linguistic context and for what purpose people produce fictive motions.

We replicated Blomberg and Zlatev's [4] experiment and conducted a picture-elicitation task. Participants were instructed to see pictures and write down one sentence to describe each picture. Fictive motion expressions were analyzed. Our experimental results show that fictive motion sentences occurred in particular scenarios. In particular, when describing static configurations, people would like to produce fictive motion expressions. The preference of using fictive motion reflects the mental simulation of motion by participants. Furthermore, the 1st-person perspective and motion affordance encourage people to produce fictive motion sentences rather than other scenarios.

However, there is one limitation in this study. That is, the number of participants tested in this experiment is not sufficient, which may not reflect the real linguistic behaviors. There were only 10 participants tested and thus the differences in tokens among each type of pictures may be small. To be more specific, the discrepancy in frequency between the pictures of the 3rd-person perspective and the ones of the 1st-person perspective was only 2 tokens. The small difference may not completely reflect how people process fictive motion. A future experiment needs to be conducted by recruiting more participants to test our hypothesis.

To conclude, this study discusses in what scenarios fictive motion sentences are produced. It is found that Mandarin native speakers produced fictive motion sentences more frequently when elicited by the-first-person-perspective pictures than by the-third-person-perspective pictures. In addition, the motion affordance has the similar effect on producing fictive motion. The production of fictive motion by participants can be grounded in people's mental simulation of motion, as suggested in Tamly's [7-8] studies.

This study has practical implications for word sense disambiguation for natural language processing in dealing with multiple meanings of motion verbs in Mandarin Chinese. In particular, fictive motion has rarely been discussed in most studies. This study also sheds light on understanding how fictive motion verbs are produced in particular scenarios and constructions.

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