

Encoding Motion Events in Taiwan Sign Language and Mandarin Chinese: Some Typological Implications

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LANGUAGE AND LINGUISTICS MONOGRAPH SERIES 50

Breaking Down the Barriers:

Interdisciplinary Studies in Chinese Linguistics and Beyond

Edited by Guangshun Cao, Hilary Chappell, Redouane Djamouri and Thekla Wiebusch

Institute of Linguistics, Academia Sinica, Taipei, Taiwan

《語言暨語言學》專刊系列之五十

綜古述今 鉤深取極

曹廣順 曹茜蕾 羅端 魏婷蘭/編輯

中央研究院語言學研究所

2013

Encoding Motion Events in Taiwan Sign Language and Mandarin Chinese: Some Typological Implications*

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Encoding patterns of motion events in Frog Story narratives of Mandarin Chinese and Taiwan Sign Language are identified with reference to Talmy's framework of conceptual analysis. In terms of Slobin's tripartite distinction, both languages can be regarded as complex verb-framed languages, though with different distribution in encoding patterns. Their typological similarity comes from conflation of conceptual elements of Manner, Path, and Motion. However, in spoken languages, these elements occur in the linear serialization, whereas in signed languages, they are simultaneously conflated in classifier predicates. A revised tripartite distinction among satellite framed, verb-framed, complex verb-framed languages is therefore proposed across the audio-vocal and the visual-gestural modalities of human languages. Co-speech gestures in spoken languages are capable of encoding more refined manners as are facial expressions in sign languages. Therefore, a more comprehensive language typology must take into consideration grammatical structures in both modalities, co-speech gestures in spoken languages, and facial expressions in sign languages.

Key words: typology, spoken languages, signed languages, serial verb languages, classifier predicates, sequentiality, simultaneity

1. Introduction

Talmy (1985, 2000) proposed a conceptual analysis of motion events which consists of six cognitive components, namely Figure, Ground, Path, Motion, Manner and Cause. He further proposed a typological distinction between 'satellite-framed' languages and 'verb-framed' languages in terms of different encoding patterns of motion events. In

* This paper was presented at Second International Conference of the French Association for Cognitive Linguistics, University of Lille, France, May 10-12, 2007. We thank Dan Slobin, Adam Schembri, Sonja Elenkamp, and others for their valuable comments and suggestions at the Conference. We also thank a traveling grant from the Ministry of Education which enabled Su Shiou-fen to present the paper at the Conference.

'satellite-framed' languages such as English and German, the verb incorporates Motion and Manner. In contrast, in 'verb-framed' languages such as French and Spanish, the verb incorporates Motion and Path. According to Talmy, Chinese is a 'satellite-framed' language. However, Tai (2003) argued that Chinese cannot properly be treated as a 'satellite-framed' or as a 'verb-framed' language because of abundance of resultative verb compounds, and thereby suggesting a tripartite typological distinction. In fact, Slobin (2004) proposed 'complex verb-framed' languages as a third type to include Chinese and American Sign Language (hereafter ASL).¹ Thus, instead of Talmy's bipartite typology, with Slobin, we adopt a tripartite typology of 'satellite-framed', 'verb-framed' and 'complex verb-framed' languages.

Mandarin Chinese is neither a 'satellite-framed' language nor a 'verb-framed' language for three reasons. First, Path can be expressed as an independent verb alone. Second, it serves as the center of predication in resultative verb compounds. Third, Manner is not syntactically subordinated to Path as in 'verb-framed' languages (Huang & Tanangkingsing 2005, Slobin 2004, and Tai 2003). In this paper, we propose that Mandarin Chinese is a 'complex verb-framed' language.

Sign languages, in visual-gestural modality, are capable of simultaneously encoding different cognitive components of motion events. How does this simultaneity in sign languages fit into the typological framework initiated by Talmy? Supalla (1990) treated ASL as a satellite-framed language. However, Slobin & Hoiting (1994) proposed that ASL is a kind of complex verb-framed languages in which the main verb conflates Path and Motion, and Manner can be encoded either by a verb before the path verb or by an affix incorporating into the path verb. In this paper, we also observe that Taiwan Sign Language (hereafter TSL) can be treated as a complex verb-framed language, just like ASL and other sign languages.²

Following Slobin & Hoiting (1994), Taub & Galvan (2001) and Galvan & Taub (2004) investigated how typologically different languages, such as English and ASL, encode information about motion events by using Frog Story narratives as materials. Frog Story (*Frog, where are you?*) is a story picture book without written text drawn by Mayer (1969) about a boy and a dog's searching for a frog.

¹ Slobin (2004) also extended this type of languages as equipollently-framed languages. The reason that we adopt the term 'complex verb-framed' languages is to emphasize the encoding of motion events with obligatory path verb but with optional manner verb or Manner incorporated into path verb.

² Taiwan Sign Language (TSL) is a language naturally developed in Taiwan Deaf Community. For an introduction, see TSL browser (<http://tsl.ccu.edu.tw>) compiled by Jane Tsay and James Tai.

As a part of sign language project at National Chung Cheng University, we have collected Frog Story narratives of Mandarin Chinese and TSL for various research issues. These narratives provide our data base for the present study. The materials we investigated include narratives by 20 subjects in Mandarin Chinese and another 20 subjects in TSL.³ The purpose of this paper is two-fold. One is to report different encoding patterns of motion events between TSL and Mandarin Chinese as spoken in Taiwan. The other is to discuss their typological implications with respect to previous studies.

The organization of this paper is as follows: Section 2 reviews the typology of motion events and identifies patterns of Frog Story narratives in Mandarin Chinese. Section 3 briefly discusses previous studies of motion events in sign languages and identifies patterns of Frog Story narratives in TSL. In §4, based on our observations in Mandarin and TSL Frog Story narratives, we examine the manner-salient property across modalities, with special reference to co-speech gestures in general. Section 5 concludes the paper with typological implications.

2. Typology of motion events and their expression

Talmy (1985, 2000) proposed a bipartite typology of construction types according to whether the core schema PATH is mapped onto a verb or a satellite: (1) *verb-framed languages* (*V-languages*), such as Spanish, map the core schema on the verb, and (2) *satellite-framed languages* (*S-languages*), such as English, map the core schema on the satellite. In addition, Slobin & Hoiting (1994) and Slobin (2004) proposed that ASL is a kind of *complex verb-framed languages* in which Path is obligatorily encoded as a main verb and Manner can be optionally encoded as a verb sequentially before a path verb, or as an affix simultaneously incorporating into a path verb.

2.1 Satellite-framed and verb-framed languages

In Talmy's (1985, 1991, 2000) analysis of motion events, a basic motion event involves one object (the Figure) moving or locating with respect to another object (the reference object or Ground). There are four major cognitive components in the conceptual structure of a motion event: Figure, Ground, Motion, and Path, while Manner or Cause will sometimes be encoded as co-event. Different strategies to encode these conceptual

³ Forty narratives were collected as a part of James Tai's sign language project sponsored by National Science Council in Taiwan (2001-2004). The project title is "A Study of Taiwanese Sign Language: Phonology, Morphology, Syntax, and A Digital Graphic Dictionary".

elements are used among different languages. Talmy (2000:26) illustrated the encoding of these two co-events with sentences (1) and (2). In sentence (1), Manner of the verb ‘roll’ is incorporated into Motion, while in sentence (2), Cause of the verb ‘blow’ is conflated with Motion. Both sentences use a preposition ‘off’ as the satellite to represent Path.

- | | | | | |
|-----|-------------------|---------------|------------|-------------------|
| (1) | <i>The pencil</i> | <u>rolled</u> | <u>off</u> | <i>the table.</i> |
| | Figure | Motion | Path | Ground |
| | | Manner | | |
| (2) | <i>The pencil</i> | <u>blew</u> | <u>off</u> | <i>the table.</i> |
| | Figure | Motion | Path | Ground |
| | | Cause | | |

As illustrated in sentences (1)-(2) above and (3) below, in *satellite-framed languages*, such as English, the core schema ‘Path’ is encoded as the satellite and the main verb conflates Manner or Cause with Motion. In contrast, as illustrated in sentence (4) below, in *verb-framed languages*, such as Spanish, the main verb conflates Motion and Path with Manner expressed optionally as an adverbial or a gerundive constituent (Talmy 2000:49).

- | | | | | | |
|-----|-------------------------------------|----------------|-------------|------------------|--------------------|
| (3) | English: | | | | |
| | <i>The bottle</i> | <u>floated</u> | <u>into</u> | <i>the cave.</i> | |
| | | Motion.Manner | Path | | |
| (4) | Spanish: | | | | |
| | <i>La botella</i> | <u>entro</u> | <i>a la</i> | <i>cueva</i> | <i>(flotando).</i> |
| | The bottle | moved-in | to | the cave | <i>(floating)</i> |
| | | Motion.Path | | | (Manner) |
| | ‘The bottle floated into the cave.’ | | | | |

2.2 Typological category of Mandarin Chinese and its expression

In addition to *verb-framed* languages and *satellite-framed* languages proposed by Talmy, there is a third type, *complex verb-framed* languages proposed by Slobin. Mandarin is a highly verb serializing language where the most preferred strategy to encode motion events is to combine manner verb, path verb and deictic motion verb (Huang & Tanangkingsing 2005). The question then arises: which kind of language does Mandarin Chinese belong to? In this section, we will review the previous studies

on this issue in §2.2.1 and examine the narratives we have elicited from Frog Story in §2.2.2.

2.2.1 Chinese as a complex verb-framed language

Talmy analyzed Path element in Mandarin Chinese as a satellite and therefore treated Mandarin as a satellite-framed language (1985, 2000). However, Tai (2003) pointed out that Path element in Mandarin Chinese can be used independently as a main verb and in V-V compound, Path element is often the center of predication.

At first glance, it appears that Mandarin Chinese should belong to the *verb-framed* language group, since the ‘core schema’ is expressed in path verb compounds such as *chu[^]lai⁴* ‘exit or come out of’ and *jin[^]qu* ‘enter or go into’. However, a closer inspection shows that these path verbs can be preceded by manner verbs and there is no syntactic or semantic evidence that either verb is subordinate to the other. Slobin & Hoiting (1994) and Slobin (2004) proposed that spoken serial-verb languages and sign languages belong to the type of *complex verb-framed languages*.

It seems to be more appropriate to treat Mandarin Chinese as a complex verb-framed language. First, as illustrated in sentence (5), path verb or path verb compound can occur independently as a main verb. Second, Manner can be optionally encoded within a verb compound, in which Manner is encoded with V₁ and Path, V₂, such as ‘*pao[^]jin^(^)qu*’,

⁴ Notational conventions:

<i>word[^]word</i>	Compound words in Chinese, e.g. <i>chu[^]lai</i> ‘exit or come out of’, <i>jin[^]qu</i> ‘enter or go into’, <i>fei[^]chu[^]lai</i> ‘fly out (toward the speaker)’ etc. The symbol # is for word boundary.
SIGN	English glosses for manual signs are written in capitals, such as JAR, FROG, DOG, TAKE, etc.
SIGN>SIGN	The change of signing from one stage to another stage.
SIGN-SIGN	Multiword glosses connected by hyphen dash are used when more than one English word is required to translate a single sign (e.g. GO-AWAY).
SIGN(SIGN [^] SIGN)	Compound sign. For example: ESCAPE(ESCAPE [^] RUN).
Gpro+Fpro-move	Classifier predicates to express motion events are typically composed of a proform for Ground (Gpro) and a proform for Figure (Fpro), the later being integrated with Motion and Path (Fpro-move). The marker ‘+’ means that Gpro and Fpro are signed simultaneously by both hands, with Gpro signed by the non-moving hand, and Fpro by the moving hand. The marker ‘-’ means that the conceptual components ‘Figure proform’, ‘Motion’ and ‘Path’ are indivisible and are expressed as one unit by the moving hand, e.g. <i>JARpro+FROGpro-move.out.of</i> . Sometimes classifier predicates consist of two Figures moving at the same time. Parentheses are used to group them together, as in (<i>DEERpro + DOGpro</i>) – move.

as illustrated in sentence (6). Third, the manner verb itself can be a replicated verb preceding the main verb compound, such as ‘*paopaopao pao^jin(^qu)*’, in sentence (7). Fourth, there is no evidence that manner verb and path verb in both sentences (6) and (7) are syntactically subordinate to each other. Fifth, the ungrammaticality of sentence (8) clearly shows that the manner verb alone cannot encode a motion event in Mandarin Chinese. In contrast, in sentence (5) path verb alone without manner verb *pao* ‘run’ is grammatical.

- (5) *Gou jin(^qu) fangjian li.*
 Dog enter(^go) room inside
 ‘The dog entered the room.’
- (6) *Gou pao^jin(^qu) fangjian li.*
 Dog run^enter(^go) room inside
 ‘The dog ran and entered the room.’
- (7) *Gou paopaopao pao^jin(^qu) fangjian li.*
 Dog run++ run^enter(^go) room inside
 ‘The dog ran and ran and ran and entered the room.’
- (8) **Gou pao fangjian li.*
 Dog run room inside

In short, Chinese is a serial verb language, and like other serial verb languages, it belongs to the third type, namely, *complex-verb framed* languages.

2.2.2 Mandarin patterns of motion event in Frog Story narratives

Manner verb cannot occur alone at the sentence level as illustrated in sentence (8) above. No motion event encoding manner verbs alone is observed in Frog Story narratives either. In other words, we didn’t find sentences such as (9) and (10) in the narratives. This kind of sentences can only be used for contrastive purpose at the sentence level. Therefore, it is not surprising that they are absent in Frog Story narratives.

- (9) ?*Mifong fei.*
 bee fly
- (10) ?*Xiaogou pao.*
 dog run

We have identified several encoding patterns in Mandarin Chinese narratives of Frog Story. These patterns can be grouped into two categories. They are (a) motion events that encode Path, and (b) motion events that encode both Manner and Path.

In (a) category, Path in Mandarin motion events can be encoded by path verbs alone, such as *jin* ‘enter’, *chu* ‘exit’, *dao* ‘arrive’, *likai* ‘leave’, etc. It can also be encoded by a path compound that is composed of a path verb and a deictic motion verb such as *lai* ‘come’ and *qu* ‘go’ in *jin^qu* (enter^go) ‘enter’, and *chu^lai* (exit^come) ‘exit’, etc., as illustrated in sentences (11) and (12). The verb *lai* ‘come’ represents the perspective of ‘toward the speaker’; the other verb *qu* ‘go’ encodes the perspective of ‘away from the speaker’.

- (11) Path verb alone (P)

Tamen yiqi dao chuang shang shuijiao.
 they together arrive bed top sleep
 ‘They went to bed together to sleep.’

- (12) Path compound composed of path verb and a deictic motion verb (P^D)

Mifong tongtong chu^lai le.
 bee all exit^come ASP
 ‘The bees all came out.’

In category (b), there are three patterns of motion events that encode both Manner and Path. The first pattern uses V-V compound that is composed of a manner verb and a path verb, as exemplified by *pa^dao* (crawl^arrive) ‘crawl (on)to’ in (13). The second pattern uses V-V-V compound that is composed of a manner verb, a path verb, and a deictic verb, as exemplified by *fei^chu^lai* (fly^exit^come) ‘fly out (toward the speaker)’ in (14). The third pattern uses V-V compound that is composed of a manner verb and a path verb, with a deictic verb occurring at the end of a sentence. For example, *pao^dao...qu* ‘run^arrive...go’ in (15).

- (13) V-V compound composed of a manner verb and a path verb (M^P)

Xiaohai pa^dao da shu shangmian.
 child crawl^arrive big tree top
 ‘The boy crawled onto the top of the tree.’

- (14) V-V-V compound composed of a manner verb, a path verb, and a deictic verb (M^P^D)

Mifong fei^chu^lai le.
 bee fly^exit ASP
 ‘The bees flew out.’

- (15) V-V compound composed of a manner verb and a path verb plus a separated deictic verb (M[^]P#D)

Xiaopengyou you *pa^dao* *shu* *shang* *qu*.
child again crawl[^]arrive tree above go
'The boy crawled onto the top of the tree again.'

Sometimes the aspect marker 'le' is inserted in between a manner verb and a path-deictic verb compound, as illustrated in sentence (16). Furthermore, to emphasize Manner, the manner verb alone in a reduplicated or even triplicated form occurs before a V-V compound composed of a manner verb and a path verb. This is shown in (17).

- (16) Manner verb and a path-deictic verb compound with an aspect marker in between (M-asp.-P[^]D)

Xiao qingwa *cong pingzi* *li* *tiao* *le* *chu^lai*.
little frog from jar inside jump ASP exit[^]come
'The little frog jumped out of the jar.'

- (17) Reduplicated or triplicated manner verb before a compound composed of a manner verb and a path verb (M#M[^]P)

Xiaohai *zouzou(zou)* *zou^dao* *shenlin* *limian*.
boy walk⁺⁺ walk[^]arrive forest inside
'The boy walked, walked, walked, and walked into the forest.'

Path can also be encoded by an adverbial or a prepositional phrase, as shown in (18) and (19).

- (18) Manner verb with an adverbial phrase represented as Path

Mifong *sichude* *fei*.
bee everywhere fly
'The bees flew around.'

- (19) Manner verb with a prepositional phrase represented as Path

Lu *wang xuanyai* *fangxiang* *pao* *zhe*.
deer toward cliff direction run ASP
'The deer ran toward the cliff.'

3. Motion events in sign languages

Cross-linguistically, motion events in sign languages necessarily involves classifier predicates. A full sentence expressing motion event can be analyzed as Figure-Ground-classifier predicate or Ground-Figure-classifier predicate. A classifier predicate is typically composed of a proform for Ground and a proform for Figure with Motion and Path conflated (Chang, Su & Tai 2005). In addition, Manner can be simultaneously incorporated into the classifier predicate or sequentially expressed as a verb occurring before the classifier predicate. Therefore, Supalla (1990) and Slobin & Hoiting (1994) proposed a serial-verb analysis of predicates in ASL. A serial-verb construction in ASL is composed of a manner verb and a path classifier predicate in sequence. Supalla (1990) analyzed the manner verb as the main verb, and thus treated ASL as a satellite-framed language.⁵ However, Slobin & Hoiting (1994) analyzed the path classifier predicate as the main verb because the manner verb is only optionally encoded. In their analysis, ASL belongs to a complex verb-framed language akin to spoken serial verb languages. In this paper, based on TSL Frog Story narratives we have collected, we will show that TSL, like ASL and other documented sign languages, can be more properly treated as a complex verb-framed language. In the following section, we report various encoding patterns in TSL Frog Story narratives.

3.1 Various encoding patterns in TSL Frog Story narratives

Both classifier predicates and lexicalized verbs can be utilized to encode motion events. We will illustrate patterns of classifier predicates first, and then those of lexicalized verbs.

3.1.1 Classifier predicates

Sign languages typically use classifier predicates to represent motion events. Each classifier predicate is composed of a proform for Ground and a proform for Figure conflated with Path and Motion (Chang, Su & Tai 2005).

In the examples below, we present full sentences expressing motion events as consisting of Figure-Ground-classifier predicate or Ground-Figure-classifier predicate. The underlined parts of sentences (20)-(23) below are classifier predicates as shown in Figures (1)-(4). The ‘proform’, represented by ‘pro’ is a replaced form for the preceding argument(s), i.e., Figure or Ground. The marker ‘+’ means two components are signed simultaneously by both hands. The non-moving hand represents the proform for Ground

⁵ Supalla (1990) referred to this kind of Manner verb as body classifier.

and the moving hand represents the proform for Figure. The marker ‘-’ means that the components ‘proform for Figure’ and ‘Motion/Path’ are simultaneously expressed as a unit by the moving hand.

- (20) *JAR FROG JARpro + FROGpro – move.out.*
Ground Figure Ground pro + Figure pro – Motion/Path
‘The frog moved out of the jar.’

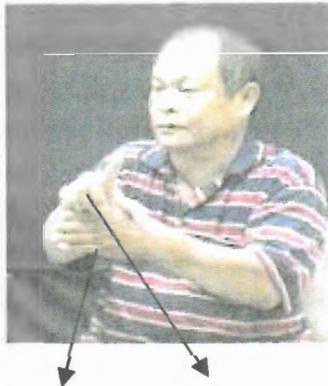


Figure 1: JARpro + FROGpro – move.out

A proform for Ground can encode either source or goal for Path. In TSL sentence (20) above, the motion event is about Figure (a frog) moving out of Ground (a jar). In TSL sentence (21) below, the motion event is about Figure (a dog) moving into Ground (a jar). Both sentences (20) and (21) represent a motion event by a classifier predicate composed of the proform for Ground and the proform for Figure with Motion and Path conflated. The difference is that the proform for Ground of sentence (20) represents the source for Path, while that of sentence (21), the goal for Path.

- (21) *DOG JAR JARpro + DOGpro – move.into.*
Figure Ground Ground pro + Figure pro – Motion/Path
‘The dog moved into the jar.’

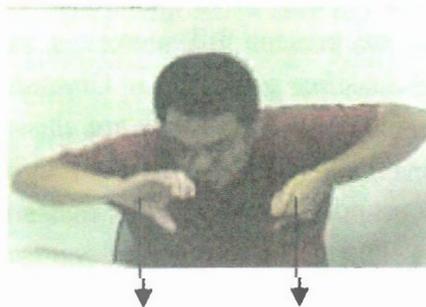


Figure 2: JARpro + DOGpro – move.into

Sentence (20) above describes a motion event that Figure (a frog) is moving out of Ground (a jar). Sentence (22) represents the same motion event by a similar classifier predicate with Manner incorporated. In this case, Manner is encoded by the turning movement of the wrist. Such local movement of Manner can be interpreted as ‘the manner of movement along the path’. Accompanied by facial expressions and contexts, the local movement can represent different manner of moving, such as stealthily or quietly crawling/climbing, etc.

- (22) *FROG* *JARpro + FROGpro – move.out.with wrist turning.*
 Figure Ground pro + Figure pro – Motion/Path/Manner
 ‘The frog moved out of the jar by crawling/climbing stealthily or quietly.’

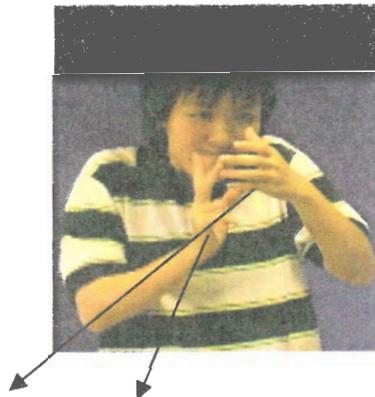


Figure 3: JARpro + FROGpro – move.out.with wrist turning

Let’s turn to a more complex representation of a motion event. Sentence (23) describes a motion event in which one Figure (a dog) is running after the other Figure (a deer), and the classifier predicate is composed of two proforms for two Figures conflated with Motion, Path and Manner. We use parentheses to group the two proforms together in (23) and Figure 4. In this case, Manner is encoded by the wiggling of the fingers. What’s complex here is the proform of the deer plays the role of both Figure and Ground at the same time. As Figure, it represents the running deer, and as Ground, it represents the deer that dog is running after. The meaning that the dog is running after the deer is encoded by the arrangement of both hands.

- (23) *DOG* *(DEERpro + DOGpro) – move.with finger wiggling.*
 Figure (Figure pro + Figure pro) – Motion/Path/Manner
 ‘The dog ran after the running deer.’



Figure 4: (DEERpro + DOGpro) – move.with finger wiggling

From the above examples, we can see that the handshape, movement, location and arrangement of both hands in the classifier predicate of TSL are all meaningful. These meaningful elements are important for sign languages to conflate motion events.

3.1.2 Lexicalized verbs

In addition to classifier predicates, motion events can be encoded by lexicalized verbs, as shown in sentences (24)-(27).

The motion event in sentence (24) is expressed with a lexicalized manner verb only. A large part of upper body is involved when signing this kind of manner verbs. Supalla (1990:136) regarded such verbs as ‘locomotion verbs involving body classifiers’, noting that they refer to ‘manner of locomotion of the agent’, not ‘manner along the path’. Slobin & Hoiting (1994) analyzed them as ‘manner verbs’ referring to different types of movement of the agent, such as run, crawl, fly, etc. In this paper, we adopt Slobin & Hoiting’s analysis. The data we collected show that manner verbs in TSL express Path as well by the orientation and movement of the body.

- (24) Motion event with a lexicalized manner verb in TSL (M)
EAGLE *TREE* *EAGLE* *FLY*.
 Figure Ground Figure Motion/Manner/(Path)
 ‘An eagle flew out of the tree.’

Motion events can also be expressed by lexicalized path verbs, as illustrated in sentence (25).

- (25) Motion event with two lexicalized path verbs in TSL (P)
I *GO-AWAY* *COME* *HOME*.
 Figure Motion/Path Motion/Path Ground
 ‘I left and came home.’

Furthermore, manner verbs can be signed sequentially with path classifier predicates in motion events, as illustrated in sentence (26). The motion event is about Figure (a frog) crawling and jumping out of Ground (a jar). The lexicalized manner verb expresses movement of Figure (a frog) in a ‘crawling’ manner. It precedes the path classifier predicate which incorporates another Manner element expressing the frog’s movement out of the jar by ‘jumping’.

- (26) Motion event with a lexicalized manner verb and a path classifier predicate represented sequentially in TSL (M#CL)
FROG JAR CRAWL JAR_{pro} + FROG_{pro} – be.in > jump.out.
 Figure Ground Motion/Manner Ground pro + Figure pro – Motion/Path/Manner
 ‘The frog crawled, and it was in the jar first and jumped out of the jar.’



Figure 5: a. CRAWL



b. JAR_{pro} + FROG_{pro} – be.in > jump.out

In our TSL Frog Story narratives, we also found several sentences like (27), in which Path verb precedes Manner verb. We feel they might not represent genuine pattern of TSL. It appears that ‘ESCAPE RUN’ is adopted from Chinese verb compound *tao^pao* ‘escape^run’ meaning ‘escape’.

- (27) *FROG ESCAPE(ESCAPE^RUN) LE.*
 Figure Motion/Path ASP
 ‘The frog escaped.’

3.2 Typological category of TSL

As mentioned in the previous section, in ASL, Manner can be encoded either as a verb or as a local movement incorporated in a path classifier predicate, and when both occur, the manner verb and the path classifier predicate are represented sequentially, as in sentence (26) above. Both Supalla (1990) and Slobin & Hoiting (1994) proposed a serial-verb analysis of ASL motion events. However, they differ with regards to whether

ASL is a 'satellite-framed' or 'verb-framed' language.

Supalla (1990) treated the fuller and more elaborated manner verb as a main verb and the path classifier predicate as a reduced form, like a satellite, and thus claimed that ASL is a satellite-framed language. In contrast, Slobin & Hoiting (1994) treated ASL as a kind of verb-framed languages because the path classifier predicate is the main verb and the manner verb is optionally encoded. Furthermore, they proposed that ASL as a serial verb language belongs to a third typological type, and referred to sign language in general as 'complex verb-framed' languages. Supalla (1990) and Slobin & Hoiting (1994) made their different analysis on sentence level. Later, Taub & Galvan (2001) and Galvan & Taub (2004) compared motion events of Frog Story narratives between English and ASL, and concluded that ASL is a verb-framed language because of the high percentage use of path classifier predicates.

In §3.1, we have identified various encoding patterns in TSL Frog Story narratives. The most abundant pattern involves classifier predicates of which Path is the necessary element with Manner optionally incorporated into Path. That means Path can be encoded without Manner (i.e., (20) and (21)) or Manner can be simultaneously encoded with Path (i.e., (22) and (23)). Therefore, it is reasonable to conclude that TSL is a verb-framed language. Furthermore, Manner in some cases can also be encoded as a verb occurring sequentially before a path verb (i.e., (26)). Therefore, TSL can be regarded as a complex verb-framed language.

In §2, we have shown that Mandarin Chinese is a complex verb-framed language on both sentence level and narrative discourse level. In §3, we have shown that TSL is also a complex verb-framed language. Although both Mandarin Chinese and TSL can be regarded as the same type of language, the frequencies of different encoding patterns of motion events are quite different, as shown in Table 1 below.

In Table 1, M stands for Manner; P for Path; CL for bare classifier predicate; CL_m for classifier predicate with Manner incorporated; M[^]P([^]D) for compound composed of Manner and Path (and Deictic); M#CL_m for manner verb and classifier predicate encoded sequentially; and M#M[^]P([^]D) for manner verb and manner-path compound encoded sequentially.

Table 1

	M	P	CL	CL _m	M [^] P([^] D)	M#CL _m	M#M [^] P([^] D)	Total
Chinese	2%	32%			59%		7%	100%
TSL	9%	13%	25%	44%		9%		100%

4. Is TSL a manner-salient language

As observed by Supalla (1990) and Slobin & Hoiting (1994), in ASL, Manner can be encoded either simultaneously with a path classifier predicate or with a manner verb sequentially represented before the path classifier predicate. We found it is also true for TSL. Sentence (28)-(29) illustrates the simultaneously incorporated Manner in a classifier predicate with the form of finger wiggling. The interpretation of this local movement incorporated in classifier predicate can be ambiguous, meaning ‘crawling, running, flying, etc’. The specific meaning of this local movement depends on facial expressions as well as context. Sentence (28) can be interpreted as ‘crawling’, while sentence (29), ‘running’. In contrast, in sentence (30), a manner verb is sequentially represented before a path classifier predicate and its meaning can be more clearly specified as ‘crawling’.

- (28) Classifier predicate with Manner simultaneously incorporated
FROG JAR_{pro} + FROG_{pro} – move.out.with finger wiggling.
 Figure Ground pro + Figure pro – Motion/Path/Manner
 ‘The frog moved out of the jar by crawling.’
- (29) Classifier predicate with Manner simultaneously incorporated
DOG (DEER_{pro} + DOG_{pro}) – move.with finger wiggling.
 Figure (Figure pro + Figure pro) – Motion/Path/Manner
 ‘The dog moved after the running deer by running.’
- (30) Classifier predicate with a manner verb sequentially represented
FROG CRAWL JAR_{pro} + FROG_{pro} – move.out.
 Figure Motion.Manner Ground pro + Figure pro – Motion.Path
 ‘The frog crawled out of the jar.’

Compare sentence (28) in TSL to sentence (31) below in Mandarin Chinese, they are similar in encoding both Manner and Path. The difference is that Manner in TSL is simultaneously encoded, while in Mandarin Chinese, sequentially. Furthermore, the meaning that Manner encodes in TSL is not as clearly specified as in Mandarin Chinese.

- (31) *Qingwa pa^chu boli ping.*
 Frog crawl^exit glass jar
 ‘The frog crawled out of the jar.’

We have seen that in TSL Manner can be made salient with manner verbs sequentially preceding classifier predicates. However, this pattern is not frequent, only 7% in our Frog Story narratives (see Table 1). In addition, Manner can also be simultaneously encoded with Path in classifier predicates, with high percentage, 44% (see Table 1). However, since we do not think that the typological distinction by Slobin (2004) between manner-salient and non-manner-salient sign languages is necessary, we do not want to conclude here that TSL is a manner-salient sign language.

5. Conclusion

The result of our study shows that Mandarin Chinese speakers use at least four patterns to encode motion events: (a) Path verb only, (b) a compound composed of Manner verb and Path verb, (c) Manner verb with Path adverbial and (d) Manner expressed sequentially as a verb before the compound composed of Manner and Path verb. Deictic verbs can optionally occur after the verb or verb compound. TSL signers use five patterns to encode motion events: (a) Path verb only, (b) Path classifier predicate, (c) Manner verb only, (d) Manner inflected into Path classifier predicate, and (e) Manner expressed sequentially as a verb before Path classifier predicate. One important finding in this study is that the linear-order representation of Manner-Path-Deictic verb is the most abundant pattern in Mandarin Chinese, while the simultaneous conflation of Manner-Path classifier predicate is the most abundant pattern in TSL. The other is that the sequential arrangement of Manner and Path in TSL is small in percentage, a natural consequence of the simultaneous conflation of Manner-Path classifier predicate in sign language in general. These two findings should not be surprising. For Mandarin Chinese, as a spoken language, encodes conceptual elements of motion events through audio-vocal modality, while TSL, as a signed language, encodes conceptual elements of motion events through visual-gestural modality. In audio-vocal modality, spoken languages are limited to one-dimensional linear order of representation. In contrast, in visual-gestural modality, signed languages are capable of conflating conceptual elements simultaneously.

In this study, we observe that the most prevalent encoding patterns of motion events in Mandarin Chinese and in TSL as well are verbs conflating Path and Motion and with Manner encoded optionally. Both languages are therefore treated as a kind of complex verb-framed languages. Extending previous typological studies, we propose a tripartite framework of language typology (as shown in Table 2) which reflects modality effects at the same time.

Table 2

Typology \ Modality	Satellite-framed	Verb-framed	Complex verb-framed
Visual-gestural			ASL, TSL, and other sign languages
Audio-oral	English, German	French, Spanish	Mandarin Chinese and other serial-verb languages ⁷

Independent of the tripartite distinction, Slobin (2004) also proposed a distinction between manner-salient or non-manner-salient languages. The visual-gestural modality of sign languages allows conceptual elements to be conflated simultaneously. The simultaneous encoding explains why classifier predicates are more abundant than lexicalized verbs in TSL, and perhaps in sign language in general. However, even though classifier predicates in sign languages are more iconic than verbs or satellites in spoken languages, without facial expressions or contexts, the meaning of the simultaneously incorporated Manner tends to be ambiguous. This observation propels us to examine further the manner-salient encoding across modalities. Speakers of languages with abundance of manner verbs (i.e., English) or manner-path verb compounds (i.e. Mandarin Chinese) in their grammar, they naturally tend to encode Manner in their narratives. In contrast, in sign languages, it is not common for manner verbs to occur alone. Therefore, we are tempted to think that without facial expressions and contexts, spoken languages like English and Mandarin Chinese are more capable than signed languages of expressing various kinds of Manner more clearly.

In the grammar of verb-framed languages like Spanish, Manner is encoded as an adjunct or a gerundive phrase. As observed in a series of works by Slobin (1996, 1997, 2000), Spanish speakers tend to less frequently and less differentiatedly express Manner of movement than English Speakers do. However, as pointed out by McNeill (1992, 2000), co-speech gestures expressing manners co-occur with path verbs. Co-speech gestures in spoken languages enable speakers to express Manner in more detail. In the same vein, facial expressions and perhaps co-sign gestures in sign languages serve the same purpose. Thus, further studies of co-speech gestures in spoken languages and facial expressions and co-sign gestures in sign languages would shed a new light to the typology of motion events within and across modalities.

⁷ Such as Creole languages and serial verb languages in Africa, Indonesia, and Papua New Guinea.

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