



<b>Title</b>	<b>The use of motion event expressions in typically developing and language-delayed preschoolers</b>
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The Use of Motion Event Expressions in  
Typically Developing and Language-delayed  
Preschoolers

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### Abstract

The present study aimed to explore the use of motion event expressions in typically developing and language delayed preschool children in Hong Kong. Narrative production of 90 typically developing children and 50 language-delayed children age from 3;01 to 5;11 were examined and evaluated. The finding indicated that the types of motion verbs increased from 3;01 to 5;11 in typically developing children. The typically developing preschoolers had a larger diversity of motion verbs than language-delayed preschoolers. Differences in the pattern of motion event descriptions were found between typically developing children and those with language delay. Although typically developing children and language-delayed children used manner + path descriptions most frequently, language-delayed children used path descriptions in a significantly higher proportion than their age equivalent counterparts in typically developing group.

Event description is common in our lives. Our daily conversation usually involves motion event descriptions (Johnson, 1987; cited in Chen, 2005). Besides, motion verb and verb complement are two pivotal elements in motion event description, indicating how the object moves and its movement trajectory respectively (Slobin, 1996). Studies by Clark (1993), and Pulverman, Hirsh-Pasek, Golinkoff, Pruden and Salkind (2006) found that motion verbs like *fall* and *jump* play a crucial role in the acquisition of children's early verb lexicon. It was reported that English-speaking children started to use path satellite (e.g. *up*) and manner verb (e.g. *run*) in single-word utterances around 14-16 months and 17-18 months respectively (Choi & Bowerman, 1991). This suggested that children start talking about movement and motion in space rather early in their language development. Other studies also found that Chinese-speaking children have more verbs than nouns in their early vocabularies and verbs tend to appear in the salient position in the sentence (Tardiff, 1996; Choi & Gopnik, 1995). Therefore, investigation of the acquisition of motion events is important as it could provide information on early verb development in children.

### Motion events

According to Talmy (2000, p.25), a motion event is defined as an 'event consisting of one object moving or located with respect to another object'. There are four basic components in motion event: *Figure*, referring to the moving object; *Ground*, an object that the figure moves with respect to; *Path*, the trajectory followed by the figure with respect to the ground

figure and *Motion*, the movement of the figure. Apart from the four basic semantic components, *Manner*, one of the important external co-event components, describes the way in which the figure moves. This can be illustrated in the following examples:

1. The man ***came*** [motion] into the room
2. The man ***ran*** [motion + manner] into the room

#### Typology of motion events

Talmy (1985, 2000) classified languages by way of encoding path and manner. He suggested that a ‘verb-framed’ language such as French, characteristically encodes path onto the main verb, and manner, which is optional, onto a subordinate expression. On the contrary, in a ‘satellite-framed’ language such as English, path is encoded onto an element associated with the verb (i.e. preposition) called satellite, and manner is encoded onto the main verb.

This contrast can be illustrated by the following example (Slobin, 2004):

Example: English: An owl      ***popped*** [Manner verb]      ***out*** [Satellite]      the tree.

French: D’un trou de l’arbre      ***sort*** [Path verb]      un hibou

‘From a hole of the tree exits an owl’

Talmy’s dichotomy is obvious for languages such as English and French which only have one verb slot in a clause (Chen, 2005). However, there is a debate in the application of Talmy’s dichotomy to serial-verb languages, which have two verb slots in a clause. In serial-verb languages such as Cantonese and Mandarin, manner is typically encoded onto the

first verb and path onto the second verb. Studies have shown that Talmy's dichotomy was not fully comprehensive and revised proposal has been made. Taking into consideration the unique characteristics of serial-verb languages, Slobin, (2004, 2006) proposed a third typological category named 'equipollent framed language', in which path and manner information were encoded onto the verb with roughly equal morphosyntactic status. Since the path verbs can stand alone as independent verbs, they cannot be regarded as a satellite.

#### Cantonese as a serial-verb language

Motion elements in Cantonese can be represented in the form of (a) manner verbs, for example, 跑 pao2 'run', 行 haang4 'walk', (b) path verbs, 出 ceot1 'exit', 嚟 lai4 'come', 落 lok3 'down', (c) neutral verb, for example, 整 zing2 'make'. In terms of the verb patterns of motion event expressions, they are categorized into four types in the present study, as shown in the examples below:

a) Manner expression: 狗 仔 跑 (only a manner verb was in the clause)

gou2      zai2      paau2

Dog                  run

“The dog ran”

b) Manner + path expression: 青蛙 行 出嚟 (manner and path verb were used)

cing1 waa1 haang4 ceot1 lai4

Frog      walk      out      come

“The frog walked out”

c) Path expression: 男 仔 出 去 (only a path verb was used in the clause)

naam4 zai2 ceot7 heoi2

Boy exit go

“The boy exited”

d) Neutral + path expression: 佢 整 佢 落 去 (neutral and path verb were used)

keoi5 zing2 keoi5 lok6 heoi2

It make him down go

“It made him fall down”

#### Previous studies on motion events

Recently, a large body of research documented the production of motion events in preschool children across languages. However, the findings were controversial. Ozcaliskan & Slobin (1999) found that there is a spurt in manner and path verbs in English, Turkish and Spanish with the use of “Frog story” (Mayer, 1969), a common elicitation tool in narrative research. They found an expansion of types of manner verbs at age five for Turkish, and age nine for Spanish but an expansion of types of path verbs at age four for English. Hickman (2006), conducting an experimental study on the way children describing motion events, found developmental progression. In general, English-speaking children used more manner descriptions with increase of age.

Cho (2002) studied acquisition of vectorial directional verbs (e.g. 落 *lok3* ‘down’), in thirty-two Cantonese-speaking children aged from 4;06 to 6;00. The subjects described a particular sentence structure with the use of pictures. She found a developmental trend on the use of vectorial directional verbs (VDV). For instance, children at age 4;06 acquired the VDV “落”, followed by 上 *soeng3* ‘up’, 入 *jap9* ‘enter’/ ‘in’, 過 *gwo3* ‘across’, 出 *ceot7* ‘out’, 埋 *maai4* ‘together’ and 開 *hoi1* ‘apart’. Children did not fully acquire the above VDV until age 6. Path verbs were regarded as part of the VDV. This suggests that the number of types of manner verbs and path verbs might increase across ages, and a developmental trend would be properly found in description of motion events in Cantonese.

On the contrary, a different perspective was offered by Chen (2005). He investigated the acquisition of motion events in *frog story* in Mandarin. Fifty-nine subjects in five different age groups (children aged 3, 4, 5, 9 and adults ranging 18-22 years of age) were involved. He found that Mandarin-speaking children did not seem to show any significant developmental difference in the use of different types of motion verbs. In his study, a motion event containing two motion elements (i.e. manner and path) was defined as ‘manner expression’ whereas it was defined as manner + path expression in the present study. He reported that the percentage of ‘manner expressions’ was always higher than that of path expressions across age groups.

Similarly, Chau (2006) studied motion event expressions in Cantonese narratives. A total



of sixty children aged 3, 4 and 5 and twenty adults participated in telling the *frog story*. She found that the adult group produced significantly more types of manner and path verbs than the children groups, but with no statistically significant differences among the children groups. Whether a developmental trend exists in the use of motion event expressions is thus still a controversy among linguists and further investigation is required.

On the other hand, studies of motion events mainly concern typically developing (TD) children and little attention is paid to children with language delay. According to Watkins, Rice & Moltz (1993), language-impaired children had a less diverse main verb lexicon (i.e. lexicon inventory) than both their age- and language-matched peers. They used a similar set of high frequency verbs (e.g. *do*, *play*) as typically developing children. Similarly, other studies also reported that children with specific expressive language impairment (SELI) often have problems with the verb category (Fletcher, 1994; Rice & Bode, 1993), and have less diverse verb lexicons than TD children. It is hypothesized that the types of manner and path verbs will be fewer in language-delayed (LD) children. Also, children with SELI often have persistent problems with verbs (Paul, 1993). As verbs play a pivotal role in motion event descriptions, it is hypothesized that LD children might be weak in motion events descriptions. They might express motion events difficultly. Instead of using manner + path expressions (i.e. involve both manner verb and path verb), they might prefer to use either path or manner expressions instead of considering both manner and path elements.

The present study aimed to examine the use of motion event descriptions, focusing on the acquisition of motion verbs and the pattern of motion event descriptions, in typically developing children and children with language delay. The following research questions were addressed:

1. What was the developmental trend of motion verbs in TD and LD preschoolers and the differences between the two groups? It was predicted that for TD children, the types of manner and path verbs would increase across age whereas LD preschoolers might show a slower development in the acquisition of manner and path verbs.
2. What was the pattern of motion event descriptions in TD children across ages and what the differences between TD group and LD group? It was predicted that TD children would mainly produce more manner + path expressions, followed by manner expressions and path expressions. On the other hand, LD children would produce more path expressions and manner expressions than manner + path expressions.

## Method

### Subjects

An invitation to participants in the project with consent form and demographic questionnaire was sent to local kindergartens. Children with normal hearing and health and speaking Cantonese as the mother tongue were recruited. A total of one hundred and forty children participated in this project. The Reynell Developmental Language Scale-Cantonese

Version (Reynell & Hurtley, 1987) (RDLS) was used as a screening tool to assess the language ability of the participants. Children scored no less than 0.6 standard deviations below the mean for their age on the expressive language scale of RDLS were included and classified as typically developing (TD) children. On the other hand, children scored lower than 1.25 standard deviations below the mean for their age on the expressive language scale of RDLS were included and classified as language delay (LD) (Fey, 1986). The number of subjects and mean ages for the children in two different groups were presented in Table 1. Besides, twenty local university students aged above 18, without report of any speech and language difficulties, were also recruited to serve as reference.

Table 1. Number of subjects, age range and mean ages of children in TD group and LD group

	Typically developing (TD) group			Language delay (LD) group		
	N=90			N=50		
	3-yr-old	4-yr-old	5-yr-old	3-yr-old	4-yr-old	5-yr-old
	N=30	N=30	N=30	N=10	N=20	N=20
Age range	3;01-3;11	4;01-4;11	5;02-5;11	3;03-3;11	4;00-4;11	5;00-5;11
Mean age	3;06	4;06	5;06	3;07	4;04	5;06

### Materials and Procedure

The wordless story book *Frog, Where are you?* (Mayer, 1969) was used as the events depicted in this story book invited a rich array of motion descriptions (Slobin, 1996). The

story book includes 24 pictures. It talks about a pet frog escaped from its jar and a boy and his dog went looking for the lost frog. The children were asked to tell the story with the following standard instructions “請你睇一次個故仔先，之後再講返俾我聽” (“Please spend time reading the storybook once before telling the story”) Only general verbal cues or probing questions, e.g. “睇吓” (“Watch here?”), “噉呢度呢?” (“What about here?”) or “有咩嘢事發生緊呀?” (“What’s happening here?”) were given. All the verbal productions by the subjects were recorded and later transcribed orthographically.

### Coding

For purpose of analysis, motion events were identified from the transcriptions. A total of 416 motion events were extracted and coded in terms of their inclusion of manner and/ or path components of motion events. We followed the coding system of Slobin (1998) (See Appendix A). The number of various types of motion events expressions as well as the proportion of uses of each category were counted and calculated. In addition, a total of 100 different motion verbs were identified and classified into three categories (See Appendix B). The number of types of motion verbs and the number of motion verbs was also calculated for each participant.

### Coding Reliability

To ensure reliability of coding, ten percent of the randomly selected transcripts were re-coded by another final year student majoring in Speech and Hearing Sciences. The

coefficient kappa was calculated to indicate the degree of agreement on the tokens of various types of motion events and types of motion verbs ( $\kappa = 0.93$ ,  $p < 0.05$ ). Any discrepancies found were discussed and resolved.

## Results

The analysis was conducted in three parts. In the first analysis, we examined the developmental trend of motion verbs in TD and LD preschoolers, and investigated whether they showed differences in the acquisition of motion verbs.

### *Number of types of motion verbs by age in typically developing (TD) group*

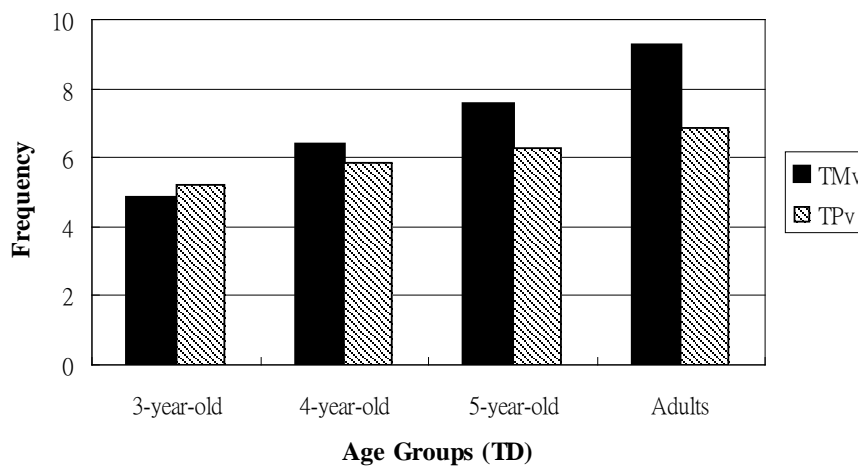


Figure 1. Mean number of types of manner verbs (TMv) and types of path verbs (TPv) in TD participants and adults

Figure 1 shows that both the number of types of manner verbs (TMv) and the number of types of path verbs (TPv) increased gradually from age 3 to adults. However, the TMv grew at a faster rate than TPv. Also, it indicated that the diversity of manner verbs was larger than that of path verbs across ages, except at age 3. The effect of age on the TMv and TPv were both

significant,  $F(3, 106) = 23.85$ ,  $p < 0.001$ , and  $F(3, 106) = 7.13$ ,  $p < 0.001$  respectively. The results of Tukey HSD tests of TMv and TPv were presented in Table 2. Statistically significant differences between all combinations of age groups, except between age four and five, were noted in TMv. On the other hand, statically significant differences were found between age three, age five and adults, and between age four and adults in TPv.

Table 2. Tukey HSD tests of TMv and TPv in TD participants

	TMv				TPv			
	3	4	5	Adults	3	4	5	Adults
3	–	-1.53*	-2.73***	-4.42***	–	-0.60	-1.07**	-1.62***
4	–	–	-1.20	-2.88***	–	–	-0.47	-1.02*
5	–	–	–	1.68*	–	–	–	-0.55
Adults	–	–	–	–	–	–	–	–

3 = children of 3-year-old; 4 = children of 4-year-old; 5 = children of 5-year-old

\* =  $p \leq 0.05$ ; \*\* =  $p \leq 0.01$ ; \*\*\* =  $p \leq 0.001$

#### *Number of types of motion verbs by age in language-delayed (LD) groups*

From Figure 2, the number of types of path verb (TPv) increased sharply between age group of 3-year-olds and 4-year-olds, followed by a steady rise from age group of 5-year-olds to adults; and there was a gradual increase in the number of types of manner verbs (TMv) across ages. The effect of age on the TPv was significant,  $F(2, 47) = 9.98$ ,  $p < 0.001$ , whereas

the effect of age on the TMv was not significant,  $F(2, 47) = 2.56$ ,  $p > 0.05$ . The results of Tukey HSD tests of TPv were presented in Table 3 and it showed statistically significant differences between three years old and all age groups.

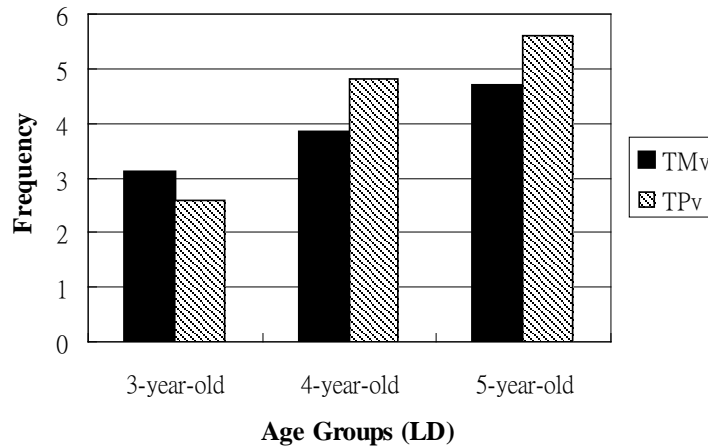


Figure 2 Mean number of types of manner verbs (TMv) and types of path verbs (TPv) in LD participants

Table 3. Tukey HSD tests of TPv in language-delayed groups (LD)

	3-year-old	4-year-old	5-year-old
3-year-old	–	-2.20**	-3.00***
4-year-old	–	–	-0.80
5-year-old	–	–	–

\*\* =  $p \leq 0.01$ ; \*\*\* =  $p \leq 0.001$

#### *Comparison of TD and LD children in number of types of manner verbs (TMv)*

As shown in Figure 3, children of different ages in TD group produced more manner verbs than those in LD group. The manner verb inventory was more diverse in TD children. A

2X3 two way ANOVA with two between-subject independent variables, language performance (typically developing, language delay) and age (3, 4 and 5), showed main effect of both age and language performance,  $F(2, 134) = 13.00$ ,  $p < 0.001$ , and  $F(1, 134) = 50.03$ ,  $p < 0.001$  respectively. However, the interaction between them was not significant,  $F(2, 134) = 0.89$ ,  $p > 0.05$ .

When comparing the children of TD and LD group at different ages, t-tests showed that TD children of 3-year-old, 4-year-old and 5-year-olds produced significantly more types of manner verbs than the age equivalent LD counterparts (For TD 3 Vs LD 3,  $t(38) = 2.24$ ,  $p < 0.05$ ; TD 4 Vs LD 4,  $t(48) = 5.35$ ,  $p < 0.001$ ; TD 5 Vs LD 5,  $t(48) = 5.55$ ,  $p < 0.001$ ).

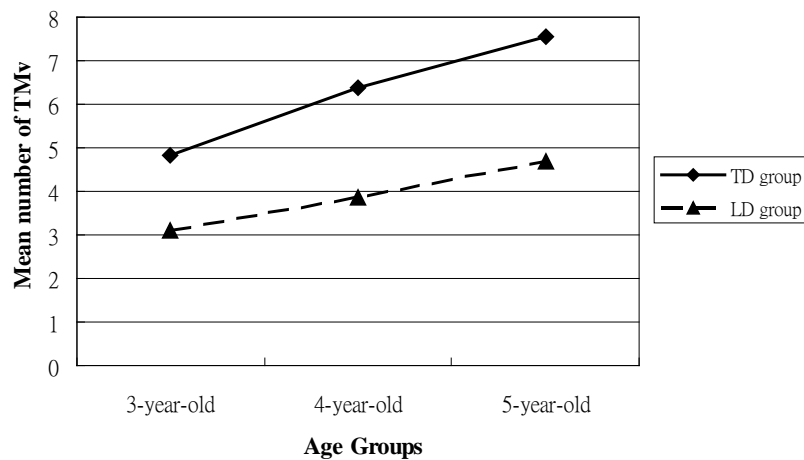


Figure 3. Mean number of types of manner verbs (TMv) in TD groups and LD groups

#### *Comparison of TD and LD children in the number of types of path verbs (TPv)*

Figure 4 illustrates that TD children produced significantly more different path verbs than LD children in all age groups. A 2x3 two way ANOVA with two between-subject independent variables, language performance (typically developing, language delay) and age



(3, 4 and 5), showed main effect of both age,  $F(2, 134) = 17.30$ ,  $p < 0.001$ , and language performance,  $F(1, 134) = 28.56$ ,  $p < 0.001$ , as well as an interaction between them,  $F(2, 134) = 4.17$ ,  $p < 0.05$ . Also, LD group showed a larger increase in the production of different path verbs than TD group from age three to five.

When comparing the children of TD and LD group at different ages, t-tests showed that TD children of 3-year-old and 4-year-old produced significantly more different path verbs than the age equivalent LD counterparts (For TD 3 Vs LD 3,  $t(38) = 3.93$ ,  $p < 0.001$ ; TD 4 Vs LD 4,  $t(48) = 2.68$ ,  $p < 0.01$ ). However, TD children of 5-year-old produced similar number of types of path verbs than LD children of 5-year-old,  $t(48) = 1.82$ ,  $p > 0.05$ .

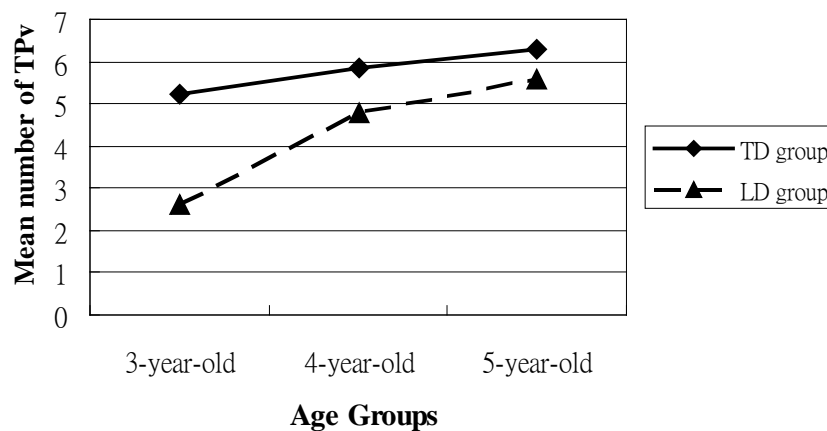


Figure 4. Mean number of types of path verbs (TPv) in TD groups and LD groups

The second investigation focused on the pattern in using the three categories of motion events, including manner + path, manner and path descriptions, in TD preschoolers across ages and adults. The neutral + path descriptions were excluded as this category contributed only 0.69% in the total number of motion event expressions. The subjects seldom chose this

category in motion event descriptions. The patterns of motion event descriptions in two groups were compared to investigate whether they showed differences in the use of motion event expressions. As two of the age 3 LD children did not produce any motion event expressions in story, they were excluded in the analysis in order to retain enough variability in the data (Allen, Ozyurek, Kita, Brown, Furman, Ishizuka & Fujii, 2007).

*Distribution of three categories of motion events in typically developing (TD) groups*

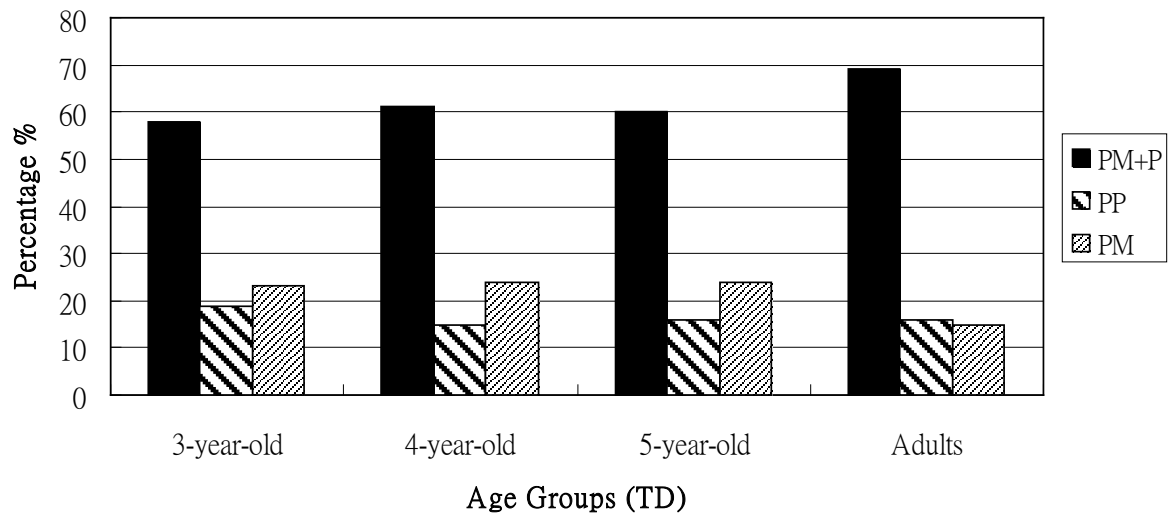


Figure 5. Percentage of three categories of motion events in TD participants and adults

Concerning the use of motion events in TD participants and adults, the mean percentage in the use of three categories of motion events was presented in Figure 5. By carrying out paired t-test comparison in all age groups (i.e. age 3, 4, 5 and adults), manner + path descriptions were used significantly more than the other two categories of motion events (i.e. path descriptions and manner descriptions).

Table 4. Paired t-tests comparison of the use of motion events in TD age groups

Age groups	Manner + path Vs Path	Manner + path Vs Manner
3	9.09***	7.29***
4	11.77***	7.27***
5	6.88***	5.70***
Adults	9.17***	10.94***

\*\*\* =  $p \leq 0.001$

*Comparison of TD and LD children in proportion of manner + path descriptions*

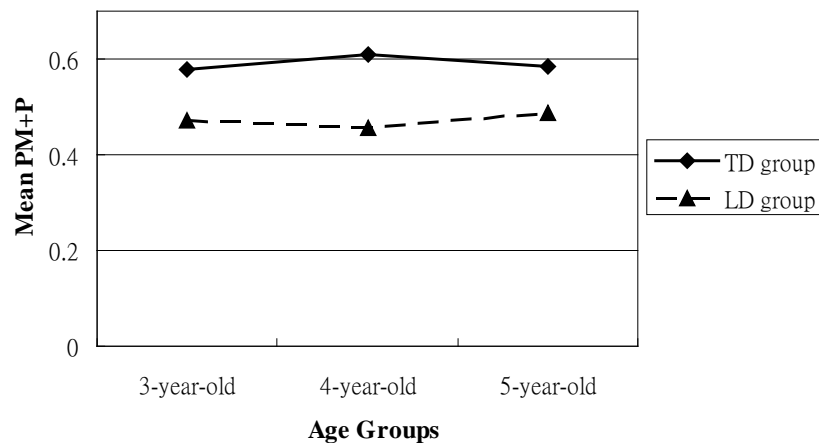


Figure 6. Mean proportion of manner + path descriptions (PM+P) in TD and LD groups

Figure 6 shows that the comparison of proportion of uses of manner + path descriptions across age groups for TD children and LD children. A 2\*3 two way ANOVA analysis with two between-subject independent variables, language performance and age, showed a main effects on language performance,  $F(1, 134) = 18.42$ ,  $p < 0.001$ . But no main effect was shown on age,  $F(2, 134) = 0.98$ ,  $p > 0.05$  and an interaction between age and language performance,  $F(2, 134) = 0.71$ ,  $p > 0.05$ . This suggested TD children used significantly more manner + path

descriptions than LD children across age.

*Comparison of TD and LD children in proportion of path descriptions*

From Figure 7, LD children produced significantly more path descriptions than TD children. A 2\*3 two way ANOVA analysis with language performance and age as between-subject independent variables showed main effects on language performance,  $F(1, 134) = 11.94, p < 0.005$ . But no main effect was shown on age,  $F(2, 134) = 0.47, p > 0.05$  and no interaction between age and language performance,  $F(2, 134) = 1.73, p > 0.05$ . This suggested that children with language delay used path descriptions to express motion events in a relatively higher proportion.

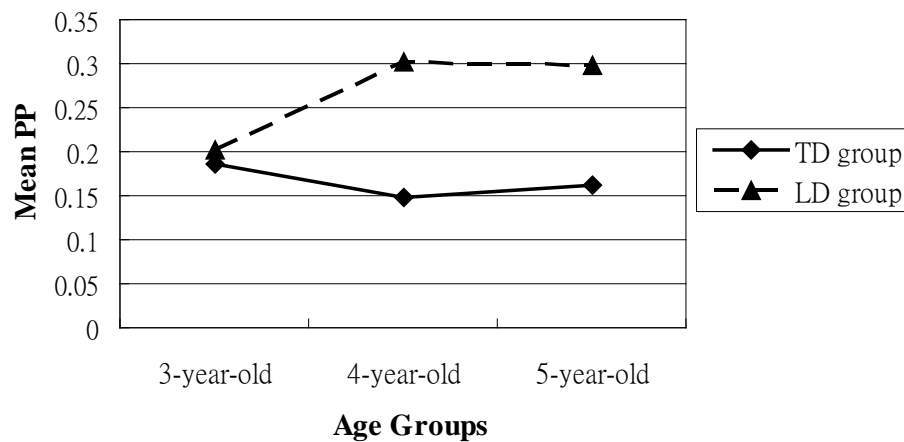


Figure 7. Mean proportion of path descriptions (PP) in TD groups and LD groups

*Comparison of TD and LD children in proportion of manner descriptions*

Figure 8 illustrates that there was a marked overlapping among the TD group and the LD group in the proportion of manner descriptions, except at age 3. This suggested both the TD and LD group did not show a preference in using this type of motion events. A 2\*3 two way

ANOVA analysis revealed no statistically significant effect on language performance,  $F(1, 134) = 0.02, p > 0.05$ , age,  $F(2, 134) = 0.12, p > 0.05$ , and an interaction between language and age performance,  $F(2, 134) = 0.31, p > 0.05$ .

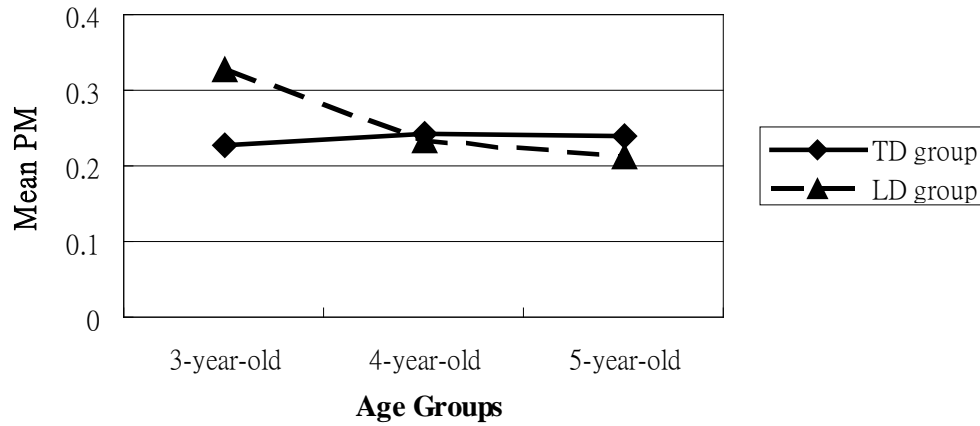


Figure 8. Mean proportion of manner descriptions (PM) in TD groups and LD groups

#### *Correlational analysis for motion event expressions*

In the third analysis, the relationship among various variables in motion events and the scores of expressive language scale of RDLS were examined. Results of correlational analysis were summarized below. First, the scores in expressive language scale of RDLS was positively correlated with the number of types of manner verbs (TMv), the number of types of path verbs (TPv), the number of motion events (ME), the number of manner verbs (NMv), the number of path verbs (NPv) and the proportion of manner + path descriptions (PM+P),  $r = 0.62, p < 0.01, r = 0.43, p < 0.01, r = 0.43, p < 0.01, r = 0.58, p < 0.01, r = 0.31, p < 0.01, r = 0.27, p < 0.01$  respectively. Second, the scores in expressive language scale of RDLS was negatively correlated with the proportion of path descriptions,  $r = -0.29, p < 0.01$ .

## Discussion

The purpose of this study was to investigate the developmental patterns of motion verbs in TD and LD preschoolers, and how they use motion event descriptions in narratives.

### *Developmental pattern of motion verbs in TD preschoolers*

In the present investigation, it was found that the diversity of motion verb lexicons, including both manner verbs (e.g. 跑 paau2 ‘run’) and path verbs (e.g. 去 heoi2 ‘go’), increased by age. TD children at age five produced significantly more different manner verbs and path verbs than at age three. The finding was in agreement with results reported in Cho (2002) and Ozcaliskan & Slobin (1999), and supported the claim of developmental hypothesis, in which older children tended to use a greater diversity of manner verbs and path verbs.

A developmental pattern of motion verbs was found in Cantonese, which was consistent with studies of other languages such as English and Turkish (Ozcaliskan & Slobin, 1999). It implied the development of motion verbs could be a universal pattern, and would not be culturally different.

The results found in the present study did not match Mandarin-speaking children in Chen’s study (2005) and Cantonese-speaking children in Chau’s study (2006). Both Chen (2005) and Chau (2006) did not identify any developmental trend between the 3- to 5-year-old groups in terms of motion verbs lexical inventory. In Chen’s study, only descriptive statistics was employed for analysis. Using inferential statistics might be more convincing in showing

the developmental trend.

On the other hand, the differences in the coding method might also account for the differential results. In the present study, the types of motion verbs were classified based on the semantic meaning. For instance, manner verbs 跌 dit9 ‘fall’ and 跌倒 dit9 dou2 ‘fall’ were counted as one type of manner verb as the complement 倒 dou2 conveys the same semantic meaning of the verb 跌 dit9. However, in Chau’s study, she counted as two types of manner verbs.

#### *Developmental pattern of motion verbs in LD preschoolers*

Children with language delay showed a significant increase in the diversity of path verbs while a subtle increase in the diversity of manner verbs across ages. The finding did not fully support the claim that language-delayed preschoolers tended to show a slower development of in the acquisition of both types of motion verbs (See below for further discussion).

#### *Differences in the acquisition of motion verbs between typically developing (TD) preschoolers and language-delayed (LD) preschoolers*

The diversity of motion verb, including both manner verbs and path verbs, in the LD group was smaller than that in the TD group across ages. This finding was in agreement with results from previous research related to development of verb lexicon (Fletcher, 1994; Rice & Bode, 1993; Watkins et. al., 1993), which showed that children with language impairment and specific expressive language impairment (SELI) had less diverse verb lexicons than typically

developing children.

Children with SELI showed persistent problems with verbs (Paul, 1993). Contrary to expectation, the present finding suggested that LD children did not show persistent weakness in both types of motion verbs. LD children used a smaller number of manner verbs than TD children from age three to age five. However, they had a similar number of path verbs at age five. The differences between the manner verb inventory and path verb inventory could account for this outcome. The lexicon inventory of path verbs (14 types) was smaller than that of manner verb (84 types) in Cantonese. Thus, it might be easier for LD children to acquire path verbs. The present finding also supported the results of Watkins and his colleagues (1993) that language-delayed and normally developing children used a similar number of high frequency verbs.

*Pattern of motion event descriptions in typically developing (TD) group*

It was found that manner + path descriptions, such as 青蛙跳出個玻璃樽 cing1 waa1 tiu3 ceot1 go3 bo1 lei1 zeon1 ‘the frog jumped out from the glass bottle’, were used by TD children in all three age groups most frequently, followed by manner descriptions, such as 狗仔跑 gou2 zai2 paau2 ‘the dog ran’ and path descriptions, such as 青蛙出去 cing1 waa1 ceot7 heoi2 ‘the frog went out’. This finding was highly similar to Chen’s study of Mandarin-speaking children aged 3, 4, 5 and 9. Chen (2005) found a higher frequency in manner + path descriptions, with lower frequency in path descriptions and neutral



descriptions.

*Differences in the use of motion event expressions between typically developing (TD) preschoolers and language-delayed (LD) preschoolers*

Several salient results were found in the comparison of TD children and LD children. In Figure 6 to 8, the comparison of proportion of use of the three different motion event constructions was presented to highlight children's preference in use of motion event expressions. Although both typically developing children and children with language delay used manner + path descriptions more frequently, children with language delay used significantly more path descriptions than TD children. The finding was in agreement with the previous hypothesis and could be explained by the following reasons. First, Slobin hypothesized processing load (2006) might affect the preference of types of motion events. Similarly, Leonard (1998) proposed that children with Specific Language Impairment (SLI) had limitation in processing capacity, which was equivalent to processing load. The notion of limited processing capacity was discussed in terms of space (i.e. the size of computational region of memory), energy (i.e. fuel to compete a cognitive task) and time (i.e. rate of information processing). He suggested that children with SLI might have insufficient work space, inadequate energy to complete task and/ or slow rate of information processing. LD children might experience similar difficulties with children with SLI. For instance, using manner + path descriptions (i.e. both manner and path were encoded) might require a larger

work space, greater expenditure of energy and more time to complete the task. Due to the limited processing capacity, LD children might use more path descriptions (i.e. only path was encoded) instead of manner + path descriptions.

In manner + path descriptions, both the manner and path information were encoded in the sentence simultaneously. Thus, the processing load increased as compared with encoding only path or manner information. As proposed by Hickman (2006, p. 301), ‘the greater complexity of structures that simultaneously expressed several types of information ... were therefore formally and semantically richer than structures expressing only one type of information’. Children with language delay might find it more difficult to produce manner + path descriptions. They therefore used path descriptions in a relatively higher proportion.

Second, language-delayed children had a smaller lexicon inventory of manner verbs than path verbs. Due to the lower lexical availability of manner verbs, it was reasonable for them to use path verbs only in the description. As suggested by Slobin (2006), the size and the diversity of motion verb inventory might have effect on the occurrence of type of motion events.

Third, in agreement with suggestions raised by Hickman (2006) and Talmy (2000), some types of information pertaining to motion events might be more basic and salient than others. The particular path that was followed by a displacement of space might constitute more prominent and important information in comparison to the manner in which it was carried out.

Thus, children with language delay might find path more salient than manner and used path descriptions in a higher proportion.

### *Clinical implication*

The number of types of manner verbs (TMv), the number of types of path verbs (TPv), the number of motion events (ME), the number of manner verbs (NMv), the number of path verbs (NPv) as well as proportion of manner descriptions (PM) were significantly and positively associated with the scores of expressive language scale of RDLS, whereas the proportion of path descriptions (PP) was significantly and negatively associated with the scores of expressive language scale of RDLS. Verbs were one of the most important areas in early language development (Tardiff, 1996) and children's verb acquisition was an area of current emphasis in the field of language acquisition (Watkins et. al., 1993). Specific analysis of motion events in children's narrative production could thus provide information on the use of verbs and to help identify developmental delay in children.

### *Limitation of study and further research*

One potentially methodological drawback in this study is that the ability to use motion events of preschoolers was solely measured by narrative production. Though the *frog story* was commonly used to explore the use of motion event descriptions, other methods using experimental design or spontaneous production could provide other aspects of information on the development.

As significant differences were found between children of 5-year-old and adults in the use of motion events such as number of type of manner verbs, further research is recommended for exploring the use of motion event expressions in school-aged children.

### *Conclusion*

The present study explored that the use of motion event expressions in typically developing and language-delayed preschoolers. Typically developing children showed gradual increase from aged three to five in the number of types of manner verbs and path verbs. On the other hand, preschoolers with language delay had a smaller diversity of manner verbs and path verbs. In addition, typically developing children used significantly more manner + path descriptions than the other two categories of motion events (i.e. path descriptions and manner descriptions). Also, language-delayed children used path descriptions in a relatively higher proportion as compared with typically developing children. In addition, the number of types of motion verbs and the proportion of different types of motion events were highly correlated with the scores of expressive language scale of RDLS.

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## Appendix A Coding of Motion Events in Frog Story

(adapted from Slobin, 1998)

1. The motion event description descriptions were marked and coded for each frog story.
2. The basic conceptual unit of analysis is a trajectory. According to Slobin (1998), “a trajectory is defined as movement of a major protagonist, beginning from a stationary position and continuing to move without interruption until arriving at another stationary position where a plot-advancing non-motion event occurs”.
3. Plans, desires, possibilities, reminiscences, habitual motion events are excluded from analysis.

Example 1. 佢想出嚟

Example 2. 就嚟跌落嚟

Example 3. 爭啲跌落

Example 4. 唔怕跌落水

Example 5. 準備上去喇

Example 6. 睇吓有冇人出

Example 7. 隻狗唔過去

Example 8. 喺咪入咗去個 X 度

4. Self-contained motions, such as rotation, oscillation or dilation were not considered.

Example 1. 青蛙跳



Example 2. 呢個反轉

Example 3. 趴喺度

5. Each motion event description coded expressed a single event, and each motion event was classified as manner expression, manner + path expression, path expression or neutral + path expression, which can be illustrated in the following examples:

- a Manner expression

狗仔跑

- b Manner + Path expression

青蛙行出嚟

- c Path expression

男仔出去

- d Neutral + Path expression

佢整佢落去

The number of motion events coded in each frog story and the percentage of different types of description (i.e. manner expression, manner + path expression, path expression and neutral + path expression) were computed.

6. Second, all verbs in motion event description were identified. Numbers of different types of verbs (i.e. manner verbs, path verbs, neutral verbs) were computed. Table 1 showed the diversity of manner, path and neutral verbs collected in all the data.

7. The self-correct part was not counted in motion events.

e.g. 隻狗(爬)跑落去 (the verb in the bracket was not counted)

隻狗(跑到)/sh/...跑到石頭到 (the verb in the bracket was not counted)

8. Repetition of verb was only counted once

e.g. 蜜蜂飛飛飛飛 (only count once)

9. 咩嚟架 or 呢個羊嚟嘅 (the path verb 嚟 in these examples was not counted as the meaning was totally different with the origin path verb)

## Appendix B List of motion verbs (i.e. manner, path and neutral verbs) across ages

Motion verbs Category	Types
Manner verbs	爬、跌 / 整跌、擒、跳、跑 / 飛跑、行、捐、走 / 抱走 / 捉走/ 飛走/ 帶走/ 趕走/ 抬走/ 運走/ 走甩、擁(/ung2/)、擁(/ung2/)跌、擺、沖、吹、塞、擒、追、咬、掇(/dam2/)、捧、搯、抱、浸、掉、挖、擔、擔走、捉、偷走、飄、推、撩(/liu1/)、飛、伸、撻、企、頂、搬、掙(/deng3/)、放、穿、擺、摸、執、拉、揸、倒、潛、跳走、沉、搥(/mang1/)、/we2/、扶、帶、攬、拎、摘、碌、日訓、坐、掛、企、騎、衝、踢、拖、/zong1/、開、攝、匿、捲、/maat9/、/zong1/、踩、篤、/zail/、探、/fik9/、彈、噴、/gat9/、秤、拋、引
Path verbs	落、返、入、上、去、出、嚟、過、埋、來、起、出現、穿、離開
Neutral verbs	整