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碩士論文

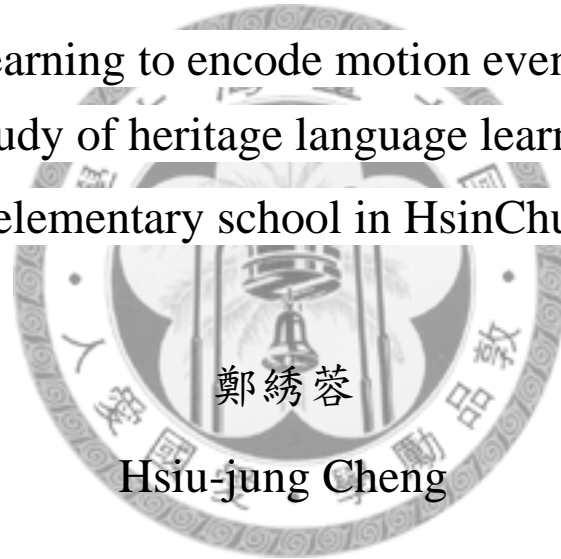Graduate Institute of Linguistics

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學習泰雅語動態事件編碼：以新竹某國小族語學習為例

Learning to encode motion events in Atayal:

A case study of heritage language learning in an

elementary school in HsinChu

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摘要

本研究旨在探討泰雅語族語學習者如何運用泰雅語描述故事中的動態事件，以及他們是否會受到泰雅語本身語言類型特性的影響（Huang & Tanangkingsing, 2005），而偏向於使用動態事件中的路徑動詞編碼。此外，本文亦會探索語言經驗對於泰雅語族語學習者在泰雅語動態事件編碼上的影響性。

本研究共包含三個作業，以及一語言背景調查。在實驗一（敘事作業），總共有５７位來自新竹某國小二到四年級的學童參與實驗作業，在實驗之前先進行為期四週關於泰雅語動態事件的教學課程。再者，於敘事作業中透過無字圖畫書「青蛙，你在哪裡？」（Frog, Where are you？）（Mayer, 1969），受試者必須描述一個關於尋找青蛙的故事。雖然大部分的受試者未能以泰雅語描述整個故事經過，但我們仍發現：當受試者使用泰雅語描述動態事件時，較多的受試者會使用路徑動詞。

實驗二則包括了兩個理解作業：一為聽力理解作業(listening comprehension task)，另一則為玩偶演出作業(act-out task)。總共有５２位來自四年級到六年級的受試者參與實驗二的作業。在理解作業中，主要為了測試小朋友在理解上是否受到泰雅語本身語言類型特性的影響。結果發現比起方式動詞(manner verb), 受試者較能理解包含路徑動詞(path verb)的句子。這兩個實驗結果均顯示：泰雅語族語學習者在泰雅語描述故事中的動態事件會受到其本身語言類型特性的影響
(Özcalişkan & Slobin, 1999)。

從語言背景調查中，我們亦發現──不管是居家，或是在學校的泰雅語使用，都會影響受試者的泰雅語表現。若將這些語言經驗因素放在一起探究時，越早在學校學習泰雅語，以及居家會使用泰雅語的受試者，在泰雅語表達方面的整體表現越佳。因此不管是來自學校、家庭，或是社區的語言經驗，都是學童成功學習族語的關鍵。

關鍵詞：動態事件；族語學習；原住民語言；語言經驗；敘事

Abstract

The present research aims (1) to investigate how the heritage language learners of Atayal (HLLs) encode and understand motion events in Atayal, a path-salient language (Huang & Tanangkingsing, 2005) and (2) to examine the influence of language experience on these heritage language learners' motion event knowledge. Three experimental tasks, together with a language background survey, were conducted to examine the HLL's production and comprehension of motion events in Atayal to investigate the relation between the language experiences and the task performances of Atayal.

HLLs of Atayal came from an elementary school in HsinChu. In the first experiment, fifty-seven students from the second grade to the fourth grade received teaching on Atayal motion events, one class per week for four consecutive weeks. Afterwards, they were asked to narrate the story 'Frog, where are you?' (Mayer, 1969) in Atayal. Even though most of the subjects were still not competent enough to tell the entire story in Atayal, more narrations made use of path verbs than manner verbs were found. In the second study, HLL's comprehension of motion events encoded with path verbs and manner verbs was examined by a listening comprehension task and an act-out task. Fifty-two students from the fourth grade to the sixth grade participated in these two tasks. The findings showed that the subjects had better comprehension of sentences with path verbs in both comprehension tasks. The results in the two studies demonstrated that the heritage language learners of Atayal had a better understanding of path verbs in motion event encoding in Atayal, a path-salient language, thus supporting the view that the encoding of motion events is language-specific (Özçalişkan & Slobin, 1999). It is also revealed in the language background survey that the subjects' performance in Atayal was associated with their frequency of use of Atayal both in family and at school. When taking two factors together into consideration, two factors concerning the time when students started to learn Atayal at school and their use of Atayal at home were together more influential and therefore might be better predictors of their performance in the heritage language.

Keywords: motion event; heritage language learning; indigenous language; language experience; narrative

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Chapter 1
Introduction

1.1 Background

The description of motion is an indicator of how people map the linguistic knowledge onto the real world among different languages. Thus, the investigation of how people encode motion events has been an essential part to better understand human languages. According to Talmy (1985, 1991, 2000), languages can be classified into two types, the satellite-framed languages (or called S-languages) and the verb-framed languages (or called V-languages), depending on how the path element is encoded. If a language encodes path as the main verb, it will be classified as a verb-framed language. However, if a language encodes path as a satellite device, such as a particle, it will be classified as a satellite-framed language. Path is viewed as the core element that determines whether a language belongs to an S- or a V-language in Talmy's two-way typology.

This classification aroused the investigation of the lexicalized patterns in different languages around the world (Berman & Slobin, 1994; McNeil & Duncan, 2000; Naigles et al., 1998; Slobin, 1996). However, the complexity to determine a language as an S-language or a V-language increases, because some languages are found to contain features of both the V-languages and the S-languages. Mandarin Chinese is one of those languages. Therefore, Slobin (2004) revised Talmy's two-way typology by adding a third category: the equipollently-framed languages, in which both path and manner are expressed by equivalent grammatical forms. Slobin's claim has been supported by Chen (2005) and Ku (2007). According to Chen (2005), Mandarin Chinese shows a mixed pattern of motion event encoding when compared with English, a satellite-framed

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language, and Spanish, a verb-framed language (Slobin, 1996). Ku's result also reveals that the construction of Manner + Path + Deixis is the most frequent pattern in Chinese narratives.

Besides the typological studies of motion events across languages, some researchers have been interested in the acquisition of motion events. It is found that how to encode the manner or path element is language-specific (Özçalişkan & Slobin, 1999). Children of the S-languages, such as English, tend to encode the manner component in the main verb. As children grow older, they will have their own preference toward certain constructions, which is influenced by their mother language (Hohenstein, 2005). Children of different language backgrounds have different strategies to encode motion events, which is also found in Chinese children. Lin (2006) in her thesis investigated Chinese children's motion event encoding and found that young children tended to omit the manner element and simply encoded the event into the Path + Deixis construction, whereas adults preferred to use the Manner + Path + Deixis (M+P+D) construction. However, a growing preference for the M+P+D construction was noticed in the older children, as revealed by their increasing uses of the M+P+D construction in the elicited data.

While studies have been carried out to investigate how monolingual children learn to encode motion events in their ambient language, some researchers have extended this issue to more complicated contexts. That is, how bilinguals or second-language learners encode motion events in their two languages, especially when the two languages encode motion events with typologically different systems. Studies have been conducted on English-French bilinguals (Nicoladis & Brisard, 2002), Mandarin-Japanese bilingual children (Fan, 2005), and Spanish-English bilinguals (Hohenstein et al., 2006). The results show that languages from different systems have an impact on bilingual

children's encoding of motion events.

1.2 Purpose

As countries became multilingual, languages of dominant cultures usually received more attention than language of minority cultures in the research field. Until recently, most of the typological studies of motion events were investigating the comparisons between languages of dominant cultures, such as English and Spanish. Minority languages, such as Austronesian languages in Taiwan, were completely absent in the discussion, not to mention studies concerning the acquisition of motion event encoding in the minority languages. In this study[1], we would like to investigate the language acquisition of a minority Austronesian people, i.e. Atayal, in Taiwan. Huang and Tanangkingsing (2005) have shed some lights on this issue. They examined how six Austronesian languages encode motion event. According to Huang and Tanangkingsing (2005), one of the languages examined in the study, Squliq Atayal, is a path-salient language; that is, speakers of Atayal tend to encode the path element in the main verb, and ignore the manner element.

As revealed by previous studies, Chinese is an equipollently-framed language, which encodes manner and path with equivalent grammatical forms. On the other hand, Squliq Atayal is characterized as a verb-framed language, which encodes the path element as the main verb. These two languages are typologically different in their motion encoding systems. Therefore, this study aims to draw attention to the interaction between an Austronesian language, Squliq Atayal, and a more dominant language, Mandarin Chinese, in Taiwan. We investigated how heritage language learners[2] encode

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[1] All the data collected in this study are from the NTU Corpus of Formosan Children. This corpus is established by Prof. Li-May Sung, Graduate Institute of Linguistics, National Taiwan University, and this project is sponsored by the Center for Humanities Research, National Science Council.
[2] The characteristic of heritage language learners is that the heritage language was first acquired at home

motion events in Atayal, and whether they show a different preference toward motion event constructions as was shown in the adults' narratives in Huang and Tanangkingsing (2005).

Three questions are addressed in this study:

Research question 1:

Since Squliq Atayal is a path-salient language (Huang & Tanangkingsing, 2005), do heritage language learners of Atayal show a tendency to encode path in the main verb when encoding motion events in Atayal?

Research question 2:

Do heritage language learners of Atayal show a difference between their comprehension on different semantic type of motion verbs?

Research question 3:

How does language experience, as self-reported by children, influence children's performance of Atayal in motion event encoding?

To answer the questions above, we collected the narratives of the picture book, *'Frog, where are you?'* (Mayer, 1969) from the school-age heritage language learners of Atayal, and examined how they encoded motion events in Atayal. These data will provide some clues to the preferred motion event constructions in this group of children. In addition to the production task, two comprehension tasks were also implemented to test whether these children had acquired the knowledge of motion event encoding.

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but was not completely acquired because of the switch to another dominant language (Valdés, 2000). A more detailed description would be provided in Chapter 2.

Furthermore, a questionnaire on language background was conducted for the purpose of investigating the effect of language experience on these heritage language learners.

1.3 Organization

The next chapter begins with a general review on the typological studies on motion events. And then it moves on to a more language-specific aspect, describing the motion event encoding in Chinese and in Atayal. This chapter also reviews the studies on the acquisition of motion event encoding, and introduces the Heritage Language Learning Program in Taiwan. In Chapter 3, a more detailed description of the children participating in this study will be provided, in particular their language background. Chapter 4 will cover the methodology of the narration task, testing children's production of motion events. Details would be provided concerning the materials and the procedure of the narration task. The results of the task would be presented and followed by a brief summary and discussion. Chapter 5 will provide the implementation of two comprehension tasks, namely, listening comprehension task and act-out task. Methodology of the two tasks and the results would be provided in detail. Influences from language experience will be taken into consideration in Chapter 6 and the concluding remarks are given at the end.

Chapter 2

Literature Review

2.1 Linguistic Typology of Motion Event

A motion event typically involves an entity moving from one place to another. According to Talmy (1985), a motion event consists of four basic semantic components, which are motion, figure (one object), ground (the reference with respect to which the figure moves), and path (the course followed by the figure with respect to the ground). An example of motion event in English is given below:

(1) *The girl   RAN   OUT   of the house.*

Figure Motion+Manner   Path   Ground

(Example from Naigles et al., 1998)
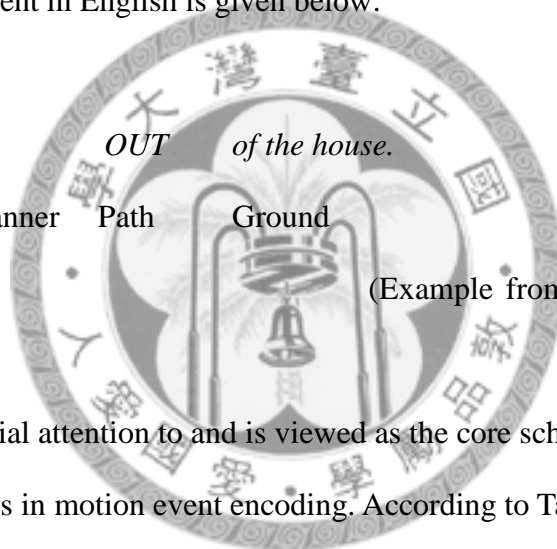
Path is paid special attention to and is viewed as the core schema to determine typological differences in motion event encoding. According to Talmy (1985, 1991, 2000), languages can be classified into two types, the satellite-framed languages (S-languages) and the verb-framed languages (V-languages), depending on how the core schema 'path' is encoded in the motion events. In an S-language, the core schema is encoded in satellites, or particles. For example, in the English sentences *I blew the ant off my plate* and *the rock rolled down the hill,* the path components *off* and *down,* are encoded in a peripheral position by a particle. English, German, and Chinese all belong to the S-languages. In a V-language, the core schema, path, is encoded in the main verbs, and if there is a necessity of adding manner of the motion, then manner will be placed in a peripheral position. Take Spanish as an example, in this sentence *la botella salió de la*

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cueva (flotando) "the bottle move-out the cave", the path element is expressed in the main verb and no manner element is specified. Languages like Spanish, Italian, and French fall into this category. Following Talmy's classification, a number of studies were conducted to further examine the lexicalization patterns of these two different types of languages. While the dichotomous classification can distinguish most of languages, some languages appear to fall out of these two categories, which challenge Talmy's classification. Thus, Slobin (2004) revised Talmy's dichotomous typology by adding a third category: the equipollently-framed language, in which both path and manner are expressed with equivalent grammatical forms. The serial verb construction in Chinese is a typical example, as is shown below.

(2) *qing1-wa1*   *tiao4 chu1 ping2-zi*

   frog   jump   exit   jar

   'the frog jump out of the jar.'

Both the manner verb *tiao4* and the path verb *chu1* are equally important, since it is not correct to say *qing1-wa1 tiao4 ping2-zi* "the frog jump the jar". In this study, we mainly adopted the three-way typology (Slobin, 2004) and classified Chinese as an equipollently-framed language, in which manner and path are equally important though whether a dichotomous typology or a tripartite typology is more suitable for the classification of languages all over the world is still under debate and needs further investigation according to previous studies (Slobin, 2004; Talmy, 1985, 1991, 2000).

2.2 Motion Events in Chinese

Chinese is classififed as a satellite-framed language in Talmy's two-way motion

event typology because the path component is viewed as a particle when used with the manner verb to form a motion event construction in Chinese. For example, *tiao3 jin4 ping2-zi* "jump enter the jar". In Talmy's classification, *tiao4* "to jump" is the main verb, and *jin4* "enter" functions more like a particle or a preposition, as the preposition *into* in English. However, Tai (2003) held a different view toward the classification. He argued that Chinese is not so much a satellite-framed language as a verb-framed language. Given the same example, it is grammatical to say *jin4 ping2-zi* "enter the jar", but the expression *tiao4 ping2-zi* "jump the jar" is ungrammatical. Tai pointed out that the path element in Chinese is more crucial and essential in a motion event construction since it can be used alone to express a motion event, while manner by itself cannot form a correct expression of motion event. Therefore, the path element should not be taken as a particle; instead, it should also be viewed as a main verb. Based on this argumentation, Chinese encodes a motion event by using a combination of a manner verb, a path verb, and a deixis, such as *tiao4 chu1 lai2* "jump exit come". Manner and path all belong to verb, while deixis signifies a reference point of direction from the perspective of speakers. Because of the controversial nature of the serial verb construction, Slobin (2004) proposed a third type of languages, namely the equipollently-framed languages, in which both the manner and the path elements are encoded with equivalent grammatical forms.

Chen (2005) examined the motion event encoding across different age groups of Mandarin-speaking children with the story *Frog, where are you?*. Both data from children and adults supported the view that Chinese should be an equipollently-framed language. Chen conducted the analyses following Slobin's study (1996), which considered various elements in the encoding of motion events, including types of motion verbs used and the presence of the ground element. Motion verbs were classified into three types: the manner

of motion verb, the path verb, and the non-motion neutral verb.[3] With regard to the ground information, if it was specified in the motion event, then the clause was marked as "plus ground", otherwise, "minus ground". It was found that Chinese possesses the characteristics of both the S-languages and the V-languages. More manner verbs (72% of the total) were found in Chinese as was shown in English (74% of the total), while less ground information (minus ground 48% vs. plus ground 52%) was specified, as was shown in Spanish (minus ground 37% vs. plus ground 63%). Moreover, frequent uses of the two deictics *lai2* 'come' and *qu4* 'go' were found in many motion event descriptions. The Manner+Path+Deixis construction and the Path+Deixis construction were the most common constructions observed in the elicitation.

2.3 Motion Events in the Austronesian Languages

Not much attention was paid to the expression of motion events in Austronesian languages until Huang and Tanangkingsing (2005), in which motion events were examined in six Austronesian languages, including Cebuano, Tagalog, Saisiyat, Squliq Atayal, Malay, and Tsou. Though these languages show minor differences in their constructions of motion events, they are similar in the dominate use of path verbs and the absence of ground information in motion event encoding. It is concluded that Cebuano and Tagalog are most strongly Verb-framed languages. Squliq Atayal is still more of a Verb-framed language than a Satellite-framed language. Saisiyat shows an incipient characteristic of macro-event language, like Tsou. Huang and Tanangkingsing (2005) further proposed to conceptualize Talmy's model as a grid, with the vertical axis representing path salience, and horizontal representing manner salience, so that the exact

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[3] Examples of the manner of motion verbs are like *pa2* 'climb,' *pao3* 'fall down,' and *fei* 'fly,' and examples of the path verbs are like d*ao4* 'arrive,' *luo4* 'drop,' and *hui2* 'return.' The non-motion neutral verbs are like *pa1* 'bend over,' *tang3* 'lie,' and *na2* 'take.'

position of each language relative to other languages could be clearly plotted, as shown in Figure 1 below.

Figure 1 *Path and Manner Salience of Six Austronesian Languages (Adopted from Huang & Tanangkingsing, 2005)*

PATH
SALIENCE
100%

Saisiyat •   Malay
Tagalog •   •   • Tsou
Cebuano •

Squliq •   • Mandarin

50% ---

0 %   50%   100 %
MANNER
SALIENCE
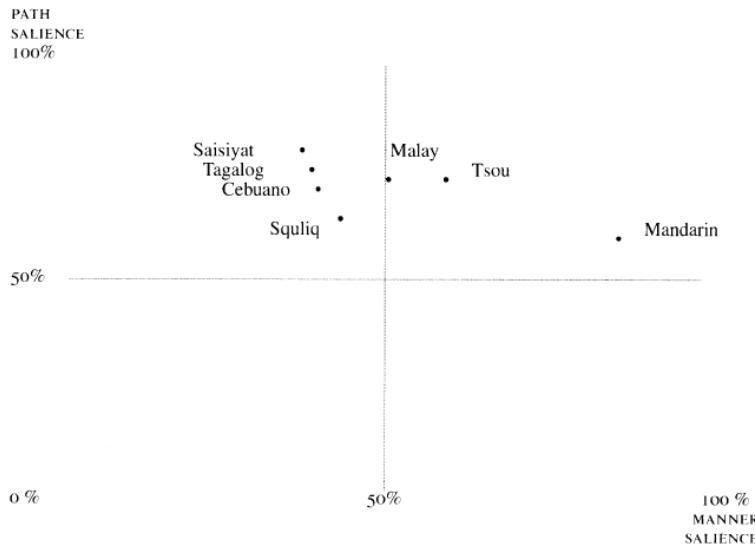
2.4 The Acquisition of Motion Events

In addition to the focus on the typological classification of motion events, some researchers have examined children's acquisition of motion events encoding. Motion events for children seem to be fundamental since children can associate them to similar concepts in cognition.

Özçalişkan and Slobin (1999) examined how 3 to 11 year-old children speaking different languages, including English, Spanish, and Turkish, encoded motion events by asking them to narrate the frog story. They found that children of different language backgrounds showed the development of manner and path verbs at divergent ages. Comparing with Spanish children and Turkish children, there was a higher tendency for English children to encode the manner element in the main verb and as children grew older, they would form a preferred motion event construction.

Hickmann and Hendriks' finding (2010) also supported this view. They studied the

acquisition of motion event in children aged from three to ten in two languages, English and French. Cross-linguistic differences were observed. First, the English speakers expressed motion events in a compact way by using multiple types of ground information. Also, compared with the French speaker, they tended to encode manner in the verb root and path was encoded in other devices (not in the verb root).

Moreover, Slobin (2003) and Hohenstein (2005) also found that children learning V-language or S-language encoded motion events in different ways. Hohenstein (2005) investigated the lexical bias in the 3.5 and 7 year-old English and Spanish children. He found that only the older age group showed a preference toward different lexicalization patterns, which implied that when children grow older, they form a preferred construction. English-speaking children at the age of 7 tended to shift to a more manner-oriented perspective in their similarity judgments of motion events, while Spanish-speaking children at the same age showed no preference. Slobin (2003) examined the encoding of visual path, such as *look into/through*, and physical path, such as *walk into/through* in children speaking English, Russian, Spanish and Turkish. It was found that children of the verb-framed languages, such as Spanish and Turkish, analyzed the visual paths into fewer components. However, unlike Spanish- and Turkish-speaking children, English- and Russian-speaking children often elaborated path by adding adverbs of directionality, such as *down* and *around*.

So far, we have reviewed the studies on the acquisition of motion event encoding in the V-languages and the S-languages. The results have revealed that children are sensitive to the language-specific difference in motion encoding. Recently, some results are coming out regarding children's acquisition of motion events in the third type, the equipollently-framed languages.

The study of Chinese motion event acquisition has been prosperous in recent years.

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Chen (2005) analyzed the developmental course of Chinese children's motion event encoding, from 3 to 9 years old. The result revealed that children had not reached the adult-like performance at the age of 9. Lin (2006) in her thesis investigated Chinese children's motion event constructions and found that young children tended to omit the manner element and simply encoded motion events into the Path + Deixis construction, such as *chu1 lai2* 'exit come'. However, the older children showed a preference for the use of the Manner + Path + Deixis (M+P+D) constructions containing, such as *pao3 chu1 lai2* 'run exit come'. Therefore, the applications of the M+P+D construction increased with age. Ku (2007) also examined Chinese children's development of manner-of-motion verbs in motion event encoding by asking children to narrate the frog story. The results echoed Lin (2006)'s finding. An increase use of manner verbs was observed and Chinese children attended to treat motion events in the way as adults, which was to encode both manner and path equally.

While studies have been carried out to investigate how monolingual children learn to encode motion events in their ambient language, some researchers have extended this acquisition issue to bilinguals or second-language learners, especially those who are learning two languages that are typologically different in motion event encoding. Nicoladis and Brisard (2002) examined the English-French bilinguals' encoding of motion events. They found that the English-French bilinguals tended to encode the path element in gesture and speech, and producing comparable number of manner verbs, either in English or in French. The result was counter to the expectation because it is expected more manner verbs should be used in English narrative since English is classified as an S-language according to Slobin's three-way typology.

Some studies are interested in the acquisition of motion events in second language learning. Navarro and Nicoladis (2005) studied the advanced Spanish learner of English

on motion event encoding, and found that L2 (Spanish) speakers exhibited a certain

influence from their L1 (English). Hohenstein and colleagues (2006) studied

Spanish-English bilinguals and found bilingual speakers behave in between the two

languages they had been exposed to in terms of motion events.

Studies on the Chinese-English language learners also revealed interference from

the other language. Wu (2008) investigated the influence of L2 (English) on the

expression of motion events in L1 (Chinese) in a group of English learners of Chinese

with different L2 proficiencies. She found that the advanced learners were more likely to

be affected by the motion event encoding system of L2, which could result from a

stronger conceptual link between L1 and L2. The study also indicated that Chinese

children at old as 10 had not completely mastered the encoding of motion events in their

L1. Wu (2011) investigated how the Chinese learners of English learned to express the

target-like manner, for example, the directional complement (DC),[4] such as *dao4* 'to',

jin4 'into', *lai2* 'come', and *hui2* 'return'. DCs can function as a main verb or a path

satellite in Chinese. The dual functions of DCs posed considerable challenges for learners,

whose L1 (i.e. English) does not have this distinction. The difficulty increased along with

the complexity of the DC construction. When a more complex DC construction, such as

ta1 zou3 jin4 lai2 le 'he walk into hither PERF' it becomes more challenging for these

Chinese learners of English, since no such construction is used in their L1 (English). In

Wu (2011), it was also shown that the Heritage Language Learners (HLL) performed

better when compared with the Foreign Language Learners (FLL) since HLLs have more

access to the natural context of the target language. In our study, the subjects included

were all Heritage Language Learners (Valdés, 2000). Therefore, in section 5 of this

chapter, the definition of Heritage Language Learner and a more detailed description of

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[4] DCs in Wu (2011) consist of path elements, such as *jin4* 'in,' *chu1* 'out,' and deixis elements, *lai2* 'hither,' and *qu4* 'thither.'

the HLLs in our study will be introduced together with the language policy implemented.

2.5 Heritage Language Learning Program in Taiwan

Taiwan, with a total population of around 21 million, is a multi-cultural and multi-lingual society due to its historical background and language policy. Huang (2007) pointed out the difficulty of revitalizing indigenous language lies in the fact that over the past fifty years, people in Taiwan were forced to use the national language, Mandarin Chinese, to communicate with each other. Peoples of minority languages, such as the Austronesians, were deprived of the right to receive education in their own languages. In consequence, many young people nowadays mainly communicate in Chinese in their daily lives, and these indigenous languages are facing extinction.

According to Chen (2010), language policy influences the multilingual evolution in Taiwan. Among the three language policies that have been implemented over the past fifty years, namely the national language policy, the mother tongue language policy, and the new English language policy, the implementation of the mother tongue language policy helped preserve the indigenous languages in Taiwan. According to the mother tongue language policy, 1-2 periods (40 minutes per period) of local language teaching per week should be included in the school curriculum. The aboriginal languages have been included in the local language teaching program since September 2001. Until now, the indigenous languages have been taught in school for ten years. These indigenous children, having some exposure to the indigenous language at home or in the community, start to learn the indigenous language via the formal school education. This group of children who have some exposure to the indigenous language at home or in the community therefore can be viewed as heritage language learners (HLL).

Valdés (2000) defines the heritage language learners as "individuals raised in homes

where a language other than English is spoken and who are to some degree bilingual in English and the heritage language." The original definition illustrates the heritage language learners in the US, and therefore is more English-centered. English, in Valdés's definition, can be substituted by any other dominant language for heritage language learners in other areas around the world. A characteristic of heritage language learning is that the heritage language was first acquired at home but was not completely acquired because of the switch to another dominant language. Therefore, different from second language acquisition (SLA), heritage language learners have had some exposure to the heritage language at home or in the community. Also, unlike first language acquisition, the language used outside their home or community is a dominant language. Heritage language learners behave like neither L1 nor L2 speakers of the heritage language (HL) because of the curtailed acquisition during childhood, according to Lynch (2003). Valdés (2005) indicates that a tremendous variation of language proficiency is observed in heritage language learners, which could result from the diverse linguistic experience at home (Carreira, 2004). Due to the diverse linguistic proficiency of heritage language learners, Kondo-Brown (2010) points out the importance to identify the heritage language learners in order to serve the needs and interests of HLLs and help them advance their competence in the heritage language from curriculum planning.

In Taiwan, the indigenous children learning their indigenous language, including the subjects in our study, can be identified as heritage language learners. The subjects in our study all have had some exposures to the heritage language at home or in the community, because the elder still use the heritage language while communicating with each other. Nevertheless, these children's acquisition of the heritage language is not complete because they receive their education in Chinese, the dominant language in Taiwan.

As indicated by Huang (2007), the government has put a lot of efforts to revitalize

the indigenous languages with some strategies, such as the development of the indigenous language textbooks and training the indigenous language teachers. It is important to identify the group of heritage language learners and provide them with proper instruction in the indigenous language learning. However, the implementation of the new English policy worsens the situation of the heritage language learning. Chen (2006) points out that English is usually viewed as providing personal benefits by means of an international outlook and socioeconomic advantage. Huang (2007) also indicates that parents hold a more positive attitude toward English learning than the indigenous language learning. Therefore, it is likely that the promotion of English may suppress the learning of the indigenous language, because the HLL will be encouraged to devote efforts to studying English, rather than their indigenous language.

As the heritage language learning program has been implemented for 10 years, we think it is time for us to evaluate whether this program has helped preserve indigenous languages. Moreover, it may be interesting to see if the promotion of English learning has influenced the HLL's learning of their indigenous language.

2.6 Summary

Based on the typological studies on motion events in Chinese (Slobin, 2004), Chinese is classified as an equipollently-framed language, in which both manner and path are encoded in equivalent grammatical forms. The Manner+Path+Deixis construction is the most frequent pattern used among adults (Chen, 2005). On the other hand, the target language in this study, Squliq Atayal, is proposed to be more like a verb-framed language (Huang & Tanangkingsing, 2005). According to Huang and Tanankingsing (2005), more path verbs are found in the narratives of frog story; therefore, the path element is more essential to be encoded in a motion event construction. As revealed by these studies,

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Chinese and Atayal are two typologically different languages.

Studies on children's acquisition of motion events show that children are sensitive to the encoding patterns in their own language. For example, children of an S-language tend to use more manner verbs than children of a V-language. As they grow older, they will produce similar constructions as those used by adults in their encoding of motion events. There are also a variety of studies concerning motion event encoding in bilinguals. The result shows that these bilinguals may be influenced by their mother tongue and make use of constructions similar to their mother tongue.

The increasing number of studies on bilingual or second language learners has propelled the understanding of motion event encoding a little forward, but most of the studies still concern motion event acquisition in dominant languages. No attempt has been made to examine the aboriginal heritage language learners in Taiwan, acquiring a dominant language and a minority language, for example, Chinese and Squliq Atayal. How these two typologically different languages interact to influence children's encoding of motion events. Specifically, we are interested in whether the heritage language learners pay more attention to the path element and perform better in the path element encoding when expressing motion events.

Facing the endangered status of the indigenous languages, the Taiwan government has put some efforts to preserve these languages, such as to include Austronesian languages in local language teaching in the elementary school curriculum. Information concerning how the indigenous language was taught at school and how these children used the language at school and at home was collected via the classroom observations and home visits. The general descriptions of these heritage language learners will be presented in Chapter 3, along with the collected information of their language use at home and at school via the language background interview

Chapter 3

Case Study of Heritage Language Learning in Atayal

3.1 A Sketch

The subjects included in this study belong to Austronesian peoples, the minority

groups in Taiwan. Compared with the Han ethnic groups, including Taiwanese, Hakka,

and Mainlander, Austronesians constitute a small proportion of the total population in

Taiwan, only 2% (Huang, 2007). The Han ethnic groups account for most of the

population in Taiwan. Besides, due to the language policy implemented over the past

decades, fewer and fewer aborigines can speak their indigenous language fluently and use

it in daily communications. Most of the young people from the age 20 to 40 cannot speak

the indigenous language well because many of them left their hometown and sought

working opportunities in cities when they graduated from junior high schools. Thus, they

use Chinese more often than their indigenous languages. The only chance for these young

people to use the indigenous languages was when they are back to their homes in the

mountains and talk to the elders who still use the indigenous languages. The indigenous

language is better preserved in the mountain area since there are more elders who still use

the indigenous language in their daily conversations.

The indigenous language group examined in this study is Squliq Atayal, one of the

two major dialects of Atayal. According to the statistics from Council of Indigenous

Peoples, Atayal people in total account for 16 % of the total Austronesian population. It is

the third largest aboriginal groups in Taiwan, only smaller than Amis (37%) and Paiwan

(18%).[5] Most of the Atayal people live in the mountain area in Yilan, Taipei, Taoyuan,

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[5] The statistics can be found on the website of Council of Indigenous Peoples, Executive Yuan.
http://www.apc.gov.tw/portal/

Hsinchu, Miaoli, Taichung, and Nantou. Speakers of C'uli, the other major dialect of Atayal, were mainly found in Miaoli, while speakers of Squliq could be found from I-lan to Nantou.

The heritage language learners in this study were Squliq Atayal from an elementary school in a remote mountain area in Hsinchu. There were 120 students in total in this elementary school. All students lived in a close and highly homogeneous community, in which 99% of the students were Squliq Atayal, and only very few of them were from the Han ethnic groups. This community was isolated from other tribes, and people here did not have any contact with other indigenous tribes and Han ethnic groups. Children were exposed to only two languages, mainly Chinese, and some Atayal from elders and the indigenous language class at school (though, nowadays with the development of TV, more and more students have access to Taiwanese Southern Min). The language children used at home and at school was mainly Chinese.

3.2 Language Use of the Heritage Language Learners of Atayal

Use of Atayal at school (classroom observations). The elementary school selected in this study consisted of more than 100 students, in which 99% of them here are Squliq Atayal. There were more than ten students in each grade. Since most of the students in this elementary school were Squliq Atayal, Squliq was taught in the indigenous language class, and one class per week.

We conducted eight times of classroom observations before and during the teaching phase of the experiment. During the observations, we did not participate in any in-class activities, but just observed what and how the teacher taught in class. According to our classroom observations, the indigenous-language teacher conducted the class with the method of Chinese-Atayal translation. Also, the teacher set different objectives for

students at different grades. For example, for lower graders, i.e. students in the first and the second grades, the teacher used pictures to facilitate their learning. The teacher mainly taught students vocabularies related to daily use, such as animal names, body parts, and some classroom language. For instance, when teaching the word *patong* 'frog' in Atayal, the teacher showed the students a picture of a frog and pronounced the word. In the lower grades, the listening and speaking abilities were emphasized. For the intermediate graders, i.e. students in the third and the fourth grades, the teacher would ask students to spell out the Atayal word in Romanization symbols. A number of short sentences were added in the teaching. In the intermediate grades, the reading and writing abilities were emphasized. Also, at this stage, the aboriginal textbook was used as the teaching materials. The first volume of the aboriginal textbooks, designed by the Center for Aboriginal Languages Cultures Education, National Chengchi University,[6] was used by the third grade, the second volume by the fourth grade, the third volume by the fifth grade, and the fourth volume by the sixth grade. Therefore, as children graduate from the elementary school, they will have learned the contents of the first four volumes of the aboriginal textbooks. The topics in the textbooks covered from their daily life conversations to the cultural events, including the festival of its tribe and their religious belief. In our classroom observations, the teacher guided the students to read each sentence in the textbook and then translated it into Chinese. The teacher then asked students to repeat after her and then to mark the pronunciation of each word with Mandarin Phonetic Symbols. From our observation, similar to their foreign language learning, students memorized words by using Mandarin Phonetic Symbols.

In the classroom observations, we also noticed that interference of English to the

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[6] The Ministry of Education (MOE) and the Council of Indigenous Peoples (CIP) co-entrusted the Center for Aboriginal Languages Cultures Education, National Chengchi University. The on-line material is available. The address of the website is http://www.alcd.nccu.edu.tw/index_0.html

learning of Squliq Atayal. English and Squliq Atayal are similar in their orthographic system, that is, both use Romanization symbols. However, the same Romanization symbols could be pronounced different in the two languages. For example, /b/ is a bilabial sound in English, while it is a labiodental sound in Atayal. Therefore, sometimes children could be confused by the different orthographic-phonological correspondences of these two languages. The situation became worse because students had more English classes after the 3rd grade. For the 1st and 2nd grades, there was only one English class per week. However, for the 3rd grade to the 6th grade, the students had two English classes per week, while still having only one indigenous language class. Thus, when children failed to master both of the languages, they turned to focus on only one language, which was often English. It is interesting that in our interview, lower graders pointed out that it was important to learn how to use Atayal since they were Atayal people. However, as these children got older, they started to think Atayal was less important than the foreign language, English. Students' attitude toward the indigenous language was shaped and influenced by adults and the whole society, who considered English as an international language that would be more useful for children to get a better job in the future. The indigenous language teacher put a lot of efforts to arouse students' interests in learning Atayal, including encouraging students to pass the proficiency test of aboriginal language (PTAL) to gain 35% extra grades for the entrance exam for high school or university. Therefore, some students started to think that learning Atayal was important, however, for the sake of extra grades, not for the sake of keeping Atayal language and culture alive.

Besides the interference from the foreign language learning, the limited teaching time for Atayal also caused the difficulty in indigenous language learning. It is not sufficient to have only one indigenous language class per week. In particular, some students mainly relied on the input from school to learn the language, since their family

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members rarely talked to them in Atayal at home. They did not have any chance to practice Atayal at home. As a result, when they came to the indigenous language class, the teacher had to spend a great deal of time reviewing the content taught in the previous class.

The problems that we observed in our classroom observations partly echoed what Huang (2007) had reported. She pointed out that the current aboriginal language teaching faced problems, as listed: (1) the insufficient financial and administrative support from government; (2) the insufficient instructional time; (3) lack of well-designed teaching materials; (4) lack of competent language teachers. In our case study, the Atayal heritage language learners had a competent language teacher and well-designed textbook; however, they required more instructional time to learn the language.

Use of Atayal at home (home visits). To further understand students' use of Atayal outside the classroom, we made home visits in the community. In our home visit, we found that in the community, the elders aged above 55, used mostly Atayal when talking to each other. However, when they talked to children, they switched the language to Chinese, because children could only understand very simple Atayal sentences. This became a vicious circle. Adults were afraid that children might not understand what they said, so they used Chinese when talking to children. However, due to the lack of Atayal input at home, children could not use the indigenous language well. Children mainly use Chinese because they thought adults all understood Chinese. There was no need for these children to use Atayal. Therefore, when adults talked to children in Atayal, children usually replied in Chinese. For example, there was one fifth grader who lived with her grandmother and her sister. Her grandmother spoke mostly Atayal, either to adults or children. Though this student could understand what her grandmother asked her to do, she

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was reluctant to use Atayal to reply because she thought her Atayal was not good enough. Whenever her grandmother talked to her in Atayal, she mainly acted out what her grandmother demanded or replied in Chinese.

Parents' or adults' attitude toward indigenous learning influences children's learning of Atayal. Some parents think that Atayal is not very important. As a result, they will not take an initiative to talk to their children in Atayal. Moreover, they may even encourage children to spend more time learning English instead of their indigenous language. On the contrary, some parents are aware of the importance of preserving the Atayal language, so they use some Atayal to communicate with their children. For these children, they may have better listening ability in Atayal. However, since they are still more comfortable in speaking Chinese than Atayal, their speaking ability usually do not improve a lot. In our observations on children's use of Atayal at home, we did observe that there was a gap between children's comprehension and production of Atayal.

So far, the description of their language use is based on information collected from the classroom observations and the home visits by the experimenter. A language background interview concerning language use at home and in school may provide a more objective description of this group of children. The interview was conducted at the end of the second semester, in June 2011. Children from the 2nd grade to the 5th grade were interviewed. The mentally-challenged students were not included for fear that they might not be able to comprehend the instructions given in the experimental phase. All students included in this interview were all Squliq Atayal. In total, seventy-three students were included, accounting for more than 60 percent of the students in this elementary school.

3.3 Language Background Interview

A questionnaire of ten questions was compiled (see Appendix 1). The students were interviewed individually. The questions were classified into three parts, six questions on the use of Atayal at home, three questions on the use of Atayal at school, and one question on student's attitude toward the indigenous language. Questions concerning the use of Atayal at home constituted the main part of the questions since it has been believed that the environment is important in children's acquisition or learning of a language.

An overview of factors examined in the language background interview. The first part of language background interview concerned students' use of Atayal at home. The first question surveyed the number of Atayal speakers in the family. For 83.6% of students, there were more than two speakers of Atayal in their family. Only 4% of students had only one speaker or even no speaker of Atayal in their family. The second question aimed to specify who were the Atayal speakers, since our home visits showed that it was usually the grandparents who used Atayal much better and more often than young parents. The results showed that 41.1 % of the students lived with grandparents and parents who would talk to them in Atayal, 38.4% with parents only, and 19.2% with their grandparents only. Two other important questions concerned whether children used Atayal at home and how often they used it. Over 67% of the students said that they used Atayal at home, but they did not use it very often. Only 2 % of the students often used Atayal at home. As for the time when children started to use Atayal at home, most of the students (75.3%) started to use Atayal after they entered the elementary school. Some students (17.8%) reported that they started using Atayal when they were in the kindergarten. Only 5.5% of students said they started to use Atayal when they were very young. While we have considered the number of adult Atayal speakers, the number of

adult speakers who would talk to children in Atayal was deemed even more important to language learning. The data showed that though 83.6% of the families contained more than two adult speakers, only 49.3% of the families have more than two people talking to children in Atayal. Most of the students had only one (34.2%) or less than one speaker (16.4%) who would talk to them in Atayal.

Regarding students' use of Atayal at school, the first question asked if the students used Atayal when they were at school. Fifty-three percent of the respondents indicated that they used Atayal at school, which was slightly more than students who did not use Atayal at school. When these students were further asked in what occasion they used Atayal at school, most of them said they used Atayal in the indigenous language class. The next question surveyed which language the students used when talking to their classmates at school. Most of the students (89%) used Chinese instead of Atayal. Also, we concerned about the time students started to receive formal teaching of Atayal. The data showed that 71.2% of the students started to learn Atayal after they entered elementary school, while 28.8% started in the kindergarten. The last question in this survey was about students' attitude for the indigenous language. They were asked if they liked Atayal. 86.3% of the students liked Atayal, while 6.8% of students disliked it. For the rest of the students, they did not show a preference for the indigenous language.

From the general description, many students in this elementary school lived in an extended family, in which there were usually more than two speakers of Atayal in the family. Students used some Atayal when they were at home. Compared with their school use, more students used Atayal at home than at school. They mainly used Chinese to communicate with classmates or friends at school. After students learned Atayal at school, they started to use some Atayal at home. The use of Atayal at home and at school seems to be intertwined with each other. The learning at school triggered the use of Atayal at home,

and when they use Atayal at home, they would become more competent in Atayal and then their interest in Atayal learning aroused.

Among all students interviewed, some students were found to have more input than other students. For example, some students had more than two speakers of Atayal at home, and more than two speakers who would talk to them in Atayal. Some students started to learn the indigenous language earlier than others and often used Atayal at home. These students were classified as being more experienced. It is expected that these children would have a better performance in Atayal. Therefore, in Chapter 6, we are going to compare the more experienced group of children with the less experienced group of children regarding to their language experience.

Besides taking the individual factor of the language background into consideration, we are also interested in that when two of the factors are taken into consideration at the same time, whether children under different conditions would perform differently. Factors were combined and examined, and the students were divided into four groups according to factors of the language background. The first set to be examined was about their use at home and at school. The second set concerns the time when they started to learn and the use of Atayal at home. The third relates to the frequency of Atayal use at home and the number of speakers who talked to the students in Atayal. The last set is about the frequency of Atayal use at home and the time when they started to learn the Atayal. We compare children under the more advantageous condition with the other groups, and see if those who were under more advantageous condition would outperform those in the other groups and unveil the factor that influenced children's performance the most.

In the following chapter, we will first introduce the narration task used to test children's performance of Atayal, including how the task was conducted and how

children's performance was coded in Chapter 4. Following that, two comprehension tasks were described in terms of the materials and procedures. The results of each task will be reported individually in Chapter 5. Furthermore, children's performances in both the production task and the comprehension tasks will be evaluated and discussed together with the various factors of their language background in Chapter 6.

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Chapter 4

Study 1: The Narration Task

4.1 Introduction

As reviewed in Chapter 2, the encoding of motion events has been studied

extensively in the fields of typology and acquisition. Looking into this issue enables us to

know how heritage language learners of Atayal conceptualize the world and to observe

the influence of thought on language from different systems. From the well-studied issue

of motion events, we would like to unveil the unique and different performances of the

heritage language learners of Atayal, on whom no attention was paid before this study.

In this study, we examined how these heritage language learners encoded motion

events in a narration task. This study consisted of two phases. In the teaching phase, the

subjects were taught 33 Atayal words which could be of use in the narration task. In the

second phase, the subjects were asked to tell the story '*Frog, where are you?*' (Mayer,

1969). In this chapter, we will give detailed descriptions of the experimental design,

including the materials, procedures and scoring. The results of the task are presented and

discussed at the end of this chapter.

4.2 Demographics of the School-age Participants

The subjects in this study were recruited from one elementary school in Hsinchu.

In this school, there were in total 120 students, almost all of whom were Atayal.

Students from the 2nd grade to the 4th grade were the target of investigation. Since each

grade consisted of a small number of students, all the students in each grade were

included in the experiment, except for one or two mentally-challenged students. As a

result, the number of boys and girls in each grade was not equally balanced, as shown in

Table 4.1.

Table 4.1			
The Number of Subjects in Narration Task			
Grade	2nd	3rd	4th
Boy	6	11	9
Girl	11	10	10
Total	17	21	19

4.3 Experimental Design

The narration task consisted of two phases. In the first phase, students were taught vocabularies that might be of use to express motion events for fear that children might not have acquired some of the vocabularies yet. In the second phase, students were asked to tell the frog story after they read the whole picture book. The experiment was conducted at the end of the second semester, from June 27 to June 29, 2011. A pilot study was conducted before the experiment. Children's narratives of frog story collected in this study will be included into the NTU Corpus of Formosan Children.[7]

4.3.1 Material and Procedure

Teaching phase. The purpose of this study was to test children's encoding of motion events in Atayal. However, concerning the subjects' lack of sufficient vocabulary, revealed by the result of pilot study, children were taught some vocabularies that might be of use in the narration of the frog story based on the adults' narratives of the frog story. Thirty-three words were selected as the teaching materials, including 15 nouns, 16 predicates, and 2 words which belonged to other parts-of-speech. These words were listed in Table 4.2.[8]

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[7] This corpus is established by Prof. Li-May Sung, Graduate Institute of Linguistics, National Taiwan University, and this project is sponsored by the Center for Humanities Research, National Science Council.
[8] The spellings and the meaning of Atayal words were in accordance with the transcription in Huang and

Table 4.2

Words Taught in the Teaching Phase

Noun	English translation	Predicate	English translation	Other	English translation
hzing	bee	syun	put	babaw	above
yuyut	jar	koxun	be.frightened	kura	toward
ubu-hzing	beehive	zmuy	shake		
qhoniq	tree	mkaraw	climb		
bling	hole	mstopu'	jump		
btunux	stone	tmux	call		
tubong	window	mhtuw	come.out		
qehuy	antler	cbing	hold		
bqanux	deer	hbyaw	chase		
hlahuy	forest	lmngyaq	swim		
llyung	river	mhotaw	fall		
luhiy	cliff	hnkangi	look.for		
hyal	floor	mqzinah	run		
sasan	day.time	tpru	stop suddenly		
gbyan	at. night	m'abi	sleep		
		kahul	be.from		

In Austronesian languages, voice can be viewed as the subject-selecting mechanism, and is presented by affixation. There are four voices, namely, Agent Voice (AV), Patient Voice (PV), Locative Voice (LV), and Referential Voice (RV). Different affixes (-m- for AV, -un or -in- for PV, -an for LV, s- or ø for RV in Squliq Atayal) will be added to the verb root. Examples in Squliq Atayal were given below.

(1) AV

musa-ku   mima   kira.
Asp-2Sg.Nom   wash.AV   later
'I'm going to bathe later.'

(2) PV

pm-on-mu   kira   qu'   laqi-maku.
wash-PV-1Sg.Gen   later   Nom   child-1Sg.Gen
'I will wash my child (later).'

Tanangkingsing (2005).

(3) LV

nyux-nya'		pm-an	qu'	pm-an	qasa.
Asp-3Sg.Gen		wash.LV	Nom	bathroom	that

'He is washing himself in that bathroom.'

(4) RV

s-pima-mu	qu'	seken	qani.
RV-wah-1Sg.Gen	Nom	soap.Jp	this

'I washed with this soap.'

To minimize sentence complexity, the predicates were taught in AV form, except for two verbs, *syun* 'to put', and *koxun* 'to be frightened', which were only used in Patient Voice (PV) in adults' narratives of the frog story.[9]

The thirty-three words were taught in sentences, which were carefully constructed not to resemble any scenario in the frog story. Sixteen target sentences were made (see Appendix 2). The students were taught four sentences in one class period. The teaching phase thus lasted for four consecutive weeks. The teaching materials were the same for all the three target grades.

In addition, the teaching procedure was controlled to ensure that all three grades received the same teaching input. In the beginning of each class period, the teacher showed the students pictures of each vocabulary via PowerPoint slides. Then, a complete sentence was presented with a motion picture. Students were required to repeat the sentence after the teacher. After several repetitions, the motion picture would be removed, and the students had to translate the sentence into Chinese. After most of the students could correctly translate the sentence, the teacher asked the students to repeat the whole sentences after her for a few times. Then, the teacher would explain and present the sentence in Chinese, and the teacher sometimes code-mixed with a few Atayal words

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[9] The adult's narratives we based on in this study were the same as in Huang and Tanangkingsing (2005).

within the a Chinese sentence. Sometimes, the teacher also told a short story related to the vocabulary she was teaching in Atayal with gestures and then asked students to guess what she was talking about. The same procedure would be repeated for each of the four sentences. At the end of each class, the teacher reviewed all the vocabularies and the sentences which students learned that day. Also, those vocabularies and sentences would be reviewed at the beginning of the next class. The teaching phase lasted for four class periods in four consecutive weeks, from June 1 to June 24, 2011.

Elicitation of motion event expressions. In this phase, subjects were tested individually in a quiet, isolated room. The testing material was a 14-page condensed version of the wordless picture book "*Frog, where are you?*" (Mayer, 1969). In this condensed version, the overall flow and the main plots remained unchanged; however, only the pages containing motion events were selected since the focus of this study was on motion events.[10]

In the testing phase, subjects were instructed to read the condensed frog story carefully before they started to tell the story. In the pilot study, we found that children were not confident enough to tell the story entirely in Atayal. Therefore, to encourage subjects to use more Atayal, we told the students that those who used Atayal well could receive extra points and a big prize. Also, to lower their anxiety and feelings of frustration, they were allowed to use Chinese, but only when it was necessary. The experimenter gave the instruction in Chinese, as shown below.

> "首先，請你先慢慢地仔細地看這本圖畫書。看完之後，要請你用泰雅語跟老師說這個故事在講什麼。"
> *'First, please read this picture book slowly and carefully. After you finish reading,*

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[10] In the condensed version, we removed the pictures of the dog jumping out of the window and breaking the jar, and also two of the three pictures which depicted the discovery of the frog at the end of the story.

you will be required to tell the story to the teacher in Atayal.'

After the subject finished reading the picture book, the experimenter provided the next instruction.

"看完了嗎？老師(實驗者)會把你講的故事錄起來給母語老師聽喔！泰雅語講得好的小朋友，母語老師會幫你加分，而且最後還可以獲得獎品喔！準備好了嗎？那就請你開始講囉！記得，每張圖都要講！如果真的不會用泰雅語講的時候，可以用一點點中文！"

'Have you finished reading? I will record the story you tell, and the indigenous-language teacher will listen to it. If you use Atayal well, the indigenous-language teacher will give you extra points and you will also be given a prize. Are you ready? Then, you may start to tell the story. Remember, you cannot skip any picture. If you really don't know how to express a certain word in Atayal, you may use some Chinese.'

The narration was audio-recorded for off-line transcription. After the subject finished narrating, a language background interview was conducted to inquire into children's exposure to Atayal or their use of Atayal at home or at school.

4.4 Results

In the narration task, students were asked to narrate the story '*Frog, where are you?*' in Atayal. On account of the students' lack of abundant vocabularies to narrate the story entirely in Atayal, they were allowed to code-mixed between Atayal and Mandarin. However, several measures were also implemented to boost students' use of Atayal. For example, in the teaching phase, the teachers taught the students most of the vocabularies and the structure of motion events that could be of use in the narration. The students had practiced vocabularies and motion event construction for many times in the teaching phase. Also, from the classroom observations before the experiment, we had observed that some students could understand short stories told by the teachers and answered in simple sentences. In addition, before narrating the story, the students were informed that

those who used Atayal to tell the story could receive not only extra points, but also a big prize. However, it turned out that most of the students, especially the lower graders, narrated the story mostly in Chinese, mixing with only a few Atayal vocabularies. Though all the motion event constructions had been taught in complete sentences repeatedly in the teaching phase, still, none of the students used a complete sentence to describe the motion events.

Following were examples of how students from each grade encoded a motion event by using the Atayal motion verbs, *mhohtaw* 'to fall', which was the most frequently-used verb in the collected narratives. As shown in the examples, students tended to code-mix between Chinese and Atayal. When students code-mixed in the motion event encoding, students placed the verb in the sentence-medial position, but not in sentence-initial position, which is the typical Atayal sentence structure. Therefore, even though the students encoded the motion with an Atayal verb, the construction was a Chinese sentence structure.
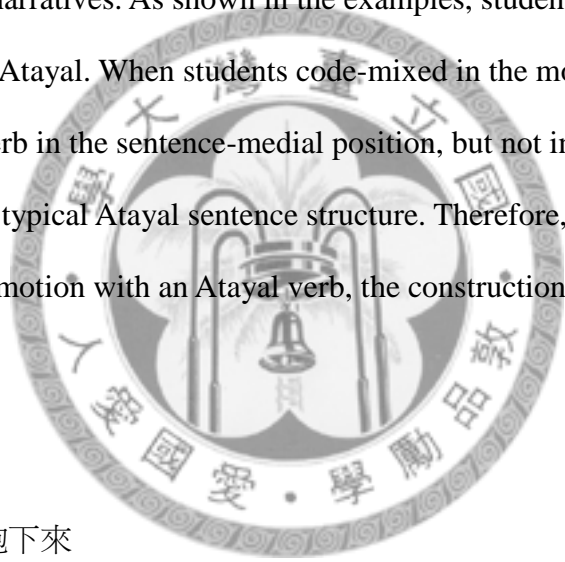
(1) 2nd grade_TJR
*CHI:　　然後鹿就跑下來
*CHI:　　然後就把他們兩
*CHI:　　兩個
*CHI:　　hotaw
*CHI:　　然後他就掉到
*CHI:　　河邊裡面

(2) 3rd grade_HN
*CHI:　　他爬到樹上
*CHI:　　看到
*CHI:　　又看到一個洞
*CHI:　　mho-
*CHI:　　從樹上 mhotaw
*CHI:　　把 hozil 嚇走

(3) 4th grade_HKS
*CHI:　　他從 llex mhotaw 下去
*CHI:　　到了 gong 裡面
*CHI:　　Watan跟 hozil
*CHI:　　從 gong
*CHI:　　一直游一直游
*CHI:　　游到一個木頭的後面

We now come to the main goal of the narration task, that is, to investigate how heritage language learners encoded motion events in the narration task. We first examined the motion verbs children expressed in Atayal in the narration task. Students produced 13 verbs in narrations. Of these verbs, seven spontaneous motion verbs were used and five of them were taught in the teaching phase. Among the motion verbs, we were concerned about the path verbs and manner verbs that a trajectory of a moving agent was involved. Among all the narrations, subjects produced one path verb and two manner verbs. More subjects made use of the path verb in their narratives. As revealed by the result in Table 4.3, the path verb, *mhotaw* 'to fall' was used by six subjects while *mstopu'* 'to jump' and *mkaraw* 'to climb' were used by only one or two subjects in the 4th grade. Compared with path verbs, manner verbs seemed to be more difficult for these children to acquire in a motion event denoting a movement of the agent.

We further investigated how children used the path verb *mhotaw* 'to fall' as presented in examples (1), (2), and (3), and how they used the manner verbs *mstopu'* 'to jump' and *mkaraw* 'to climb' in examples (4) and (5) below.

In example (1), the subject used the Atayal verb *hotaw* 'to fall' to encode the motion; however, she used a Chinese construction to specify the goal, *i.e.*掉到河邊裡面. In example (2), the subject used the word *mhotaw* 'to fall' to indicate the path of the motion and the deictic element. However, he introduced the source *tree* with Chinese, i.e. 從樹上.

In this example, the Atayal verb was embedded in a construction which is often found in Mandarin motion event encoding, that is, Source+Manner+Path+Deixis (Lin, 2006). Different from example (2), the subject in example (3) used the Atayal word *mhotaw* 'to fall' with the Chinese path and deictic components *xia4qu4* '下去'. However, in Atayal, the path verb *mhotaw* 'fall' incorporates both the concepts of path and deixis. Therefore, the use of the Mandarin path and deictic elements *xia4qu4* was redundant in this case. From the examples (1) to (3), the heritage language learners were found to use the Atayal path verb in Chinese constructions, and did not really grasp the meaning of the Atayal verb *mhotaw* completely.

In example (4) and (5), we examined the subjects' use of manner verbs *mkaraw* and *mstopu'*. As shown in these examples, subjects seemed to use these manner verbs in Chinese constructions. In example (4), the subject could be encoding the motion event with the Chinese construction 爬到樹上, but just replaced the word 爬 'climb' with the Atayal word *mkaraw* 'to climb'. However, it was worth noting that the word *mkaraw* 'climb' in Atayal can mean 'to climb up' or 'to climb down,' according to its context. For example, *mkaraw qhoniq qu' mqu'* can be interpreted as either 'The snake climbed up the tree' or 'The snake climbed down the tree'. The finding that the subject in example (4) encode path independently of the Atayal verb *mkaraw* suggested that the subject did not know how to use these Atayal verbs well. Also in example (5), it was shown that *na4 ge* '那個' followed by *mstopu'* 'jump' functioned as a pause (Huang, 1999) for the subject to search for the Atayal vocabulary with the meaning of 'jump'. From examples (4) and (5), it was found that children encoded the motion events in Chinese and tried to translate some of the words into the Atayal vocabularies they knew.

(4) 4th grade_HYP

*CHI:　　　Watan弄

*CHI:　　　mkaraw 爬

*CHI:　　　mkaraw 到樹上

(5) 4th grade_HYP

*CHI:　　　看到那個 patong 那個 mstopu'

*CHI:　　　那個小男生 跟小狗狗

Since no complete Atayal sentence was produced in children's narratives, the use of each Atayal word was then closely examined. Words used by the subjects in the narratives were listed in Table 4.3. This table provided the number of users and the number of tokens for each word. The number of users provided a clearer view to the use of each word among our subjects. Words of high occurrences were sometimes contributed by only a few subjects. For example, *tmux* 'to call' and *mita* 'to see', were used ten times and eight times respectively, but, actually, they were only used by two of the fourth graders. The number of tokens itself cannot tell us how many students among the subjects can really use it. Thus, the number of users should also be shown in the table.

Among 57 subjects (17 second graders, 21 third graders, 19 fourth graders), *patong* 'frog' and *hozil* 'dog' were the most frequently-used nouns. Forty-six subjects (81%) used the Atayal word *patong* 'frog' and thirty-six subjects (63%) used *hozil* 'dog'. The most frequently-used predicate was the path verb, *MHOTAW* 'to fall' (the verb forms with or without AF voice affix, i.e. *hotaw* and *mhotaw,* were both included). Among all the subjects, only six subjects (11%) used the verb *MHOTAW.*

Table 4.3

Words Occurred in the Narratives: Ranked by Number of Users

Atayal Vocabulary	English translation	No. of users	Token	Atayal Vocabulary	English translation	No. of users	Token
(PATONG)	frog	46	256	ngungu	nose	2	2
patong	frog	45	251	taquy	fall.down	2	2
hozil	dog	36	199	**tmux**	**call**	**2**	**10**
qoli	**mouse**	**8**	**9**	**abi**	**sleep**	**1**	**1**
yuyut	**jar**	**7**	**20**	balay	really	1	5
btunux	**stone**	**6**	**10**	cipo	small	1	3
(MHOTAW)	**fall**	**6**	**11**	cyux	ASP	1	4
sasan	**day.time**	**5**	**8**	gong	stream	1	2
hotaw	**fall**	**4**	**7**	**hzing**	**bee**	**1**	**3**
qutux	one	4	14	lixun	door	1	1
'sang	be.quiet	4	5	llex	mountain	1	2
tunux	head	4	6	lokah	be.strong	1	1
bling	**hole**	**3**	**9**	mit	goat	1	1
sqnux	smell.bad	3	5	**mkaraw**	**climb**	**1**	**2**
qsya	water	3	3	**qhoniq**	**tree**	**1**	**1**
sazing	two	3	4	qpatong	frog	1	5
tubong	**window**	**3**	**5**	su	2S.G	1	1
gbyan	**at.night**	**2**	**2**	tama	sit	1	1
la	SFP	2	2	tryong	wasp	1	1
laqi	kid	2	2	**ubu hzing**	**beehive**	**1**	**1**
lipa	slippers	2	2	ungat	NEG	1	1
llyung	**river**	**2**	**3**	yamil	shoe	1	2
mhotaw	**fall**	**2**	**4**	yapit	polatouche	1	1
mita	see	2	8	Note: (1) Words that had been taught in the teaching phase were bold-faced.			
mstopu'	**jump**	**2**	**3**	(2) The capitalized PATONG in the parenthesis represents two forms of 'frog' in Atayal, i.e. *patong* and *qpatong*.			

The most frequently-used words, include *patong* 'frog', used by 81 percent of the subjects, and *hozil* 'dog,' used by 63 percent of subjects. The frequencies of other words dropped dramatically. For the remaining 42 words, each word was used by less than 15 percent of subjects. The results revealed that even after students were taught how to encode motion events in Atayal, few of them could really make use of them.

Subsequent lexical analysis was conducted to examine the distribution of different parts-of-speech in the production data. Words were categorized on the basis of their parts-of-speech, namely nouns, predicates, and others, according to its function in subject's production. For example, *qutux* 'one' was classified into the category of Other, not in the category of Noun, since it functioned as a modifying quantifier in the subject's narrative. Words of these three categories were listed in Table 4.4. Among the forty-four words, 60% were nouns (26 words), 30% were predicates (13 words), and 10% belonged to the category of others (5 words). As revealed, subjects used more nouns than predicates.
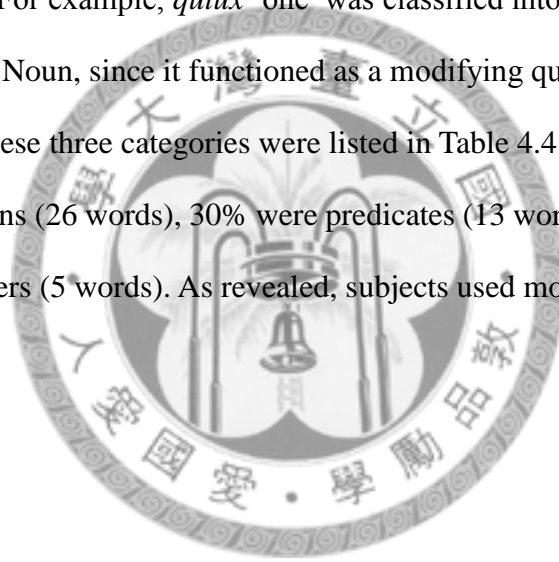
Table 4.4			
Words Occurred in the Narratives: Categorized by Parts-of-Speech			
Atayal	English translation	Atayal	English translation
Noun			
bling	**hole**	laqi	kid
btunux	**stone**	lipa	slippers
sasan	**day.time**	lixun	door
hzing	**bee**	llex	mountain
qhoniq	**tree**	mit	goat
qoli	**mouse**	ngungu	nose
llyung	**river**	(PATONG)	frog
gbyan	**at.night**	qsya	water
tubong	**window**	su	2S.G
ubu hzing	**beehive**	tryong	wasp
yuyut	**jar**	tunux	head
gong	stream	yamil	shoe
hozil	dog	yapit	polatouche
Predicate (Verbal & Adjectival)			
(MHOTAW)	**fall**	ungat	NEG
abi	**sleep**	mita	see
mkaraw	**climb**	qnux	smell.bad
mstopu'	**jump**	lokah	be.strong
tmux	**call**	cipo	be.small
tama	sit	sang	be.quiet
taquy	fall.down		
Others			
balay	really	sazing	two
cyux	ASP	la	SFP
qutux	one		
Note: Words that had been taught in the teaching phase are bold-faced.			

We were interested in the teaching effect; therefore we examined whether children had acquired words taught in the teaching phase and used these words in narratives. Table 4.5 demonstrated the subjects' use of the vocabularies that were taught in the teaching

phase. In the teaching phase, 33 words were taught, including 15 nouns, 16 verbs, and 2 words belonging to the category of Others. Analyses on the subjects' narratives revealed that the subjects used 16 words that were taught in the teaching phase, including 11 nouns and 5 predicates. As shown in Table 4.5, the subjects had used 11 out of 15 nouns taught in the teaching phase to tell the story, while they only used 5 predicates among the 16 predicates taught in the teaching phase. The results suggested that subjects learned the newly-taught nouns faster and could make use of them better, in comparison with their use of the predicates. Nevertheless, if we further examined the total use of words, it was found that words taught in the teaching phase only accounted for one-third of students' production of vocabularies. Two-thirds were from the subjects' spontaneous productions, which indicated that students had possessed some Atayal vocabulary knowledge before the experiment.

Table 4.5 *Subjects' Use of the Vocabularies that were Taught in the Teaching Phase*					
Noun (Taught)		Predicate (Taught)		Other (Taught)	
Used	Non-used	Used	Non-used	Used	Non-used
11 (73%)	4 (27%)	5 (31%)	11 (69%)	0 (0%)	2 (100%)

From the data collected, it was clearly shown that our subjects used very little Atayal vocabulary. Some children did not even use any Atayal word in their narratives. Only 65% of the second graders used at least one Atayal word in the narratives. However, increases in the number of narratives that contained at least one Atayal word were found in the 3rd and 4th graders, as shown in Table 4.6, which indicated a maturation trend of children's general performance in Atayal.

Table 4.6			
The Number of Narratives that Contained at Least One Atayal Word			
	2nd grade	3rd grade	4th grade
Number of narratives containing at least one Atayal word	11 (65%)	20 (95%)	17 (89%)
Total number of narratives	17 (100%)	21 (100%)	19 (100%)

As for the number of Atayal words used, a tremendous increase was found while we compared the second graders with the third graders or the fourth graders. Among the second graders, only seven Atayal words were used, while among the third and fourth graders, more than twenty-seven words were used, as reported in Table 4.7. The 3rd and the 4th graders had similar performances, and only manifested a minor difference in the use of predicates. That is, the 4th graders used more predicates than the 3rd graders.

Table 4.7			
The Number of Atayal Words Used in the Narratives of Different Age groups			
	2nd grade	3rd grade	4th grade
Noun	5	17	18
Predicate	2	7	9
Other	0	3	3
Total	7	27	30

In the narration task, we only observed some production data at the lexical level, but not at the sentence level. The limited production data prevented us from digging deeper into how these heritage language learners understood the motion events; therefore the comprehension tasks were implemented to further assess children's knowledge of the motion event constructions. In comprehension tasks in Study 2, the second graders were excluded, because the subjects' performances in the narration task revealed that children might have better knowledge of the motion event constructions until they were older. Therefore, in the comprehension tasks in Study 2, we included students from the 4th to the

6th grade, i.e. the 3rd grade to the 5th grade in the narration task in Study 1.

4.5 Summary and Discussion

In the narration task in Study 1, these heritage language learners of Atayal were asked to narrate the frog story in Atayal, with an aim to finding out how these learners constructed the motion event in Atayal. Even though a teaching phase was conducted before the testing phase, subjects still produced very few Atayal vocabularies, and did not produce any complete Atayal sentences in the narratives. Among the 44 words used, including 26 nouns, 13 predicates, and 5 words in the category of Others, one-third were words that had been taught in the teaching phase, while the other two-thirds were words the subjects had acquired before the experiment. Among the words taught, 11 words were nouns and 5 were predicates. More of the nouns than predicates taught in the teaching phase were applied in the narratives. When we further examined the use of motion verbs in children's narratives, we found that children, even those in the 4th grade, had not acquired how to encode motion events in Atayal.

Subjects only applied half of the vocabularies they had learned in the teaching phase to the narration task, which suggested that the teaching only exerted limited effect to children's narrative performance. Our classroom observations during the teaching phases might provide some possible explanations. First of all, the limited teaching effect might partially result from the limited lecturing time. There was only one indigenous-language class a week. Students had very little time for practicing what they learned. As a result, at the beginning of each class, the teacher had to spend five to ten minutes reviewing what was taught the week before. Second, the teacher used the translation method to teach students the meaning of each sentences; therefore, the students would use Chinese to decode the Atayal sentence. As a result, code-mixing occurred very often in children's production data. Also, compared with nouns, predicates

might be more abstract for students (Gentner, 1982), thus require more demonstrations of what they mean and how they are used. For example, when the teacher taught the word *mhtuw* 'fall,'.she had to demonstrate the falling action so that the student would understand that the word *mhtuw* 'fall' means the downward movement.

The other factors that affected the teaching effect could be the difficulty of the teaching materials and the aboriginal students' learning style. At the third class during the teaching phase, some students started to complain that the content was too much and too difficult. This was counter to our expectation because the indigenous language teacher said that it would be feasible to teach four sentences to the students in the intermediate and higher grades in one class period, if they were only required to understand the meanings. We speculated that students' complaints might result from the schedule of the teaching phase, which was relatively more intense than their other courses. Unlike students in urban areas, these heritage language learners received less pressure from adults and also teachers regarding their academic performances. One of the homeroom teachers also revealed that students were only required to master the basic level of each subject and the teacher only tested the students on basic questions. Therefore, students were used to the loose schedule of a class. The schedule of teaching thirty-three Atayal words in four classes within a month was too tight for them. The students were overloaded and could not absorb all the materials. In addition, no handout was provided for reviews at home. We had made this decision because the teaching phase was designed just to facilitate students' understanding of the motion events. Furthermore, we would like to control the amount of input the students received. However, this decision might have affected students' learning. While the students only had one class in a week, and they did not review after school, the effect of teaching could be very limited.

From the result of the narration task, we knew that these heritage language learners

had very limited production in motion event encoding. Thus, we conducted a second study which assessed children's comprehension of motion events. In these tasks, we aimed to find out if subjects had correct understanding of motion events and whether subjects showed different performances in understanding sentences containing different semantic types of verbs, i.e. the path verbs and the manner verbs. Besides, our narration result showed that the 2nd graders could not produce any motion event construction, which suggested they might have not acquired the motion event encoding yet. As a result, in the following study, we only included subjects from the intermediate grade and the higher grade, namely the 4th to the 6th graders, in the comprehension tasks.

Though most of the students showed very limited production in Atayal in the narration task, we noticed that some students had better knowledge of Atayal vocabulary. Since children received the same teaching input, we would expect that the difference in vocabulary knowledge could be the result of their diverse language experience. In Chapter 6, we investigated what kind of language experience, as surveyed in the language background questionnaire, influenced students' performance in Atayal.

Chapter 5

Study 2: Comprehension Tasks

5.1 Introduction

In the narration task, we found that the subjects had very limited ability in narrating the frog story in Atayal, even though all Atayal vocabularies that could be of use were taught to them before the elicitation of motion event expressions. Most of the subjects mainly used Chinese, and code-mixed with a few Atayal lexicons in their narratives. We were wondering if there was a gap between these heritage language learners' production and comprehension of Atayal. Therefore, to better understand this group of heritage language learners' linguistic competence, two comprehension tasks were implemented. One was the listening comprehension task, and the other was the act-out task. Huang and Tanangkingsing (2005) indicated that Squliq is a path-salient language, in which adults used more path verbs than manner verbs to encode the motion events in the frog story. Therefore, the focus of the comprehension tasks lied on the comprehension of questions of two semantic types of verbs and the age difference. The two tasks were designed to examine whether these heritage language learners could comprehend Atayal motion events, and if they showed different performances in comprehending motion events encoded with different semantic types of verbs, i.e. the path verbs vs. the manner verbs.

5.2 Demographics of the School-age Participants

As mentioned in the previous chapter, in the narration task, we included students from the 2nd grade to the 4th grade as the participants. However, we found that younger subjects did not have sufficient Atayal vocabulary, and it would be unavailing to test their comprehension of the motion event constructions in Atayal. Therefore, in this

study, we included students from the 4th grade to the 6th grade as the participants. Again, we included all the students in the classes into the experiment, except for one or two mentally-challenged students, given that there were not many students in one class. As a result, the numbers of boys and girls in each grade were not equally balanced, as shown in Table 5.1.

Table 5.1
Number of Subjects Included in Each Task

	Listening Comprehension Task			Act-Out Task		
Grade	4th (3rd)	5th(4th)	6th(5th)	4th(3rd)	5th(4th)	6th(5th)
Boy	11	9	5	11	7	5
Girl	9	10	12	9	8	12
Total	20	19	17	20	15[11]	17

Note. The ordinal numbers in parentheses refer to the grades the subjects were in when tested in the narration task.

5.3 Experimental Design

To obtain a full picture of the students' linguistic capacity in encoding motion events, two comprehension tasks were implemented to investigate if these subjects could understand motion events and how well they could understand them. One was a listening comprehension task and the other an act-out task. The two comprehension tasks were conducted in September 2011, which was the beginning of the semester following the semester when the narration task was conducted (i.e. June 2011). There was a summer break between the implementation of the narration task and the comprehension tasks. For fear that students might need to refresh their memory about the vocabularies and motion event constructions taught at the end of the last semester, two review classes were then implemented before the two comprehension tasks. The overall procedure was similar to

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[11] Four students in the 5th grade only participated in the listening comprehension task but not in the act-out task due to health problems. Therefore, the performance of these four students in the listening comprehension task would be discussed only in the result section, but would not be taken into consideration in the later correlation analysis.

the teaching phase in the narration task. The teacher showed the vocabularies that the students had learned at the end of the last semester via PowerPoint slides, but the vocabularies covered in the review section were mainly words that would occur in the listening comprehension task and the act-out task.

The experiment was conducted at the beginning of the semester, from September 23 to October 3, 2011, after the review section. All the data of the comprehension tasks from different grades were collected within two weeks.

5.3.1 Listening Comprehension Task

Material. The listening comprehension task was designed to examine the subjects' comprehension of motion events and to investigate if the semantic type of motion verbs affected these subjects' comprehension of motion events. The motion verbs taken into consideration in this study were the spontaneous, self-initiated motion, with a change of location. We included two semantic types of verbs, i.e. path verbs and manner verbs. Different studies concerning motion events had slightly different definitions for manner and path verb. Manner verbs in this study were defined as those verbs which encode internal details of the motion, such as the speed or the gait. Path verbs, on the other hand, referred to a motion in which the trajectory of the moving actor was encoded.In this study, four target verbs were selected, including two manner verbs, *mkaraw*[12] 'climb' and *mstopu'* 'jump', and two path verbs, *mhotaw* 'fall' and *musa* 'go'. The reason why these four motion verbs were chosen was because they appeared in both children and adults' narratives[13], which implied they were more commonly-used motion verbs. Two sets of

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[12] *Mkaraw* 'to climb' in Squliq Atayal encodes the manner of motion only, without any implication of upward or outward movement. That is to say, the path of the movement is not expressed by the manner verb *mkaraw* alone. Speakers have to refer from the context or other component is needed to clearly depict the movement.

[13] See Footnote (9)

motion events constructions were formed respectively for the manner verbs and the path

verbs: Manner + Source for manner verbs, and Path + Goal for path verbs. Description of

each question and the choice item can be found in Appendix 3. Since the focus of this

study was on the motion event, the motion animations were provided as the choice items

in each question and the whole testing materials were made with PowerPoint 2007.

Motion event sentences with different levels of difficulty and complexity were

designed for the purpose of ensuring students' basic understanding and examining

whether the complexity of motion event construction affected subjects' understanding.

The difficulty of the three levels was manipulated by varying the number of verbs in a

sentence and the association between the actor and the verb. In total, eighteen questions

were constructed, including 4 sentences for the basic level, 12 sentences for the general

level, and 2 sentences for the advanced level. Questions of the basic level and advanced

level were to provide us with a more complete and detailed understanding for subjects'

comprehension of the overall motion event constructions. A multiple-choice question

type was adopted. In each question, three choice items were provided for subjects to

choose from. When given a sentence, the subject had to select the corresponding

animation from the three choice items (see Figure 2).

Figure 2

An Illustration of A Question with Three Choices of Animation

In the basic level sentences, there was a close link between the actor and the motion verb, so that the subjects could easily interpret the sentence if they had knowledge of the vocabularies and motion event expression in Atayal. Therefore, the basic level questions were used as the baseline for subjects' performance of motion events. The close link between the actor and the motion verb was created by associating the actor with their typical action, for example, the action of climbing and the actor of snake in the sentence *Mkaraw yuyut mhtuw qu' mqu.* 'The snake climbed out of the hole', or by using a pair of an actor and a motion verb, which had co-occurred in the sentences taught in the teaching phase, for example, *Mhotaw sa llyung sasan qu' qoli.* 'The mouse fell into the river in the daytime.'

The general level sentences were designed to test the subjects' interpretation of the sentences containing two types of verbs: the manner verbs and the path verbs. Two verbs were chosen for each verb type: *mkaraw* 'climb' and *mstopu'* 'jump' for manner verbs, and *mhotaw* 'fall' and *musa* 'go' for path verbs. Each verb was tested three times in questions which provided different patterns of distractors. In the question with A-V alternatives, it provided two distracters which differed from the accurate animation in terms of the actor element and the verb element respectively. For example, in questions with A-V alternatives, when children heard *musa yuyut qu' Watan* 'Watan went into a jar', they saw three motion animations. One of the animations demonstrated the scenario corresponding to the target sentence (i.e. Watan going into a jar). Another displayed the scenario of *a mouse* going into a jar (the A alternative). The other displayed Watan *jumping* into a jar (the V alternative). In the question with A-D alternatives, it contained two distracters which differed from the accurate animation in terms of the actor element and the deictic element respectively. For example, when children heard *musa yuyut qu' hozil* 'The dog went into a jar', they were shown three animations, one of which

demonstrated the scenario corresponding to the target sentence (i.e. a dog going into a jar), while the others differed from the accurate scenario in terms of either the actor (i.e. *a mouse* going into a jar) or the deixis (i.e. a dog going *out of* a jar). The third type of question provided two distracters in which one presented a different motion verb element and the other a different source element (hence V-S alternatives). In the questions of V-S alternatives, when children heard the same sentence *musa yuyut qu'hozil* 'The dog went into a jar', they saw the corresponding animation with a dog *going into* a jar, and the other two distracters, one with a dog *jumping* into a jar (i.e. the V alternative), and the other with a dog going into a *hole* (i.e. the S alternative). Examples of each type of questions were given below in Table 5.2.

Table 5.2
Questions with Different Patterns of Distractors

Description of animations / Alternative	Corresponding animation	Distracter 1	Distracter 2
A-V alternatives	Watan went into a jar.	**A mouse** went into a jar.	Watan **jumped** into a jar.
A-D alternatives	A dog went into a jar.	**A mouse** went into a jar.	A dog went **out of** a jar.
V-S alternatives	A dog went into a jar.	A dog **jumped** into a jar.	A dog went into a **hole**.

As for the advanced level, more complex sentence construction was used, namely the Manner + Source + Path construction. The sentence was *mkaraw bling mhtuw qu' hozil* 'The dog climbed out of a hole', which carried the same meaning as the sentence *kahul bling mkaraw qu'hozil*. The manner verb *mkaraw* 'climb' was used together with a path verb *mhtuw* 'exit'. As indicated by our informant, this construction can only be applied to the manner verb *mkaraw* 'climb' to the exclusion of other manner verbs that could occur in the frog story. This sentence was tested twice under two questions with different patterns of distracters, namely the question with the A-D alternatives and the question with the V-S alternatives. The sequence of each question was randomly assigned,

and the positions of the choice items on the PowerPoint slides were counter balanced.

Procedure and coding. The subjects were tested individually in a quiet and isolated room. Before the experiment started, three practice trials were conducted to familiarize children with the test procedure. Most of the students could choose the corresponding animation correctly. After that, the subjects would be informed verbally that the test was about to start, while simultaneously seeing a line appearing on the computer screen, saying '準備好了嗎? 那我們要正式開始了。' At first, they heard an Atayal sentence spoken by a native speaker of Atayal, and they saw three motion animations projected on the screen at the same time (see Figure 2, p.49). Then, the subjects were asked to watch each motion animation in detail one by one. After they watched all the three options, the three options of motion animation were placed together.. Meanwhile, they listened to the target sentence again. Then, the experimenter asked the subjects, 'Which picture is suitable to describe the sentence you hear?' The subject could answer by pointing to the preferred animation on the screen, or refer to the animation either with its position (e.g. left, middle, or right), or with the color of its frame (e.g. red, yellow, or green). They experimenter would mark their answer on the answer sheet. The final record had been double-checked with the answer sheet and also the record kept by the experimenter. All the procedure had been video recorded for the later reference.

As for scoring, the subjects could earn one point if they chose the correct animation. If they failed to do so, they would get a zero for that question. The highest score for the listening comprehension task was eighteen.

5.3.2 Act-out Task

An act-out task has the advantage that subjects can respond freely, without being confined by the choices provided by the examiner. In the present act-out task, children

were asked to act out four sentences. Their performances were the reflections of their understanding of the test stimuli.

Material. In the act-out task, we also examined the subjects' understanding of two semantic types of verbs. Verbs included in this task were the same as those in the listening comprehension task, namely the manner verbs *mkaraw* 'climb (in/out)' and *mstopu'* 'jump', and the path verbs *mhotaw* 'fall' and *musa* 'go'. Four sentences were constructed for the four verbs, as shown in Table 5.3. Sentence 1 and 2 contained the manner verbs, while Sentence 3 and 4 contained the path verbs. The same actors, frog and dog, were used in both verb types. The four target sentences were recorded beforehand by the experimenter.

Table 5.3
Four Target Sentences in Act-out Task

Sentence	Atayal	English translation	Code	Total score
1	Mkaraw yuyut qu' hozil.	The dog climbed into/out of the jar.	Manner of motion	1
2	Kahul yuyut mstopu' qu' qpatong.	The frog jumped out of the jar.	Manner of motion + Deicitc	2
3	Kahul yuyut mhotaw qu' qpatong.	The frog fell out of the jar.	Path of motion +Deictic	2
4	Musa yuyut qu' hozil.	The dog went to the jar.	Path of motion	1

For the subjects to act out the sentences they heard, we had prepared a plastic jar, a puppy, and a frog doll, as presented in Figure 3.

Figure 3

The Properties Used in the Act-out Task

| The plastic jar | The puppy | The frog |

Procedure and scoring. Students were tested individually in a quiet and isolated room. The act-out task was conducted right after the listening comprehension task. In the beginning of the test, the experimenter would place all the properties, including the plastic jar, the puppy and the frog doll, on the table in front of the subjects, and asked the subjects to name each property in Atayal. If subjects failed to label an object correctly, the experimenter would name the property with its Atayal label to ensure students knew the Atayal labels of each properties. After the subjects were familiarized with the properties on the table, the experimenter told the students that later they would hear a sentence, and they had to use the properties on the table to perform the action. Their action should be clear enough to be identified. The subjects would hear each sentence twice. In addition, the subjects were informed that they could feel free to verbally introduce what they were doing in Chinese while they were performing the action. All the instructions were given in Chinese by the experimenter, except for the familiarization of each property. The instructions of the experimenter were given below:

> "等一下你會聽到一個泰雅句子,請你用桌子上的道具表演出你聽到的句子的意思!你可以一邊做動作,一邊用中文說你在做什麼。每個動作都要盡量做得確實。"
>
> *"Later, you will hear an Atayal sentence. Please use the properties on the table to perform the meaning of the sentence. You can also introduce what you are doing in Chinese while you are performing the action. Be sure to perform the action clearly and accurately."*

All the procedures were video-recorded for off-line scoring. The actor element was excluded in scoring since students were all familiar with the names of the actors. When scoring, two elements of the motion events were examined for Sentence 2 and 3. One was the motion element, and the other was the deictic element. If the subject could perform the motion correctly, they would get one point. If they also performed the deictic element accurately, another point would be given. For example, when a subject heard the sentence, *kahul yuyut mstopu' qu' patong* 'The frog jumped out of the jar', he should use the property 'frog' to show the action *mstopu'* 'jump' and the deictic element *kahul* 'out of.' If the subject performed correctly both the elements, he or she could earn two points.

As for Sentence 1 and 4, only the motion element was scored, that is, the manner of the motion for Sentence 1 and the path of the motion for Sentence 4. Subjects would get one point for that sentence if they could perform the corresponding motion. For example, for Sentence 4, when a subject heard the sentence, *musa yuyut qu' hozil* 'The dog went into jar', the subject should use the puppy doll to perform the action of *musa* 'go'. If the subject could perform the path of motion correctly, one point would be given. The highest score for Sentence 1 and Sentence 4 was one point. Therefore, the total score of the act-out task was six.

The experimenter was the main rater. However, to avoid a biased rating, another rater was asked to rate 10% of the video clips. An inter-rater reliability was administered and consensus was made after the discussion of each criteria.

5.4 Results

Listening comprehension task. In this task, students from the 4th grade to the 6th grade were included. We tested the subjects' performances in interpreting sentences with different semantic types of verb, i.e. the manner verbs and the path verbs. For each verb

type, there were nine questions, including two basic questions, six general questions, and one advanced question. In total eighteen questions were tested in the comprehension task. If the subjects answered one question correctly, one point would be given. The total score of this task was eighteen. The overall performance of the listening comprehension task is summarized in Table 5.4.

Table 5.4
The Average Scores of Students' Performance in the Listening Comprehension Task

Level of questions	Basic(4)	General (12)		Advanced(2)	Total(18)
		Manner(6)	Path(6)		
4th grade	2.9 (73%)	3.1(52%)	4.15 (69%)	0.7(35%)	10.85 (60%)
5th grade	3.47 (87%)	3.47(58%)	4.53(76%)	1.05(53%)	12.53(70%)
6th grade	3.59 (90%)	3.71(62%)	4.06(68%)	0.59(30%)	11.94(66%)

As shown in Table 5.4, the average of the subjects' total scores ranged from 10.85 to 12.53. Concerning subjects' performance in the four basic level questions, the 5th and 6th graders' average scores were 3.47 and 3.59 respectively, with accuracy rates as high as approximately 90%. Though the accuracy rate of the 4th graders was slightly lower (2.9 out of 4), it was still high (73%). The results indicated that most of the subjects have basic understanding of the motion event encoding in Atayal. In addition, we examined the subjects' performance in the advanced level questions. These questions were more difficult because they had complex motion event constructions, i.e. Manner + Source + Path. The results showed that only the 5th graders reached an accuracy rate of 50%. The accuracy rates of the other two grades were around 30%. The Manner + Source + Path construction increased the difficulty in comprehending the sentence. Analyses on performances in the basic level question showed that the subjects had had some basic understanding of the motion event encoding in Atayal. However, they were not competent enough to deal with sentences with complex structure, as revealed by their performance in the advanced level questions. Therefore, the look into the general level

questions could provide us with student's average comprehension of motion events. In the following analyses, only the twelve general level questions were taken into consideration when investigating the effect of verb type on subjects' comprehension of motion event constructions.

We first conducted a two-way ANOVA test with the within-subject variable of verb type, and the between-group variable of age. The dependent variable was subjects' accuracy in identifying the animation corresponding to the target sentence. A significant main effect of verb type was found, $F = 11.523$, $p < .05$. No main effect of age nor an interaction effect of age and verb type was found, (Age: $F=.593$, $p>.05$; Interaction: $F=.891$, $p>.05$). This result indicated that verb type influenced children's comprehension of motion events independently of age. Heritage language learners performed differently when encountering questions containing different semantic types of verbs. More subjects could choose the corresponding picture correctly when they heard sentences containing path of motion than manner of motion. Manner verbs seemed to be more challenging for children in the listening comprehension task.

Act-out Task. The objective of the act-out task was also to examine the subjects' comprehension of motion event constructions in Atayal; however, different from the listening comprehension task, this task required the subjects to act out the sentences they heard. As mentioned in the previous section, there were four sentences in total, two sentences for each type of verbs.

Table 5.5			
The Average Scores of Students' Performance in the Act-out Task			
Verb type Grade	Manner (3)	Path (3)	Total (6)
4th grade	1.60 (53%)	1.45 (48%)	3.05 (51%)
5th grade	1.27 (42%)	1.60 (53%)	2.87 (48%)
6th grade	1.35 (45%)	1.71(57%)	3.06 (51%)

A summary of subjects' performance in the act-out task was shown in Table 5.5. A one-way ANOVA was conducted to examine whether there was an age difference in subjects' performance. The result showed that no significant main effect of age was found, $F = 0.165$, p > .05. Therefore, the subjects from different grades performed similarly in this task. We further examined the age effect within different verb types. No main effect of age was found in either the manner verb condition, $F = 1.030$, p > .05, or the path verb condition, $F = 0.535$, p > .05. The findings suggested that subjects from different grades performed equally when interpreting sentences containing manner verbs or sentences containing path verbs. Since there was no age difference in performances, the subjects from different grades were grouped together in the following analysis.

The purpose of this task was to examine whether subjects had different performances in interpreting sentences containing different semantic types of verbs. Therefore, we ran a pair-*t* test to compare the subjects' performance in the manner verb condition and the path verb condition. No significant main effect of verb type was found ($t = -1.071$, p > .05), which meant that subjects performed equally in both verb types. Though we had found no significant effect of verb types in the quantitative analyses, analyses on children's errors in performances would show how children misinterpret the motion events regarding to different verb types and some possible reasons for the inaccurate actions.

Error Analysis. The inaccurate actions performed by the subjects were presented in

Table 5.6. For each verb, two columns were presented. The Error column showed the

inaccurate actions performed by subjects. The number of token represented the number of

subjects that performed the inaccurate action. For fear that the rater might misinterpret

children attempted action, we only examined the actions that children had verbally

specified in the error analysis.

The examination on the inaccurate action performed by subjects showed that the

heritage language learners tended to mis-encode the target action with the action of

jumping, despite the semantic verb type of the target verb. For example, when they heard

the sentence containing the manner verb, *mkaraw yuyut qu' hozil* 'The dog climbed

into/out of the jar.' they would perform the action of a dog jumping out of the jar.

Table 5.6
Error Analysis of the Act-out Task

mkaraw 'climb'		mstopu' 'jump'		mhotaw 'fall'		musa 'go'	
Error	# token	Error	# token	Error	# token	Error	# token
jump	9	fall	3	jump	10	jump	7
ø	4	?	1	?	4	ø	3
fall	2			climb	1		
run	2	note					
walk	1						
put	1						

Note: The question mark (?) meant the subject said that he/she did not know what the sentence meant. The empty set symbol (ø) represented no target manner element or no target path element was encoded in children's action.

In Sentence 2, *kahul yuyut mstopu' qu' patong* 'The frog jumped out of the jar',

subjects who performed inaccurate action consistently act the action "fall" for the word

mstopu' 'jump', except for one subject who said "I don't know" (marked by a question

mark). On the other hand, in Sentence 3, subjects who performed inaccurate actions

tended to perform the action of jump. This might be due to these two words *mstopow*

'jump' and *mhotaw* 'fall' sound phonologically alike. Another explanation was that the actor of Sentence 3 was "the frog"; therefore, the subject associated the actor with its typical action "jump". It was possible that this might be because the action was closely related to the actor 'frog, but for the other two verbs in which a different actor 'dog' was used, subjects still tended to encode the motion 'jump,' when they heard sentences containing the verb *mkaraw* 'climb' and *musa* 'go.' Therefore, we may infer from the result that when children were required to act out the actions carried by the animal, the most frequently associated action was the motion 'jump.' They often used the motion of 'jump' to describe the motion of animals.

The other possibility was that these children had not acquired the motion verbs yet. But, in the listening comprehension task, subjects' performance of each verb was above chance level. They should have equipped some knowledge of motion verbs. Another possibility was that the subjects were influenced by Chinese, in which the most often used construction was Manner + Path + Deixis (Lin, 2006). Therefore, they thought it was essential to have a manner verb when encoding a motion event, and the motion of 'jump' was the one that was often associated with the movement of animals.

From the errors subjects produced, it was worthy noticing that four subjects did not encode any manner of motion when they heard the sentence *mkaraw yuyut qu'hozil.* 'The dog climbed into a jar'. They replied to this sentence by saying 狗就進去了*gou3 jiu4 jin4 qu4 le* 'The dog just went into (the jar)' when they were presenting the action. This might imply the influence from the heritage language, Atayal. Subjects paid less attention to the manner of the verb. For these heritage language learners, the path of the motion was more important than the manner of the motion.

We also examined the deictic component *kahul* 'from' in Sentence 2 and 3. The correct action should be 'jump out' for Sentence 2 and 'fall out' for Sentence 3. However,

more than 60% of subjects failed to perform the correct action of 'jumping out' and 'falling out' in both sentences. Most of the subjects demonstrated the deictic action of 'jumping in' and 'falling in'. It seemed that the subjects had not fully mastered the word *kahul* 'from' well.

From the error analysis, it is manifested that the reason why no significant effect was found in the act-out task might be resulted from the frequently-associated action 'jump' when they were required to perform the action by an animal doll. Also, these heritage language learners might be influenced by Chinese that manner element was essential for a motion event.

Subjects' performances in the two comprehension tasks. In this analysis, the focus was to examine relevance between tasks. Since these tasks were all aimed to investigate children's performance of motion event construction, we would like to know whether children performed well in one task would perform well in the other tasks.

An accuracy rate of 75% was set to divide subjects into two groups in both tasks. As a result, four groups were formed, as demonstrated in Table 5.7. Among all the subjects, three reached the accuracy rate of 75% in both tasks. Eleven subjects performed well in only one task, and 38 subjects did not reach the accuracy rate of 75% in both tasks. Among those who had an accuracy rate of 75% in only one task, there was a higher tendency for them to have better performance in the listening comprehension task. The act-out task seemed to be more difficult than listening comprehension task for these heritage language learners.

Table 5.7			
The Number of Subjects in Each Group			
		Listening Comprehension Task	
		< 75%	> 75%
Act-out Task	< 75%	38	10
	> 75%	1	3

Then, we focused on the eleven subjects who had reached the accuracy rate of 75%

in at least one task and further examined their corresponding production data in the

narration task. The average number of words used in the narration task for subjects who

had reached 75% accuracy rate in least one task was listed in Table 5.8.

Table 5.8				
The Average Number of Words Used in the Narration Task				
	Total	Noun	Predicate	Other
Listening Comprehension Task & Act-out Task>75%	7.33	3.33	3	1
Listening Comprehension Task >75%	4.1	3.4	0.5	0.2
Act-out Task >75%	5	5	0	0

The subjects who reached the accuracy rate of 75% in both task produced an average

of 7.33 vocabularies in the narratives, while the subjects who reached the accuracy rate of

75% in the listening comprehension task produced an average of 4.1, and those reached

75% accuracy rate in the act-out task produced an average of 5. It was revealed that

subjects who reached the accuracy rate of 75% in both tasks or at least in one task used

more than 4 Atayal words in the narration task. This indicated that to perform better in both

the listening comprehension task and the act-out task, a subject must have equipped better

vocabulary knowledge of Atayal. In other words, there was a close link between subjects'

vocabulary size and their comprehension performance.

5.5 Summary and Discussion

Despite the fact that the subjects had very limited production of Atayal in the narration task, the result showed that the average scores for each grade in the listening comprehension task was 11.78, reaching an accuracy rate of approximately 65%, a performance above the chance level. This indicated that the subjects could comprehend the sentences they heard, instead of interpreting the sentence by guessing. The result in the act-out task showed that the average score was 2.99, a little lower than at chance level. The act-out task seemed to be more difficult than the listening comprehension task. The reason might be that in the listening comprehension task the subjects' interpretation of the sentence could be cued by the provided choice items; however, in the act-out task, the subjects had to figure out the sentence meaning all on their own.

Overall speaking, from the results of both comprehension tasks, we found that subjects performed better in comprehending sentences containing path verbs than manner verbs. This might imply that subjects paid more attention to the path element than the manner element. Besides, no age difference was found, indicating that subjects, had come to a steady stage in language learning after they entered the 4th grade. Therefore, subjects in the higher grades may not perform better than those in the intermediate grades, as revealed from the result in both tasks. Though no age difference was found, we found a different pattern in the two tasks. In the listening comprehension task, the 5th graders had the best performance, while the 4th grade had the worst performance. However, in the act-out task, it was the opposite. The 4th graders performed the best, while the 5th graders performed the worst, even though theirs score did not differ significantly. The reason why the 5th and the 6th grade outperformed the 4th grade significantly in the listening comprehension task but not in the act-out task might be that as children grew older, their reasoning ability would also become better. Thus, when several choice items were

provided, children of higher grades could make the correct guesses.

The errors subjects made may also reflect their understanding of sentences. It was found that subjects tended to perform the action of "fall" for the word *mstopu'* 'jump' or the other way around since they might sound phonologically alike. Also subjects tended to encode sentences they did not understand with a jumping action, or just did not encode the manner of the motion. As for the deictic component introduced by *kahul* 'from', less than 40% of the subjects comprehended it correctly and performed the right deictic component in Sentence 2 and 3 in the act-out task. It seemed that the subjects had not fully acquired the word *kahul* 'from' yet. In the teaching phase, *kahul* was taught together with the whole sentence of motion events, yet the teacher did not use a single slide to introduce this word. She just explained its meaning when it appeared in the sentence. Therefore, students might ignore the meaning of *kahul* since it was not emphasized during the teaching phase.

Further, when we crosstabbed the subjects' performance in the listening comprehension task and the act-out task, it was shown that subjects performed better in the listening comprehension task than in the act-out task. However, if the subjects performed well in the act-out task, they would perform well in the listening comprehension task. A close link was found between the vocabulary size in the narration task and the performance in the comprehension tasks when we further examined the subjects' production data. For subjects who performed well in both comprehension tasks or at least in one comprehension task, they could use more Atayal vocabularies in the narratives, with an average of more than 4 words.

From the comparison between the narration task and two comprehension tasks, we found a gap between comprehension and production. Subjects can understand the sentences of motion events, but they can rarely produce any motion event construction.

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The limited data of the narration task might be the consequence of the situation that the subjects did not have many chances to use Atayal in their daily lives since all their parents and grandparents could understand Chinese well. The situation that heritage language learners could not produce Atayal sentences was getting worse because most young parents rarely used Atayal, and even some of them could not speak Atayal. These children would receive less and less input from their parents. Therefore, it is very important to arouse the awareness of preserving Atayal in this young generation. However, as revealed from our data, the heritage language learners did not perform well even after the teaching phase, which countered to our expectation. Factors, such as teaching materials, lecture time, learning style, would affect the performance of heritage language learners. A further examination was needed to find out whether the teaching materials were too difficult, the vocabulary load was too heavy, or more teaching time was needed for the subjects to acquire the knowledge. It is not possible to rely mainly on the family input. The school teaching input is also very important for these heritage language learners to acquire Atayal.

In Chapter 6, we will report the association between the language competence in Atayal and language background in this group of the heritage language learners. We are going to examine whether children with different language backgrounds performed differently in the three tasks of motion events.

Chapter 6

Discussion and Concluding remarks

6.1 Influences from Language Background

In the narration task, we noticed that some students had better knowledge of Atayal vocabulary than the others. We were curious whether the difference in vocabulary knowledge resulted from their diverse language experiences. Therefore, before making the concluding remarks, we examined the relationship between language experience and students' performance in Atayal. We investigated all factors in the language background survey and reported which factor influenced the heritage language learners' proficiency in Atayal. For fear that the lower graders in the elementary school might have difficulty in understanding the questions of the survey, it was conducted with an interview, not with a written questionnaire. The interviewer would provide examples or additional explanations to enhance the subjects' understanding of the question. Most subjects could offer reliable information, except for some subjects, who provided inconsistent information. For example, when asked who spoke Atayal at home, one of these subjects said his dad spoke Atayal. But later when asked how many people spoke Atayal in the family, he said none of the family members spoke Atayal. If situations similar to this case happened, the experimenter would ask the subject more questions to specify the accurate information, and also would ask the homeroom teacher for more information.

Results of the language background survey. As mentioned in Chapter 3, a language background survey was conducted to offer some background information about the subjects' language experience, such as the use of Atayal at home or at school, and also their preference toward their indigenous language. There were ten questions in total, as shown in Appendix 1. In the following section, we would first briefly examine whether

the subjects with more Atayal input and also willingness to use the language would perform better than the others in the three tasks (the narration task and two comprehension tasks). The subjects, who had more Atayal input and were more willing to use the language, were classified into the more advantageous group and for the others, the less advantageous group. The following analyses first included the examination on the influence of a single factor and then the interaction between two factors in the language background survey.

In the analyses on the influence of a single factor to task performance, the subjects were divided into two groups based on their answers in each question. The two groups differed in their linguistic experience with Atayal. The subjects who had more input of or more access to the indigenous language were classified into the more experienced group; otherwise the less experienced group. For example, in Question 1, children were asked about how many people spoke Atayal at home. Students who had more than two Atayal speakers at home were classified into the more experienced group; while those who had two or less than two speakers were classified into the less experienced group. The principle of grouping in each question was shown in Appendix 1.
A summary of how the two groups in each question performed in the three tasks was provided in Table 6.1. The performance of the narration task was represented by the average number of Atayal vocabularies that were produced by the subjects. As for the listening comprehension task and the act-out task, the subjects' performance was represented by the average number of correct responses.

Table 6.1

The Average Performance of the More Experienced Group and the Less Experienced Group

QUESTION	Grouping	Narration task	Listening comprehension task	Act-out task
Q1.How many people speak Atayal in your family?	Group 1	3.21	11.64	3.00
	Group 2	1.92	12.67	3.00
Q3.Do you use Atayal at home?	Group 1	3.39	12.10	3.10
	Group 2	2.21	10.80	2.67
Q4.When do you begin to use Atayal at home?	Group 1	3.59	11.75	3.31
	Group 2	2.85	11.75	2.86
Q5.How often do you use Atayal at home?	Group 1	3.48	12.50	3.12
	Group 2	2.64	11.21	2.81
Q6.How many people talk to you in Atayal at home?	Group 1	3.67	12.28	3.07
	Group 2	2.35	11.19	2.92
Q7.Do you use Atayal at school?	Group 1	3.13	11.88	3.38
	Group 2	3.03	12.00	3.05
Q8.When do you start to learn Atayal at school?	Group 1	4.19	11.76	3.38
	Group 2	2.52	11.74	2.83
Q10. Do you like Atayal?	Group 1	3.16	11.87	3.16
	Group 2	2.22	11.25	1.83

Note:

1. Group 1: more experienced group; Group 2: less experienced group

2. The number in the column of Narration Task for each question was the average number of Atayal vocabularies used by subjects in the narration task. The number in the column of Listening Comprehension Task and Act-out Task for each question was the average score subjects of the group got in the listening comprehension task (total score of 18), and the act-out task (total score of 6).

3. Only quantitative analyses were provided. Therefore, Question 2 was excluded in the following analyses.

The average number of vocabularies produced among these children was 3. The average score among all the subjects for the listening comprehension task and the act-out task were 12 and 3 respectively. Therefore, when children used more than 3 Atayal words in the narratives, or got above 12 or 3 in the listening comprehension task and the act-out task, their performance was better than the average. As revealed by the average performance of each group in each question, the more experienced groups performed better than the less experienced group in the three tasks. Exceptions were found only in Question 1 and 7, in which the less experienced groups had higher score than the more experienced groups in the listening comprehension task. However, the nonparametric Mann-Whitney U test showed that the two groups did not differ significantly (Question 1: $U = 1.328$, $p > .05$; Question 7: $U = 0.095$, $p > .05$).

Among all the factors, only factors of statistic significance would be discussed. Subjects were found to differ significantly in two factors. One was the time when they started to learn Atayal and the other was their preference toward Atayal. The subjects who learned Atayal earlier at school significantly outperformed those who started to learn Atayal after they entered the elementary school in the narration task ($U = 4.148$, $p < .05$). It was likely that students who learned Atayal earlier at school possessed a larger vocabulary size than those who learned Atayal at a later time. Also, the subjects who liked Atayal significantly outperformed students who did not like Atayal in the act-out task ($U = 41.5$, $p < .05$). Subjects seemed to perform better when they like the language. The findings indicated that students' preference for Atayal and when they started to learn this language might be influential to their proficiency of this language.

Besides examining the influence of each factor, we were also interested in the interaction of two factors and their impact on the proficiency of Atayal. Therefore, in the following analyses, we analyzed two factors at a time. In each set of analysis, the subjects

were divided into four groups (i.e. two groups for each factor), and the performances of each group in the three tasks were compared. The factors chosen for analyses were those that could be quantified, including the frequency of Atayal use at home, the starting age of Atayal learning, the number of Atayal users at home, the use of Atayal at home and the use of Atayal at school.

Use the first set of analysis as an example. In this analysis, we examined the interaction of the subjects' use of Atayal at home and at school. The subjects were divided into four groups based on their answers. Group A contained those answered YES in both questions, namely the subjects who used Atayal both at home and at school. Group B consisted of those who did not use Atayal at home (i.e. answered NO in Atayal Use at Home), but only used Atayal at school (i.e. answered YES in Atayal Use at School); while Group C consisted of those who used Atayal only at home (i.e. answered YES in Atayal Use at Home), but not at school (i.e. answered NO in Atayal Use at School). Finally, Group D contained the subjects who did not use Atayal at home or at school (i.e. answered NO in both questions). The number of people in each group and their performances in the three tasks were presented in separate tables (see Table 6.2 and Table 6.3).

When comparing the subjects' performances across the four groups, we found that Group A outperformed Group D in all the three tasks, while Group A, B and C had similar performances in the three tasks (see Table 6.3). A nonparametric Kruskal–Wallis test showed that no significant difference was found among the four groups. However, when pairwise comparisons were further conducted, a significant difference was found between Group B and C in the listening comprehension task ($U = 7$, $p < .05$). Group B performed significantly better than Group C in the listening comprehension task. Therefore, compared with the use of Atayal at home, the use of Atayal at school was a more

important factor to the performance of the listening comprehension task.

Table 6.2

Use of Atayal at Home and Use of Atayal at School (Set 1): Number of Subjects in Each Group

		Atayal Use At Home	
		Yes	No
Atayal Use at School	Yes	31 (Group A)	18 (Group B)
	No	8 (Group C)	15 (Group D)

Table 6.3

Use of Atayal at Home and Use of Atayal at School (Set 1): Average Performance of Each Group in the Three Tasks

Set 1	Narration Task	Listening Comprehension Task	Act-out Task
Group A	3.26	11.70	3.04
Group B	3.61	12.86	3.21
Group C	1.88	10.50	2.50
Group D	2.38	10.91	2.75

The second set of analysis concerned the time when the subjects started to learn the indigenous language at school and their use of Atayal at home (see Table 6.4 and Table 6.5). Subjects who started to learn Atayal earlier and used Atayal at home, namely Group A, outperformed students who learned Atayal after they entered the elementary school and who did not use Atayal at home, namely Group D (see Table 6.5). The result of the Mann-Whitney U tests on the performances of Group A and Group D in the three task revealed a significant difference in the narration task ($U = 91$, $p < .05$), and a near significant difference in the act-out task ($U = 40$, $p = .066$). The subjects who started to learn Atayal earlier and used Atayal at home had better performance in Atayal.

Table 6.4

Use of Atayal at Home and the Time Subjects Started to Learn Atayal (Set 2): Number of Subjects in Each Group

| | | Starting time | |
		Kindergarten	Elementary
Use at home	Yes	16 (Group A)	33 (Group B)
	No	5 (Group C)	19 (Group D)

Table 6.5

Use of Atayal at Home and the Time Subjects Started to Learn Atayal (Set 2): Average Performance of Each Group in the Three Tasks

	Narration Task	Listening Comprehension Task	Act-out Task
Group A	4.38	12.07	3.43
Group B	2.91	12.11	2.92
Group C	3.60	10.33	3.00
Group D	1.84	10.92	2.60

The third set of analysis considered the interaction between the frequency of Atayal use at home and the number of speakers who talked to the subject in Atayal at home (see Table 6.6 and Table 6.7). Both of the factors concerned the use of Atayal at home. In this set, Group A outperformed all the other groups in the three tasks, though the Kruskal–Wallis test revealed no significant difference among the four groups. However, when comparing between each of the two groups using a Mann-Whitney U test, we found near significant differences between Group A vs. Group D and Group A vs. Group B in the narration task (Group A vs. D: $U = 173.5, p = .052$; Group A vs. B: $U = 63.5, p = .053$). The factor of the frequency of student's Atayal use at home seemed to be less influential to the subjects' proficiency of Atayal since Group B and Group D did not differ significantly in their performance of the three tasks.

Table 6.6

The Number of Speakers Talking to the Subjects in Atayal at Home and the Frequency of Using Atayal at Home (Set 3): Number of Subjects in Each Group

		Speakers of Atayal	
		Two or more	One or none
Frequency of Atayal Use at home	Sometime/often	20　(Group A)	11　(Group B)
	Never/seldom	16　(Group C)	26　(Group D)

Table 6.7

The Number of Speakers Talking to the Subjects in Atayal at Home and the Frequency of Using Atayal at Home (Set 3): Average Performance of Each Group in the Three Tasks

Set 3	Narration Task	Listening Comprehension Task	Act-out Task
Group A	4.25	12.61	3.22
Group B	2.09	12.25	2.86
Group C	2.94	11.73	2.80
Group D	2.46	10.74	2.94

The last set of analysis considered the frequency of Atayal use at home and the time when they started to learn Atayal (see Table 6.8 and Table 6.9). The result of the Kruskal–Wallis tests revealed that the performance of these four groups differed significantly in the narration task ($\chi(3) = 8.757$, $p <. 05$), which indicated that the two factors of this set could distinguish the subjects' performance in the narration task. Pairwise comparisons were further conducted using the Mann-Whitney U test. The results showed that those who seldom or never used Atayal at home and learned Atayal after they entered the elementary school (Group D) performed significantly worse than those who learned Atayal since kindergarten and sometimes used Atayal at home (Group A) in the narration task ($U = 70$, $p < .05$). Besides, Group A also significantly outperformed Group B in the narration task ($U = 39.5$, $p < .05$). This indicated that the time when students started to learn Atayal affected their performance greatly. No

significant difference was found between Group A and Group C, showing that the frequency of students' Atayal use at home seemed to be less influential to the subjects' performance in the three tasks.

Table 6.8
The Frequency of Using Atayal at Home and the Time When They Started to Learn Atayal (Set 4): Number of Subjects in Each Group

		Starting Time	
		kindergarten	elementary
Frequency of Atayal Use at home	sometimes/often	10 (Group A)	21(Group B)
	seldom/never	11 (Group C)	31(Group D)

Table 6.9
The Frequency of Using Atayal at Home and the Time When They Started to Learn Atayal (Set 4): Average Performance of Each Group in the Three Tasks

Set 4	Narration Task	Listening Comprehension Task	Act-out Task
Group A	5.90	12.67	3.33
Group B	2.33	12.41	3.00
Group C	2.64	10.75	3.43
Group D	2.65	11.23	2.70

Lastly, we examined two groups of subjects from two extremes, the affirmative group and the non-affirmative group. Students in the affirmative group include those who gave almost all positive answer to each question in the language background interview, and thus were viewed as in a more advantageous condition of language learning. The performances of these two groups were shown below in Table 6.10. The result revealed that subjects of the affirmative group outperformed the other group in the narration task and the act-out task. After running a Mann-Whitney U test, a near significance difference was found between two groups only in the narration task ($p = .065$), suggesting that language background might have greater influence on subjects' production but not

comprehension.

	Narration Task	Listening Comprehension Task	Act-out Task
Table 6.10 *The Average Performance of the Affirmative and Non-affirmative Groups*			
Affirmative group	6.6	12.6	3.4
non-affirmative group	2.33	13	2.5

Summary and Discussion

We examined various factors of the subjects' experience with Atayal, including the use of Atayal in family and at school, and their preference for this language. The result suggested that factors concerning the subjects' use of Atayal in family and at school all influence students' performance. Students in a more advantageous condition for heritage language learning, namely having more input, outperformed those in a less advantageous condition. When students received more input either from the school or from the family, they were more likely to have better performance in Atayal. The comparisons of all factors between the affirmative group and the non-affirmative group revealed that factors of language experiences provided a better predictor to their performance in production (the narration task), but not in comprehension (the listening comprehension task and the act-out task).

If we examined factor by factor, it was shown that among the ten factors, two factors concerning the time when students started to learn Atayal and their use of Atayal at home were more influential and then might be better predictors of their performance in Atayal, while other factors, such as the frequency of students' use of Atayal at home were less influential in students' performance in the three tasks. It was noteworthy that for students who used Atayal at school but not at home, this group of students outperformed students who used Atayal at home but not at school in the listening comprehension task. This might reveal that subjects who used Atayal at school were those who might be more

motivated in learning Atayal at school. These subjects were more willing to learn Atayal and more concentrated in the indigenous language class, and therefore, though they might not perform well in the narration task, they showed better performances in the listening comprehension task, since all the materials tested in the listening comprehension task were taught before the experiment. Motivation might be another influential factor that affected student's learning.

Though the analyses in the previous section confirmed the impact of language experiences on heritage language learning in our study, we found that the questions were not equally balanced between the Atayal use at school and at home, and also a further consideration of whether each question took the same weight regarding the Atayal learning was needed. Therefore, a well-designed questionnaire should still be adopted to provide a more solid result and a precise picture of the subjects' language experience so that more objective analysis could be conducted.

After examining the influence of language experiences, we would provide a general discussion on the heritage language learners' performance of motion events in Atayal in the next section and answer our three research questions.

6.2 Discussion on HLLs' Performance

This study aimed to investigate how the heritage language learners of Atayal in Hsinchu learned to encode motion events in Atayal. Referring back to the research questions introduced in the introduction section, we were going to examine them one by one with the data collected.

Research Question 1:

Since Squliq Atayal is a path-salient language (Huang & Tanangkingsing, 2005), do heritage language learners of Atayal show a tendency to encode path in the main verb when encoding motion events in Atayal?

According to the results of the elicited data in the narration task, more children used the path verbs when narrating the frog story, even though equal number of the manner verbs and the path verbs were taught in the teaching phase before the experiment. In adults' narration of the frog story, more path verbs were found compared with manner verbs, as indicated by Huang and Tanangkingsing (2005). The results of children's narratives revealed that similar to adult's narratives, these heritage language learners tended to encode the path element in the main verb more often when describing motion events. Children mastered path verbs faster and used them better. A possible explanation was that languages differed typologically in their motion encoding systems, and children learned how to express motion events from the construction used by adults. Since path is more salient in Atayal, adults would often encode the path element when describing a motion event. Therefore, children might receive more input of path elements from adults in the community or at home. It became easier for the heritage language learners to acquire the concept and used it in the way adults did. This finding supported the view that how to encode motion events was language-specific (Ö zçalişkan & Slobin, 1999). The heritage language learners of Atayal used more path verbs when encoding motion events in Atayal, a path-salient language.

Research question 2:

Do heritage language learners of Atayal show a difference between their comprehension on different semantic type of motion verbs?

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To obtain a full picture of the students' linguistic capacity in encoding motion events, two comprehension tasks were implemented. The results of the listening comprehension task revealed that subjects could choose the corresponding pictures of motion events correctly, not just by chance, since the accuracy rate reached 65%. The heritage language learners of Atayal showed different performances when facing different semantic types of verb in the listening comprehension task. Sentences containing manner verbs were more challenging for these heritage language learners. However, the subjects performed similarly when asked to act out sentences containing either the manner verbs or the path verbs. Most of the subjects performed slightly better in acting out the sentences with path verbs, but no significant difference was found between sentences with path verbs and sentences with manner verbs. An explanation for the incongruent findings between the two tasks concerned the nature of the tasks. In the listening comprehension task, pictures of motion events were provided as the choice items. Subjects could make guesses from the motion pictures even and made the correct choice even when they did not understand the full meaning. However, in the act-out task, the subjects had to respond based on their understanding of the whole sentence since no choice item was provided. Therefore, when the subjects merely understood part of the sentence, it was hard for them to combine all the elements of the motion events together and perform the sentence correctly. Another possibility was that these heritage language learners were influenced by the dominant language, Chinese, in which manner and path were encoded by equivalent grammatical forms. Therefore, they tended to perform an action denoting the manner of the motion in the act-out task, even when they heard sentences containing path verbs. The influence from Chinese was revealed from the result of the act-out task but not in the listening comprehension task since no choice item containing both of the manner and the path verb was provided together.

Other than the influence of language experiences, the test materials and teaching might also be another determinant of the success in Atayal learning. As revealed in the results of both comprehension tasks, subjects reached the accuracy rate of 65 % in the listening comprehension task and a little above 50% in the act-out task. The motion event constructions seemed to be challenging for this group of heritage language learners. Even after being taught the construction of motion events, they still could not accurately answer all the questions, which showed that they might not fully acquire the construction of motion events. As suggested by Huang (2007), this might be due to the insufficient time for the indigenous language learning.

Research question 3:

How does language experience, as self-reported by children, influence children's performance of Atayal in motion event encoding?

The result of the language background survey suggested that factors concerning the use of Atayal in family and at school both influenced students' performances in the heritage language. Students in a more advantageous condition for heritage language learning outperformed those in a less advantageous condition. Among the ten factors that were examined, two factors concerning the time when students started to learn Atayal at school and their use of Atayal at home were more influential and therefore might be better predictors of their performance in Atayal. On the other hand the factor of the frequency of students' use of Atayal at home was less influential to their performances in the three tasks.

The overall profile of the subjects' language experience seemed to provide a better predictor for their performance in production (the narration task), but not in comprehension (the listening comprehension task and the act-out task). However, it was

found that the subjects' performance in comprehension tasks seemed to be better predicted by their use of Atayal at school. Students who were willing to use Atayal at school might be more motivated to the heritage language learning at school, and thus performed better in tasks designed from the teaching materials. Therefore, motivation might be another important factor for these heritage language learners to master their heritage language.

6.3 Urge to Preserve the Indigenous Language

Our study is the first to report how heritage language learners learned and performed in their heritage language. It had been generally believed that the indigenous languages were better preserved and inherited in the mountain areas. However, sadly, in our case, we found that even in remote mountain areas, these heritage language learners of Atayal did not have better knowledge of Atayal as expected. They mainly used Chinese in their daily conversations. Furthermore, the implementation of the new English policy constricted the time of heritage language learning and the promotion of English as the international language influenced adults. Most of the parents believed that English was more important. As a result, children were asked to pay more attention to the foreign language learning, instead of the heritage language learning. Also, more English classes were provided than the heritage language classes. In our case, the intermediate graders and the higher graders had only one indigenous language class, but two English classes per week. The interference of the foreign language learning and the insufficient time for heritage language learning both led to the failure to preserve the endangered indigenous language. Luckily, we found that the heritage language learners of Atayal still retained a basic ability to comprehend Atayal. If the officials can be aware of this difficult situation in heritage language learning and provide more administrative supports, the indigenous

language will be better preserved.

6.4 Residue

Some parts of this study may require refinement and further research. First of all, the result reflected that the learning style of the students should be taken into consideration. In our study, the heritage language learners of Atayal were used to a loose schedule of learning; therefore, a longer teaching phase was needed to obtain a better teaching effect. Second was the selection of testing materials. The testing material selected in this study was about the motion event encoding in Atayal. That the subjects failed to demonstrate the competence in Atayal in motion events might not really reflect their true ability in Atayal. This might only imply that the heritage language learners of Atayal have not mastered how to encode motion events in Atayal yet. Therefore, with the view to investigating their Atayal competence, standard testing materials should be designed to help understand their vocabulary size in order to develop better and suitable testing materials for heritage language learning.

This study was the first study that looked into the heritage language learning, but we believed that it should not be the last one. We hope that more attention would be drawn to the study of heritage language learning in Taiwan, which will provide some help to develop a more favorable environment for heritage language learning and the preservation of the endangered indigenous languages.

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Appendix 1

Questions about Language Background

Question	English Translation	More experienced	Less Experienced
1. 你們家有幾個人會講泰雅語?	How many people speak Atayal in your family?	More than two	Two or less
2. 你們家有誰會講泰雅語?	Who speaks Atayal in your family?		
3. 你在家會用泰雅語嗎?	Do you use Atayal at home?	Yes	No
4. 你什麼時候開始在家會用泰雅語?	When do you begin to use Atayal at home?	From kindergarten or younger	From elementary school
5. 你在家多常使用泰雅語?	How often do you use Atayal at home?	Often/sometimes	Seldom/Never
6. 你在家有幾個人會跟你講泰雅語?	How many people talk to you in Atayal at home?	2 or more	One or none
7. 你在學校會使用泰雅語嗎?	Do you use Atayal at school?	Yes	No
8. 你什麼時候開始在學校學泰雅語?	When do you start to learn Atayal at school?	From kindergarten	From elementary
9. 你比較常用哪個語言跟同學說話, 泰雅語還是中文?	Which language do you usually use when you talk to your classmates, Atayal or Chinese?	Atayal	Chinese
10. 你喜歡泰雅語嗎?	Do you like Atayal?	Like	Ok/ Dislike

Appendix 2

The Sentence of Motion Events Taught in the Teaching Phase

No.	Atayal	English translation
1	cyux nya' syun yuyut knzap nya' hzing qu' watan	Watan put the bees into the jar.
2	koxun ubu-hzing qu' watan	Watan was frightened by the beehive.
3	cyux zmuy qhoniq qu' watan	Watan shook the tree.
4	kmayat qutux nguziq watan	Watan keeps an owl.
5	mkaraw bling mhtuw qu' watan	Watan climbed out of the hole.
6	kahul bling mstopu' qu' patong	The frog jumped out of the hole.
7	mkaraw babaw btunux qu' watan	Watan climbed up to the stone.
8	cyux si kura tubong tmux qu' hozil	The dog barked at the window.
9	cyux hbyaw qoli te hlahuy qu' bqanux	The deer chased the mouse in the forest.
10	cyux lmngyaq llyung qu' hozil	The dog swam in the river.
11	mhotaw sa llyung sasan qu' qoli	The mouse falls into the river in the day time.
12	hnkangi nya' qutux nguziq qu' watan	Watan looks for an owl.
13	cbing qehuy bqanux qu' watan	Watan hold the antler of the deer.
14	wayal kura luhiy mqzinah qu' watan	Watan ran toward the cliff.
15	tpru qu' watan	Watan stops all of a sudden.
16	m'abi hyal gbyan qu' hozil mhotaw pira su.	The dog sleeps on the floor at night.

Appendix 3

The listening comprehension task: Descriptions of Each Question and Each Choice Item

Question Type	Atayal	English	Choice 1	Choice 2	Choice 3
Basic	Mkaraw yuyut mhtuw qu' mqu.	A snake climbed out of a jar.	A snake climbed out of a jar.	A snake climbed out of a hole.	A snake climbed into a hole.
	Kahul llyung mstopu' qu' patong.	A frog jumped out of a stream.	A frog jumped into a jar.	A frog jumped out of the stream.	A frog jumped out of a jar.
	Mhotaw sa hyal qu' qoli.	A frog fell on a ground.	A mouse fell onto the ground.	A mouse fell out of a jar.	A mouse fell into a jar.
	Musa bling qu' Watan.	Watan went to a hole.	Watan went out of a jar.	Watan went into a jar.	Watan went into a hole.
General	Kahul bling mkaraw qu' hozil.	A dog climbed out of a hole.	A snake climbed out of a hole.	A dog climbed out of a hole.	A dog climbed into a hole.
	Kahul bling mkaraw qu' hozil.	A dog climbed out of a hole.	A dog climbed out of a jar.	A dog jumped out of a hole.	A dog climbed out of a hole.
	Kahul yuyut mstopu' qu' qoli.	A mouse jumped out of a jar.	A mouse jumped into a jar.	A frog jumped out of a jar.	A mouse jumped out of a jar.
	Kahul yuyut mstopu' qu' qoli.	A mouse jumped out of a jar.	A mouse jumped out of a hole.	A mouse went out of a hole.	A mouse jumped out of a jar.
	Mhotaw sa yuyut qu' patong.	A frog fell into a jar.	A frog fell into a jar.	A mouse fell into a jar.	A frog fell out of a jar.
	Mhotaw sa yuyut qu' patong.	A frog fell into a jar.	A frog jumped into a jar.	A frog fell into a hole.	A frog fell into a jar.
	Musa yuyut qu' hozil.	A dog went to a jar.	A mouse went into a jar.	A dog went into a jar.	A dog went out of a jar.
	Musa yuyut qu' hozil.	A dog went to a jar.	A dog jumped into a jar.	A dog went into a jar.	A dog went into a hole.
	Kahul bling mkaraw qu' mqu.	A snake climbed out of a hole.	A snake fell from a hole.	A snake climbed out of a hole.	A dog climbed out of a hole.
	Kahul yuyut mstopu' qu' patong.	A frog jumped out of a jar.	A frog jumped out of a jar.	A mouse jumped out of a jar.	A frog fell out of a jar.
	Mhotaw sa yuyut qu' qoli.	A mouse fell into a jar.	A mouse went into a jar.	A frog fell into a jar.	A mouse fell into a jar.
	Musa yuyut qu' Watan.	Watan went to a jar.	Watan went into a jar.	Watan jumped into a jar.	A mouse went into a jar.
Advanced	Mkaraw bling mhtuw qu' hozil.	A dog climbed out of a hole.	A snake climbed out of a hole.	A dog climbed out of a hole.	A dog climbed into a hole.
	Mkaraw bling mhtuw qu' hozil.	A dog climbed out of a hole.	A dog climbed out of a hole.	A dog climbed out of a jar.	A dog jumped out of a hole.