FROM DIAGNOSIS TO REMEDIAL PLAN: A PSYCHOLINGUISTIC ASSESSMENT OF LANGUAGE SHIFT, L1 PROFICIENCY, AND LANGUAGE PLANNING IN TRUKU SEEDIQ

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAI‘I IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN LINGUISTICS

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ABSTRACT

Will Truku, an endangered dialect of the Seediq language spoken in eastern Taiwan, be commonly spoken again in Truku villages? Since the younger generations do not speak Truku, this project intends to diagnose the relative language strength of Truku (vs. Mandarin), assess Truku proficiency, and propose a conservation plan for Truku speech communities. Hence, the purposes of this study are to (i) further assess the Hawai‘i Assessment of Language Access (HALA) approach, (ii) assess the relative strength of Truku, (iii) assess Truku linguistic proficiency across age groups, (iv) provide quantitative data for community and government programs, (v) establish baseline data, as a starting point for conservation programs, and (vi) propose a micro-level language planning for language maintenance.

Two approaches will be employed, and the preliminary results show an overt intergenerational decline that suggests the need for urgent remedial action if Truku is to survive for another generation. First, HALA experiments comprised of body-part naming, nature-term naming, and phrase-building tasks will be analyzed to investigate Truku’s current linguistic vitality. A total of sixty-eight participants in four age cohorts from Qowgan village have been tested (ages: 10-15, 16-25, 26-40, and 41-65). As predicted, Truku (non-dominant language) produced longer response times and lower accuracy than Mandarin (dominant language) across all speakers, suggesting a cross-generational decline of Truku. Second, on the basis of four elicitation tasks including repetition, picture naming, act-out task, and picture-based storytelling, knowledge of certain phonological and morphosyntactic properties will be assessed across the age groups.
It is predicted that young Truku who are 10-25 years of age will exhibit overall changes or incompetence in the use of phonological and morphosyntactic properties compared with the older generations who are 26-65 years of age. Second, all participants from 10 to 65 years of age will show incompetence in the use of morphosyntactic properties compared with a speaker widely recognized as competent, an 86-year-old linguistically-competent individual. Based on the concepts of micro-level language planning, a modified two-way immersion program and Integrative Community-Based planning will be designed and proposed to stem further Truku erosion and to attempt reversal of a critical shift toward Mandarin.
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# LIST OF ABBREVIATIONS

1. **first**
2. **second**
3. **third**

- **AI** — agglutinating index
- **AV** — actor voice
- **BE** — bilingual education
- **BEN** — benefactive
- **CAUS** — causative
- **CIP** — Council of Indigenous People
- **ELP** — English language policies
- **EV** — ethnolinguistic vitality
- **EXCLA** — exclamation
- **FUT** — future
- **GEN** — genitive
- **GV** — goal voice
- **HALA** — Hawai‘i Assessment of Language Access
- **HOR** — hortative
- **ICBP** — Integrative Community-Based Planning
- **IMP** — imperative
- **INCL** — inclusive
- **INS** — insertion
- **LCI** — linguistically-competent individual
- **LP** — language planning
- **LPP** — language policy and planning
- **LV** — locative voice
- **NEG** — negation
- **NOM** — nominative
- **OBL** — oblique
- **PASS** — passive
- **PAUS** — pause
- **PL** — plural
- **PRF** — perfect
- **PROG** — progressive
- **PROX** — proximate
- **PST** — past
- **PTL** — particle
- **PTUs** — partial Truku users or learners
- **PV** — patient voice
- **Q** — question
- **RDP** — reduplication
- **RV** — referential voice
- **TLs** — Taiwanese languages (Southern Min, Hakka, and indigenous/Formosan languages)
- **TOP** — topic
- **(M)TWI** — (modified) two-way immersion
- **VZ** — verbalizer
CHAPTER 1
INTRODUCTION

1.1 BACKGROUND

In a language contact situation that involves a disappearing indigenous language, what is being lost, and why and how does it happen? In such a situation, is it likely that the social minority group will maintain proficiency in its language? How do we precisely assess relative language strength and speakers’ linguistic knowledge? What is the most effective language policy and planning in a multilingual context? These are indispensable yet largely unexplored questions within the subfields of indigenous language assessment and indigenous language planning. This study aims to contribute to research on these essential issues by using the example of the Truku speech community, whose background is briefly introduced in this section.

Together with the Teuda and Tkdaya dialects, Truku is one of the three dialects of Seediq, an Austronesian language spoken northeast of Puli Township in Central Taiwan. Seediq dialects are spoken in the area north of Wushe village and in the valleys to the east and northeast of the village, as well as throughout the Central Mountain Range, as far as Truku Gorge and the Pacific coast (Holmer 1996:9).1 The map in Figure 1-1 shows the distribution of Formosan languages, with Seediq appearing in the upper right. Seediq is one of the two members of the Atayalic subgroup; the other one, Atayal, comprises Squliq and Ci’uli dialects.

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The population of Truku is around 24,000, but the number of speakers is unknown.\(^2\)

According to Krauss’s classification for degree of language endangerment (2007:1–8), Truku is categorized as a definitely endangered language, which is spoken only by the parental generation and above. In addition, the ninth factor of the “Nine Factors” that UNESCO (2003) proposes to assess language vitality is to evaluate the urgency of documentation.\(^3\) It has grades 0 through 5,

\(^2\) Information on numbers of Truku people comes from the Council of Indigenous Peoples in Taiwan. I use the term “Truku” to represent “Truku Seediq” for the remaining chapters (http://www.apc.gov.tw/portal/docList.html?CID=7FB6B2AF9D6C8C1E). Politically, the Executive Yuan, Republic of China has officially recognized Truku as the 12\(^{th}\) indigenous group since January 15, 2004, and Seediq as the 14\(^{th}\) tribe since April 23, 2008.

where zero refers to complete shift to another language (termed *extinct* in UNESCO rubric), and
five represents vitality of a language for that factor (termed *safe*). Current Truku language can be
graded as 3 termed *fair* for the ninth factor “Amount and Quality of Documentation”, where
there may be an adequate grammar or sufficient amount of grammars, dictionaries, and texts, but
no everyday media; audio and video recordings may exist in varying quality, with or without any
annotation. Since Truku is defined as a definitely endangered language, language maintenance
or revitalization effort should be prior to language documentation at this juncture if Truku
language is to survive another generation.

Growing up as a Truku Seediq in the multilingual and multicultural context of Taiwan, I have
felt ambivalent about my ethnolinguistic identity. I take speaking Truku as a marker of group
membership. However, to have access to “better” socio-economic and educational opportunities,
I feel obliged to invest in learning and speaking both Mandarin and English. I maintain Truku
ethnolinguistic identity by speaking to some of my family members and senior community
members; yet I construct new multilingual identities through using Mandarin and English for
survival purposes. It was not until my participation in the Language Documentation Training
Center that my appreciation toward my mother tongue began to grow rapidly, and I seriously
started to think about the meaning of language identity as well as how it relates to an individual
and ethnicity. Language is more than a mere communicative tool. It is a marker of one’s
individual and social identity and it affects one’s self-perception and self-esteem. As Joseph

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4 The existing documentation includes Truku Hymnbook (1994), Truku Reading Book I (1994), Truku textbook:
5 The Language Documentation Training Center (LDTC) was created by the University of Hawai‘i Linguistics
Department and the Linguistic Society of Hawai‘i for the purpose of giving something back to the community. Its
goal is to teach native speakers of understudied languages how to record their languages in ways that are accessible
to their communities, to linguists, and to the rest of the international community (http://www.ling.hawaii.edu/~uhdoc/index.html).
(2004) puts it, language represents our self. Through language, we construct our self in different times, places, and people.

I lament the endangerment of Truku because it symbolizes that individual and ethnic identities are being lost simultaneously. If these identities are shifted or threatened and if the language policy and planning of the country ignores linguistic diversity, the indigenous children in the dominant-language schools usually experience language shock, culture shock, drop-out, low achievement, and other social problems (Awasthi 2004). This situation urges me to further ask the question: “How can Truku have access to social, economic, and educational opportunities through Mandarin and English yet still maintain Truku use and ethnolinguistic identity in the multilingual context of Taiwan?” Having worked as a nurse in an Intensive Care Unit for several years, I have come to believe that diagnosis needs to precede treatment for a physical disorder. I elaborate an analogy between medical and linguistic diagnosis and remedial plans in the following section.

1.2 AN ANALOGY FOR TRUKU LANGUAGE SHIFT AND ATTRITION

Despite the considerable amount of research and concern in the fields of bilingualism and language documentation that are relevant to endangered language conservation or revitalization, little attention has been paid to the diagnosis of or screening for language endangerment among speech communities before initiating corrective conservation planning. Like a surgeon who needs to identify patients at significant risk for a bleeding disorder by means of laboratory testing as well as thorough patient history and physical examination, a linguist needs to identify the status of an endangered language speech community through on-line measurement and an
observation of linguistic proficiency before proposing a plan to reverse language decline, as shown in Table 1-1.⁶

Table 1-1. An analogy between medical and linguistic diagnosis and remedial plan

<table>
<thead>
<tr>
<th>Role</th>
<th>Problem</th>
<th>Immediate diagnosis (on-line measurement)</th>
<th>Identification of symptoms</th>
<th>Remedial plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgeon</td>
<td>Patient (internal bleeding disorder)</td>
<td>Laboratory testing</td>
<td>Thorough patient history and physical examination</td>
<td>Surgery/medicine</td>
</tr>
<tr>
<td>Linguist</td>
<td>Endangered language</td>
<td>Assessment of language shift: HALA experiments</td>
<td>Assessment of language attrition: Collective proficiency</td>
<td>Maintenance: Micro-level language planning</td>
</tr>
</tbody>
</table>

1.3 SIGNIFICANCE OF THE STUDY

Over the last few decades, many scholars have predicted an alarming decline in the number of the world’s languages, especially “endangered languages.”⁷ Crystal (2000:19) suggests that an average of one language every two weeks may vanish over the next hundred years. A total of twenty-four Formosan Austronesian languages are known to have existed in Taiwan. Nine of these Formosan indigenous languages are already extinct, and the others are declining rapidly (Zeitoun, Yu, and Weng 2003:218). Truku Seediq is an example of a language in decline, as demonstrated by the results of the body-part naming task I conducted in Qowgan village in 2009, which showed three strong signs of cross-generational decline.⁸ In addition, the youngest

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⁷ The term “endangered language” refers to a language whose very existence is threatened in the modern world; it is not a language of government, nor a language of education, commerce, or of wider communication (Hinton 2008b:3).

⁸ Qowgan is one of the eight Truku villages in Hualien county, eastern Taiwan. There are 710 residential houses and the Truku population in this village is 2,220, consisting of 1,149 males and 1,071 females (data from Jin-mei Village Office, Hualien County, Taiwan).
generation of speakers showed even further decline in their Truku language abilities than older generations (see Chapter 3). Hence, urgent remedial action is indispensable if Truku and other Formosan languages are to survive another generation.

Preserving Formosan languages is of great significance because it not only helps maintain Austronesian linguistic diversity, whole cultures, and knowledge systems, it helps retain personal human rights as well as individual and ethnic identities. Specifically, this study is important for three reasons. First, the psycholinguistic assessment of language shift offers a sensitive on-line measure of relative language strength and can serve as supplemental support to the observation that linguistic characteristics are undergoing attrition. Early diagnosis of a disappearing language is essential because it usually provides a higher possibility of retrieving it; otherwise, by the time a speech community becomes aware of impending language loss, it will be too late.

Second, this study suggests a variety of tasks as alternative methods to investigate individual or collective proficiency. These include both on-line and off-line measurements, both production and comprehension tasks, and tests that focus on linguistic structure from the phonetic to the syntactic level. Anderson (1982:84) presents a comprehensive view of language attrition research:

Ultimately, language attrition research should adopt a *language use perspective*. This would include (1) both comprehension and production, (2) both oral and written use of language, (3) both the traditional linguistic areas of phonology, morphology, syntax and lexicon, on the one hand, and functions […] that we can group under the general category of ‘doing things with language’.
However, Schmid (2002:29) states that this type of research design is idealistic and no study to date has been able to fulfill all the requirements. Generally, traditional measures of linguistic proficiency include oral proficiency interviews or cloze tests (O’Grady 2009:12). For endangered language assessment, some common methods involve surveys or questionnaires (see Chapter 3). In Formosan languages, previous studies of syntactic levels of language attrition and assessment tools are limited. Huteson (2003:4) has found a general decline in fluency among Rukai children and young adults using dialect imitation tests. Moreover, he (2004:11) has used a survey to investigate Puyuma language proficiency and reports that Puyuma ability is limited to the production of individual lexical items among people in their forties and younger. Hence, one of the purposes of the present study is to suggest an alternative research design advocated for language attrition research and language endangerment assessment.

Third, because attrition needs to be considered with a multi-component view, this Truku study explores localized language planning that integrates ethnolinguistic, national, and global identities in a multilingual context. No plan for localized language planning has yet been proposed, let alone implemented, for any Formosan language. Previous studies tackle language loss or maintenance issues mostly from sociolinguistic perspectives. Mo (2000:ix) argues that factors that favor language maintenance can help reverse the existing shift trend, and her discussion is generally about the Taiwanese languages including Southern Min, Hakka, and indigenous/Formosan languages, as opposed to the dominant language, Mandarin. Using a socio-

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9 The written use of Truku cannot be included in this set of tasks because written Truku is learned only by individuals who are interested in reading the Bible. Others might have no motivation for learning it yet. A Truku Romanization system was invented by Yudaw Pisaw and Kadu Lawsing in November 1981, and the Old Testament was translated using this system between 1981 and 2003 (Pisaw, pers. comm. 2011).

10 Huteson studies Rukai and Puyuma, two endangered languages spoken in south-central and eastern Taiwan respectively. He has used dialect imitation tests to test fluency in Tona, Maga, and Mantauran, the three dialects of Rukai that are spoken in Maolin Township, and he uses surveys to investigate Puyuma language proficiency.
political perspective, Chen’s (2010:102) research on multilingualism in Taiwan concludes that the above-mentioned Taiwanese languages, in the absence of more vigorous protection and promotion from the government, which does not seem likely, will continue to lose their functions. In other words, realistic remedies to resist the gradual disappearance of Formosan languages, taking into account the multiple components involved, have, to date, not yet been attempted.

1.4 RATIONALE

As noted previously, this study deals with three aspects of language loss research: language shift, language attrition, and language maintenance. Studies on these themes are usually used to describe phenomena that are also sometimes referred to in terms of language maintenance and loss (Fase, Jaspaert, and Kroon 1992:3). Language loss is a generic term referring to any kind of negative language contact outcome, be it at the micro or the macro level (de Bot 2001:66). Within the field of language loss, although many scholars have treated these terms differently, it is generally agreed that language shift refers to the loss of functional aspects (i.e., change in language use), and occurs at the macro or community level. Language attrition, however, refers to the loss of structural aspects of language (i.e., change in language proficiency), and exists at the micro or individual level (Köpke 2002:1335). As can be seen here, these two phenomena—language shift and language attrition—are distinguishable, and language maintenance refers to retention of both use and proficiency.

1.4.1 Language shift

Language shift to Mandarin leading to indigenous language death is currently rampant among the Formosan speech communities, due to the early sinicization of the indigenous groups
who lived in lowland areas; governmental policy imposing Mandarin Chinese as the only official language; lack of intergenerational transmission in linguistically still-extant communities; and emigration of younger villagers to neighboring towns (Zeitoun et al. 2003:218). In addition, Truku is not used as the medium of instruction in school, so people feel that learning Truku brings little or no future benefit.

The outcome of these ongoing changes has already resulted in a shift from the use of Truku to that of Mandarin across generations. Specifically, these changes have brought about a decrease in domains of use of Truku, the reduction of the number of speakers, and the interruption of intergenerational transmission; that is, the weakening of three factors that are crucial for a language to survive. To assess the change in language use across generations, this study uses an on-line psycholinguistic method because it offers a more precise and accurate measurement of language strength than does any off-line proficiency test. It is predicted that older speakers will have higher accuracy, shorter response times, and higher reported percentage of use in Truku than younger ones. Moreover, the youngest generation is expected to show further decline due to the continuing infrequent use of Truku. This prediction, if borne out, will indicate that the L1 for the older speakers (i.e., 41 to 65) might still be Truku, with Mandarin as their L2, whereas the opposite is the case for the other, younger groups (i.e., below 40) in this study.

1.4.2 Language attrition

More and more researchers recognize that the study of attrition needs to be considered a multidisciplinary field. According to Yağmur (1997:13), the definition of attrition varies depending on the focus of research. That focus can be on what is lost (linguistic aspects), why it

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11 The areas of lowlands and highlands are shown in Figure 1-1.
is lost (sociological aspects), or how it is lost (psycholinguistic aspects). Because the main concerns of this study are the course of Truku disappearance and how this trend might be stopped or reversed, language attrition here refers to “a gradual process in which a language recedes as it loses speakers, domains, and ultimately structure; it is the loss of linguistic material that is not replaced by new materials (for instance, by material borrowed from a dominant group’s language)” in the same language (Thomason 2001:227).

The process of attrition is closely related to that of language shift. It is predicted that if individuals lose their ability to use Truku in their community, they will feel reluctant to use it and will shift toward Mandarin as a means of expression. Then, as the language shift continues, their opportunities to use Truku will be reduced, causing further erosion of Truku proficiency. Moreover, language death is generally accompanied by attrition. To assess the change of collective proficiency, four elicitation tasks are used to test the participants’ knowledge of certain phonological and morphosyntactic properties. It is predicted that Truku who are 10–65 years of age will exhibit overall changes or incompetence in the use of phonological and morphosyntactic properties compared with the speaker widely recognized as competent, an 86-year-old linguistically-competent individual (LCI).  

1.4.3 Language maintenance

After the current linguistic status of Truku was determined, micro-level language planning involving community-based and intergenerational language-learning initiatives was judged to be the best remedial program for the Truku speech community in the multilingual context of

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12 Yudaw Pisaw is a widely acknowledged competent speaker who has served as one of the members of the Truku Dictionary Committee from 2005 until the present. From 1953 to 1963, he translated the New Testament of the Bible with Dr. Ralph R. Covell, a fluent Truku speaker and an American missionary in the Seediq speech community, and Teylung Liduk, a senior pastor in Qowgan village, Hualien County, Taiwan.
Taiwan. As mentioned above, the goals of the planning should be to ensure both retention of use and proficiency. To this end, community involvement is needed in indigenous language maintenance. More and more researchers agree that both economic and educational development conceived of at the community level or with the collaboration of non-governmental organizations are more likely to be successful than externally imposed and controlled models (e.g., Davis 1999:90; Gegeo and Watson-Gegeo forthcoming; Siegel 1997:221).

In addition, intergenerational transmission and educational planning should be factored into the language planning equation. As Romaine (2007:121) puts it, the pulse of a language clearly lies in the youngest generation. Therefore, the future of a language is at stake if it is no longer transmitted naturally to children in the home by parents or other caretakers. Once the family domain is affected, the rate of shift increases (de Bot 1997:581). Although indigenous language education (one hour weekly) has been in force in elementary schools since 2001 in Taiwan, the current indigenous younger generations are not able to speak their own imperiled tongues, nor are elderly speakers transmitting their languages to the next generations.

1.5 OBJECTIVES AND ORGANIZATION

The objectives of this study are to (i) consider the relevance of a psycholinguistic approach to the assessment of language loss; (ii) assess Truku strength across age groups; (iii) assess Truku linguistic proficiency; (iv) provide quantitative data for government programs; (v) establish baseline data, as a starting point for conservation programs; and (vi) propose a micro-level language planning project for language maintenance. This dissertation is divided into six chapters. This chapter briefly introduces the background and motivation, topics and rationales, and the hypotheses and methodology of the study. In the second chapter, earlier and contemporary theories of language loss and attrition are compared, the ideological foundation of
language policy and planning (LPP) and its relevance in the context of Truku research are presented, and three research questions are identified. The third chapter introduces the Hawai‘i Assessment of Language Access (HALA) project, with its easy-to-use psycholinguistic measures of language strength. In particular, I discuss how the body-part and nature-image naming tasks, which are being developed as parts of the HALA project and which I field-tested, can be used to assess Truku language shift.

The fourth chapter describes a comparative analysis of data from four elicitation tasks: repetition, picture naming, an act-out task, and picture-based storytelling. This chapter investigates proficiency at the phonological and morphosyntactic levels across age groups in order to assess language attrition. Chapter 5 presents Formosan linguistic history, discusses factors affecting Truku language shift and attrition, and proposes a micro-level language planning project that attempts to maintain Truku use and proficiency in the multilingual context of Taiwan. Finally, in Chapter 6, I summarize the major findings of this study, discuss the issues that emerged from the study along with its major contributions, and conclude by making recommendations for future research.

1.6 CONCLUSION

The discussion of the background and rationale for this study suggests that it is difficult for individuals to maintain the use and proficiency of an endangered language in language contact situations. In order to respond to language endangerment, effective language assessment is necessary. The current proficiency tests are neither sufficient nor satisfactory, so new methods of early diagnosis of language loss and assessment of language maintenance efforts are essential. In addition, the issues of language shift and attrition cannot be entirely explained by linguistic, social, or political factors. In this dissertation, I point out that there is a need for an easy-to-use
psycholinguistic on-line measure of relative language strength for early diagnosis. Moreover, I adopt Anderson’s view of language attrition research design, in which a wide array of elicitation tasks can be used to measure proficiency. Furthermore, by taking a multi-component view of language attrition, I point out that the issues of language shift, attrition, and maintenance require interdisciplinary contributions. There is a need for indigenous language planning that involves political, economic, educational, and sociocultural factors, while recognizing the importance of conservation plans being created primarily by the communities themselves.
CHAPTER 2
THEORETICAL ORIENTATION

2.1 INTRODUCTION

Fase, Jaspaert, and Kroon (1992:3) point out that “language shift, language attrition, language death, and language obsolescence are used to describe phenomena which are also sometimes referred to in terms of maintenance and loss.” They state that in spite of the confusion that results from different uses of terminology, the most common characteristics of the above-mentioned studies that concern us here is that they either deal with the gradual disappearance of a language in a community where it used to be spoken, or with the resistance some languages show to this disappearance. They further note that the linguistic system of a disappearing language does not just instantly vanish; it is always replaced with the language with which it is in contact. Likewise, only those languages maintained in contact situations are eligible for language maintenance research. Moreover, in such a contact situation, the danger of disappearance is only real for the language of the sociological minority group.

Most scholars in the field of language shift and attrition agree that language use and language proficiency serve as indexes for maintenance and disappearance. Language shift describes “changes in use,” and language loss or attrition describes “changes in proficiency” (Fase et al. 1992:4; Pavlenko 2002:47; among others). Language shift occurs between generations (intergenerational), while loss, or attrition, occurs within individuals (intragenerational). Language maintenance refers to retention of use and proficiency (Fase et al. 1992:4). Before dealing with the fields of language use and language proficiency, it will
be useful to take a closer look at the concepts and current issues of language loss and language maintenance.

Research on the process of language extinction is still new and limited. The problem of language death has been tackled from several different angles. Some scholars look at the issue of language death from a sociolinguistic perspective without describing the actual linguistic events. Others focus on the structural deviations of dying languages without paying attention to sociolinguistic factors. However, many investigators find that the recent accelerated rate of indigenous language loss is related to issues of power, and political and economic domination (see Chapter 5). Therefore, in this dissertation, my goal is to use a holistic approach that takes account of the interrelation of all relevant phenomena. I employ a comprehensive theoretical framework of language death proposed by Sasse (1992) to account for the process of gradual disappearance that Truku is suffering in Qowgan village, where it used to be spoken as the primary language.

Truku is not yet dead but is undergoing language attrition. Attrition is the focus of interest because it is the most common linguistic route to language death and it is the one Sasse’s model envisions. In this chapter, I will briefly discuss several related and important linguistic issues and the major claims that have been made in the literature on language death, language attrition, and language planning. I begin by summarizing Sasse’s theoretical framework of language death in Section 2.2. In Section 2.3, the theoretical issues and main findings of L1 attrition in L2 environments are discussed. Next, the question of language maintenance is addressed in Section 2.4. Finally, the notion of language policy and planning is described in Section 2.5. I then identify the primary research questions of the dissertation.
2.2 THEORY OF LANGUAGE DEATH

Figure 2-1 summarizes Sasse’s (1992:19) model of language death in a flow chart with three interacting columns: External Setting (ES), Speech Behavior (SB), and Structural Consequences (SC). The interrelation of these three sets results in an implicational chain in a bilingual situation. Extralinguistic factors appear first. Then there is a change in speech behavior as a reaction to the extralinguistic factors. Finally, structural changes occur as a consequence of the change in speech behavior. The following list of terms and definitions are used by Sasse, and are necessary to understand his model. These terms are used in these senses throughout the dissertation.

Terms and definitions

\[ A = \text{Abandoned Language} \] (language that is dying out).

\[ T = \text{Target Language} \] (Dominant language that is continued).

\[ \text{Primary Language} = \text{L with higher degree of lexical, grammatical, and pragmatic competence.} \]

\[ \text{Secondary Language} = \text{L with lower degree of lexical, grammatical, and pragmatic competence.} \]

\[ \text{Primary Language Shift} = \text{Shift from A as Primary to T as Primary and from T as Secondary to A as Secondary.} \]

\[ \text{Language Replacement} \ (= \text{Complete Shift}) = \text{Total replacement of A by T (possibly TA, i.e., an A-influenced variety [dialect] of T).} \]

\[ \text{Language Transmission} = \text{Purposive, directed passing-on of a language from one generation to the next.} \]

\[ \text{Language Transmission Strategies (LTS)} = \text{The whole array of techniques used by adults to assist their children in first language acquisition, e.g., “motherese,” repetitions, exercise games, corrections, metacommunication, etc.} \]
Language Decay = Pathological language disintegration that is typical for the speech of so-called semi-speakers.

Semi-speaker = Member of the post-Language-Transmission break generation with imperfect knowledge of A.

Terminal Speaker = (Sometimes confused with imperfect speaker) = Last generation speaker.

Simplification = Removal of linguistic complexities.

Reduction = Removal of significant/essential/functionally necessary parts of the language.

Figure 2-1. Model of theory of language death (Sasse 1992:19)

The first column, External Setting, begins with “historical events which lead to uneven distribution of languages in multilingual setting.” Such uneven distribution leads to pressure on the minority speech community, and negative attitudes emerge toward the minority group’s
language. Ultimately, speakers make the decision to abandon the language, shifting away from it to the language of the majority group.

In the second column, Speech Behavior, the first historical events described under ES begin to cause some restriction of the community language to particular domains. This results in increasing levels of bilingualism among members of the minority language group (e.g., Truku speakers have to use Mandarin instead of Truku in certain domains such as the workplace or school). While the abandoned language is stigmatized, speakers’ competence in the other language develops and increases. Once they decide to forsake their ethnic-heritage language, they are likely to avoid transmitting it to the younger generations and therefore prevent them from completely acquiring it. At this juncture, the use of the minority language shrinks further and the dominant language becomes the main communicative tool in the entire speech community. In other words, the ethnic-heritage language is not used regularly in daily life; the community members use their residual knowledge only for specialized purposes, group identification, or as a secret language.

Sasse’s first two columns—External Setting and Speech Behavior—describe the social processes that trigger the events in the third column, Structural Change. The first phenomenon of this stage is loss of lexicon. If the target language is favored, a failure to develop new vocabulary in the new domains occurs. Sasse further predicts that borrowing will be prevalent and more speakers will become competent bilinguals in the majority language. As time goes by, even while the minority language is used in the appropriate domains, it will still undergo structural simplification due to increased contact with majority-language features. Next, if the process of intergenerational transmission is interrupted, language decay—pathological reduction phenomena—is predicted in the speech of semi-speakers. Semi-speakers, according to Sasse
are characterized by imperfect knowledge of the minority language. Their morphology is defective; they lose significant grammatical categories like tense, aspect, or mood. Moreover, their speech often shows pidgin-like simplification of syntax and a strong insecurity in the mapping of forms and functions. They are unable to master the phonological distinctions of the minority language and show extreme variation in their pronunciation. Finally, if the minority language is only used to fulfill social or religious functions, this restricted knowledge becomes fossilized in the form of unanalyzed words and phrases. Nevertheless, this residue or substratum knowledge of the minority language, he predicts, will persist in the speech community.

While Sasse provides a comprehensive theoretical framework to account for the course of language death, his model deals only with the question of what is being lost and why this happens. Fase et al. (1992:9) explain that the “what” question refers to the issue of linguistic description. If loss is basically a structured process, it is possible to linguistically categorize those elements that are lost. In Sasse’s model, the third column describes the linguistic disintegration produced by semi-speakers who have an imperfect knowledge of their own mother tongue. The “why” question refers to the sociolinguistic explanation of the structure that appears from the description. If the process of language loss is to be understood, an analysis must describe not only the linguistic elements that are affected, but also why they are affected. Sasse’s first two columns combine to provide an overview of the social processes that ultimately trigger the linguistic consequences in the third column.

Nevertheless, this model does not answer the “how” question, i.e., how the process of loss will affect linguistic elements, or in general, how the human mind deals with language. This needs to be explained from a psycholinguistic perspective. Schmid (2007:18) states that “this
approach is based on the growing emphasis on psycholinguistic processes in bilingual speech production at large that the past decade has witnessed.” However, she cautions that the question of whether attrition is evidence for something being irretrievably “lost” or merely an indication of a temporary problem of accessibility has not yet been resolved conclusively. Hence, it is necessary to present the relevant contemporary theoretical issues in first language (L1) attrition and the implications for reducing L1 attrition from a psycholinguistic perspective.

2.3 THEORETICAL ISSUES IN L1 ATTRITION

There are two reasons to discuss current theoretical issues in L1 attrition and the attempts to describe how attrition affects linguistic elements. First, Truku is undergoing collective language attrition. Therefore, the hypotheses and findings in the domain of first language attrition in a second language (L2) environment are highly relevant. Second, language attrition is the focus of interest because it is the most common linguistic route to language death.

Many researchers, including Sasse, agree that language attrition is determined by both linguistic and extralinguistic (e.g., external and social) factors. Thus far research on language attrition has been done from two perspectives. First, earlier approaches to language attrition are based on language-internal principles, such as the regression hypothesis (Jakobson 1941), the interlanguage hypothesis (e.g., Seliger and Vago 1991), the language change hypothesis (e.g., Dorian 1982; Schmidt 1991), and the parameter hypothesis (Sharwood Smith and van Buren 1991). These analyses are based on acquisitional and typological features of languages that interact in the contact situation; they discuss the changes found in different types of contact situations (Köpke and Schmid 2004:11–18).

Second, since the 1990s, researchers have started to investigate language attrition using socially informed frameworks, such as the theory of socio-psycholinguistic determinants (e.g.,
Ammerlaan 1996) or the Ethnolinguistic Vitality Theory (e.g., Yağmur 1997). Recently, in response to a growing interest in psycholinguistic processes in bilingual speech, some researchers have tried to analyze language attrition in terms of processing and memory retrieval, and accessing and forgetting of information (Schmid 2002:18). Until very recently, little attention has been paid to psycholinguistic aspects of L1 attrition. However, Schmid and several other researchers argue that insights obtained from this angle might greatly improve understanding of the interaction between bilingualism and how its mechanisms function in human communication. For de Bot (2002), the available evidence strongly suggests that attrition may be psycholinguistic in nature, and Köpke and Schmid (2004:23) claim that “all sociolinguistic factors which have so far been established as bearing on the attrition process seem to have psycholinguistic consequences.”

Köpke (2007:9) explains that the biological, cognitive, and external factors involved in language attrition are closely linked. The three most relevant contemporary issues in research from a psycholinguistic perspective—age, lost of accessibility, and activation and inhibition—and the empirical findings from this research are outlined in the following subsections.

2.3.1 Age

Age appears to play an important role in attrition. There are two possible explanations for this. The first is related to the critical period hypothesis, which assumes that “L2 learning becomes more difficult past a certain age” due to brain maturation constraints (Köpke and Schmid 2004:19). This biologically constrained mechanism is called plasticity. It is based on the idea that “synaptic connections are not fully mature in the first years of life, facilitating quick adaption to new situations”; plasticity is the most often cited reason for a biologically-constrained critical period for language acquisition and/or learning” (Köpke 2007:10). Evidence
suggests that an L1 system can be eroded to a quite dramatic degree if the attrition process sets in well before puberty (e.g., Kaufman and Aronoff 1991; Seliger 1989, 1991; Turian and Altenberg 1991; Vago 1991); L1 attrition in children is much more severe than in adults (Schmid, Köpke, Keijzer, and Weilemar 2004:19).

However, not all scholars agree on the existence of a critical period in L2 learning, and the influence of age on L2 acquisition is still controversial (Flynn and Manuel 1991:118). In terms of language attrition, Köpke and Schmid (2004:20) mention Harley and Wang’s (1997) study, which suggests that a “sensitive period” that declines gradually after the age of 6 or 7 years is a more appropriate concept and term. This sensitive period hypothesis would imply that “the easier it is for a child to learn L2, the more likely is it that she will forget her L1.”

From Köpke’s (2007:21) neurofunctional and psycholinguistic perspective, literacy offers a second way to explain the impact of age on attrition, being a possible factor that might prevent attrition: “It is likely that literacy contributes to the grounding of a language in memory as it adds orthographic representations and new synaptic connections.” As Olshtain (1986) points out, literacy and its possible influence are closely related to age. According to Köpke and Schmid (2004:20), “the age limit up to which a very severe attrition process can set in for children—until approximately 8 or 9 years—coincides with the time at which most children can be considered to have acquired reading and writing skills in at least one language (L1 or L2).” These skills might facilitate “fixing” the language in the brain and add another network. That these effects are related to age prompts Köpke (2007:21) to note that while it is still a challenge to distinguish the factors of literacy and age in an experimental setting, literacy should nevertheless be kept in mind in the study of attrition.
Empirical research suggests that it takes a number of years to establish an L1 in the human brain; hence, during those years, an L1 can be easily influenced and replaced by another language (e.g., Nicoladis and Grabcis 2002; Ventureyra and Pallier 2004). Although there are a number of studies that investigate language attrition at different ages, it is not yet clear to what degree attrition is influenced by age. Köpke is the only one who tries to determine the effect of age on attrition. However, her research does not show significant effects of age on any linguistic level of attrition (Köpke 1999:203).

2.3.2 Loss vs. accessibility

The second theoretical issue within the psycholinguistic framework is whether an L1 can be erased from memory, or whether it only becomes difficult to access. Sharwood Smith and van Buren (1991:19) consider it necessary for language attrition studies to make the distinction between competence and performance. The difference in this context is not so much between grammatical competence and pragmatic competence, but rather between knowledge and the on-line processing of knowledge. The authors emphasize that performance refers to “on-line performance mechanisms that are responsible for accessing and manipulating that knowledge millisecond by millisecond.” Attrition at the level of competence involves underlying linguistic competence and includes a restructuring of what is known about the language. Attrition at the level of performance results in control of that knowledge, which may remain intact.

Köpke and Schmid (2004:21) propose two types of manifestations of performance attrition, word finding and processing difficulties. For word finding difficulties, Ammerlaan’s (1996) and Hulsen’s (2000) psycholinguistic studies differentiate between productive and receptive language skills on the lexical level. The results from their picture naming tasks, especially in
Ammerlaan’s study, show clearly that the accessibility of the lexicon is reduced. However, their matching tasks do not show receptive skills to be greatly influenced.

*Processing difficulties*, the second type of performance attrition, is closely related to the cognitive demands of the tasks. Because speakers need to change the dominance patterns between two languages, they may find it increasingly more difficult to inhibit the L2 and prevent its interference while using their L1.\(^\text{13}\) Green (1986:217) assumes that trying to inhibit the L2 will consume resources that will be withdrawn from other levels of processing. As Köpke (2007:19) explains, “strong cognitive demands arising from reduced access to the less-used L1 and from its competition with the more accessible L2 would put strong demands on executive control mechanisms, resulting in processing difficulties…Attrition would thus, to a large extent, be a processing issue.” Empirical research is needed to investigate this aspect of attrition.

Only a few studies have been done that compare competence and performance. Major (1992) looked at phonetic measures, Ammerlaan (1996) and Hulsen (2000) investigated the lexical level, and Köpke (1999) studied morpho-syntactic processing. Their findings show variability of performance across all linguistic levels. According to Köpke and Schmid (2004:22), Major reports that in spontaneous speech, some subjects produce Voice Onset Times (VOTs) in their L1 (English) that are no longer native-like and are clearly influenced by the L2 (Brazilian). However, in a read-aloud task, the same subjects produce more native-like VOTs. Köpke’s findings indicate a distinction between competence and performance with respect to attrition data. She finds that subjects produce more errors on the structures that are prone to errors in a sentence generation task than in a grammaticality judgment task.

\(^{13}\) The term “interference” is used to “designate any kind of utterance that deviates from an assumed norm of a monolingual standard” (Schmid 2002:37). According to Köpke (2007:19), “inhibition” is the mechanism exercising control over the two competing language systems in bilingual language processing. A more detailed definition of inhibition is given in Section 2.3.
2.3.3 Activation and inhibition

The third theoretical issue from a psycholinguistic perspective has to do with the notions of *activation* and *inhibition*, which are directly related to the frequency of use of specific linguistic items or structures (Köpke 2007:11). With respect to activation, Penfield and Roberts (1959:246) proposed that “frequency of use entails facilitation of activation.” This is further developed in Paradis’ Activation Threshold hypothesis (2004:28), which assumes that a certain amount of neural impulses is needed in order to reach activation. He further states that the most important factor for language attrition is language use. More precisely, items that are more frequently used in the L2 will be more easily activated when they are competing with less frequently used items in the L1. However, Schmid (2007:151) suggests that it is meaningless to study the use and attrition of only one of a bilingual’s languages without including the use and development of the other. Furthermore, she proposes that the impact of both active and passive exposure (i.e., productive and receptive skills) should be taken into consideration in L1 attrition studies.

Inhibition receives less attention than activation in research on L2 learning, L1 attrition, or polyglot aphasia (Köpke 2007:13). Inhibition refers to a mechanism that can “cancel out competitors that are likely to interfere with a selected item, structure, or language” (Green 1986:220). Green assumes that L1 attriters lack the ability to sufficiently suppress the activation of the other system. In the context of L1 attrition or polyglot aphasia, he further suggests that a speaker may experience double impediments: the lack of activation of the L1 on one hand and the need to strongly inhibit the highly active L2 on the other. In addition, he predicts that the impact of inhibition will depend on the *actual language use* and *typological relatedness* of the languages, meaning the closer the languages, the more interference is expected.
There is a lack of empirical studies on the inhibition mechanism that might help account for bilinguals who express themselves with difficulty in their L1. In terms of the empirical findings on activation, Köpke and Schmid (2004:23) state that it is only recently that the Activation Threshold hypothesis has been applied to language attrition data (Gürel 2004; Köpke 1999, 2002). At the lexical level, reduced accessibility is predicted as a natural outcome of infrequent language use. This principle has been validated for the lexicon by Köpke (2002). With respect to grammatical parameters, Gürel (2004) found that attrition occurs where two competing languages have equivalent forms: “When the L1 has a corresponding linguistic element in the L2, the actively used L2 element will interfere with the disused L1 element” (74). In other words, the L1 element will be subject to attrition under L2 influence because it will have a higher activation threshold and therefore will be inhibited. While there is more research on activation than inhibition, further research on both of these cognitive mechanisms of language attrition is needed.

As Köpke and Schmid (2004:24) point out, the theoretical considerations of attrition so far seem to be recursive. In general, explanations start from the regressive framework that deals with cognitive factors, then move toward increasingly more rigorous assumptions based on various aspects of the linguistic systems themselves, and eventually turn back to the recent frameworks that are based on cognitive and psycholinguistic aspects of language processing. Because language attrition is determined by multiple factors, research in this domain may shed light on bilingual competence and language maintenance. This brings us to the question of how we can support the acquisition and maintenance of a minority language from either the earlier or more recent theoretical perspectives.
2.4 THE QUESTION OF LANGUAGE MAINTENANCE

Based on the intralinguistic and extralinguistic factors provided by Sasse’s model and the more contemporary, socio-psycholinguistic frameworks discussed in the preceding sections, it is clear that psycholinguistic systems containing two or more languages are “less stable than monolingual ones, and repair or reactivation procedures are constantly required to maintain the system in a steady state” because the maintenance of two or more language systems at a similar proficiency level can be seen as more than twice as strenuous as maintenance of a monolingual system because the multilingual brain is constantly involved in processes of matching and differentiation (Jessner 2003:241). These psycholinguistic consequences are closely related to a large variety of factors discussed above. This section presents how the various scholars address the issue of language maintenance within their respective frameworks.

2.4.1 Sasse’s question of revitalization

As can be seen in Sasse’s model (Figure 2-1), a language is considered dead if its use for regular communication has ceased. Hence, for the process of language revitalization to be possible, we must look for the language to be resumed and reused on a daily basis in a speech community. Before we delve into the question of revitalization, it is necessary to summarize the three phases of language death as conceived in the previous section. The model in Figure 2-2 is divided into three different stages: Stage I is primary language shift, Stage II is language decay, and Stage III is language death that ultimately leads to language replacement.

I. Primary Language Shift

\[
\text{Abandoned language/Primary language} \rightarrow \text{Abandoned language/Secondary language} \\
\text{Target language/Secondary language} \rightarrow \text{Target language/Primary language}
\]

in the entire speech community or in the majority of it (stragglers notwithstanding)
II. Language Decay

Emergence of Semi-speakers
Reduction of Style Repertoire $\rightarrow$ Reduction of Grammatical System
Pragmatic Incompetence $\rightarrow$ Structural Incompetence

III. a. Language Death

Extinction of Communication in Abandoned language $\rightarrow$
$\rightarrow$ Extinction of Creativity in Abandoned language

b. Language Replacement

Full Monolingual Proficiency in Target language (possibly substratum phenomena; emergence of a Target dialect on Abandoned Language substratum)

Figure 2-2. Stages of language death (Sasse 1992:20)

Sasse’s (1992:21) view of the “natural” revitalization process is as follows. First, before a language enters Stage I, it is considered “healthy.” However, it instantly becomes “threatened” after this point. Once the new language is primarily used in a certain speech community, the old one is potentially endangered. Nevertheless, it can potentially be retained if a strong motivation exists. Such motivations might include removal of social pressure from the dominant community, support from an ethnically or linguistically related community from outside, and so forth. The ultimate purpose for this stage is to reverse the Abandoned-Target/Primary-Secondary relationship; the entire community makes the A language primary again by reinforcing its transmission.

In Stage II, the process of revitalization is even more difficult. If the number of full or competent speakers is sufficient and they see the value of transmitting the mother tongue, they may begin to teach the next generation the A language. However, in the advanced phase of Stage II, this process is possible only by “creolization”; the A language is mixed with some related or non-related language to the point that a generation skip might occur; the oldest generation still
speaks the A language; the middle generation falls between semi-speakers and non-speakers; and
the youngest generation newly acquires the A language. From Stage III onward, only artificial
revitalization on the basis of the codified material is possible. A clear example of this type of
event is “Ivrith, Modern Hebrew, which was created on the basis of the codified holy texts after
more than 2000 years of interruption of regular language transmission” (Sasse 1992:22).

Many scholars, including Sasse, agree that a sufficient number of native speakers and
intergenerational transmission are critical to the survival of a language (de Bot 1997:581;
Romaine 2007:117, among others). In other words, the disappearing language needs to be
resumed and reused on a daily basis in a speech community. To this end, external
motivations play an important role in influencing speakers’ internal values and desire to
acquire an L2 and/or maintain an L1. Nevertheless, external motivation is insufficient to
address the various factors involved in the process of language attrition or loss because the
factors that involve external political or social settings cannot completely respond to the
question of how, specifically and practically, to increase the number of speakers and ensure
intergenerational transmission. This brings us to the internal factors and tools that may
reduce language attrition from the more recent psycholinguistic point of view.

2.4.2 Tools to reduce language attrition from psycholinguistic perspectives

As noted earlier, the many factors involved in language attrition—biological, cognitive,
social, and external—are closely linked. Even though the current frameworks cannot yet fully
account for attrition effects, certain psycholinguistic, sociolinguistic, and community factors
can nevertheless be considered as effective tools to practically reduce language attrition in a
language revival program.
2.4.2.1 Psycholinguistic factors: Literacy

It has been proposed that literacy plays some role in resistance to language attrition. Köpke (2007:20) points out that literacy can be seen as a factor that may prevent attrition in several ways. First, from a psycholinguistic and neurofunctional perspective, literacy might contribute to the grounding of a language in memory because it adds orthographic representations and new synaptic connections. Nevertheless, these effects are related to age. Second, from a sociolinguistic perspective, she further comments that literacy allows L1 speakers to maintain contact with the L1 by reading. In addition, it arouses speakers’ motivation for maintaining the L1 by wishing to have access to written input. While the methodological difficulties of investigating the interaction between age and literacy may remain unresolved, speakers who have had the opportunity to become literate in their L1, especially if they often use that skill, will be expected to have less attrition (Olshtain 1986).

2.4.2.2 Interface of psycholinguistic and sociolinguistic factors: Language use

When a bilingual starts using more than one language for the same linguistic domain, languages come into competition. However, it is not easy for a speaker to maintain two language systems at comparable levels of activation. As de Bot (2004:234) notes, languages “need maintenance and advanced use…It’s not about how much memory space we have to store language material, since there probably is no real limit there, but about the time and resources needed to keep all parts of the system in the foreground of processing…learning another language does not remove older languages from memory, but does push them more to the background and makes it accordingly more difficult to access them.” Therefore, language use is
deeply related with activation and inhibition, and has been proposed as an important predicting factor in language attrition.

De Bot (2001:70) points out that language contact and language use are more or less determined by sociolinguistic factors and they, in turn, have an impact on the processing of the languages in contact, meaning that the key factors in language loss are both limited input and limited output. His model of language loss suggests that input and output are the link or interface between the environment and the processing system, as shown in Figure 2-3.

![Figure 2-3. Language use as an interface between sociolinguistic factors and psycholinguistic processes in language loss (de Bot 2001:70)](image)

Like de Bot, many other researchers agree that the amount of contact with the L1 or the frequency of L1 use is a crucial factor in language retention. For instance, Köpke (2007:18) claims that only frequency of use can maintain the accessibility of a language. In addition, Sharwood Smith and van Buren (1991:22) propose that L1 speakers need to develop and maintain their L1, and that input is crucial for maintenance. Furthermore, O’Grady, Schafer, Perla, Lee, and Wieting (2009:101) note that “the factor that contributes most directly to the maintenance of a linguistic system is the frequency with which it is used.” The more accessible a linguistic system is, the more likely speakers are to feel comfortable using it. This creates a cycle that ultimately leads to partial acquisition and/or attrition (see Chapter 3).
2.4.2.3 Affective factors: Motivation and attitude

Even though attrition is based on brain mechanisms and cognitive factors, it is widely acknowledged that motivation, attitude, and other external and affective factors appear to play a crucial role in determining the degree and type of attrition. Three motivations can be influential to language maintenance. First, motivation can arise from socio-economic or ideological contexts. According to Köpke (2007:25), Ben-Rafael and Schmid (2007) investigate how motivation is dependent on such contexts for different groups of immigrants in Israel. The results show that language maintenance is much higher among more recent Russian immigrants who have a stronger economic motivation, allowing for the maintenance of Russian as a family language. As Crystal (2000:132) puts it, “an endangered language will progress if its speakers increase their wealth relative to the dominant community.” This is crucial because (i) if people can survive without immigrating elsewhere, their use of the language increases in their communities; and (ii) people feel motivated to think of long-term language maintenance once their basic needs are met.

Second, compared to children, adults have stronger motivations and more positive attitudes because the L1 is an essential part of their identity. To help enhance children’s motivation, “minority” language programs in both school and community settings should create opportunities for children to appreciate and learn their L1. The third aspect of motivation may be directly based on a speaker’s view of the contact situation, including his or her attitude toward his or her origins, language competence, and integration into the L2 community.
2.4.2.4 Community factors: Identity and ethnicity

The individual’s perception of the contact situation is part of what determines the speaker’s motivation to continue using his or her L1 in the face of marginalization, and hence influences language maintenance. Another factor is the speakers’ sense of identity and ethnicity. With regard to identity, Schmid (2002:191), based on her study of L1 German Jews, claims that “what is at the heart of language attrition is not so much the opportunities to use the language, nor yet the age at the time of emigration. What matters is the speaker’s identity and self-perception.” In other words, a speaker who identifies himself or herself as part of a community and wants to be recognized as a member is capable of behaving accordingly over an extremely long stretch of time. However, a speaker who rejects the community or is rejected is likely to adopt the majority language in an attempt to acquire a native-like L2 proficiency.

With respect to ethnicity, language has been considered one of its most constitutive factors (e.g., Fishman 1989:9). Ethnic identities are different across language contact situations; some minority groups choose to give up their own culture and assimilate quickly to the dominant group, while others appear to persistently keep their traditions. Ethnolinguistic Vitality (EV) is a socio-psychological framework developed and tested by Yağmur (1997:22) to establish the degree of “vitality,” i.e., “that which makes a group likely to behave as a distinctive and active collective entity in intergroup situations” (Giles, Bourhis, and Taylor 1977:308). Because language has been considered as a marker of group identity, this theory assumes that a group with a high degree of EV will reduce and prevent attrition more than a group with negative social identity (i.e., a low degree of EV). Factors including prestige, education, demographic distribution, or media are measured in a minority
speech community. However, Yağmur’s study of speakers of Turkish using EV does not find significant interaction between vitality factors and language attrition (1997:100).

Even so, the assumption of the link between vitality and attrition still holds some truth from my own point of view. If the degree of vitality is high in a speech community, it is very likely that (i) the speakers and domains of use of L1 will then be increasing; (ii) individual speakers’ self-perception and identity as part of the community will be stronger; and (iii) the group’s legitimate power from the dominant group’s perspective will also be greater. In this, I am in accord with Crystal’s (2000:130–144) six postulates on what sustains an endangered language, all of which suggest that the vitality of an ethnicity is one of the determining factors to practically reduce attrition and hence maintain a language.14

What clearly emerges from this discussion is that attrition or loss depends on various factors. An interdisciplinary approach is needed in order to address these factors and the issue of language loss effectively. As Köpke (2007:31) notes, “attrition needs to be considered within a multi-component view, relying unavoidably on the complementary contribution of several disciplines of the humanities.” Language policy and planning (LPP), according to Ricento (2006b:129), is an interdisciplinary field that “requires an understanding and use of multiple methods in exploring important questions about language status, language identity, language use, and other topics that fall within the purview of research.” LPP attempts to answer the following questions. Why are some language programs more effective than others? What policies should an educational institution or community adopt to ensure that language learners are successful? Why do some people

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14 These six postulates are that an endangered language will progress if its speakers (i) increase their prestige within the dominant community; (ii) increase their legitimate power in the eyes of the dominant community; (iii) increase their wealth relative to the dominant community; (iv) have a strong presence in the educational system; (v) can write their language; and (vi) can make use of electronic technology.
acquire or learn better than others? It is to the diverse approaches of the field of language policy and planning that we now turn.

2.5 LANGUAGE POLICY AND PLANNING

Davis (1999:69) points out that many language scholars have become concerned with indigenous language issues and have made important contributions. Some have taken on the roles of corpus planners or consultants for indigenous immersion programs and/or have described indigenous language situations (e.g., Hinton 1994). In support of indigenous language policy making and planning, Fishman (1991) has developed the Graduated Intergenerational Dislocation Scale (GIDS) through a comparative analysis of language maintenance, loss, and revitalization. Other scholars, including Hale, Krauss, Watahomigie, Yamamoto, Craig, Jeanne, and England (1992), have taken overt political stands for indigenous language maintenance and revitalization.

Davis (1999) further comments that even though many scholars have made important contributions in the political realm, the field of language planning has, overall, lacked advocacy and comprehensive data on the social, cultural, political, and economic conditions of language use and attitudes. Three approaches of LPP studies are distinguished: (i) the neoclassical approach emphasizes individual linguistic decisions assuming that the rational calculus of individuals is the focus of research (Tollefson 1991:31); (ii) the historical-structural approach “seeks the origins of constraint on planning, the sources of the costs and benefits of individuals’ choices, and the social, political, and economic factors which constrain or impel changes in language structure and language use” (Tollefson 1991:31); (iii) the ethnographical approach puts emphasis on the integration of holistic, semiotic/emic, and ethnological perspectives in a language situation (Davis 1999:71–73). I take the view that the ethnographical approach offers
the possibility of a more comprehensive analysis that examines integrated political, historical, social, cultural, economic, and educational factors, and that this approach is applicable across language minority populations.

2.5.1 The Neoclassical approach

Tollefson (1991:27–28) points out four characteristics of the neoclassical approach. First, the primary causal variables on language research are centered within the individual; the unit of analysis it employs is individual choices. For instance, educational programs for recent U.S. immigrants assume that learners’ characteristics such as their attitudes and values determine their success in learning English. Therefore, work on learner variables is the basis for much language planning research.

Second, this approach tends to focus on the current situation but not the past relationships between groups. Third, it often evaluates plans and policies in ahistorical and amoral terms; it insulates language planners from any evaluation that is external to the planning process. Finally, it typically assumes that the researcher is viewed as an observer; s/he is not part of the historical context and is primarily responsible for analyzing the planning process without interfering in it.

2.5.2 The Historical-structural approach

The historical-structural approach assumes that “the primary goal of research and analysis is to discover the historical and structural pressures that lead to particular policies and plans and that constrain individual choice” (Tollefson 1991:32). Again, four characteristics are distinguished. First, unlike the neoclassical approach, this approach considers the influence of socio-historical factors on language use. Language policy is considered as one mechanism by which the interests of dominant sociopolitical groups are maintained and the seeds of
transformation are developed. Second, it takes the past relationships between groups into consideration. The main goal of policy research is to examine the historical basis of policies.

Third, this model is concerned with the issues of class dominance and oppression. As Tollefson notes, this approach assumes that “the primary goal of research and analysis is to discover the historical and structural pressures that lead to particular policies and plans and that constrain individual choice” (32). Fourth, while the neoclassical approach is apolitical, this model’s view is that a political stance is inescapable and researchers need to engage the political questions that arise throughout the process.

2.5.3 The Ethnographic approach

Davis (1999:71) claims that small but growing numbers of researchers conduct LPP studies using the methods of ethnography and philosophy (Davis 1994; Hornberger 1988). She further explains that this approach includes three primary philosophical axioms of ethnography: holistic, semiotic/emic, and ethnological perspectives. First, at the policy level, holistic philosophy allows for analyses of social, cultural, political, and economic motivations behind decision-making. At the planning level, this approach considers how various factors are interrelated and what these interrelationships mean in developing language plans. In addition, this approach has the ability to include various perspectives that are appropriate to the situation from across disciplines such as political science, education, and economics (72).

The second element in this approach is the use of a semiotic/emic perspective, which seeks an understanding of the immediate and local meanings of actions, defined from the actors’ point of view. Moreover, it focuses on the ways in which language and cultural meanings interact. Last but not least, it suggests analyses of the intersection of meanings of policy decision-makers, teachers, community members, and others within a specific social setting.
Third is the ethnographical approach, which provides for detailed, comprehensive, and interpretive study of particular language situations. The resulting descriptions can be used to develop local plans, and the ethnographic data collection can be helpful to policy and planning decision making for the speech community. This approach suggests that a comprehensive analysis should include “examination of issues related to language policy development, community language/cultural experiences, implementation of language policies and formal language learning practices” (73).

2.5.4 Evaluation of the three approaches to LPP

Of these three approaches, the ethnographical one is likely to provide the most effective ideological foundation for Truku research and Truku LPP. Both neoclassical and historical-structural approaches suffer serious limitations, while the ethnographical approach has unique advantages.

Although the neoclassical approach has generally dominated the field of LPP, there are three crucial linguistic questions that this approach is unable to answer, as Tollefson (1991:29) intimates. The first question is “how do language communities form and how do they come to invest their language(s) with varying degrees of value?” The neoclassical approach derives typologies of language communities based on degrees of multilingualism and structural characteristics of language varieties. However, it has been unable to develop a theory to account for the formation and development of language communities.

Second, this approach is unable to explain why some groups choose to learn and speak other languages easily, perhaps at the expense of losing their mother tongue altogether, whereas other groups persevere and cling to their native language in spite of the great pressure they encounter. In other words, the neoclassical emphasis on individual decision means that it cannot account for
the fact that some communities easily accept language loss, while others boldly choose to struggle over language issues.

Third, the neoclassical approach is unable to answer the question “what are the mechanisms by which changes in language structure and language use take place, and how does the language-planning process affect those mechanisms?” It cannot explain under what conditions planning decisions bring about linguistic changes, having recourse only to a notion of so-called “natural” language change.

The historical-structural approach to LPP is superior to the neoclassical one because it allows linguists to conduct analyses that take account of social, political, and economic motivations and perspectives. In addition, this approach allows consideration of the past relationships between groups rather than confining itself to mere interest in individual choices. However, as Davis (1999:70–71) observes, the historical-structural approach has important limitations. From a theoretical perspective, this approach does not provide a philosophy of research that can shed light on current conditions and methods for determining language plans, especially in regard to various language minority groups. To address the interests of such groups, it is necessary to embark on comparative case studies that focus on the process of language policy formation and the subsequent impacts on language minorities. From a practical perspective, although it provides the tools for groups and individuals to understand why linguistic power differentials can create conditions of oppression, this approach does not tackle the actual needs and purposes of minority languages and literacy. Moreover, it does not offer ways to conduct language acquisition planning (Cooper 1989) that can serve these needs and purposes.

Finally, for this LPP research with an indigenous minority language group, the ethnographical approach is judged to be the most appropriate ideological foundation for four
reasons. First, this approach implies the need for research into the linguistic, economic, and cultural practices within and across communities. Second, the emic nature of ethnography requires analyses of the interrelationships among language, educational, economic, and educational goals and practices. Next, the full range of its research methods allows community members to reflect on their experience and needs, which might illuminate their motivations for choosing to maintain or abandon their native language.

Last, it shows the importance of policies that reflect community and program practices and needs (Davis 1999:91). To be able to consider the great variety of factors involved in issues of indigenous language attrition or loss, localized or micro-level language planning suggests the policy and ideology that can integrate ethnolinguistic, national, and global identities in a multilingual context. In other words, micro-level planning would include examination of issues related to language policy development with a multi-component view, cultural experiences, implementation of language policies, and formal or informal language learning practices. It is this type of language planning that the current Truku study adopts; it is described in detail in Chapter 5.

2.6 RESEARCH QUESTIONS

The existing frameworks attempt to explain language shift, attrition, and loss by viewing these phenomena as multi-component processes. Many factors result in the loss of functional aspects (i.e., language shift or change in language use) and the loss of structural aspects of language (i.e., language attrition or change in language proficiency), ultimately leading to language loss. The other side of the coin is maintenance, which, as Fase et al. (1992:4) point out, presupposes maintenance of use as well as maintenance of proficiency. These are separate concepts, and likewise, reduction of use and reduction of proficiency can and do occur.
separately; there is a need to distinguish these two concepts and the terminology employed to discuss them.

To investigate the changes in language use and proficiency in the current Truku community, this project assesses Truku language strength relative to Mandarin through the HALA experiment, a psycholinguistic on-line measurement, and observes Truku proficiency through elicitation tasks that include repetition, picture naming, an act-out task, and picture-based story telling. The motivation behind this research is to provide a foundation for initiating effective conservation planning for Truku as a language in the multilingual context of Taiwan. Hence, this dissertation consists of three components. The first is the assessment of intergenerational language shift to examine whether the use of Mandarin in this language contact situation must lead to loss of Truku. The second part of the study assesses language attrition across age groups, based on a collective notion of proficiency present within the Truku speech community. The third component is the exploration and preliminary development of the most effective language planning to help stem further erosion in the use of Truku, and attempt reversal of a critical shift toward Mandarin.

In order to fulfill these purposes, the proposed study will address three questions: (i) Are younger speakers weaker in Truku than older speakers, and do the youngest generations show the greatest decline? In addition, is there any correlation between language use and label accuracy or response times?; (ii) what is the participants’ knowledge of the use of phonological and morphosyntactic properties compared with that of a linguistically competent individual (LCI)? ; and (iii) what conservation plan will be the most appropriate and effective for the current situation in Truku? These questions will be addressed in the next three chapters.
CHAPTER 3
PSYCHOLINGUISTIC ASSESSMENT OF LANGUAGE SHIFT

3.1 INTRODUCTION

A major obstacle to the early diagnosis of language shift is the absence of a precise and easy-to-use measure of language strength. Many scholars agree that recognition of language shift that leads to language loss is often delayed (e.g., Davis 1999:81; Schmidt 1990:32; among others). In other words, it is usually difficult to retrieve a disappearing language by the time a speech community becomes aware of impending language loss. Some common methods advocated for endangered language assessment include Fishman’s (1991:395) scale for determining language loss or gain and a UNESCO framework (Brenzinger 2007:x) that uses nine core factors to assess the vitality of specific endangered languages. In Formosan languages, Huteson (2003:4) has used dialect imitation tests to test fluency in Rukai and a survey to investigate Puyuma language proficiency.\footnote{Rukai and Puyuma are two endangered languages spoken in south-central and eastern Taiwan respectively. The dialect imitation tests are employed in Tona, Maga, and Mantauran, the three dialects of Rukai spoken in Maolin Township, Taiwan.}

However, the assessments mentioned above remain insufficient for three reasons. First, the off-line tests mentioned above are fundamentally impractical for many endangered languages due to certain of their properties, including subjectivity, labor-intensiveness, longer time requirements, difficulty in design, or limited number of participants. Second, when a speech community shifts to another language, it is always in response to external economic, political, and social factors, as described in Chapter 5.3.1. Yet language loss is ultimately a neurological phenomenon because it involves changes to the cognitive structures that allow us to hear and produce sounds, to select and understand words, to build and interpret sentences, and so forth
(O’Grady et al. 2009:100). Hence, to measure the degree of loss, a well-controlled real-time experiment is preferable because subjects can be forced to draw on knowledge that they are uncertain about under conditions approximating those of actual speech. As de Bot (1997:582) suggests, “research on lexical change in attrition/shift processes apparently needs to be done with tasks that imply some sort of time pressure, and that are ideally ‘on-line’.”

Third, a language assessment that involves all the languages known by the individuals in a speech community is indispensable. Bialystok and Craik (2007:209) claim that “our assessments of language proficiency are inevitably inaccurate if they fail to account for proficiency in all the languages known by the individual.” These considerations motivate the introduction of a new tool—the Hawai‘i Assessment of Language Access (HALA)—using psycholinguistic methods to assess and measure language shift or loss.

The purposes of this chapter are (i) to further explore the HALA approach, (ii) to use it to assess Truku strength (vs. Mandarin) across age groups, (iii) to establish baseline data as a starting point for developing conservation programs, and (iv) to provide quantitative data for community and government programs. Specifically, the question being asked is “Are younger generations weaker in Truku than older generations in multilingual Taiwan”? I begin with a brief introduction of the HALA project in Section 3.2. In Sections 3.3 and 3.4, the method and predictions for both body-part and nature-image naming tasks are described. I then report the results on accuracy and speed (shown in Response Times [RTs]), along with the demographic data in Section 3.5. Finally, I discuss the implications of the results of these two naming tasks.
3.2 THE HALA PROJECT

Before describing the new tool developed by O’Grady et al. in 2009, I will discuss the relationship between language use and language strength in Section 3.2.1 and introduce naming time measurement in general in Section 3.2.2.

3.2.1 Language use and language strength

Many researchers agree that language maintenance depends heavily on language use. First, as noted in Section 2.4.2.2, de Bot (2004:234) asserts that the acquisition of another language will cause the less-used language to become less easy to access. A language that is not used will attrite because it is pushed to the background and make it accordingly more difficult to access. Therefore, he argues that “the average multilingual is faced with the fact that all those languages in the system need maintenance and advance use to keep them.”

Second, Paradis’ Activation Threshold Hypothesis (2004:28) assumes that the frequency of use entails facilitation of activation; the more a language is used, the more accessible it is. The mechanism for this is that “the amount of impulses necessary to activate the item constitutes its activation threshold.” If an item is activated once, its threshold is lowered and fewer impulses are required to reactivate it. Therefore, after each activation, the threshold is lowered but gradually rises again. However, if the item is not stimulated, it becomes more and more difficult to activate over time. He further states that “attrition is the result of long-term lack of stimulation. Intensive use/exposure to one of the languages in a bilingual environment leads to a lower activation threshold for that language (i.e., it requires fewer resources), even in early, fluent, behaviorally balanced bilinguals”.

Third, Köpke (2007:18) claims that “those L2 items or rules used more frequently will be more easily activated when they are in competition with less frequently used L1 items or rules.”
Fourth, O’Grady et al. (2009:101) point out that it is difficult to maintain two language systems at comparable levels of activation, identifying frequency of use as the factor that contributes most directly to the maintenance of a linguistic system. They further view this mechanism as a natural cycle: “As a language becomes less accessible through infrequent use, its speakers become reluctant to use it, further decreasing its accessibility and creating the downward spiral that ultimately leads to partial acquisition and/or attrition,” a process shown in Figure 3.1.\(^{16}\)

![Cycle of infrequent use and lowered accessibility](http://scholarspace.manoa.hawaii.edu/bitstream/10125/5105/9/5105.pdf)

**Figure 3-1.** The cycle of decreasing usage and lowered accessibility that leads to language loss

These previous studies apparently suggest that (i) only frequency of use can maintain the accessibility of a language, and (ii) frequency of language use is closely correlated with the level of activation and speed of access. It is widely acknowledged that an excellent indicator of this accessibility is the relative frequency with which lexical items are used, which can be correlated with how quickly they can be accessed (Alario, Costa, and Caramazza 2002; Bates et al. 2003; Jescheniak and Levelt 1994; among others). In other words, speed is a widely accepted psycholinguistic reflection of accessibility. The more highly activated lexical items can be accessed more quickly than the less highly activated items (Ellis and Morrison 1998:516; O’Grady et al. 2009:100). Previous work using this measurement is introduced in 3.2.2.

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\(^{16}\) The quotation can also be found in O’Grady’s lecture notes (2009:3). This figure is from http://scholarspace.manoa.hawaii.edu/bitstream/10125/5105/9/5105.pdf (O’Grady et al. 2009:101).
3.2.2 Naming time measurement

Using comparative measures of naming times to diagnose language strength in bilinguals is not new. Ervin (1961) used picture-naming response time to assess the fluency of Italian-English bilinguals. In her cross-sectional study on Swedish-German bilingual high school students, Mägiste (1979) divided her participants into eight groups depending on their length of residence in Sweden. She took response times as an indicator and based on the results of different response times from these groups, she estimates that “the closer an individual approaches bilingual balance—somewhere between 4 and 6 years—the more he will be able to perceive and read words in both languages” (86). In their language-switching task with a group of bilingual older adults and college-age bilinguals, Hernandez and Kohnert (1999) used reaction time and error rate to investigate the difference between age groups and found that language switching is particularly difficult for older adult bilinguals (81). In their study on Spanish-English bilinguals, Gollan, Montoya, Cera, and Sandoval (2008) used picture naming time to examine the frequency effect and proposed the Weaker Links Hypothesis in a bilingual setting: The increased use of a language leads to increased lexical accessibility; conversely, infrequent use leads to a weakening of the association between forms and their meanings, resulting in lower accessibility (805).

The existing work clearly establishes two general principles: (i) naming latency is shorter in a speaker’s dominant language, and (ii) naming time is shorter for high-frequency words than for less frequent ones. In addition, these studies demonstrate that the naming times and error rates correlate with different factors such as proficiency (Ervin 1961; Mägiste 1979), age (Hernandez and Kohnert 1999), or word frequency (Gollan et al. 2008). The two main factors that the present study hopes to probe are proficiency in both languages (Truku and Mandarin) and level of word
frequency, because these are factors that reflect the use and strength of the languages in this bilingual setting.

The HALA project provides a series of tests that assess language activation in groups of speakers by measuring speed of access to lexical items and structure-building routines in their two languages (O’Grady et al. 2009:100). It consists of three tasks: a body-part naming task, a nature-image naming task, and a phrase-building task. This chapter is limited to a discussion of the first two tasks. As mentioned earlier, the speed of accessibility serves as a potent indicator of relative language strength in this tool. It also allows the evaluation of label accuracy, another indicator of language strength. Moreover, subjects’ self-assessment of their language use is also observed along with these psycholinguistic indicators.

This sociolinguistic phenomenon is equally crucial to assess the link between language strength and language use. As Lanza (2004:172–173) puts it, “language dominance is essentially a psycholinguistic phenomenon closely intermeshed with sociolinguistic parameters.” Similarly, Köpke (2007:10) stresses the correlation between language attrition or loss and social aspects of language use. She claims that language attrition, though clearly defined as an individual phenomenon, is intimately linked to social aspects of language use. In Sections 3.3 to 3.6, the method, predictions, results, and general information on the HALA project are discussed.

3.3 METHOD

The purpose of using this tool is to observe subjects’ language proficiency on body-part and nature-image naming tasks comprising items of high, medium, and low frequency. The HALA project focuses on a comparative measure –speed of access to words and structure-building operations in one language relative to the speaker’s other language(s) (O’Grady et al. 2009:102). Therefore, it is crucial to compare how quickly and how accurately a speaker responds to a given
lexical item in both Truku and Mandarin rather than to compare whether Speaker A is faster and more accurate than Speaker B at accessing a word in Truku or Mandarin within a cohort or group. The asymmetrical response time within a speaker helps to indicate the relative language strength.

The validity of these two tasks is based on three properties of test stimuli that the HALA project suggests as fundamentally important (O’Grady et al. 2009:102–103). First is to have counterparts of vocabulary items in all languages. To increase the validity of the test in measuring bilinguals’ proficiency, the lexical items should share the same lexical-semantic frequency in the different cultures. Second, at least some lexical items are basic enough so they can be acquired by all users of the language at an early age. Third, these terms can also be expected to be relatively resistant to borrowing. With these properties, we can reasonably expect the words elicited to be from the target language rather than loaned from the competitor language.

3.3.1 Participants

A total of 68 participants in four age cohorts was tested. All were ethnic Truku living in Qowgan village, Hualien, Taiwan. The Older Adults (OA) ranged in age from 41 to 65 years old; the Adults (AD) were 26 to 40 years old; the Young Adults (YA) were from 16 to 25 years old; and the Youth (YO) were from 10 to 15 years old. Each cohort had 17 participants and there were almost even numbers of males and females in each group. All participants grew up in bilingual Truku- and Mandarin-speaking families.

During the years 1945–1987, the participants in the OA group were forbidden to speak fangyan ‘local dialects’ in schools. Most participants in the AD group had much exposure to Mandarin-speaking environments due to work or further education. Many participants in the YA
group studied in the Mandarin-speaking high schools and colleges outside Qowgan village. The participants in the YO group mostly stayed in the village and received one hour a week of Truku instruction at their schools due to the language policy of the “Nine-year Curriculum” begun in 1999. Moreover, they have been taught some Truku, mostly vocabulary, in an after-school program in Qowgan village occasionally during the weekdays.\(^1\)

I excluded the data of five participants from the body-part task and ten participants from the nature-image task due to short periods of habitation in Truku villages, or drunkenness at the time of testing. Therefore, there are 63 participants for the body-part naming task and 58 for the nature-image naming task. To assess the participants’ accuracy on the choice of lexical items, a linguistically competent individual (LCI) was also tested, and his data served as a comparison point for the level of accuracy in all data sets.

### 3.3.2 Materials

The participants could complete the task easily. They named 43 pictures of body parts and 48 pictures of nature terms divided into three strata of estimated frequency of occurrence, first in Truku and then in Mandarin or vice versa. Specifically, the total of 43 body-part terms is divided into three strata based on assumed frequency: 18 items in Stratum 1, 12 items in Stratum 2, and

\(^{17}\) Depending on the availability of funding, Truku is taught from half an hour to one hour a day, in the evening after the Chinese-language school. In addition, because of their various backgrounds, not all of the participants’ families are bilingual.
13 items in Stratum 3 as in Table 3-1; the 48 nature terms contain 16 items for each stratum as in Table 3-2.\(^\text{18}\) The sets of items are arranged into two different orders, Order A and Order B.

Table 3-1. Test items by stratum in body-part naming task

<table>
<thead>
<tr>
<th>High estimated frequency</th>
<th>Medium estimated frequency</th>
<th>Low estimated Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>back</td>
<td>arm</td>
<td>ankle</td>
</tr>
<tr>
<td>ear</td>
<td>cheek</td>
<td>arch</td>
</tr>
<tr>
<td>eye</td>
<td>chin</td>
<td>bicep</td>
</tr>
<tr>
<td>face</td>
<td>eyebrow</td>
<td>calf</td>
</tr>
<tr>
<td>fingers</td>
<td>fingernail</td>
<td>cheekbone</td>
</tr>
<tr>
<td>foot</td>
<td>forehead</td>
<td>elbow</td>
</tr>
<tr>
<td>hair</td>
<td>neck</td>
<td>eyelid</td>
</tr>
<tr>
<td>hand</td>
<td>palm</td>
<td>forearm</td>
</tr>
<tr>
<td>head</td>
<td>thumb</td>
<td>heel</td>
</tr>
<tr>
<td>knee</td>
<td>toe</td>
<td>knuckle</td>
</tr>
<tr>
<td>leg</td>
<td>waist</td>
<td>pupil</td>
</tr>
<tr>
<td>lips</td>
<td>wrist</td>
<td>shin</td>
</tr>
<tr>
<td>mouth</td>
<td></td>
<td>toenails</td>
</tr>
<tr>
<td>nose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>shoulder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stomach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>teeth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tongue</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^{18}\) As O’Grady et al. (2009:104) point out, these items are “divided into three subsets or strata based on their relative frequency of use, as determined by information collected from intuitive ratings, naming times and HAL (Hyperspace Analogue to Language) log in the English Lexicon Project (Balota et al. 2007), and performance by a separate group of pilot participants who spoke a range of native languages.” However, according to Blust (pers. comm. 2011), PAN *siku ‘elbow’ is fairly stable across hundreds of Austronesian languages, while there is no construction for ‘wrist’, which suggests that wrist is not a psychologically salient body part, and whatever lexical encoding it had was unstable. As for the nature-image items, he points out that reflexes of PAN *qabu ‘ash’ are very stable in Austronesian languages, and the term is on Swadesh’s 200-word basic vocabulary. Together with firewood, ashes are something people see and use every day in the hearth for traditional cooking. Therefore, ‘ashes’ can be more frequent than ‘wave’ in high-frequency words and ‘ridge’ in medium-frequency words.
Table 3-2. Test items by stratum in nature-image naming task

<table>
<thead>
<tr>
<th>High estimated frequency</th>
<th>Medium estimated frequency</th>
<th>Low estimated frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>spider</td>
<td>smoke</td>
<td>bark</td>
</tr>
<tr>
<td>rock</td>
<td>snow</td>
<td>cliff</td>
</tr>
<tr>
<td>cloud</td>
<td>island</td>
<td>vein</td>
</tr>
<tr>
<td>moon</td>
<td>star</td>
<td>frond</td>
</tr>
<tr>
<td>flower</td>
<td>grass</td>
<td>stream</td>
</tr>
<tr>
<td>sand</td>
<td>vine</td>
<td>forest</td>
</tr>
<tr>
<td>sky</td>
<td>ridge</td>
<td>log</td>
</tr>
<tr>
<td>path</td>
<td>cave</td>
<td>ash</td>
</tr>
<tr>
<td>fire</td>
<td>tree</td>
<td>bay</td>
</tr>
<tr>
<td>sun</td>
<td>stem</td>
<td>hole</td>
</tr>
<tr>
<td>lightning</td>
<td>bird</td>
<td>truck</td>
</tr>
<tr>
<td>fish</td>
<td>drop</td>
<td>peak</td>
</tr>
<tr>
<td>mountain</td>
<td>ocean</td>
<td>shoot</td>
</tr>
<tr>
<td>wave</td>
<td>waterfall</td>
<td>pond</td>
</tr>
<tr>
<td>rainbow</td>
<td>root</td>
<td>field</td>
</tr>
<tr>
<td>leaf</td>
<td>banana</td>
<td>beach</td>
</tr>
</tbody>
</table>

### 3.3.3 Design and procedure

Every participant was tested in both Truku and Mandarin. As it may be expected that a participant will respond more quickly on the second run through the experiment, half the participants were tested first in Truku, and second in Mandarin, whereas the other half of the participants were tested in the reverse order. For example, Participant A is tested with Order A in Truku on the first day and with Order B in Mandarin the next day, while Participant B is tested in the reverse order. Hence, 34 out of 68 participants were tested first in Truku and the other 34 were tested first in Mandarin.

To get accustomed to the tasks, each participant first practiced naming 12 items after being given brief instructions about the experiment. Then testing of the main set of items began, with the subsets appearing in the following order: high-frequency, medium-frequency, and low-
frequency. However, the items within each subset for each language are presented in different random orders.

For each item, a photo was displayed in the center of a laptop computer in a quiet room. To draw the participant’s attention, the onset of each black and white image was accompanied simultaneously with a short beep. As the picture was presented on the computer screen, the participant named a red-circled body part, as shown in Figure 3-2 or 3-3, as quickly as possible. In this version of the HALA experiment, the photo remained on the screen until the participant named the item aloud. Nevertheless, participants could skip an item if it was unknown to them. Then the subsequent item followed after 5000 milliseconds (ms). The whole set of response times was recorded and measured from the onset of the picture to the onset of their response in ms. The primary interest is to compare each participant’s reaction times for Truku versus Mandarin within a cohort.

After the naming tasks, the Language Experience and Proficiency Questionnaire (LEAP-Q) designed by Marian, Blumenfield, and Kaushanskaya (2007:940–967), was filled out by each participant in OA and AD (see Appendix A). However, to increase the level of objectivity, the LEAP-Q was administered orally with the young participants in YA and YO.

![Figure 3-2. Test item for ‘leg’, body-part naming task](image)
3.3.4 Data coding

The digital sound files were imported into Praat, and then TextGrids created for each file to (i) allow transcription of the lexical items that were produced between beeps in a tier, and (ii) mark boundaries at the onset of the beep and the onset of participants’ responses as in Figure 3-4. The values of these two dependent measures—label accuracy and reaction times—were then placed in an Excel spreadsheet. All data were coded in accordance with the guidelines of Schafer (2010).
The first dependent measure is label accuracy. All items that each participant produced needed to be compared with those produced by the LCI. An item was coded as “accurate” if the participant pronounced it clearly and accurately within the given time (5 seconds in all three strata). In addition, some sound variations produced by the younger participants (ages 10 to 25) were coded as correct; they show consistent sound variation for the lateral fricative /ɮ/, uvular stop /q/, and velar fricative /x/ (see Section 4.3.1.2 C). Responses were considered inaccurate in the cases of: (i) incomplete or no response, (ii) failure to recognize the intended item, (iii) failure to access the correct term, (iv) phrasal descriptions (e.g., muscle of the foot for arch), (v) overly broad terms (e.g., mouth for lips), and (vi) an analyzer’s inability to hear the response either because of low volume or sound interference.

Second, the value of reaction times is self-evident. As can be seen in Figure 3-3, the onset of the beep was clear but that of the speech response was different depending on each participant. Any hesitation sounds like “um” or “er” as well as interruptions such as coughing, sneezing, or clearing of the throat that were produced before the actual speech response begins were not considered part of the naming time. In other words, the onset of the speech response was marked at the first sound of the full intended test item. In addition, if the speaker first provided a partial or whole response, and then repaired to a correct response within the given time, such as “toe-, toenail” or “toe, no toenail” for “toenail,” the onset of the naming time was marked at the first sound of the full intended test item “toenail.”

### 3.4 Predictions

As noted in 3.2.2, many psycholinguistic researchers such as Gollan et al. (2008) have clearly established that response time is negatively correlated with frequency of language use. It is expected that (i) response times are faster in a dominant language; (ii) they are faster for more
frequent items than for less frequent ones; and (iii) these effects are not nullified by factors such as word length, the number of words with similar meaning, syllable structure, or morphological composition (O’Grady 2009:4). Hence, for this study, it was predicted that (i) speakers across all age groups would produce lower accuracy, longer response times, and lower reported percentage of use for Truku than Mandarin; (ii) level of accuracy would be higher and response times faster for high-frequency than for low-frequency items; (iii) compared to the younger participants in YA and YO groups, the older ones in OA and AD groups would produce higher accuracy, shorter response times, and reported higher percentage of use for Truku; and (iv) reported percentage of use would be positively correlated with accuracy and negatively correlated with response times.

3.5 RESULTS

The results of the body-part and nature-image naming tasks are reported here. In the discussion of each of the tasks, there are four subsections on (i) level of accuracy, (ii) response times, (iii) correlations between these two indicators and reported percentage of use, and (iv) discussion.

3.5.1 Body-part naming task

3.5.1.1 Accuracy

Figures 3-5 to 3-7 summarize the accuracy of all participants, presenting the percentage correct at which they correctly named each picture in the three different strata: high-frequency items in Figure 3-5, medium-frequency items in Figure 3-6, and low-frequency items in Figure
3-7. A total of 2,752 accurate responses out of the 5,686 items (both accurate and inaccurate responses), meaning 48% of the naming responses, was kept in this data set.

Figure 3-5. Accuracy on the body-part naming task across four cohorts in High-frequency items

Figure 3-6. Accuracy on the body-part naming task across four cohorts in Medium-frequency items
Except for OA, the levels of accuracy in the three strata clearly suggest a Mandarin dominance and cross-generational decline of Truku. The key findings can be summarized as follows. First, all participants except those in OA exhibit higher accuracy in Mandarin than Truku across all three strata, and there is a shift from a Truku to a Mandarin advantage starting with the participants in AD as in Table 3-3. Therefore, the participants in OA and AD exhibit a general Truku advantage more than those in YA and YO, whereas the participants in AD, YA, and YO appear to show a greater Mandarin preference than those in OA.

Table 3-3. Accuracy percentages on the body-part task across four cohorts in high-, medium-, and low-frequency items

<table>
<thead>
<tr>
<th>Frequency</th>
<th>High-frequency (%)</th>
<th>Medium-frequency (%)</th>
<th>Low-frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OA</td>
<td>AD</td>
<td>YA</td>
</tr>
<tr>
<td>Truku</td>
<td>79</td>
<td>72</td>
<td>47</td>
</tr>
<tr>
<td>Mandarin</td>
<td>75</td>
<td>87</td>
<td>92</td>
</tr>
</tbody>
</table>
Second, as the cohort becomes younger, Truku accuracy becomes lower across the three strata. In the high-frequency items, for example, the percentage correct of accuracy changes from 79% in OA, to 72% in AD, and to 47% in both YA and YO in Truku as shown in Figure 3-4. A similar pattern of accuracy can be seen in the medium-frequency items showing 54% in OA, 31% in AD, 7% in YA, and 13% in YO as in Figure 3-5. However, the participants in YO exhibit 6% higher accuracy than those in YA, possibly due to the after-school Truku lexical instruction during the weekdays.

Next, the younger generations (YA and YO) exhibit a higher degree of Mandarin dominance than those in the older generations (OA and AD). In the high-frequency items, the level of Mandarin advantage is 45 percentage points in YA and YO versus 6 percentage points in OA and AD; 68 percentage points versus 28 percentage points in the medium-frequency items, and 28 percentage points versus 10 percentage points in the low-frequency items. Finally, participants in YA and YO show sound variances from (i) lateral fricative /ɮ/ to alveolar nasal /n/; (ii) uvular stop /q/ to velar stop /k/; and (iii) velar fricative /x/ to glottal fricative /h/ throughout their responses.\(^{19}\)

These results are consistent with the participants’ self-assessment as shown in Table 3-12 below. The percentage of language use was derived from participants’ responses to the question number five in the LEAP-Q “When choosing a language to speak with a person who is equally fluent in all your languages, what percentage of time would you choose to speak each language?” Truku appears to be the dominant language in OA (71%) and AD (31%), and the use of Truku is 74% in OA and 45% in AD. In contrast, YA and YO report 0% of Truku dominance, and the Truku use is 20% in YA and 17% in YO.

\(^{19}\) These sound changes did not affect the scoring of accurate responses in the young adults and youth.
Inferential statistics were computed treating first participants and then items as random variables. Age cohort was not treated as a random variable. As can be seen in Table 3-4, OA, in both the by participant analysis and the by item analysis, showed a significant main effect of stratum in a repeated measures analysis of variance (ANOVA) with factors language (Truku vs. Mandarin) and stratum/item frequency (S1 vs. S2 vs. S3). While AD showed a significant main effect of stratum, language, and interaction of strata and language in the by participant analysis, only a significant main effect of stratum and language was shown in the by item analysis. Like AD, both YA and YO showed a significant main effect of stratum, language, and interaction of strata and language in the by participant analysis but only a significant main effect of stratum and language was shown in the by item analysis. These findings suggest that while the oldest adults may have a comparable level of strength in both languages, language difference becomes stronger as the cohort becomes younger.

Table 3-4. F values for accuracy, four age cohorts (OA, AD, YA, and YO), and factors (stratum and language), and their interactions in the by-participant and by-item analyses

<table>
<thead>
<tr>
<th>Effect</th>
<th>OA By-participant</th>
<th>OA By-item</th>
<th>AD By-participant</th>
<th>AD By-item</th>
<th>YA By-participant</th>
<th>YA By-item</th>
<th>YO By-participant</th>
<th>YO By-item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stratum</td>
<td>$F (2, 32) = 238.534^*$</td>
<td>$F (2, 86) = 5.256^*$</td>
<td>$F (1, 13) = 52.377^*$</td>
<td>$F (2, 86) = 5.590^*$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td>–</td>
<td>–</td>
<td>$F (2, 26) = 145.413^*$</td>
<td>$F (1, 43) = 5.596^*$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language x stratum</td>
<td>–</td>
<td>–</td>
<td>$F (2, 26) = 17.951^*$</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effect</th>
<th>YA By-participant</th>
<th>YA By-item</th>
<th>YO By-participant</th>
<th>YO By-item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stratum</td>
<td>$F (1, 14) = 189.455^*$</td>
<td>$F (2, 86) = 7.436^*$</td>
<td>$F (1, 16) = 371.801^*$</td>
<td>$F (2, 88) = 8.873^*$</td>
</tr>
<tr>
<td>Language</td>
<td>$F (2, 28) = 133.839^*$</td>
<td>$F (1, 43) = 125.291^*$</td>
<td>$F (2, 32) = 355.323^*$</td>
<td>$F (1, 44) = 71.413^*$</td>
</tr>
<tr>
<td>Language x stratum</td>
<td>$F (2, 28) = 46.060^*$</td>
<td>–</td>
<td>$F (2, 26) = 49.922^*$</td>
<td>–</td>
</tr>
</tbody>
</table>

* $p < .05.$
3.5.1.2 Response times (RTs)

As noted above, the response times reflect the speed with which bilingual speakers access lexical items in each language. Two sets of RT results are presented here. First are all RTs including accurate and inaccurate responses, with 5,686 items in total. Second, to further probe the validity of this test, are the RTs with accurate responses only, by Matched by Participant analysis. This refers to “Matched in Each Participant” analysis in which all strata are collapsed, keeping only those items (mostly high-frequency items) that a given participant is accurate on in both languages. Therefore, the items kept vary from one participant to another, but the language comparison always has the same number of observations within each participant. After this analysis, only 1,489 out of 5,686 items are kept as accurate naming data; that is, 26% of the total responses (see Section 3.5.1.2.2).

3.5.1.2.1 RTs with both inaccurate and accurate responses

Figure 3-8 summarizes the mean RTs of all participants in responding to all 43 body-part picture stimuli, with the average time in milliseconds at which they accurately or inaccurately named the photos.
As can be seen here, all participant groups respond more slowly in Truku than in Mandarin on all three strata. In addition, the language difference becomes stronger as the cohort becomes younger. Specifically, the participants in OA show little difference in response times between the two languages (348ms). The difference in response times between languages is much larger in AD (1499ms), YA (2558ms), and YO (2216ms). Moreover, a stratum effect is observed here; the response times for both languages are longer as the item frequency decreases across all cohorts. The longest response times (> 5000ms) are for the medium- and low-frequency items in YA and YO.

### 3.5.1.2.2 Accurate responses

Following common procedures in psycholinguistics, I first eliminated all inaccurate responses and then excluded any response times that were more than the 2.5 standard deviation from the average response time for accurate responses in a participant. To increase the validity of
the data and to carefully measure the response times for Truku vs. Mandarin in each speaker as an indicator of relative access, only items that a participant named accurately in both Truku and Mandarin were kept in the Match by participant analysis. This reduces any confounding due to picture difficulty or concept complexity. The results are presented in Figure 3-9.

![Figure 3-9. Mean response time for high accuracy items in Matched by Participant analysis](image)

These results can be summarized as follows. First, except for OA, the other groups responded significantly more quickly in Mandarin than in Truku even in the high accuracy items.

Second, the dominance effect increased in each successive age cohort; the response time differential for both languages grows larger as the cohorts get younger (208ms in OA > 330ms in AD > 543ms in YA > 787ms in YO). Statistically, the paired t-tests showed no significant effect of language in OA (p < 0.4) but found a significant effect of language in the other, younger cohorts (p < 0.06 in AD; p < 0.04 in YA; and p < 0.001 in YO) suggesting that language
differences become stronger as the cohort becomes younger. Essentially, the margin of difference between YA and YO was not captured by the accuracy measure reported in Figure 3-4 above (Truku accuracy is 47% and Mandarin accuracy is 92% in both YA and YO) but was captured in the measurement of response times as shown in Figure 3-8. Third, the response-time advantage in favor of Mandarin is more evident among younger generations than among the older speakers.

To further show how language strength can be manifested by response times, I provide the counts of response time patterns for high accuracy items averaging over participants in Table 3-5 and for participants averaging over all high accuracy items in Table 3-6. As with the mean response times discussed above, the counts of response time patterns averaging over all participants and high accuracy items also exhibit subtle differences between the YA and YO groups. The column “Truku < Mandarin”, meaning response time is faster in Truku, represents a Truku advantage while “Truku > Mandarin”, meaning response time is slower in Truku, shows a Mandarin advantage averaging over all participants.

Table 3-5. Counts of response time patterns for high accuracy items

<table>
<thead>
<tr>
<th>Cohort</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truku &lt; Mandarin (Faster in Truku)</td>
<td>12</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Truku &gt; Mandarin (Slower in Truku)</td>
<td>13</td>
<td>15</td>
<td>9</td>
<td>7</td>
</tr>
</tbody>
</table>

As can be seen here, the participants in OA were competent in using both Truku and Mandarin with the high accuracy items; 12 items showed a Truku advantage and 13 items showed a Mandarin advantage. In AD, only four items showed a Truku preference and 15 showed a Mandarin preference. The participants in both YA and YO consistently showed a Mandarin preference in response times even for items with high accuracy in both languages. The
only item that each of the two younger groups shows a Truku preference for is *baga* ‘hand’, one of the basic terms in the high-frequency words for this task.

<table>
<thead>
<tr>
<th>Cohort</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truku &lt; Mandarin (Faster in Truku)</td>
<td>8</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Truku &gt; Mandarin (Slower in Truku)</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

Like the counts of response time patterns for high accuracy items in Table 3-5 above, the participants in OA were balanced in using both Truku and Mandarin with these high accuracy items as shown in Table 3-6; while eight participants showed a Truku preference when averaging over all accurate items, nine showed a Mandarin advantage. However, there is a shift in language preference in AD; only four speakers showed a Truku preference whereas 10 showed a Mandarin preference. In addition, most participants in YA and YO have strongly shifted to a Mandarin advantage.

### 3.5.1.3 Percentage of language use

Both accuracy and response times correlated with self-assessment on language use. The percentage of language use was derived from participants’ responses to the question number five in the LEAP-Q “When choosing a language t speak with a person who is equally fluent in all your languages, what percentage of time would you choose to speak each language?” Figure 3-9 summarizes the correlation between the percentage of accurate responses and the reported percentage of use in Truku. Figure 3-10 exhibits the correlation between the response times for accurate responses and reported percentage of use in Truku.
Figure 3-10. Correlation between the percentage of accurate responses in Truku and the reported percentage of use in Truku

As illustrated here, the reported percentage of use is positively correlated with the level of accuracy; the less Truku is used, the less accurate participants are. The older and younger participants exhibit two different pictures. As for the older speakers, 71% of participants in OA and 31% in AD considered Truku as their dominant language and reported that it constituted between 74% and 45% of their daily language use. These reported data correlated with their level of accuracy (80% in OA and 72% in AD) as shown in Table 3-7 below. In contrast, no participant in the younger groups of YA and YO considered Truku to be their dominant language, and they reported speaking Truku for between 20% and 17% of their daily language use. This self-report correlates with their performance at a lower level of accuracy, 47%.

---

20 74% and 45% were the averages of the participants’ reported percentage of daily Truku use in OA and AD respectively.
Table 3-7. Percentage of reported Truku dominance, use, and accuracy

<table>
<thead>
<tr>
<th>Cohort</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported Truku dominance</td>
<td>71%</td>
<td>31%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Reported Truku daily use</td>
<td>74%</td>
<td>45%</td>
<td>20%</td>
<td>17%</td>
</tr>
<tr>
<td>Accuracy in Truku (high-frequency words)</td>
<td>80%</td>
<td>72%</td>
<td>47%</td>
<td>47%</td>
</tr>
<tr>
<td>Differential in response times for Mandarin and Truku</td>
<td>208ms</td>
<td>330ms</td>
<td>543ms</td>
<td>787ms</td>
</tr>
</tbody>
</table>

Figure 3-11. Correlation between response times in Truku and reported percentage of use in Truku

As can be seen here, the reported percentage of use is negatively correlated with response times; the less Truku is used, the slower participants are. The older speakers considered Truku as their dominant language and showed a smaller difference in response times for Mandarin and Truku than the younger participants (208ms in OA and 330ms in AD). The younger cohorts, however, reported that Mandarin is their dominant language and the margin of difference in response times for the two languages is much larger than for the older speakers (543ms in YA

---

21 The two variables displayed in the correlation are the reported Truku use and the averaged Truku RTs.
and 787ms in YO). Nevertheless, it is noteworthy that OA reported more use of Truku, but still responded faster in Mandarin, suggesting that self-reports may be misleading.

3.5.1.4 Discussion

These test results support three main findings. First, the level of accuracy can serve as an indicator of language strength but is not as reliable as response time in detecting the fine differences between two languages. In other words, although the young adults and the youth show very similar levels of accuracy on high, mid, and low frequency vocabulary items, the response times for items that the participants named accurately in both Truku and Mandarin were slower in the youth. Statistically, both groups showed a significant effect of language in the response times but the effect of language dominance appeared stronger in the youth (p < 0.04 in YA and p < 0.001 in YO). Compared to accuracy, then, response time is a superior measure of dominance effects.

Second, consistent with widely acknowledged psycholinguistic principles and the underlying logic of the HALA project, these results confirm that the key measure (i.e., response times) of this study shows significant effects for both frequency and language dominance. Truku participants responded more quickly to high-frequency items in both languages, but were generally faster on lexical items in their dominant language, Mandarin.

Third, the effect of language dominance is manifested in the differences in response times for the two languages even in the high accuracy items. In addition, the differences between the young adult group and the youth group in the number of correct responses and the response times for both languages can be measured even with high accuracy items. Inferential statistics also
show that the language difference becomes stronger as the cohort becomes younger. This confirms the inference that response times can serve as a more reliable indicator of dominance.

3.5.2 Nature-image picture naming task

To further probe the validity of this test, the nature-image naming task was conducted along with the body-part naming task. The following subsections include (i) data coding, (ii) level of accuracy, (iii) response times, (iv) correlations between these two indicators and reported percentage of use, and (v) discussion.

3.5.2.1 Data coding

As with the body-part naming task, the digital sound files were imported into Praat, and then TextGrids were created for each file to (i) allow transcription of the lexical items that were produced between beeps in a tier, and (ii) mark boundaries at the onset of the beep and the onset of participants’ responses. Two dependent measures—label accuracy and reaction times—are the primary dependent measures. As for accuracy, clear and accurate responses that were produced within the given time were coded as correct. Moreover, some sound variations (e.g., *sutu* for *sudu* ‘grass’) and final consonant deletion (e.g., *tahu* for *tahut* ‘fire’) produced by the younger participants (ages 10 to 25) were coded as correct. Items that were considered inaccurate responses included: (i) incomplete or no response, (ii) failure to recognize the intended item, (iii) failure to access the correct term, (iv) phrasal descriptions (e.g., *water on the leaf* for *drop*), (v) overly broad terms (e.g., *tree* for *trunk*), and (vi) an analyzer’s inability to hear the response either because of low volume or sound interference.

Any hesitation or non-linguistic sounds before the actual speech response were not considered to be part of the naming time. Hence, the first sound of the full intended test item was
the onset of the speech response. Moreover, if the speaker first provided a partial or full response, and then mended it to a correct response, such as “pea-, peak” or “mountain, no peak” for “peak,” the onset of the naming time was marked at the first sound of the full intended test item “peak.”

### 3.5.2.2 Accuracy

The figures below summarize the level of accuracy of all participants, presenting the percentage of accurate responses to each item in the three different strata: high-frequency items in Figure 3-12, medium-frequency items in 3-13, and low-frequency items in 3-14. A total of 2,793 accurate responses out of the 5,523 items (both accurate and inaccurate responses), meaning 50% of the naming responses, were kept in this data set.

![Accuracy on the nature-image task across four cohorts in High-frequency items](image)

Figure 3-12. Accuracy on the nature-image task across four cohorts in **High**-frequency items
Consistent with the results from the body-part naming task described above, these results also provide evidence of Mandarin dominance and cross-generational decline of Truku for three reasons. First, except for those in the OA group, who manifest a comparable level of accuracy in both languages, the other groups are significantly more accurate in Mandarin than Truku across
all three strata as in Table 3-8. The participants in OA and AD have a higher level of accuracy in Truku than those in YA and YO, whereas the participants in AD, YA, and YO appear to have a higher level of accuracy in Mandarin than those in OA. The YO perform numerically better than the YA only in Truku low-frequency stratum, possibly due to the additional instruction they receive in the after-school program in the village.

Table 3-8. Accuracy percentages on the nature-image task across four cohorts in high-, medium-, and low-frequency items

<table>
<thead>
<tr>
<th>Frequency</th>
<th>High-frequency (%)</th>
<th>Medium-frequency (%)</th>
<th>Low-frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort</td>
<td>OA  AD  YA  YO</td>
<td>OA  AD  YA  YO</td>
<td>OA  AD  YA  YO</td>
</tr>
<tr>
<td>Truku</td>
<td>85  63  25  23</td>
<td>69  54  9  6</td>
<td>62  29  0  6</td>
</tr>
<tr>
<td>Mandarin</td>
<td>83  99  96  98</td>
<td>69  94  96  93</td>
<td>53  100  85  75</td>
</tr>
</tbody>
</table>

Second, Truku accuracy becomes lower across the three strata as the cohort becomes younger; participants respond more accurately to more frequent stimuli in both languages. For example, for the high-frequency items the rate of accuracy in Truku changes from 85% in OA, to 63% in AD, to 25% in YA, and to 23% in YO as shown in Table 3-8. Third, the degree of Mandarin dominance is higher in the younger generations (AD, YA, and YO) than in the oldest group (OA). In the high-frequency items, the level of Mandarin advantage is 45% in YA and YO versus 6% in OA and AD; 68% versus 28% in the medium-frequency items, and 28% versus 10% in the low-frequency items. These results are also aligned with the participants’ self-reports, shown in Table 3-12 below.

Inferential statistics were calculated treating first participants and then items as random variables, as shown in Table 3-9. Age cohort was not treated as a random variable. In both the by participant analysis and by item analysis, ANOVA, with factors language (Truku vs. Mandarin) and stratum/item frequency (S1 vs. S2 vs. S3) showed a significant main effect of stratum in OA.
While the AD showed a significant main effect of stratum, language, and interaction of strata and language in the by participant analysis, only a significant main effect of stratum and language is shown in the by item analysis. Both YA and YO showed a significant main effect of language and interaction of strata and language in by participant analysis. However, all age groups showed a significant main effect of stratum, language, and interaction of strata and language in the by item analysis. Consistent with the results of the body-part naming task, these findings suggest that while the older adults have a comparable level of strength in both languages, the language difference becomes stronger as the cohort becomes younger. Specifically, the Truku of the youth is undergoing further decline in comparison with the young adults.

Table 3-9. F values for accuracy, four age cohorts (OA, AD, YA, and YO), and factors (stratum and language), and their interactions in the by-participant and by-item analyses

<table>
<thead>
<tr>
<th>Effect</th>
<th>OA By-participant</th>
<th>OA By-item</th>
<th>AD By-participant</th>
<th>AD By-item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stratum</td>
<td>( F(2, 24) = 4.083^* )</td>
<td>( F(2, 50) = 9.892^* )</td>
<td>–</td>
<td>( F(2, 50) = 9.109^* )</td>
</tr>
<tr>
<td>Language</td>
<td>–</td>
<td>–</td>
<td>( F(1, 13) = 51.070^* )</td>
<td>( F(1, 25) = 33.795^* )</td>
</tr>
<tr>
<td>Language x stratum</td>
<td>–</td>
<td>–</td>
<td>( F(2, 26) = 8.552^* )</td>
<td>–</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effect</th>
<th>YA By-participant</th>
<th>YA By-item</th>
<th>YO By-participant</th>
<th>YO By-item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stratum</td>
<td>–</td>
<td>( F(2, 48) = 10.953^* )</td>
<td>–</td>
<td>( F(2, 50) = 10.485^* )</td>
</tr>
<tr>
<td>Language</td>
<td>( F(1, 12) = 364.038^* )</td>
<td>( F(1, 24) = 500.761^* )</td>
<td>( F(1, 15) = 294.031^* )</td>
<td>( F(1, 25) = 354.528^* )</td>
</tr>
<tr>
<td>Language x stratum</td>
<td>( F(2, 26) = 8.552^* )</td>
<td>( F(2, 48) = 6.582^* )</td>
<td>( F(2, 30) = 7.037^* )</td>
<td>( F(2, 50) = 6.905^* )</td>
</tr>
</tbody>
</table>

* \( p < .05 \).
3.5.2.3  Response times (RTs)

Two results of RT analysis are presented here: (i) all RTs including accurate and inaccurate responses, and (ii) the RTs with accurate responses only by Matched by Participant analysis.

3.5.2.3.1  RTs with both inaccurate and accurate responses

Figure 3-15 summarizes the mean RTs of all participants in responding to all 48 nature-image stimuli, without respect to accuracy.

![Figure 3-15. Mean response times (accurate and inaccurate responses)](image-url)

As in the body-part naming task, all speakers except for OA group exhibit longer response times in Truku and shorter response times in Mandarin on all three nature-image vocabulary strata. In addition, compared to the older cohorts (OA and AD), the younger cohorts (YA and YO) show larger response time differentials. In other words, only the participants in OA show an advantage in favor of Truku and a slight difference in response times in the two languages (84ms). The other groups respond significantly more quickly in Mandarin. The difference in
response times between languages is much larger in AD (1168ms), YA (2636ms), and YO (2549ms). The longest response times (> 5000ms) are for the medium- and low-frequency items in YA and YO.

3.5.2.3.2 Accurate responses

After eliminating all inaccurate responses and excluding any response times that were more than the 2.5 standard deviation from the average response time for accurate responses in a participant, I kept only the items that participants named accurately in both Truku and Mandarin in the analysis (i.e., Matched by Participant analysis). The total count of items in the raw data (both inaccurate and accurate responses) is 5,523, but 1,190 items are used in the by participants. In other words, only 21% of the accurate naming data are kept and analyzed. The results for the by participants are presented in Figure 3-16.

![Figure 3-16. Mean response time for high accuracy items in Matched by Participant analysis](image)

This figure summarizes the speed with which participants accurately access nature-image items in Mandarin and Truku. There are two main observations. First, consistent with the results
found in the Match by participant analysis in the body-part task, this set of data shows that Truku averagely produced longer response times (2237ms) than Mandarin (1891ms) across all speakers even in the high accuracy items. Second, the margin of difference increases in each successive cohort; the difference in response times for Mandarin and Truku grows larger as the cohorts get younger (-108ms in OA > 186ms in AD > 542ms in YA > 765ms in YO).

Inferential statistics were calculated treating first participants and then items as random variables, as shown in Table 3-10. Age cohort was not treated as a random variable. In both the by-participant analysis and by-item analysis, ANOVA, with factors language (Truku vs. Mandarin) and stratum/item frequency (S1 vs. S2 vs. S3) showed no significant main effect of stratum, language, and their interaction in OA for the by-participant analysis, but showed significant main effect of stratum for the by-item analysis. AD showed a significant main effect of stratum in both by-participant and by-item analyses. While YA showed a significant main effect of stratum, language, and their interaction in the by-participant analysis, only a significant main effect of stratum is shown in the by-item analysis. YO showed a significant main effect of language, and interaction of strata and language, in the by-participant analysis. However, all age groups showed a significant main effect of stratum in the by-item analysis. As observed in the results of the body-part naming task, these findings suggest that the older adults have a comparable level of strength in both languages, whereas the language difference becomes stronger as the cohort becomes younger. In addition, the youth is undergoing further decline in comparison with the young adults.
Table 3-10. *F* values for response times, four age cohorts (OA, AD, YA, and YO), and factors (stratum and language), and their interactions in the by-participant and by-item analyses

<table>
<thead>
<tr>
<th>Effect</th>
<th>OA</th>
<th>AD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>By-participant</td>
<td>By-item</td>
</tr>
<tr>
<td>Stratum</td>
<td></td>
<td><em>F</em>(2, 26) = 6.845*</td>
</tr>
<tr>
<td>Language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language x stratum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YA</td>
<td></td>
<td><em>F</em>(2, 22) = 8.867*</td>
</tr>
<tr>
<td>Language</td>
<td></td>
<td><em>F</em>(1, 11) = 7.555*</td>
</tr>
<tr>
<td>Language x stratum</td>
<td></td>
<td><em>F</em>(2, 22) = 3.875*</td>
</tr>
</tbody>
</table>

* *p* < .05.

The count of response time patterns for items and participants is also provided as a further indication of how response times reflect language strength. Like the results from the body-part task, the response time patterns averaging over all participants and high accuracy items in this set of data show fine differences between the YA and YO as seen in Tables 3-11 and 3-12 below.22

<table>
<thead>
<tr>
<th>Cohort</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truku &lt; Mandarin (Faster in Truku)</td>
<td>16</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Truku &gt; Mandarin (Slower in Truku)</td>
<td>9</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

As can be seen here, the participants in the OA cohort show a Truku advantage for 16 items. In AD they were balanced in using Truku and Mandarin with the high accuracy items. However,

---

22 A possible explanation for the low accuracy in Mandarin in both YA and YO groups is due to the poor quality of Chinese teaching in the indigenous schools in rural regions (Kimi Yudaw 2010, pers. comm.).
both the YA and YO participants consistently showed a Mandarin preference in response times even for the mere three items with high accuracy in both languages. These items all fell in the high-frequency word set of vocabulary.

Table 3-12. Counts of response time patterns for participants on high accuracy items

<table>
<thead>
<tr>
<th>Cohort</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truku &lt; Mandarin (Faster in Truku)</td>
<td>10</td>
<td>7</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Truku &gt; Mandarin (Slower in Truku)</td>
<td>4</td>
<td>7</td>
<td>12</td>
<td>14</td>
</tr>
</tbody>
</table>

Consistent with the counts of response time patterns for high accuracy items in Table 3-10 above, the participants in the OA cohort here show a Truku preference for 10 high accuracy items as shown in Table 3-11. The AD participants, however, show a balance in using Truku and Mandarin with seven high accuracy items in each language. This indicates that the participants in the YA and YO cohorts have strongly shifted to a Mandarin advantage.

3.5.2.4 Percentage of language use

Similarly, the percentage of language use was derived from participants’ responses to the question number five in the LEAP-Q “When choosing a language to speak with a person who is equally fluent in all your languages, what percentage of time would you choose to speak each language?” The correlation between the percentage of accurate responses and the reported percentage of use in Truku is presented in Figure 3-17. Then, Figure 3-18 summarizes the correlation between the response times of accurate responses and reported percentage of use in Truku.
Figure 3-17. Correlation between accuracy and reported percentage of use in Truku across all cohorts

As shown here, the less Truku is used, the less accurate participants are in the nature-image task as well. Reported Truku dominance and use are positively correlated with the participants’ level of accuracy as in Table 3-13.

Table 3-13. Percentage of reported Truku dominance, use, and accuracy

<table>
<thead>
<tr>
<th>Cohort</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported Truku dominance</td>
<td>71%</td>
<td>31%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Reported Truku daily use</td>
<td>74%</td>
<td>45%</td>
<td>20%</td>
<td>17%</td>
</tr>
<tr>
<td>Accuracy in Truku (high-frequency words)</td>
<td>85%</td>
<td>63%</td>
<td>25%</td>
<td>23%</td>
</tr>
<tr>
<td>Differential in response times for Mandarin and Truku</td>
<td>-108ms</td>
<td>186ms</td>
<td>542ms</td>
<td>765ms</td>
</tr>
</tbody>
</table>
Figure 3-18. Correlation between response times and reported percentage of use in Truku across all cohorts

This figure also shows that the less Truku is used, the slower participants are. As can be seen in Table 3-8 above, the older participants reported that Truku is their dominant language and showed a smaller difference in response times for Mandarin and Truku (-108ms in OA and 186ms in AD) than the younger participants. The self-assessment in younger cohorts reported that Mandarin is their dominant language, and the response-time differentials for the two languages is much larger than for the older generations (542ms in YA and 765ms in YO).

3.5.2.5 Discussion

Three main findings can be supported from the results of the nature-image naming task. First, as in the previous task, response times rather than level of accuracy serve as the most reliable indicator of the relative strength of the languages in this bilingual community. For instance, the
young adults and youth show comparable levels of accuracy in the high-frequency items (25% in YA and 23% in YO for Truku; 96% in YA and 98% in YO for Mandarin). This might suggest stabilization in language shift. However, if we examine the speed of lexical access more closely, the size of the response time differentials for Mandarin and Truku is larger for the youth (765ms) than for the young adults (542ms). This suggests ongoing language decline in the youth group.

Second, response times are faster in the dominant language, Mandarin. Consistent with the results of the previous task, Truku participants show overall Mandarin preference in response times across age groups (2237ms for Truku and 1891ms for Mandarin) even in the limited high accuracy items.

Third, the stratum effect is manifested in the differences in label accuracy and response times for the two languages across the age groups. For instance, high-frequency items become easier to access than less frequent items. Hence, participants respond faster to high-frequency stimuli than to less frequently encountered items in both languages. Consistent with one of the findings in the body-part naming task, the participants in YO perform numerically better than the young adults in the low-frequency words in Truku. This may relate to the additional after-school and summer program for the young Truku who live in the village and are aged 7 to 15, indicating that the exposure and use of a language may help stem further weakening of Truku.

### 3.6 GENERAL DISCUSSION

To measure or assess an endangered language’s strength or vitality, conventional approaches such as specialized surveys, questionnaires, interviews, vocabulary tests, or imitation tests are often used to provide a diagnosis of language shift. As noted earlier, however, these off-line tests are fundamentally impractical for many endangered languages due to certain of their properties, including subjectivity, labor-intensiveness, longer time requirements, difficulty in design, or
limited number of participants. While they might serve as an indicator of language strength, they are not as reliable as response times in detecting the subtle differences in strength between a bilingual’s two languages.

Many studies, including the current Truku study, find that the level of linguistic activation reflects the amount of input to which language users are exposed. This can be measured by the speed or time it takes to access lexical items. In other words, a language that is used frequently over time is the one that will be more quickly activated and therefore more accessible to language users. Four findings from this study further show how response times offer a sensitive measure of relative language strength in a bilingual setting.

First, consistent with well-established psycholinguistic principles, response times in both body-part and nature-image naming tasks show significant effects in language dominances: naming latencies are shorter in language users’ dominant language. Overall, Truku participants respond more quickly in Mandarin even for high-accuracy items: 1794 ms for Truku and 1520 ms for Mandarin in the body-part task; 2237 ms for Truku and 1891 ms for Mandarin in the nature-image task. In addition, the older adults show a comparable level of accuracy in Mandarin and Truku. The other groups are significantly more accurate in Mandarin.

Second, this research indicates that the response times also show significant effects in language frequency. Response times are faster for more frequent items than for less frequent ones in both languages. Thus, Truku participants not only respond faster in Mandarin than in Truku but also respond faster to the more frequent stimuli both in Mandarin and Truku. Moreover, the dominance and frequency effects do not seem to be greatly affected by factors such as word length (e.g., *hakaw utux* ‘rainbow’ in Truku) and morphological composition (e.g., *s-en-saku baga* ‘arm’) (O’Grady 2009:4). In their study of French-English bilinguals, Bachoud-
Lévi, Dupoux, Cohen, and Mehler (1998:342) report that word length did not affect naming latencies. Moreover, Jescheniak and Levelt (1994:841) point out that the number of words with similar meanings did not contribute to naming latencies.

Next, label accuracy and response times in both tasks correlated with self reports on language use: the less Truku is used, the less accurate and slower the participants are. Nevertheless, OA reported more use of Truku, but still show comparable levels of proficiency in Truku and Mandarin. One of the limitations of these psycholinguistic measurements is the difficulty in measuring passive exposure. Even if OA ‘use’ Truku more than Mandarin, they may ‘hear’ Mandarin more than Truku, and this may naturally affect the test results in ways that are difficult to measure.

Last but not least, these results indicate that response time (the key measure of the HALA tests) offers a more precise measure of language access than accuracy does. In other words, the size of the response time differentials provides a useful measure of relative degree of proficiency. As listed in Table 3-14, young adults and youth manifest a comparable level of accuracy in both languages even in the high accuracy items; this might suggest stabilization in language shift. Nevertheless, if we take a closer look at response times, the differential in response times for Mandarin and Truku is larger for the youth than for the young adults in both naming tasks—suggesting further generational decline.

Table 3-14. Level of accuracy in Truku and response time differentials in body-part and nature-image naming tasks

<table>
<thead>
<tr>
<th>Cohort</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accuracy</td>
<td>RTs-D*</td>
<td>Accuracy</td>
<td>RTs-D</td>
</tr>
<tr>
<td>Body-part</td>
<td>80%</td>
<td>208ms</td>
<td>72%</td>
<td>330ms</td>
</tr>
<tr>
<td>Nature-image</td>
<td>85%</td>
<td>-108ms</td>
<td>63%</td>
<td>186ms</td>
</tr>
</tbody>
</table>

* RTs-D refers to the difference in reaction time between Mandarin and Truku in milliseconds.
In sum, the current investigation supports (i) the Weaker Links Hypothesis in a bilingual setting: the increased use of a language leads to better and faster lexical accessibility, and vice versa; and (ii) the basic premise behind the HALA tests that views response times as a key and potent measure of relative language strength. With this sensitive indicator, we see not only strong signs of cross-generational decline of Truku, but also further decline in the youth compared to the young adults—suggesting the need for urgent remedial action if Truku is to survive another generation.

In addition, this work creates a psycholinguistic record of Truku strength at the lexical level by using the body-part and nature-image naming tasks. The baseline results of the current study can serve as a point of comparison for further assessing Truku language skills, and as a starting point for developing Truku conservation programs in the near future. Furthermore, the results derived from the two HALA tests can serve as supplemental support to the observation that linguistic characteristics are undergoing continuing attrition. Together with the structure-specific measures (see Chapter 4), this psycholinguistic record of Truku relative strength can provide quantitative data to convince the government and Truku local communities to take urgent remedial action for Truku Seediq and the other indigenous languages in Taiwan.

To strengthen the validity of the conclusions and for comparison to the baseline results from the present body-part and nature-image naming tasks, perhaps the next question to ask is how well the HALA age groups correlate with other measures of general proficiency such as oral proficiency or narratives. It is predicted that the participants with lower differentials (i.e., OA and AD) will perform better on linguistic measures of proficiency than those with higher differentials (i.e., YA and YO). To investigate this, in the next chapter, I will further look at the
same Truku participants’ use and proficiency with the language at phonological and morphosyntactic levels.
CHAPTER 4
ASSESSMENT OF TRUKU PHONOLOGICAL AND MORPHOSYNTACTIC PROFICIENCY

4.1 INTRODUCTION

The HALA tests discussed in Chapter 3 clearly indicate that Truku is undergoing an intergenerational shift to Mandarin. In other words, there is an overt decline in language use between and within generations. As noted earlier, many researchers agree that language shift—changes in language use—is closely related to language loss or attrition, that is, changes in language proficiency in individuals in a speech community. It appears that the Truku community is engaged in the natural cycle proposed by O’Grady et al. (2009:101): When a language is less accessible through infrequent use, its speakers become more reluctant to use it, which decreases its accessibility and creates the cycle that ultimately leads to partial acquisition, attrition, or loss.

Consistent with this cycle is the process that Fase et al. (1992:9) point out: if individuals lose the ability to use their own language, they will automatically shift toward other means of expression. Then, as language shift continues, the lack of opportunity to use the language will cause erosion of language proficiency. They continue and suggest that in this sense, “loss of proficiency can also be studied as an indicator of language shift. In this case, it is no longer the change in the individual’s linguistic system that is the concern. The focus of interest shifts toward some sort of collective notion of proficiency present within a community” (10). To examine the correlation between the HALA response-time differentials and common measures of general proficiency, the interest in the current study is, therefore, focused on a notion of collective proficiency shown across age groups.
The purpose of this chapter is to answer the question “What is a given participant’s knowledge of the phonological and morphosyntactic properties of Truku compared with that of a linguistically-competent individual (LCI)?” I begin with a brief introduction of the basic features of the structure of Truku in Section 4.2. In Section 4.3, the methods and results of measuring phonological, morphological, and syntactic proficiency are discussed. Finally, I discuss the implications of the results of the four reported proficiency tasks in Section 4.4.

4.2 BASIC FEATURES OF THE STRUCTURE OF TRUKU

Because all participants’ data, compared to the data of the LCI, are expected to exhibit some deviant linguistic forms due to partial acquisition, it is worthwhile to begin this chapter by presenting the basic features of the structure of Truku including phonetics, syllable structure and stress, and verb morphology.

4.2.1 Phonetics

There are 18 consonants in Truku, given in Table 4-1. The velar nasal [ŋ] is written as ng, flap [r] as r, lateral fricative [ɬ] as l, and palatal glide [j] as y. In addition, c is used to represent [ts].

<table>
<thead>
<tr>
<th></th>
<th>Bilabial</th>
<th>Post-dental</th>
<th>Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
<th>Uvular</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plosive</td>
<td>p b t</td>
<td>d</td>
<td></td>
<td>k g</td>
<td>q</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasal</td>
<td>m</td>
<td>n</td>
<td></td>
<td>ŋ (ng)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flap</td>
<td>r (r)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fricative</td>
<td>s</td>
<td>x</td>
<td></td>
<td>h</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affricate</td>
<td>c</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral</td>
<td></td>
<td></td>
<td>l</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fricative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glide</td>
<td></td>
<td></td>
<td>j (y)</td>
<td>w</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The six monophthongs are /i, e, ə, a, o, u/, as shown in Table 4-2. The schwa /ə/ is written as e and the front mid tense vowel /e/ as ey. In addition, there are three diphthongs, /aw, ay, uy/, as in the words /saw/ ‘like’, /'lelay/ ‘azalea’, and /'babuy/ ‘domestic pig’.

Table 4-2. Vowels

<table>
<thead>
<tr>
<th></th>
<th>FRONT</th>
<th>CENTRAL</th>
<th>BACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>i</td>
<td></td>
<td>u</td>
</tr>
<tr>
<td>MID</td>
<td>e</td>
<td>ə</td>
<td>o</td>
</tr>
<tr>
<td>LOW</td>
<td></td>
<td>a</td>
<td></td>
</tr>
</tbody>
</table>

4.2.2 Syllable structure and stress

The underlying syllable shapes that constitute either monosyllabic or polysyllabic words are V, VC, CV, and CVC as in o ‘topic marker’, ah ‘exclamation’, hi.ya ‘3S’, and peh.pah ‘flower’, for example. Tsukida (2005:292) states that the distribution of vowels can serve as an indicator of word boundary. The vowel /i/, /u/, or /a/ usually appears in the final syllable, while /i/, /u/, /a/, or /ə/ occur in the penultimate syllable. In other words, /ə/ does not appear in the final syllable of a word. The stress falls on the penultimate syllable as in me.qe.de.'gi.yaq ‘mountain people’. The schwa /ə/ written as e can receive stress as in se.'e.diq ‘people’. There is usually no distinction of length in either consonants or vowels.

4.2.3 Verbal construction

Truku morphology tends to be agglutinating. One word is usually composed of one lexical morpheme and some optional affixations such as prefixes, infixes, suffixes, or circumfixes. The clause structure is typically right branching; heads of constructions appear in the initial position in the construction. Hence, the constituent order is (i) predicates that can be adjectives, NPs, or verbs, as in (1) to (3), and (ii) the constituent that is the target of predication such as nominal
complements, adjuncts, or other modifiers of the predicate.\textsuperscript{23} When the constituent that is the target of predication is overtly expressed, it is preceded by the nominative marker \textit{ka}; the NP bearing nominative case is syntactically prominent and can be recognized on the basis of a voice affix, clitic pronoun, quantifier floating, and relativization (Tsukida 2005:299).

\begin{enumerate}
\item[(1)] malu bi ka empetegesa gaga.\textsuperscript{24} \hfill \textsuperscript{24}
\begin{tabular}{llll}
  & good & very & NOM teacher \\
\end{tabular}
\begin{tabular}{l}
  ‘That teacher is very good.’
\end{tabular}
\item[(2)] empetegesa ka yaku. \hfill \textsuperscript{24}
\begin{tabular}{llll}
  & teacher & NOM & 1SG \\
\end{tabular}
\begin{tabular}{l}
  ‘I am a teacher.’
\end{tabular}
\item[(3)] tegesa-un=kuna ka empetegesa. \hfill \textsuperscript{24}
\begin{tabular}{llllll}
  & teach-GV\textsubscript{1}=1SG,NOM:3SG,GEN & NOM & teacher \\
\end{tabular}
\begin{tabular}{l}
  ‘The teacher will teach me.’
\end{tabular}
\end{enumerate}

\textbf{4.2.3.1 Verbal affixes}

The five common verbal affixes can be categorized into three voices: (i) -\textit{em}/-\textit{me}/-\textit{ø}, agent voice/AV as in (4); (ii) -\textit{un}/-\textit{an}, goal voice/GV as in (5) and (6); and (iii) \textit{se}-, referential voice/RV including instrumental and beneficial voices as in (7a) and (7b).\textsuperscript{25} The verbal affix identifies the semantic role of the nominal argument, which is accompanied by \textit{ka} in the clause-final position. The example sentences illustrate the use of four affixes. For

\textsuperscript{23} Philippine-type languages have long been known to pose a problem for the notion of subjecthood. Since “subject” and “object” are controversial notions, the constituent that is the target of predication in a clause refers to the “syntactically prominent NP” marked by \textit{ka} in Truku in this paper. The prominent NP is what Schachter and Otanes (1972:69) call reference-related topic.

\textsuperscript{24} The schwa /ə/ is often inserted between consonants in a syllable (Nowmaw and Pisaw 2007:26). In this paper, to show the actual pronunciation of a Truku word, I have written this inserted schwa as \textit{e}, which does not conform to modern Truku orthography. For example, \textit{tgsa} ‘teach’ is changed to \textit{tegesa}; \textit{emptgsa} ‘teacher’ is changed to \textit{empetegesa}. However, a schwa cannot be inserted between two consonants for certain words such as \textit{cs-rumaw}/\textit{tɕs}-‘rumaw’/‘blur’.

\textsuperscript{25} I agree with Tsukida (2005:299), who treats GV as a cover term for -\textit{un} and -\textit{an}; -\textit{un} is called GV\textsubscript{1} and -\textit{an} is called GV\textsubscript{2}. There is an overlapping distribution in their use, and I suggest that the difference between them is in the degree of transitivity (Tang 2010:14).
example, when an agent is selected as the prominent *ka*-marked NP, the verb is marked with -*em*-, AV as in (4).

**AV**

(4) k-*em*-erut siyang sapah ka **Lowking**.
cut-AV meat house NOM Lowking
‘Lowking cuts the meat at home.’

**GV**

(5) keret-*un* Lowking sapah ka **siyang**.26
cut-*GV*<sub>1</sub> Lowking house NOM meat
‘Meat is cut by Lowking at home.’

**GV**

(6) keret-*an* siyang Lowking ka **sapah**.
cut-*GV*<sub>2</sub> meat Lowking NOM house
‘Lowking cuts meat at home.’

**RV**

(7) a. se-kerut siyang nii ka **yayu gaga**
RV-cut meat this NOM knife that
‘That knife is used to cut the meat.’

b. se-kerut siyang Lowking ka **baki**.
RV-cut meat Lowking NOM grandfather
‘Lowking cuts meat for Grandfather.’

Following Himmelmann (2002:11–15; 2005:110–181), Ross and Teng (2005:739–781), and Tsukida (2005:313–325), I consider these morphemes as voice morphemes rather than focus morphemes as proposed by Holmer (1996) and Chang (2000). My stance is based on two facts about Truku: (a) the *ka*-marked NP is syntactically prominent in terms of how it behaves with relativization, raising, floating quantifiers, and coordination reduction; and (b) pragmatic focus is expressed by means of other syntactic devices, such as topicalization and fronting of question words. (8) below shows that relativization is restricted to *ka*-marked NPs. In (8a), the verb is marked with -*m*- and the agent **Lowking** is selected as the prominent *ka*-NP. While the *ka*-marked NP **Lowking** can be relativized, as in (8b), the relativization of

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26 The process of this verbal derivation is irregular. When the suffix -*un* is attached to the word 'kerut 'cut’, the preceding vowel of the suffix, /u/, is weakened to schwa. Therefore, the verb becomes *ke'aret-un*. 

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the theme argument *siyang ‘meat’ is prohibited, as shown in (8c). In order to relativize the theme argument, the verb *kerut ‘cut’ in the relative clause must be marked with -an (GV2), as in (8d), instead of -m- (AV).

(8) a. k-em-en-erut *siyang sehiga ka Lowking.
   cut-AV-PRF meat yesterday NOM Lowking
   ‘Lowking cut meat yesterday.’

      Lowking cut-AV-PRF meat yesterday TOP strong very true
      ‘Lowking who has cut the meat yesterday is very strong.’

      meat cut-AV-PRF Lowking yesterday TOP big very true
      ‘The meat that Lowking has cut yesterday is very good.’

   d. siyang [k-en-eret-an Lowking sehiga] o malu bi uqun
      meat cut-PRF-GV2 Lowking yesterday TOP good very taste
      ‘The meat that Lowking has cut yesterday is very tasty.’

4.2.3.2 Tense/aspect/mood

These voices can co-occur with five morphosyntactic tense/aspect categories: present, perfect, past, progressive, and future. A set of examples can be seen in the AV paradigm shown in Table 4-3 and in Example (9) below.\(^{27}\) No marker is needed to indicate the present tense, as in (9a); -en- is the marker for the perfective aspect, as in (9b); *wada* is a preverbal auxiliary that indicates the past tense, as in (9c); *gaga* is a preverbal auxiliary marking progressive aspect, as in (9d); and *mpe*- is the marker to express the future tense, as in (9e). As for mood, no marker is used for imperative, as in (9f); and -\(^{-a}\) is the hortative marker in the AV paradigm, as in (9g).

\(^{27}\) The present AV form is also marked with *me*- or Ø. The future AV form is also marked with *me*-, or *mpe*-ke- (Tsukida 2005:314).
Table 4-3. Voice and tense/aspect/mood paradigm

<table>
<thead>
<tr>
<th></th>
<th>AV</th>
<th>GV</th>
<th>RV</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRS</td>
<td>-em-</td>
<td>-un (GV1)</td>
<td>se-</td>
</tr>
<tr>
<td>PRF</td>
<td>-em-en-</td>
<td>-en-an</td>
<td>se-(en)</td>
</tr>
<tr>
<td>PST</td>
<td>wada -em-</td>
<td>wada -an</td>
<td>wada se-</td>
</tr>
<tr>
<td>PROG</td>
<td>gaga -em-</td>
<td>gaga-un</td>
<td>gaga se-</td>
</tr>
<tr>
<td>FUT</td>
<td>mpe-</td>
<td>-un</td>
<td>se-</td>
</tr>
<tr>
<td>IMPERATIVE</td>
<td>ø</td>
<td>-i</td>
<td>-an-i</td>
</tr>
<tr>
<td>HORTATIVE</td>
<td>-a</td>
<td>-aw, -ay</td>
<td>-an-ay</td>
</tr>
</tbody>
</table>

(9) a. me-taqi ka laqi.
AV-sleep NOM child
‘The child sleeps.’

b. m-en-taqi ka laqi.
AV-PRF-sleep NOM child
‘The child has slept.’

c. wada me-taqi ka laqi.
PST AV-sleep NOM child
‘The child slept.’

d. gaga me-taqi ka laqi.
PROG AV-sleep NOM child
‘The child is sleeping.’

e. e-mpe-taqi ka laqi.
INS-FUT-sleep NOM child
‘The child will sleep.’

f. taqi=ta da.
sleep=1PL.INCL.NOM PTC
‘(We) sleep.’

g. teqi-a=ta da
sleep-HOR=1PL.INCL.NOM PTC
‘Let’s sleep.’

4.3 LINGUISTIC PROFICIENCY

Early studies generally assume that dying languages, by their very nature, are restricted in use by many speakers. As the number of speakers of a language decreases, the use of the
language diminishes. Then the reduced use of a language leads to a reduced form of that language (Anderson 1982:88; Dorian 1977:279). As noted earlier, this chapter aims at observing the collective linguistic proficiency of the community by looking at the data that Truku users actually produce in order to construct a holistic picture of the actual repertoire they have retained in their minds. For the purposes of this study, the analysis will be confined to (i) the phonological level, with a focus on the sounds that are prone to change, using a repetition test; (ii) the morphological level, focusing on the use of plurals and oblique case marking using a picture naming task, and more generally on affixes using an act-out task; and (iii) the syntactic level, stressing the percentage of code choice and agglutinating indexes (i.e., competence in using complex morphosyntactic constructions), using picture-based storytelling.

There are 72 participants and each participant undertook the four different tasks—repetition, picture naming, an act-out task, and picture-based storytelling—sequentially. There are two predictions. First, due to partial or no acquisition in Truku, young Truku who are 10–25 years of age will exhibit overall changes or defects in the use of phonological and morphosyntactic properties compared with the older generations who are 26–65 years of age. Second, all participants from 10 to 65 years of age will show incompetence in the use of morphosyntactic properties compared with the LCI. This second prediction is based on Anderson’s (1982:91) study of language attrition and language loss, in which he hypothesizes that a language attriter’s use of a language will be significantly restricted in comparison with a linguistically competent individual’s use of the same language. The following observations are based on a comparison of the data produced by the LCI and that produced by users in each age group, OA, AD, YA, and YO. I will refer to all of these users as PTUs as the participants are all partial Truku users or learners due to attrition or partial acquisition; some participants in the OA group might be
considered as attriters, but those in the other groups are more likely learners with partial or no acquisition in Truku. Sections 4.3.1 to 4.3.3 present their proficiency in these three different linguistic levels.

4.3.1 Phonological proficiency

The participants, methods, materials, designs, and procedures of the task, and the results including label accuracy as well as intergenerational differences in use are presented in the following subsections.

4.3.1.1 Method: Repetition test

The repetition test was developed to observe use of different sounds across all age groups. In his study of sentence repetition tests, Grimes (1992:74–75) points out that this type of test is based on the observation that once a sentence reaches a certain level of complexity, one cannot repeat it if it cannot be understood. Similarly, it seems reasonable to suppose that one cannot accurately repeat a lexical item if its pronunciation reaches a certain degree of unfamiliarity or complexity. The primary interest of this test is to compare the collective accuracy, among the cohorts, of speakers’ pronunciation when they repeat lexical items spoken in Truku.

4.3.1.1.1 Participants

A total of 72 participants in four age cohorts was tested. As in the HALA tests, all were ethnic Truku living in Qowgan village. The Older Adults (OA) ranged in age from 41 to 65 years old; the Adults (AD) were 26 to 40 years old; the Young Adults (YA) were from 16 to 25 years old; and the Youth (YO) were from 10 to 15 years old. There were 21 participants in the OA group and 17 participants in each of the AD, YA, and YO groups. The majority of the
participants took part in the HALA tests in 2009 but there were some changes in each group: all participants in OA were the same with the addition of four new people; in the AD group, 13 participants were the same and four were new because four of the previous participants were not available; in the YA group, 11 were the same and six were new; and in the YO group, 13 were the same and four were new. The number of male and female participants in each group can be seen in Table 4-4. All participants grew up in bilingual Truku- and Mandarin-speaking families.

Table 4-4. The number of male and female participants in each group

<table>
<thead>
<tr>
<th></th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Female</td>
<td>12</td>
<td>8</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

As noted earlier, the participants in the OA group had been forbidden to speak Truku when they were in school. Most participants in the AD group had much exposure to Mandarin-speaking environments, mainly due to work. Participants in the YA group studied in the Mandarin-speaking high schools and colleges outside Qowgan village. The participants in the YO group were required to receive Chinese-medium education in elementary and junior high schools. However, they have been taught some Truku, mostly vocabulary, in an occasional after-school program in Qowgan village on weekdays.

To assess the participants’ accuracy on the pronunciation of lexical items, production of the plural and oblique markers, comprehension of affixes, and narration of the picture story, the LCI was also tested (i.e., he took the whole series of tests just as the other participants did). His data served as a comparison point for the level of accuracy in the different tasks because his accuracy for most of these tasks was 100%.
4.3.1.1.2 Materials

The participants were able to complete the task easily. They were asked to repeat 40 words in Truku recorded by the LCI, which are shown in Appendix B1. This word list includes the five basic vowels and 18 consonants; all sounds appear in different positions of a word for three reasons. First, to observe phonetic variance, every consonant should appear in initial, medial, and final positions of a word. For example, the tested uvular stop /q/ appears in *gerak* ‘embrace’, *mk-Qowgan* ‘from Qowgan village’ where it is an allophone of /k/, and *iq* ‘yes’. Second, to further assess the most frequent phonetic variance shown in the HALA tests, these sounds—lateral fricative /ɮ/, uvular stop /q/, and velar fricative /x/—are examined in different positions. Third, the (morpho-) phonological process—dorsal harmony—observed by Lee (2009:586), is further evaluated. The two words [mək-'dawi] ‘lazy’ and [məq-'Qowgan] ‘from Qowgan’ in the word list are used to observe this change, especially in younger generations.

4.3.1.1.3 Design and procedure

Every participant began with the repetition test and was tested in Truku only. To enable younger participants to repeat each word, the 40-word list was recorded with a four-second interval between words. A participant first repeated a couple of Truku words produced by the experimenter as practice. After a word was heard in the earphones, the participant pronounced the word. They were instructed to pronounce each word even if it was unknown to them. The whole set of pronunciations that each participant produced was recorded and later compared with the production of LCI.

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28 Dorsal harmony is a phonological process in which the underlying velar segment /k/ in prefixes is realized as [q] whenever there is a uvular /q/ in the stem.
4.3.1.1.4 Data coding

A total of 2,840 responses from 71 participants across the four age groups was recorded. One participant from the AD group was excluded due to the poor quality of the sound recording. I manually transcribed all the responses in Truku into each participant’s Work Log. As noted above, the words that each participant produced were compared with those produced by the LCI. A word was coded as “accurate” if the participant produced and pronounced it correctly. Pronounced words are considered inaccurate in the cases of: (i) mispronunciation of any distinctive consonant or vowel, and (ii) incomplete or no response. An item was eliminated if the analyzer was unable to hear the response. There were 968 accurate responses in total. The counts of the inaccurate responses for each group are 123 (OA), 177 (AD), and 334 (YA and YO), meaning 42% of the responses were excluded from this set of data.

4.3.1.1.5 Predictions

As noted previously, Anderson (1982:91) hypothesizes that a language attriter’s use of a language will be significantly restricted in comparison with a linguistically competent individual’s use of the same language. In addition, as Grimes (1992) points out, individuals with reduced competence are unable to repeat utterances that exceed a certain level of complexity. Hence, it is predicted that (i) the older generations who are 26–65 years of age will exhibit lower accuracy than the LCI, and (ii) the younger generations who are 10–25 years of age will show lower accuracy than the older generations.

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29 One of the examples of mispronunciation can be seen in the eighteenth word geqeguq [gəqəqəq] ‘abyss’. One participant in OA pronounced it as [ləqəguq] in which the initial velar stop [g] is replaced with the alveolar lateral [l].
4.3.1.6 Results

Each participant’s pronunciation was evaluated in three different ways: for label accuracy, naturalness of Truku sounds, and major differences in use across age groups. The results are presented in the following subsections.

A. Accuracy

Figure 4-1 shows that accuracy is higher in the older generations, OA and AD, than in the younger ones, YA and YO. Specifically, the level of accuracy for Truku pronunciation is 82% in OA, 64% in AD, and 40% in both YA and YO. Statistically, the paired $t$-tests showed significant differences between OA and AD groups as well as between AD and YA groups ($p < 0.001$) but found no significant difference between YA and YO, suggesting that pronunciation becomes weaker as the cohort becomes younger (under 25 years old).

![Figure 4-1. Repetition test: Mean accuracy on Truku word list across four cohorts](image-url)
B. Evaluation of Truku pronunciation by raters

The second evaluation is based on two raters’ judgment on each participant’s naturalness of Truku pronunciation. Both of them are competent native speakers in Qowgan and they were asked to give a score for each participant by using the typical five-point Likert scale (from 1 to 5, 1 being “Strongly disagree” and 5 being “Strongly agree”; see Appendix B2).  

Figure 4-2. Mean evaluation of Truku pronunciation by two raters

As shown here, the mean evaluations from both raters unanimously show that Truku pronunciation becomes more unnatural across all items as the cohort becomes younger. The mean scores given by the first rater are 4.81 in OA, 4.06 in AD, 3.12 in YA, and 2.41 in YO. The mean scores from the second rater are 4.05 in OA, 3.69 in AD, 2.83 in YA, and 2.47 in YO. Statistically, the paired t-tests showed no significant difference ($p = 0.13$) between the two raters, suggesting that their observations that Truku pronunciation becomes weaker as the cohort becomes younger are consistent.

30 The two raters are widely recognized as Truku senior speakers in Qowgan village. Rater 1 is Yuki Kumus, a 68-year old retired church Elder and civil servant. Rater 2 is the LCI.
C. Major types of phonological differences across age groups

The number of investigations describing phonetic variance in endangered languages is rather limited. Nevertheless, many researchers agree that it is not uncommon that categorical changes occur with the transfer of a sound from the dominant language to the disappearing language (Anderson 1982:95; Campbell and Muntzel 1989:186–187; among others). As noted earlier, the following observations are based on a comparison of the phonological data produced by the LCI with those produced by all PTUs; this designation refers to all participants in OA, AD, YA, and YO groups, because they are all in the process of losing or learning Truku. In comparison with the LCI, the PTUs exhibit three types of phonological incompetence: a smaller number of phonological distinctions, a tendency toward optimal syllabification, and lack of dorsal harmony.

(i) Smaller number of phonological distinctions

Due to frequent contact with Mandarin, the younger participants (ages 10 to 25) in both the HALA and repetition tests exhibited consistent phonetic variants for the lateral fricative /ɮ/ and uvular stop /q/; they tend to shift /ɮ/ to /n/ or /l/ and /q/ to /k/, as in (10) to (12). In addition, although there is a velar fricative /x/ in the Chinese inventory, given in Table 4-5 (Li 2003:4), they tended to pronounce /x/ as /h/ throughout their responses or repetitions of given items, as shown in (13). Other phonetic variances are devoicing (e.g., initial /ɡ/ to /k/ or initial /b/ to /p/), as in (14); initial nasal change (e.g., /ŋ/ to /m/), as in (15); and improper neutralization (e.g., final /ŋ/ to /n/), as in (16).

31 Phonological changes do occur in non-endangered languages, too; this type of natural historical change describes changes over periods of time. However, dying languages are, by their nature, restricted in use by many speakers (Anderson 1982:88). In language contact situations, restricted use often arises when one of the languages has or acquires less prestige than the other. Hence, one of Anderson’s assumptions about language attrition or loss is that “restriction in language use accompanied by a break with a previously established linguistic tradition (or norm) leads to reduction in linguistic form and the creation of gaps in the individual’s linguistic repertoire in that language” (Anderson 1982:87).
Table 4-5. Consonants: Modern standard Chinese

<table>
<thead>
<tr>
<th></th>
<th>Bilabial</th>
<th>Alveolar</th>
<th>Palatal-alveolar</th>
<th>Alveo-palatal</th>
<th>Palatal</th>
<th>Velar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plosive</td>
<td>p pʰ</td>
<td>t tʰ</td>
<td></td>
<td></td>
<td>k kʰ</td>
<td></td>
</tr>
<tr>
<td>Nasal</td>
<td>m</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td>η</td>
</tr>
<tr>
<td>Fricative</td>
<td>f s ʂ ɻ ɕ x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affricate</td>
<td>ts tsʰ  tʂ tʂʰ tc tcʰ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glide</td>
<td>w l</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>j</td>
</tr>
</tbody>
</table>

(10) /kuxulɣ/ → /kuxun/ ‘to like’
(11) /tʂalɣa/ → /lala/ ‘many’
(12) /qaqay/ → /kakay/ ‘foot’
(13) /snunux/ → /snunuh/ ‘hair’
(14) /gupun/ → /kupun/ ‘tooth’
(15) /ŋusulɣ/ → /musul/ ‘nasal mucus’
(16) /muhiŋ/ → /muhin/ ‘nose’

The counts of these sound variances, shown in Table 4-6, allow further assessment of the participants’ use of the phonological distinctions. While listening to each participant’s recording, I manually transcribed each item in his or her Work Log. As noted earlier, all of these sound variances (968 out of 2,840 items) were considered inaccurate responses in this test. As can be seen in the table, some younger participants did not seem to have the ability to pronounce /tʂ/, /ɿ/, /x/. Moreover, they tended to devoice the initial voiced consonants and change initial /ŋ/ to /m/ when they repeated the word [ŋusuɿ] ‘nasal mucus’. Presumably, these variances are due to an effect from their dominant language of Mandarin, in which /tʂ/, /ɿ/, /x/, do not form part of the phoneme inventory and /ŋ/ only appears in the word-final position.

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32 The count of the improper neutralization, as in (16), is not provided in Table 4-5 because muhin ‘nose’ was not included in the word list for the repetition test but was a test item in the high-frequency words of the body-part naming task in the HALA experiment.
Table 4-6. Counts of sound variances across four cohorts

<table>
<thead>
<tr>
<th>Phonetic variances</th>
<th>Older Adults</th>
<th>Young Adults</th>
<th>Adults</th>
<th>Youth</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ɮ/ to /n/</td>
<td>6</td>
<td>19</td>
<td>32</td>
<td>25</td>
</tr>
<tr>
<td>/ɮ/ to /l/ or /ɾ/</td>
<td>2</td>
<td>1</td>
<td>32</td>
<td>21</td>
</tr>
<tr>
<td>/ɡ/ to /k/</td>
<td>3</td>
<td>4</td>
<td>17</td>
<td>37</td>
</tr>
<tr>
<td>/x/ to /l/ or /s/</td>
<td>0</td>
<td>1</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>/ɡ/ to /k/ or /b/</td>
<td>0</td>
<td>1</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>/ŋ/ to /m/</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

An acoustic analysis of the word ḫaba ‘many’ provides an example of how the Truku lateral fricative /ɮ/ is changed to the lateral approximant /l/ in young Truku speakers’ phonological inventory, exhibiting a difference from the speech of the LCI. Such change leads to a reduction in the number of phonological distinctions. Comparing the patterns, aperiodic energy, intensity, and frequency in utterances from two speakers, Figure 4-3 summarizes how the LCI is still able to pronounce and keep the consonant /ɮ/ whereas the young subject YO 009 loses this distinctive sound. Instead, he replaces it with the lateral approximant /l/, which is commonly used in Mandarin. First, we can visualize that the vibration of aperiodic energy of the fricative /ɮ/ is pretty high before the first vowel /a/ pronounced by the LCI (indicated by the upper-left oval circle of the waveforms in Figure 4-3). However, YO 009’s waveforms show a low vibration of aperiodic energy, indicating the consonant is clearly an approximant /l/ rather than a fricative.

In addition, Ladefoged (2001:182) points out that there is a rising pattern in intensity from a lateral approximant to a vowel. Figure 4-3 confirms that there is a pattern of rising intensity calibrated in dB from the beginning of the initial /l/ to that of the initial vowel /a/ in YO 009’s utterance, while the LCI exhibits a pattern of falling intensity indicating this is not a lateral approximant. As shown for YO 009 below, the intensity at the beginning of the sound
/l/ is 49.37 dB, which changes to 57.34 dB at the beginning of the vowel /a/, suggesting that this /l/ is a vowel-like voiced approximant. Nevertheless, the same sequence shows a falling pattern—from 70.90 dB to 65.32 dB—for the LCI.

Next, another main acoustic feature for a fricative is high frication; there is a random noise pattern especially in higher frequency regions (Ladefoged 2001:185). As can be seen in Figure 4-3, there is a clear range of high frequency calibrated in Hz and ranging from 3000 Hz to 10000 Hz in the LCI’s fricative /ɮ/, whereas there is no sign of high frication in YO 009’s /l/, suggesting that this is a vowel-like voiced approximant.

![Waveforms, intensity (dB), frequency (Hz) of the word ɟaɟa ‘many’ in Truku](image)

(ii) Tendency toward optimal syllabification

While the LCI is very stable in pronouncing consonant clusters, the PTUs have a tendency toward optimal syllabification and a tendency toward an optimal number of two syllables per
word. As noted previously, a schwa cannot be inserted between two consonants for certain words such as [tes-d'amat] ‘lonely’, as in (17 LCI). However, younger Truku users tend to break up consonant clusters by vowel insertion, as in (17 PTUs). In addition, they are prone to reducing consonant clusters or trisyllabic words to produce two-syllable words, as in (18 PTUs) and (19 PTUs).

(17) LCI: [tes’d’amat] ‘lonely’
   PTUs: [cid’amat] or [təsd’amat]

(18) LCI: [tes’d’amat]
   PTUs: [d’amat]

(19) LCI: [gəqəguq] ‘abyss’
   PTUs: [qəguq] or [kəguq]

A total of 2,840 responses from 71 participants across the four age groups was examined. As noted above, the words that each participant produced were compared with those produced by the LCI. A word was coded as “accurate” if the participant’s pronunciation is consistent with the LCI’s. Pronounced words are considered inaccurate in the cases of: (i) CV syllables, (ii) disyllabic words as in (19 PTUs), (iii) C deletion, and (iv) V insertion as in (17 PTUs). Based on the transcriptions of the recorded wordlists, I show the counts of the PTUs’ use of optimal syllabification in Table 4-7. As predicted, the younger participants have a tendency to avoid consonant clusters or trisyllabic words to produce two-syllable words.

Optimal syllabification is defined as a syllable in which vocalic and consonantal segments alternate regularly (Manessy 1977:134).

34 An example of the use of the CV syllable can be seen for word #14 in the list, [tes’d’amat] ‘lonely’; participant YA001 broke up the consonant cluster /tes/ and replaced the second consonant /s/ with the vowel /i/, producing [tid’amat]. An example of the use of C deletion can be seen from participant YA007, who eliminated the initial consonant /d/ in word #20, [də’djima] ‘bamboo’, producing [s’djima].
Table 4-7. Counts of the use of optimal syllabification across four cohorts

<table>
<thead>
<tr>
<th></th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV syllables</td>
<td>3</td>
<td>6</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>Disyllabic words</td>
<td>5</td>
<td>7</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>C deletion</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>V insertion</td>
<td>2</td>
<td>2</td>
<td>9</td>
<td>16</td>
</tr>
</tbody>
</table>

(iii) Lack of dorsal harmony

To further assess the use of dorsal harmony, I provide the counts of participants who accurately pronounce the two test words—the non-dorsal-harmony word ‘lazy’ as [mək-‘dawi] and the dorsal-harmony word ‘from Qowgan’ as [məq-‘Qowgan]—in Table 4-8. While listening to each participant’s pronunciations of these two words in the recordings, I transcribed and divided them into either accurate or inaccurate responses in their individual Work Logs.

A word was coded as “accurate” if the participant pronounced it clearly and accurately. The word is considered inaccurate in the cases of: (i) it being pronounced without dorsal harmony in the case of the dorsal-harmony word, (ii) incomplete or no response (NR), and (iii) an analyzer’s inability to hear the response clearly. As discussed above, if a participant encounters a certain level of phonetic complexity or unfamiliarity, s/he cannot reproduce the segment or sequence accurately. There were 21 participants in OA, 17 each in YA and YO, but only 15 in AD; two participants’ productions were excluded because their recordings were unclear.

Table 4-8. Number of participants who accurately pronounce each test word

<table>
<thead>
<tr>
<th></th>
<th>[mək-‘dawi] ‘lazy’</th>
<th>[məq-‘Qowgan] ‘from Qowgan’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accurate</td>
<td>NR</td>
</tr>
<tr>
<td>Older Adults</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>Adults</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Younger Adults</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Youth</td>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>
As can be seen in the table, all PTUs generally were incompetent in using the (morpho-) phonological process of dorsal harmony in Truku. Some specific examples appear in the data from the OA group. Eighteen participants were competent in pronouncing the word [mək-'dawi] ‘lazy’, two pronounced it as [pə-dawi], and the remaining one repeated this word as [əmp-dawi]. On the other hand, seven participants had the ability to accurately produce [məq-'Qowgan] ‘from Qowgan’. Ten participants did not repeat it, two mispronounced it as [məqəqi], and the remaining four inaccurately pronounced it as [qəqə…], [məqə-qo], [məqə-qo] and [məqə-qi]. The AD group manifested a similar pattern. Their inaccurate responses included [kə-dawi], [məka-dawi], [mənkə-], and [mə-dawi]. On the other hand, they inaccurately produced [qəqi], [məqə-qo], and [məqə-qowwan].

However, the younger generations showed themselves to be strongly incompetent in using this (morpho-) phonological process; out of the two younger groups, very few participants pronounced the words accurately. For YA, the inaccurate responses included [dəkə-dawi], [bədə-kawi], [mək-lawi], [kəndawi], [pə-dawi], [kə-dawi], [məka-lawi], [məka-tawi], [kə-dawi], and [ləkə-dawi]. They also produced the inaccurate responses [məkə-kowgan] and [məkə-qowwan].

For YO, the inaccurate responses included [əmk-lawi], [dək-dawi], [mək-tawi], [ləbə-dawi], [bə-ławi], [kəpə-tawi], [duku-dawi], [kədə-dawi], [ləkə-dawi], and [məkə-kawi]. They also produced the inaccurate pronunciations [məkə-kowan] and [məkə-qowgan].

### 4.3.2 Morphological proficiency

Previous work on language loss has found that a language learner or partial user shows very marked deficits not only in vocabulary but morphosyntactic development because s/he receives substantially less linguistic input (Hart and Risley 1995; Maratsos 2000; among others). Based on observations from the current Truku speech community, the use of complex morphology is
apparently disappearing. A production/picture naming task was conducted to collect data to assess the participants’ understanding and use of plural formation and oblique case marking in Truku. In addition, a comprehension/act-out task was conducted to test participants’ ability to understand and respond correctly to sentences using a variety of affixes. As predicted, the participants with lower differentials (i.e., OA and AD) perform better on morphological measures of proficiency than those with higher differentials (i.e., YA and YO). The method, materials, design, and results of each task are presented here.

4.3.2.1 Production task: Picture naming task

The picture naming task was developed to observe participants’ use and change in plural formation and oblique case marking across all age groups. The participants in OA were expected to have better performance in the use of these two morphological processes due to their frequent contact with senior Truku speakers and frequent use of the target constructions in different domains of their earlier life experiences, like working in the rice fields, collective hunting, or weaving activities in Qowgan village. The primary interest of this test is to compare the collective accuracy, among cohorts, with which speakers produce the constructions in question or respond to the given pictures and confirmation questions containing these constructions.

4.3.2.1.1 Participants

All participants who took part in the repetition test described in Section 4.3.1.1 also participated in this picture naming task. The LCI was also tested, and his data served as a baseline point for the level of accuracy in the production task.

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35 This observation is additionally confirmed by senior speakers such as Reykong Huwat, Pusi Nowmaw, and Yudaw Pisaw (pers. comm. 2011).
4.3.2.1.2 Materials

The implementation of the picture naming task was simple. Before the actual test, participants were given a practice picture set, shown in (20), designed to elicit the plural form *pehe-pehepah* ‘flowers’ if the participant was competent in knowing and using this reduplication process, in a sentence such as that in (20b).

(20)

![Practice Picture Set](image)

a. gaga m-urus qesiya kingal pehepah ka Rubiq.
   PROG AV-pour water one flower NOM Rubiq.
   ‘Rubiq is watering a flower.’

b. gaga m-urus qesiya pehe-pehepah ka Rubiq.
   PROG AV-pour water RED-flowers NOM Rubiq.
   ‘Rubiq is watering flowers.’

c. Confirming question:
   kehenu pehepah ga rus-un Rubiq hug?36
   How many/much flower PROG pour-GV1 Rubiq Q
   ‘How many/much flowers is Rubiq watering?’

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36 The monosyllabic *ga* is the abbreviation for the word *gaga* ‘PROG’. Specifically, it refers to ‘distal progressive’ while *nii* is ‘proximate progressive’.

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After the practice session, every participant was asked to produce eight sentences in response to four sets of pictures in Truku only. Two sets of pictures were designed to elicit plurals, as in (21) and (23), and two sets were designed to elicit oblique markers, as in (22) and (24); participants were expected to produce the reduplicated form of a noun to indicate a plural (e.g., the noun pete-patas ‘books’ is the plural form for the singular noun patas ‘book’) for (21) and (23), and to produce the suffix -an, the oblique marker, attached to an object, which could be either a proper noun (e.g., Eyang-an ‘Iyang-OBL’ is the oblique form for Iyang ‘a female name’) as in (22) or a pronoun (e.g., heya-an ‘3S-OBL’ is the oblique form for hiya ‘3S’) as in (24). All sentences from (20) to (24) were produced by the LCI. All sentences produced were recorded and compared across cohorts and with the production of the LCI.

(21)

a. ga d-em-uy kingal patas ka Lowking.
   PROG hold-AV one book NOM Lowking.
   ‘Lowking is holding a book.’

b. ga d-em-uy pete-patas ka Lowking.
   ‘Lowking is holding books.’

37 Before the oblique marker -an is attached to the Truku female name Iyang, the initial vowel ‘i’ needs to be weakened to schwa. Therefore, Eyang-an is the oblique form for Iyang.
Confirming question: kehenu patas ga jiy-un Lowking hug?
How many/much book PROG hold-GV1 Lowking Q
‘How many/much book is Lowking holding?’

(22)

a. ga me-gay kingal patas Eyang-an ka Yudaw.
   PROG AV-give one book Iyang-OBL NOM Yudaw
   ‘Yudaw is giving a book to Iyang.’

b. ga me-gay kingal patas leqi-an ka Yudaw.
   PROG AV-give one book child-OBL NOM Yudaw
   ‘Kumu is giving a book to a child.’

Confirming question: ga me-gay patas ema-an ka Yudaw hug?
   PROG AV-give book who-OBL NOM Yudaw Q
   ‘Whom is the book being given to by Yudaw?’

(23)
a. ga paadas kingal patas ka Kumu.
   PROG send-AV one letter NOM Kumu.
   ‘Kumu is sending a letter.’

b. ga paadas pete-patas ka Kumu.
   PROG send-AV RED/PL-letter NOM Kumu.
   ‘Kumu is sending letters.’

Confirming question: kehenu patas ga pedes-un Kumu hug?
   how many/much letter PROG send-GV1 Kumu Q
   ‘How many/much letter is Kumu sending?’

(24)

a. ga s-em-ipaq heya-an/seediq-an ka Pisaw.
   PROG hit-AV 3S-OBL/person-OBL NOM Pisaw
   ‘Pisaw is hitting him/a person.’

b. ga s-em-ipaq deheya-an/seediq-an ka Pisaw.
   PROG hit-AV 3PL-OBL/persons-OBL NOM Pisaw
   ‘Pisaw is hitting them/persons.’

Confirming question: ga s-em-ipaq ema-an ka Pisaw hug?
   PROG hit-AV who-OBL NOM Pisaw Q
   ‘Whom is the person being hit by Yudaw?’

4.3.2.1.3 Design and procedure

Each participant was tested for the ability to (i) make sentences in accordance with given
pictures, and (ii) answer confirming questions from the experimenter. First, four picture stimuli
were shown to the subject one by one. Each picture stimulus was divided into two parts that the participant would see simultaneously. The two parts each showed a picture. For the plural stimuli, these two pictures were identical except for a single difference that would evoke either the singular or plural of the noun. In addition, they were asked to use the plural form of the noun if they could, and not to provide the actual number of the plural objects. For the oblique marker stimuli, the two pictures were identical except for a single difference that would evoke the Truku oblique marker -an attached to different nouns in each of the paired pictures. For example, as soon as the pictures in (20) were shown to a participant, s/he was asked, *Ga hemuya ka Rubiq hug?* ‘What is Rubiq doing?’ The participant then produced sentences in response to the pictures and questions.

Second, after the participant made two sentences, s/he was asked to look at specific items that were circled in the pictures, e.g., ‘a flower’ (20a) and ‘flowers’ (20b) above, and to answer the question, *Kehenu pehepah ga rusun Rubiq hug?* ‘How many flower(s) is/are Rubiq watering?’ The purpose of this confirmation is to enhance the validity of the data. This is based on the concept of *convergent validity coefficients*, which refers to correlations between measures of the same trait that are obtained with different measurement methods (Campbell and Fiske 1959:84).

### 4.3.2.1.4 Data coding

A total of 576 responses from 72 participants across the four age groups was recorded. I listened to the recordings and manually transcribed all the responses into each participant’s Work Log. As noted above, the words that each participant produced were compared with those produced by the LCI. A sentence was coded as “accurate” if the participant produced the targeted plural form or oblique marker for the corresponding sentences. The responses were considered
inaccurate in the cases of: (i) incomplete or no response, (ii) saying “not understandable” or “I don’t know” in either Truku and Mandarin, (iii) absence of a plural or oblique marker in a sentence, and (iv) substituting a plural form with a quantifier.

4.3.2.1.5 Results

There was a total of 72 accurate responses out of 576, and the counts of the inaccurate responses for each group are 129 (OA), 109 (AD), 131 (YA), and 135 (YO), meaning that 87% of the responses are excluded from this set of data. The label accuracy and major differences in the use of plural and oblique markers in the picture naming task are presented here.

A. Accuracy on the plural marker

While the LCI’s label accuracy for the plural markers in (20), (21), and (23) is 100%, the PTUs’ label accuracy is low. A sentence was coded as “accurate” if the participant produced the reduplicated form of a noun to indicate a plural noun (e.g., pete-patas ‘books’). A sentence is considered inaccurate in the cases of: (i) incomplete or no response, (ii) responding with a singular noun (e.g., patas ‘a book’), and (iii) responding with a quantifier (e.g., /ɮəɮə patas/ ‘many books’) or a numeral (e.g., maxal patas ‘ten books’).

Figure 4-4 summarizes the accuracy of the participants in responding to the picture stimuli for plural markers, i.e., sentences (21) and (23), and it shows overall incompetence in the use of plural markers across age groups. Compared to the younger generations, the participants in the older groups (OA and AD) exhibit higher levels of accuracy in the use of plural markers; the label accuracy is 45% in OA, 40% in AD, 7% in YA, and 1% in YO. Statistically, the paired t-tests showed significant differences between the OA and AD groups as well as between the AD and YA groups ($p < 0.001$) but no significant difference between YA and YO, suggesting that
the ability to produce plural markers in a sentence becomes weaker as the groups become younger (under 25 years old).

![Bar chart showing mean accuracy on plural markers across four cohorts.](image)

**Figure 4-4. Picture naming task: Mean accuracy on plural markers across four cohorts**

### B. Major intergenerational differences in the use of the plural marker

The Truku plural is formed by the process of partial or full reduplication depending on the syllable structure (see Appendix B3). For instance, the syllable structure for the word *patas* ‘book’ is CVCVC. Here the first four segments CVCV are reduplicated and then the two vowels within this reduplicated form are reduced to schwa, giving *pete-patas* ‘books’. While the LCI successfully formed a plural through reduplication as in (25 LCI), the PTUs are evidently incompetent in using this process; they replace the reduplicated form *pete-* with either the quantifier *lala* ‘many’ as in (25a) or a numeral *maxal* ‘ten’ as in (25b) below. In addition, some participants, especially in the younger generations, have no response or respond in Mandarin, saying, for example, 聽不懂 ‘not understandable’ or 我不知道 ‘I don’t know’ when asked to answer a question such as ‘What is Lowking doing?’.
C. Accuracy on oblique case marking

Whereas the LCI’s label accuracy on the oblique markers in (22) and (24) was 100%, the PTUs showed overall incompetence in producing them. A sentence was coded as “accurate” if the participant produced the oblique form of a proper noun or pronoun to indicate a theme. For example, the sentential response was coded as “accurate” if a participant produced either heya-an or seediq-an ‘3S-OBL’ or ‘person-OBL’ for (24a) above. A sentence was considered inaccurate in the cases of: (i) incomplete or no response, (ii) responding with a regular noun such as heya ‘3S’ or seediq ‘person’, and (iii) responding with ini ku kela ‘I don’t know’ in Truku or 我不知道 ‘I don’t know’ in Mandarin.

The mean accuracy of the participants in responding to the pairs of picture stimuli in (22) and (24) for the oblique marker is rather low even in the OA group, which has only 1.2% correct. However, the participants in the other groups including AD, YA, and YO show no competence in using the oblique marker across sentences. Statistically, the paired t-tests showed no significant difference between OA and AD groups, AD and YA groups, and YA and YO groups, suggesting that all groups exhibit no competence in producing oblique markers in a sentence.
D. Major intergenerational difference in the use of oblique case marking

As noted earlier, language loss as well as attrition leads to an overall reduction in morphological complexity, resulting in a more analytical language structure. In other words, the loss of this type of morphological complexity is often compensated for by an increase of syntactic differentiation. Hence, while observing the decline of the use of a morpheme like that for the oblique marker -an, one can expect to see some syntactic strategies being used by PTUs to replace it. The decline in morphological complexity appears in PTUs’ lack of control over the oblique noun, the absence of the agent voice, and the misuse of tense or aspect markers, each of which is discussed in the following sections. In addition, compared to the LCI and older generations, the younger generations (YA and YO groups) tend to exhibit code choice from Truku to Mandarin or shorter phrases (i.e., two to three words) in their responses.

(i) Using the uninflected noun or SVO word order instead of the oblique marker

The Truku oblique marker -an is attached to a noun indicating an indirect object. While an LCI is able to maintain this use, most PTUs across age groups are not; unlike the LCI, who produces the complete form for the indirect object leqi-an ‘child-OBL’ as in (26 LCI), PTUs can only utter the full, uninflected noun laqi ‘child’ as shown in (26 PTUs).

(26) LCI: ga me-gay kingal patas leqi-an ka Yudaw.
  PROG AV-give one book child-OBL NOM Yudaw
  ‘Yudaw is giving a book to a child.’

  PTUs: ga me-gay kingal patas laqi ka Yudaw.
  PROG AV-give one book child NOM Yudaw
  ‘Yudaw is giving a book to a child.’

The other way that the PTUs replaced the oblique form was to use SVO word order. Unlike the LCI, who was able to maintain the use of VOS word order and use the oblique marker -an, as
in (27 LCI), the PTUs preferred using SVO word order or coordination, as shown in (27 PTUs), presumably due to Mandarin influence.

(27) LCI: begay=na e-yang-an ka patas Yudaw
give-av=3SG.GEN INS-Iyang-OBL NOM book Yudaw
‘Yudaw gives a book to Iyang.’

PTUs: Yudaw nii o, gisu d-em-uy patas ni me-gay patas Iyang.38
Yudaw this TOP is:coming carry-AV book and AV-give book Iyang
‘As for Yudaw, he is carrying and giving a book to Iyang.’

To measure the use of the uninflected noun or SVO word order instead of the oblique marker, the sentences produced by the 72 participants in response to pictures (22a) and (22b) were recorded and examined. Table 4-9 shows the counts of participants who used uninflected nouns, SVO word order, responded in Mandarin, and had no response for picture (22b) above. The responses indicate that there is an overall inability to use the oblique form across age groups.

<table>
<thead>
<tr>
<th></th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uninflected noun</td>
<td>18</td>
<td>13</td>
<td>3</td>
<td>–</td>
</tr>
<tr>
<td>SVO word order</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Response in Mandarin</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>No response</td>
<td>–</td>
<td>0</td>
<td>10</td>
<td>7</td>
</tr>
</tbody>
</table>

The dash – refers to zero.

(ii) Absence of agent voice

PTUs often exhibit a smaller number of morphologically marked categories, including voices, than does an LCI of Truku. In this task, the LCI is competent in using both the oblique

38 gisu is a cislocative meaning ‘motion toward something’ (Mithun 1995:14).
marker and agent voice -em- as in (28 LCI). However, both are absent in most PTUs’ responses as in (28 PTUs).

    PROG hit-AV 3S-OBL/person-OBL NOM Pisaw
‘Pisaw is hitting him/a person.’

PTUs: ga sipaq hiya/seediq ka Pisaw.
    PROG hit 3S/person NOM Pisaw
‘Pisaw is hitting him/a person.’

To measure the absence of agent voice in response to the picture (28a), the sentences produced by the 72 participants were recorded and examined. Table 4-10 shows the counts of participants who used (i) agent voice, the most common and appropriate type, (ii) absence of agent voice/stem (i.e., sipaq ‘hit’), (iii) goal voice (i.e., -un or -an), (iv) causative p-stem (i.e., p-sipaq ‘CAUS-hit’), (v) a different verb, kinka ‘fight’, (vi) Mandarin, and (vii) no response. The responses indicate that the younger groups YA and YO tend to use the word stem without using the agent voice in the verb sipaq ‘hit’, suggesting an overall morphological reduction in young Truku speakers’ language.

Table 4-10. Voice for the word sipaq ‘hit’: Number of participants for each kind of response

<table>
<thead>
<tr>
<th></th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent voice</td>
<td>17</td>
<td>8</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>No-agent voice/stem</td>
<td>–</td>
<td>4</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Goal voice</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>–</td>
</tr>
<tr>
<td>Causative p-stem</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Different verb</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Response in Mandarin</td>
<td>–</td>
<td>–</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>No response</td>
<td>–</td>
<td>–</td>
<td>3</td>
<td>–</td>
</tr>
</tbody>
</table>

The dash – refers to zero.
(iii) Misuse of tense or aspect marker

Another morphologically marked category that is often missed or misused is tense or aspect. Compared to (28 LCI) above, PTUs exhibit a misuse of the perfective marker -en--; it mistakenly coexists with gaga ‘PROG’ and da ‘already’ as in (29a). In addition, they sometimes appear to use an inaccurate verb in a specific context. In (29b), instead of using the accurate verb sipaq ‘hit’ in this situation, they use inappropriate verb sebut ‘spank’.

(29) PTUs:
   a. gaga s-em-en-ipaq seediq da.
      PROG hit-AV-PRF person already
      ‘(Pisaw) has hit a person already.’

   b. s-en-but seediq da.
      spank-PRF person already
      ‘(Pisaw) has spanked a person already.’

4.3.2.2 Comprehension task: Act-out task

Participants’ morphological proficiency was also measured through an act-out task. This is a comprehension task designed to assess understanding of prefixes, suffixes, and circumfixes. Goodluck (1996:150) states that because “the act-out task requires the subject to perform actions that vary from sentence to sentence, it may be less prone to response bias than tasks in which there is a fixed and restricted set of responses (e.g., judgment tasks or picture verification tasks in which the subject classifies a sentence as “good” or “bad” as a description of an action or picture.” She further points out that because participants must be able to give a clear indication of who does what to whom, act-out tasks can be superior to production tasks as a test of many aspects of syntactic knowledge (160).

In addition, Hirsh-Pasek and Golinkoff (1996:106–107) point out that language comprehension data serve three useful purposes. First, researchers can obtain a more accurate
picture of the content of speakers’ emerging language systems, especially with children, since their productions may underrepresent their grammatical knowledge. Second, the study of comprehension provides an alternative window onto the *process* of language acquisition. For instance, the data help us understand what strategy a child is using to interpret a new word. Third, comprehension data permit a degree of methodological control that is not available from observing production; this test creates a type of situation that controls extraneous variables.

### 4.3.2.2.1 Participants

All 72 participants who participated in the repetition test and picture sentence-elicitation tasks described in Sections 4.3.2.1 and 4.3.2.2 also took part in the act-out task. The LCI was also tested, and his responses to these four minimal pair test sentences served as a comparison point for the level of accuracy of the other participants in this comprehension task.

### 4.3.2.2 Materials

To assess the participants’ knowledge of affixes, (i) *tege-* ‘ordinal’, (ii) *peke-* ‘along’, (iii) *ge-* ‘a verbalized marker’, (iv) -an ‘Goal Voice*₂*, (v) -i ‘imperative’, and (vi) *se-* ‘Referential Voice’ were used in the minimal pair test sentences (30), (32), and (33); (31) shows filler sentences.³⁹ These six affixes were chosen for two reasons. First, according to the LCIs, these affixes are commonly used in daily conversion, so speakers should have the ability to comprehend them. Second, they can be used to constitute the minimal pair test sentences. The only difference in the minimal pair sentences is either an additional affix in one of the pair or a change of affixes.

³⁹ There is expected to be no difference in the participants’ responses to Sentences (31a) and (31b). However, it is predicted that, overall, the PTUs are not familiar with or do not know the prefix *peke-* ‘along’ in (31a) or the prefix *ge-* ‘a verbalized marker’ in (31b). Therefore, PTUs are expected to show inaccurate responses or actions.
between the two pairs. The eight sentences were randomized and recorded by the LCI. All test sentences were seven to ten words in length.40

(30) a. angal ka tege-deha patas ga hug?
take-AV NOM tege-two book that Q
‘Could you take the second book?’

b. angal ka deha patas ga hug?
take-AV NOM two book that Q
‘Could you take those two books?’

(31) a. peke-siyaw q-em-arit ka belak nii hug?
along-side cut-AV NOM paper this Q
‘Could you cut along the side of this paper?’

b. ge-syag-i q-em-arit ka belak nii hug?
VZ-side-IMP cut-AV NOM paper this Q
‘Could you cut along the side of this paper?’

(32) a. qi-an-i haya ka emu nii hug?41
eat-GV2-IMP BEN.3S NOM candy this Q
‘Could you have him eat this candy?’

b. qi-i haya ka emu nii hug?
eat-IMP BEN.3S NOM candy this Q
‘Could you eat the candy for him?’

(33) a. se-teru-i peniq babaw hini ka emu nii hug?
se-three-IMP place-AV on here NOM candy this Q
‘Could you place these candies three by three (on the table)?’

b. tege-teru-i peniq babaw hini ka emu nii hug?
tg-three-IMP place-AV on here NOM candy this Q
‘Could you place the candy into three heaps (on the table)?’

40 This is to ensure that grammatical structure was the primary factor that varied across the stimuli (Mayberry and Lock 2003:375).
41 The base form for the verb ‘eat’ is uqi. If the suffix -an is attached, the second vowel /i/ is eliminated so the verb form becomes uq-an. Then the initial vowel of the base form /u/ is deleted when the suffix i ‘IMP’ is added.
4.3.2.2.3 Design and procedure

As a practice, the experimenter demonstrated the procedure with a sample sentence, and then each participant was tested on whether they were able to (i) comprehend what the spoken sentence means, (ii) perform an action accordingly, and (iii) answer the question ‘What does the sentence require you to do?’ either in Truku or Mandarin depending on participants’ proficiency to verify his or her comprehension of Truku affixations. The four sets of recorded sentences were presented one by one; after participants listened to a spoken sentence through the earphones, they paused and performed actions that varied from sentence to sentence. These sentences were presented in a fixed order as given above for each participant and s/he was allowed to listen to the sentences repeatedly. Aside from the second set of sentences, in which their performances for both sentences were expected to be the same, the other three sets were supposed to vary due to the different affixes in each. To reconfirm their understanding of a sentence, they were expected to answer the question ‘What did the spoken sentence ask you to do?’.

4.3.2.2.4 Data coding

A total of 576 responses from 72 participants across the four age groups was recorded. As soon as a participant finished performing the action requested by the test sentence at the testing site, I manually recorded whether his or her response to this sentence was accurate in the individual’s Work Log. As noted above, the actions that each participant performed were compared with those performed by the LCI. A sentence was coded as “accurate” if the participants performed accurately what the sentence was asking them to act out. Performances in responding to these stimuli are considered inaccurate in the cases of: (i) wrong action in response, (ii) incomplete or no response, and (iii) an analyzer’s inability to understand the responsive performance. For instance, a participant’s response to (26a) above is considered
inaccurate if s/he takes two books instead of the second book, or shows uncertainty about the sentence’s meaning by performing more than two different actions in combination with verbalizing “Does it mean this”?

4.3.2.2.5 Results: Accuracy

Out of 576 total responses 152 were accurate, meaning that 73% of the responses were excluded from this set of data. The counts of the accurate responses for each set of sentences can be seen in Table 4-11.

Table 4-11. Counts of accurate responses in each sentence type in the Act-out task

<table>
<thead>
<tr>
<th></th>
<th>(a)</th>
<th>(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(30)</td>
<td>6</td>
<td>54</td>
</tr>
<tr>
<td>(31)</td>
<td>26</td>
<td>13</td>
</tr>
<tr>
<td>(32)</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>(33)</td>
<td>12</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 4-5 summarizes the label accuracy of the participants’ comprehension of different affixes through the act-out task. While the LCI exhibits total accuracy in responding to all the eight recorded sentences, the PTUs show variability of inaccuracy in their actions. As can be seen in the figure, the participants across the age groups exhibit an overall lower level of accuracy in responding to the four sets of spoken sentences; the level of accuracy is 48% in the OA group, 30% in AD, 15% in YA, and 7% in YO.
This overall low proficiency in comprehension correlates to substantially less input. One of Anderson’s (1982:97) hypotheses on morphological reduction states that “the degree of maintenance or reduction of morphologically-marked distinctions in an LA’s use of language X will correlate significantly with the relative frequency of use of these morphologically-marked distinctions by LCs of that language.” Even though the current participants are partial acquirers or learners rather than attriters, it is reasonable to suppose that their inadequate morphological proficiency is due to input deficits or infrequent use of Truku. As discussed before, the reported Truku daily use is 74% in OA, 45% in AD, 20% in YA, and 17% in YO. Statistically, the paired t-tests showed no significant differences between OA and AD, AD and YA, and YA and YO groups, suggesting that all groups exhibit overall incompetence in their comprehension of these

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42 Anderson (1982:84) uses the abbreviation LA to refer to a language attriter, one whose competence in a language has eroded as a result of language attrition; LC is the abbreviation for “linguistically-competent” individual, one who is fully fluent and competent in language X, whether as a native or a non-native speaker (equivalent to LCI in this dissertation).
affixes. Hence, it is reasonable to suppose that PTUs’ infrequent use of Truku correlates with or has an effect on not only vocabulary but also morphosyntactic proficiency.

4.3.3 Syntactic proficiency

As already mentioned, reduction in morphological complexity results in a more analytical language structure in the situation of language loss or attrition, a phenomenon widely acknowledged among researchers. Anderson (1982:99) explains that the number and variety of syntactic operations decline gradually in favor of a small number of more widely productive devices. Likewise, Hagen and de Bot (1990:143) claim that a rather universal principle of language change and decay is that a decrease in morphological complexity is compensated for by an increase in syntactic differentiation. More recently, Schmid, Köpke, Keijzer, and Weilemar (2004:16) claim that “language loss as well as attrition will lead to an overall reduction in morphological complexity, resulting in a more analytical language structure.” To assess participants’ syntactic knowledge, a picture-based storytelling task is used to elicit their narrations of the story, as described in the following subsections.

4.3.3.1 Picture-based storytelling task

The participants were asked to narrate the picture story *Frog, Where Are You?* (Mayer 1969), which contains a series of detailed pictures without any written text (Appendix B5). This approximately six-minute task of telling a picture-based story is employed to identify the compensatory linguistic strategies and features that the PTUs produce.\(^{43}\) Trabasso and Rodkin’s (1994:86) view of narration tasks such as this one is that they first require a participant to

\(^{43}\) The picture story *Frog, Where Are You?* has been employed frequently and proved to be useful according to reports in the literature, in studies on topics ranging from American Sign Language to first language acquisition and language attrition (Yağmur 1997:63).
interpret what is happening. In this interpretation, a conceptual basis is formed for narrating the picture events in the language in question. They further emphasize that the narration of the picture story is a joint process of event comprehension and production and has been successfully used as a means of eliciting narrative texts taken from folk tales, myths, and other stories in much the same way.

4.3.3.1.1 Participants

The same 72 participants who completed the repetition, picture naming, and act-out tasks took part in this task. Again, the LCI was also tested on this task, and his utterances in response to this series of detailed pictures (see Appendix 5Ba) served as a comparison point for the level of accuracy in the free spoken data of the other participants.

4.3.3.1.2 Materials

Trabasso and Rodkin (1994:85–86) summarize this 24-picture story as follows.

This is a story about a little boy who had a pet dog and frog. One evening, the boy, dog, and frog were in the boy’s bedroom. The boy and the dog went to sleep and while they were sleeping, the frog escaped from its jar. The next morning the boy and the dog woke up and found the empty jar. The boy was upset and tried to find the frog. But in each place he searched, he found nothing or encountered a different animal. Finally, a deer accidently carried the boy to a pond where he found the frog with a family of frogs. The story ended with the boy taking home a baby frog.

They further indicate that the summary follows a plot structure and there are three components: the boy’s realization that the frog has disappeared, the boy’s search for the missing frog, and the boy’s finding of the frog.
4.3.3.1.3 Design and procedure

After they accomplished the first three elicitation tasks—repetition, picture naming, and act-out task, the participants were asked to first skim through the whole story book and then tell the story while looking at each picture in the book. No one, including the researcher, interrupted or gave comments throughout the process. Each subject’s utterance was recorded from the beginning to the end and transcribed afterward. No feedback concerning the content was given after the recording. The storytelling task takes about six to ten minutes, depending on the individual informant.

4.3.3.1.4 Data coding

All the narratives from the 72 participants were transcribed in Transcriber. Five narratives were randomly chosen from each age group (see Appendix B5b to B5e), so the calculations were done for the narratives of 20 participants. All Mandarin or Japanese words (i.e., all non-Truku code choices) were counted. Figure 4-6 shows excerpts from four narratives with the Mandarin and Japanese words circled. The percentage of non-Truku words was calculated by dividing the total number of words in both Mandarin and Japanese by the mean number of all words from each group. The mean number of all words from each group was calculated by dividing the total number of words from five different participants in each group by the total number of participants (i.e., five for each group, except for the LCI). Therefore, the mean number of all words in OA was 473, AD 319, YA 242, and YO 24.

I coded it as a word if a participant produced (i) a word stem; (ii) a word stem with a prefix, suffix, or circumfix; or (iii) a case marker such as ka ‘NOM’, o ‘topic marker’, or hug ‘question marker’ in Truku. In addition, words that have been borrowed from Japanese and are now established in Truku, such as kujyu ‘shoes’ and abunay ‘dangerous’, are easily recognized
and these were also counted as Truku words.

Figure 4-6. Portions of non-Truku code choice in four participants’ narratives

Two examples are provided here to further show the PTUs’ actual use of the non-Truku code choice in their narratives. The change in code choice can occur as a non-clausal phrase within a sentence, as in (34a) or in Lines 5–6 spoken by AD 012 in Appendix B5d, or as a clause within a sentence, as shown in (34b) or in Appendix B5e, in Line 1 spoken by YO 014. The underlining in the English translation in the second line of the example marks the words originally in Mandarin. Therefore, 10 out of 16 words in (34a) and 5 out of 8 words in (34b) were considered non-Truku code choice in this calculation.

(34a) AD 012

hana rajiing o, 他以為是 huling na. 是被他 huling 趕走了.  just begin TOP, he thought is dog 3S.GEN 3S is PASS 3S dog drive away PTL.

‘At the beginning, he thought it was his dog. It was driven away by his dog.’
有一天晚上，laqi me-taqi da.
‘There was a night, the child (has) slept.’

4.3.3.1.5 Results

Language loss is generally characterized by attrition and imperfect acquisition. From a language rather than a speaker perspective, Truku has been undergoing attrition. The narrative data of this story is subjected to further linguistic analyses to reflect on syntactic attrition. In the following subsections, the proportion of non-Truku code choice, and the major types of syntactic strategies used across the groups are considered in order to evaluate the participants’ syntactic knowledge and use.

A. Proportion of non-Truku code choice

Figure 4-7 summarizes the proportion of non-Truku code choice across the four cohorts. While the LCI and OA groups appear not to engage in non-Truku code choice (i.e., all spoken data are produced in Truku only), the proportion of non-Truku code choice is 0.22 in AD, 2.52 in YA, and 4.52 in YO for the total spoken data (see Appendix B5), suggesting that the use of Mandarin becomes stronger as the cohorts get younger, presumably due to their inability to use Truku.
B. Major types of syntactic differences across age groups

Prior to the discussion of syntactic proficiency, I will briefly mention the reduction of lexical items evident from this narrative data, since one of the purposes of the picture-based storytelling is to find lexical retrieval difficulties due to infrequent use of certain lexical items or partial acquisition. In Yağmur’s (1997:60) study of Turkish immigrants using the Controlled Lexical Naming task, informants had difficulty finding and producing the word for the object or animal in focus. Similarly, this spoken data shows that, due to infrequent use, partial acquisition, or lack of acquisition across the age groups, the lexical items most susceptible to becoming irretrievable or inaccessible are infrequent and specific nouns, such as the Truku words for *jar*, *beehive*, *gopher*, *tree hollow*, *owl*, *deer*, *cliff*, *pond*, and *log*.

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44 Sharwood Smith (cited in Olshtain and Barzilay 1991:40) claims that even the speakers of a language who use their L1 dominantly in an L2 environment suffer lexical loss because of the reduction in accessibility due to infrequent use of certain lexical items.
All the lexical items that the same 20 participants named in response to the objects in Pictures # 1 (for jar), #9 (for beehive), #11 (for tree hollow), #13 (for owl), #15 (for cliff), and #16 (for deer) (see Appendix B5) were recorded and calculated. Each item was compared with that of the LCI. I coded a lexical item as “accurate” if the participants pronounced and produced the word for the specific object clearly and accurately when they saw the specific picture in this story. Items are considered inaccurate in the cases of: (i) wrong response, (ii) no response, (iii) response in Mandarin, and (iii) a general or broad term. For instance, it was coded as inaccurate if the participant produced a broader term for yugow ‘jar’, such as rungaw ‘glass’ or tutu ‘bottle’.

Table 4-12 shows the counts of the participants in each group who used the accurate term for the objects. As predicted, while the LCI accurately produced all the six items, all PTUs showed an overall low accuracy. Specifically, the younger groups (YA and YO) were not able to produce any of the infrequent and specific nouns, suggesting that PTUs suffer lexical loss possibly because of the reduction in accessibility due to infrequent use or partial acquisition for the infrequent nouns.

<table>
<thead>
<tr>
<th>Item</th>
<th>OA</th>
<th></th>
<th>AD</th>
<th></th>
<th>YA</th>
<th></th>
<th>YO</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>AR</td>
<td>IR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yugow 'jar'</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>5</td>
</tr>
<tr>
<td>walu 'beehive'</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>5</td>
</tr>
<tr>
<td>langax 'tree hallow'</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>5</td>
</tr>
<tr>
<td>purung 'owl'</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>5</td>
</tr>
<tr>
<td>dowras 'cliff'</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>5</td>
</tr>
<tr>
<td>regenx 'deer'</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>–</td>
<td>5</td>
<td>–</td>
<td>5</td>
</tr>
</tbody>
</table>

AR refers to accurate response; IR, inaccurate response.
The dash “–” refers to zero.

However, the LCI did not use the specific terms for gopher, pond, and log in Truku. He used qurit ‘mouse’ for gopher, yayung ‘river’ for pond, and gehuni ‘tree’ for log. Therefore, these three items are excluded in Table 4-9.
On the other hand, the items that the younger participants usually retain in their narration data are those high-frequency words that they commonly use or are exposed to in their daily lives. For example, Truku items or phrases that appear in their free spoken data are *huling* ‘dog’, *qepatur* ‘frog’, and *laqi* ‘child’. Two participants produced their entire narratives in Mandarin, but all other participants (8 out of 10) from the younger groups (YA and YO) used these three frequent nouns in their narratives.

With regard to syntactic proficiency, Anderson (1982:96–97) points out that when languages come in contact, there are losses in grammatical distinctions that are not shared by both languages. Truku is an agglutinating language and the word order is VOS, whereas Mandarin is an analytical language in which words are composed of a single morpheme and the word order is SVO. Hence, among younger participants, who have substantial use of Mandarin, a possible scenario for Truku proficiency in interaction with L2 Mandarin might include a preference for SVO word order, a smaller number of syntactic devices, or paraphrasing.

The narrative data of this picture story produced by the PTUs were subjected to further linguistic analyses and compared to the spoken data produced by the LCI in order to assess the speakers’ syntactic proficiency. Based on Anderson’s hypothesis on syntactic attrition, the following subsections present the PTUs’ current repertoire or characteristics of use of syntactic structures including syntactic reduction, preference for analytic syntax, morphosyntactic transfer, circumlocution/rephrasing, abandonment, and nonlinguistic consequences of linguistic erosion.

(i) **Syntactic reduction**

Anderson (1982:99) claims that the number and variety of syntactic operations declines with attrition. In a similar fashion, being restricted in exposure or use of Truku, a PTU tends to use a smaller number of syntactic constructions. For instance, while the LCI is competent in using the
prefix *sepe-* ‘to do something for somebody with concern and compassion’ with the combination of *na* ‘3S.GEN’ to express the phrase ‘his calling for’ before the *ka-NP* as in (35 LCI), a PTU uses a simple coordination structure (*qiita* ‘see’ and *lawa* ‘call’) as in (35 OA 017) to compensate for an inability to access this morphosyntactic device:

(35) LCI: wada su inu da qepatur, sepe-lawa na ka qepatur.
   PST 2S where already frog sepe-call 3S.GEN NOM frog
   ‘Frog, where were you? He called for the frog (with concern and compassion).’

OA 017: gisu q-em-ita, me-lawa. me-lawa ka huling uri.
   is:coming see-AV AV-call AV-call NOM dog too
   ‘(He) is looking, calling. The dog is calling too’

The PTU’s use of Truku simple coordination here is uncommon and inappropriate. A competent speaker does not combine these two verbs—‘see’ and ‘call’—within a sentence (Pisaw 2011, pers. comm.). It is also inaccurate to have a pause between the two verbs, which suggests that they are separable. Therefore, the best solution here would have been to use the conjunction *ni* ‘and’ to connect the meanings of these two actions.

The sentence that describes Picture #8 of the story, as in (35 LCI) above, was examined in all 20 of the narratives chosen for analysis to measure the PTUs’ use of serial verbs and the ‘prefix-BASE=na’ construction. Three out of five participants from the OA and AD groups used serial verbs in response to Picture #8. The serial verb combinations that the participants used were *musa miying* ‘go look for’, *miying pelawa*, ‘look for call’, *gemita melawa* ‘see call’, *perajing wada miying* ‘start looking for’, and *qetay-i lemelung* ‘see-IMP think’. In addition, unlike the LCI, who was the only one who used the ‘prefix-BASE=na’ construction (i.e., *sepe-lawa=na*) before the *ka-NP*, all PTUs exhibited syntactic reduction. All five participants from the OA group used ‘AV-BASE’ before the *ka-NP* (i.e., *me-lawa*). As for the AD group, three used ‘AV-BASE’

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46 Nine out of ten participants in YA and YO described Picture #8 in Mandarin so their use of the serial verbs in Truku was not observable.
before the *ka-NP* to express ‘to call’ as well, while the remaining two participants used the verb stem ‘to look for’ in Truku. In the younger groups, YA and YO, all ten participants expressed the verb of this sentence in Mandarin. Out of these ten participants, five used the verb ‘to call’ and the other five produced ‘to look for’ in Mandarin to describe the little boy’s action in this specific picture.

(ii) **Preference for analytic syntax**

As noted earlier, an overall reduction in morphological complexity may result in a more analytic language structure. To determine the analytic versus synthetic use of the first language, the agglutinating index (A.I.) suggested by Huls and Van de Mond (1992) is employed to express the density of meaning in the words of a sentence. They calculated the A.I. by dividing the total number of morphemes by the total number of words in a sentence. In their example of a one-word sentence in Turkish, *Seviştirilemediler* ‘they could not be induced to love each other’, there are eight morphemes, so the A.I. is 8, suggesting that the language is highly synthetic:

\[
\text{Agglutinating Index} = \frac{\text{Number of Morphemes (8)}}{\text{Number of Words (1)}}
\]

To find the most similar expressions to compare in the narrative, I chose the utterances produced in response to Picture #24 (the last picture of the story), where a participant was expected to use the noun for ‘good-bye’ and express a happy feeling. One participant from each group except for YO, whose expressions for this picture were all in Mandarin, was chosen and the A.I. for their sentences is shown in (36).

leave-AV-PRF good bye-AV 3PL-OBL
‘(The boy and dog) have left and said good-bye to them.’
A.I. $= 7/3 = 2.3$

OA 002: me-qaras bi s-em-uway ka dehiya uri da.
    AV-happy very good bye-AV NOM 3PL too PTL
     ‘(The boy and dog) happily said good-bye too.’
A.I. $= 9/7 = 1.3$

AD 006: h-em-ici me-swayay kana qepatur.
   leave-AV AV-good bye all frog
   ‘(The boy and dog) left and said good-bye to all the frogs.’
A.I. $= 6/4 = 1.5$

YA 002: swayay ta da.
    good bye 1INCL PTL
    ‘Forever, good-bye.’
A.I. $= 3/3 = 1$

As can be seen in Table 4-13, the A.I. of utterances produced by the LCI is 2.3, suggesting that the language is more synthetic. However, the A.I. of utterances produced by OA is 1.3, AD 006 is 1.5, and by YA 002 is 1, indicating their preference for analytic syntax.48

Table 4-13. Agglutinating index of LCI and the three cohorts for Picture #24

<table>
<thead>
<tr>
<th>Cohorts</th>
<th>LCI</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agglutinating Index</td>
<td>2.3</td>
<td>1.3</td>
<td>1.5</td>
<td>1</td>
</tr>
</tbody>
</table>

47 There are two different ways to say good-bye in Truku. First, if the final particle is da in the phrase swayay ta da, it means ‘good-bye forever; I won’t see you again’. However, if han is used in the phrase swayay ta han, it implies ‘good-bye and I will see you again’.

48 Moreover, compared to the LCI, the subject OA002 is unable to produce the oblique form, dehya-an ‘3PL-OBL’. In addition, AD 006 shows two differences in morphological use. First, the infix -en- ‘PRF’ is eliminated. Second, s/he misplaces the AV marker -em-; this marker needs to be inserted after the first consonant of the stem swayay ‘good bye’ instead of preceding it.
Nevertheless, Yağmur (1997:74) points out that A.I. cannot be employed in tracing syntactic language attrition because it does not yet provide any reliable analyses with respect to analytic versus synthetic structures, as in the data shown here. (37) below helps show the contrast between analytic versus synthetic structures. To express the past event, the LCI successfully used three verbs with complex affixes: (i) r-em-en-edu ‘stop-AV-PRF’, (ii) p-en-pa-an=na ‘ride-PRF-GV₂=3SG.GEN’, and (iii) m-en-tucing ‘AV-PRF-fall’, suggesting his sentence structure is highly synthetic. In contrast to the LCI, AD 012 exhibited a reduction in morphological complexity resulting in a more analytical language structure: s/he simply uses wada ‘PST’ to express the past event.

(37) LCI: asi do r-em-en-edu siyaw doras hiya ka reqenux do, wada serahuq just PAUS stop-AV-PRF side cliff there NOM deer PAUS PST slide
paah tunux p-en-pa-an=na hiyi=na ka Lowking nii da ga, from head ride-PRF-GV₂=3SG.GEN body=3SG.GEN NOM Lowking this PTL ga
bowsh, m-en-tucing yayung.
EXCLA AV-PRF-fall river
‘The deer suddenly stopped by the cliff; then Lowking was sliding off the head of the deer that he was riding on, splash, (he) fell into the river.’

AD 012: seterung samat ni...wada em-periyax qesiya ka laqi do meet meat and PST AV-tumble water NOM child PAUS
ida ini 放棄,
still NEG give up
‘The child met the deer/meat, tumbled down to the river/water, and did not give up.’

(iii) Morphosyntactic transfer

Another evident syntactic difference between the PTUs and the LCI is the preference of PTUs to employ SV order due to the frequent contact with and use of Mandarin.⁴⁹ While the LCI

⁴⁹ As was noted earlier, “subject” and “object” are controversial notions in the discussion of Philippine-type languages including Truku Seediq. S is used here to refer to what Liao (2004:9) calls A (the more active core
consistently uses VS word order throughout his utterances, as in (38 LCI), the PTUs often show a preference for a SV word order as in (38 YA 007) and (38 YO 014).

(38) LCI: nii hini ka Lowking.
PROX.exist here NOM Lowking
‘Lowking (the child’s name) is here.’

YA 007: laqi takur.
child fall
‘The child fall(s).’

YO 014: kingal laqi niqan qepatur.
one child have frog
‘One child has a frog.’

The transcribed narratives from the same 20 participants were examined. To determine the groups’ inclination for using SV versus VS order, the percentages were calculated for each cohort by dividing the total number of SV order sentences in Truku by the total number of Truku sentences including both SV and VS order. As can be seen in Table 4-14, while SV order is not found in either the LCI’s or the OA group’s spoken data, it appears in 19% of AD’s data, 75% of YA’s data, and 75% of YO’s data, suggesting that the younger cohorts have a preference for employing SV order in their Truku utterances.

<table>
<thead>
<tr>
<th></th>
<th>LCI</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV word order</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>VS word order</td>
<td>40</td>
<td>23</td>
<td>21</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Percentage of SV word order</td>
<td>0%</td>
<td>0%</td>
<td>19%</td>
<td>75%</td>
<td>75%</td>
</tr>
</tbody>
</table>

Furthermore, PTUs tend to shy away from more elaborate syntactic constructions; they use less complex, although often grammatical, structures as a strategy to convey their meaning. For argument of a canonical transitive verb) in the canonical transitive structure. O refers to the less active core argument of a canonical transitive verb.
instance, whereas the LCI uses the relative clause and the passive construction in *qepatur te-en-beg-an na* ‘frog that has been raised by him’ in (39 LCI), the participant expresses this notion by using topicalization and constituent order that is prominent-NP-initial and predicate-final as in (39 OA 019).

(39) LCI: q-em-ita qepatur t-en-beg-an=na.

\[\text{look-AV frog raise-PRF-OBL=3S.GEN}\]

‘(The child) looks at the frog that has been raised by him.’

OA 019: laqi nii o t-em-abug qepatur.

\[\text{child this TOP raise-AV frog}\]

‘As for this child, he raises the frog.’

This observation suggests two possible, overlapping explanations. On the one hand, PTUs, especially younger generations, are much exposed to the use of Mandarin; therefore, they tend to overuse such structures that are more transparent or available (i.e., SVO word order in Mandarin) to express underlying meaning and relations. This possibility is in line with Anderson’s prediction that a language attriter who has contact with another language will produce in his weaker language morphological and syntactic constructions based on his stronger language (1982:109). On the other hand, these speakers have much less input and have limited access to full use of Truku by competent speakers. Hence, they will have much smaller repertoires of syntactic devices or structures to draw upon, due to their imperfect acquisition.

(iv) Circumlocution/rephrasing

To patch up their deficient linguistic repertoire, PTUs attempt to use several compensatory strategies. Galván and Campbell (1979:145) note that “the strategy of circumlocution appears to be used principally to avoid a word or structure.” They note that circumlocution is a type of paraphrasing. When a speaker or user tries to avoid a word s/he does not know (circumlocution)

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50 Compensatory strategies are ways for a speaker to cope with linguistic reduction and gaps—in other words, they answer the question “What do you do when you can’t do what you should do—linguistically?” (Anderson 1982:100).
or tries to express a certain notion by using alternate means (paraphrasing), s/he attempts to communicate a necessary meaning to an interlocutor using the means available.

In terms of circumlocution, when compared to the LCI in (40) below, it is clear that the subject (40 AD 012) avoids words s/he does not know and attempts to convey necessary meanings in other ways. First, s/he uses word items that are more frequent and relevant to daily life: *samat* ‘meat from hunting’ instead of *reqenux* ‘deer’ and *gesiya* ‘water’ rather than *yayung* ‘river’. Second, s/he uses the phrase 放棄 ‘give up’ in Mandarin when trying to convey *laxi* ‘give up’ in Truku.

(40) LCI: asi do r-em-en-edu siyaw doras hiya ka reqenux do…Lowking da ga, just PAUS STOP-AV-PRF side cliff there NOM deer PAUS Lowking PTL ga

m-en-tucing yayung …kiya ka kiya ni…
AV-PRF-fall river so NOM so and
‘The deer suddenly stopped by the cliff; then Lowking fell into the river, even so…’

AD 012: seterung samat ni…wada em-periyax gesiya ka laqi do meet meat and PST AV-tumble water NOM child PAUS

ida ini 放棄.
still NEG give up
‘The child met the deer/meat, tumbled down to the river/water, and did not give up.’

To measure the use of circumlocutions, the same 20 responses to Picture #1 (Appendix B5), *yuqow* ‘jar’ were examined. It is considered a circumlocution if a participant (i) did not respond to the picture of the jar, (ii) used another, generic term such as *rungaw* ‘glass’ or *tutu* ‘bottle’, or (iii) produced any name for the object in Mandarin. Table 4-15 shows the counts of participants who used a circumlocution rather than the infrequent lexical item *yuqow* ‘jar’ in response to Picture #1. The responses indicate that the younger groups show an inclination for circumlocution.
Table 4-15. Number of participants who exhibited a circumlocution for *yuqow* ‘jar’

<table>
<thead>
<tr>
<th></th>
<th>LCI</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>yuqow</em> ‘jar’</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>rungaw ‘glass’</td>
<td>–</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td><em>tutu</em> ‘bottle’</td>
<td>–</td>
<td>–</td>
<td>2</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>瓶子* bottle’</td>
<td>–</td>
<td>–</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>No response</td>
<td>–</td>
<td>–</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

*Mandarin
The dash “--” refers to zero.

Rephrasing is another strategy that PTUs use to compensate for their syntactic deficiency; they use alternate means to express a certain notion. As can be seen in (41), while the LCI successfully uses both subordinate and relative clauses to express the frog’s location and status in one sentence, the subject AD 019 uses two prepositional phrases *paah kingan lungaw* ‘from one glass’ and *ruwan kingan lungaw ni* ‘in this glass’ to describe the frog’s previous status and current action. Moreover, he mistakenly uses the tense marker *ga* ‘PROG’ in the verb phrase *ga qeduriq da* ‘escaped’ because its implication is contradictory to that of the particle *da*, which connotes ‘already’; compare this to the production of the LCI, who correctly uses *wada* ‘PST’ in the phrase *wada qeduriq da* here.

(41) LCI: telung me-taqi sida o, qepatur ga t-en-beg-an hiya ka nii meniq just AV-sleep then TOP frog that raise-PRF-OBL there NOM PROG be

yuqow nii o, wada qeduriq da.
jar this TOP PST escape PTL
‘As (he) sleeps, the frog he was raised and that is supposed to be in the jar, escaped.’

AD 019: me-taqi ka laqi ni da ni, qepatur ni da o, paah kingan AV-sleep NOM child this PTL and frog this PTL TOP from one

lungaw, ruwan kingan lungaw ni, ga qeduriq da.
glass in one glass this PROG escape PTL
‘Then the child sleeps. As for this frog, in the glass, (it) escapes from the glass.’
To assess their use of rephrasing, the same 20 participants’ responses to Picture #2 of the story were examined. I considered it as a rephrasing if a participant was not able to produce a relative clause as in (41 LCI) above but used (i) topicalization, e.g., “As for the frog, (it) escaped (from the glass),” (ii) simplification, e.g., “Frog escaped from the glass,” (iii) a static sentence, e.g., “The frog was gone,” or (iv) a sentence in Mandarin. Table 4-16 shows the counts of participants who exhibited a rephrasing in describing the status and action for Picture #2, suggesting that the PTUs overall have a tendency to use alternate means to express a certain notion to compensate for their syntactic deficiency.

Table 4-16. Counts of participants who exhibited a rephrasing in responding to Picture #2

<table>
<thead>
<tr>
<th></th>
<th>LCI</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative clauses</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Topicalization</td>
<td>–</td>
<td>4</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Simplification</td>
<td>–</td>
<td>1</td>
<td>4</td>
<td>–</td>
</tr>
<tr>
<td>Static sentence</td>
<td>–</td>
<td>–</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Response in Mandarin</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>4</td>
</tr>
</tbody>
</table>

The marker “–” refers to zero.

(v) Abandonment

The previous discussion dealt with participants’ attempts to complete their narratives of the Frog story. However, speakers may choose to abandon or give up their attempt to communicate when they find the demands on their resources too great (Anderson 1982:110). It may be for this reason that, in this set of spoken data, some younger participants simply abandon their narration in the middle of their picture storytelling. Furthermore, compared to the LCI (42) below and older groups’ data (OA and AD) seen in Appendix B5b to B5c, the younger ones (YA and YO) seen in Appendix B5d to B5e produce much shorter narrations for the entire story. For example, after producing eight complete sentences, the subject YA 007 says he is unable to

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51 The LCI (42) can also be found in the Appendix B5a (30) line 3–4.
continue and attempts to stop narrating the story by producing 不會 ‘be unable to’ and 真的不會 ‘really unable to’ at the end of his utterance in (42). Moreover, there is one long pause before 不會 ‘unable’ and three short phrases that are italicized and indicated by the topic marker o toward the end of this sentence showing his or her hesitation or linguistic insufficiency.

(42) LCI: wada serahuq paah tunux p-en-pa-an=na hiyi=na ka PST slide from head ride-{PRF-GV}2=3S.GEN body=3S.GEN NOM

Lowking nii da ga, bowsh, m-en-tucing yayung.
Lowking this PTL ga EXCLA AV-{PRF-fall} river
‘While Lowking was sliding off the head of the deer that he was riding on, Splash, (he) fell onto the river.’

YA 007: wada karaw qehuni baraw…不會! tucing ayu ka raqi nii o,
PST climb tree up unable fall stream NOM child this TOP
tutuy o, kiya do o, 真的 不會.
rise TOP so PAUS TOP really unable
‘Climbed up the tree…(I am) unable! The child falls into the stream; then rises up…so, I am really unable.’

To assess the amount of participants’ choice to avoid using Truku and their ability to express themselves in Truku for the picture storytelling, the Truku words produced by the same 20 participants were quantified. A word is coded as Truku if a participant produced (i) a word stem; (ii) a word stem with a prefix, suffix, or circumfix; and (iii) a case marker such as ka ‘NOM’, o ‘topic marker’, or hug ‘question marker’. Borrowed words from Japanese like abunay ‘dangerous’ and words in Mandarin were excluded.

The mean number of Truku words produced by each group in its narratives is calculated by dividing the total number of Truku words used in the whole group’s spoken data by the total number of participants (i.e., five for each group, except for the LCI). The percentage is calculated by dividing the mean number of Truku words from each group by the mean number from all four groups together. As shown in Table 4-17, the ability to produce words in Truku is
weaker as the cohort becomes younger: those in the younger groups more often attempt to abandon their narration and seem incapable of continuing the narrative in Truku.

Table 4-17. Mean number and percentages of Truku words produced by each group in the narratives

<table>
<thead>
<tr>
<th></th>
<th>LCI</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
<th>YO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean number of Truku words</td>
<td>1015</td>
<td>473</td>
<td>319</td>
<td>242</td>
<td>24</td>
</tr>
<tr>
<td>Percentages of produced Truku words</td>
<td>95%</td>
<td>44%</td>
<td>30%</td>
<td>22%</td>
<td>0.02%</td>
</tr>
</tbody>
</table>

(vi) Nonstructural consequences of linguistic erosion

Along with the inadequacy of expressive ability indicated by their use of the linguistic features described above, the younger generations are usually not quick and expressive in their overall narrations. This is evident in their frequent pauses, hesitation, insecure expressions, and the shorter length of their spoken narratives. This observation corroborates Anderson’s prediction that a person who is incompetent in a language may speak at a slower rate, with more frequent hesitation, pauses, repairs, false starts, etc. than a linguistically competent speaker of the same language (1982:112).

To assess the use of hesitations in order to consider the nonstructural consequences of linguistic erosion, I chose to observe how frequently a participant used hesitation. All spoken data from the same 20 participants were examined. The percentage of hesitations expressed by the sound of filler syllables or hesitation sounds such as “um,” “ey,” “er,” or “ano,” as in (43), is calculated by dividing the total number of hesitations by the mean of Truku sentences for each cohort. It is considered a hesitation if a participant uses any of the filler syllables (i.e. “eh” in (43LCI) and “ey” in (OA 008)) described above with a pause (indicated as “…”) either within a sentence or between two Truku sentences.
as such eh...ano know=2S as NOM eh river BIG NOM under this
‘as such, eh (pause), it turned out to a big river under this.’

OA 008: qepatur nii o nii na pesa-un kingal lungaw, ey... rowan lungaw hini frog this TOP this=3S.GEN put-GV2 one glass ey (pause) glass here
‘As for this frog, (it) was put in a glass, ey (pause), in the glass here.’

Table 4-18 shows the counts and percentages of participants who exhibited a hesitation during their narratives, suggesting that the younger groups have a reduced ability to speak easily and to be expressive.

Table 4-18. Number and percentages of participants who exhibited a hesitation across four cohorts

<table>
<thead>
<tr>
<th></th>
<th>LCI</th>
<th>OA</th>
<th>AD</th>
<th>YA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonstructural erosions/ hesitation</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Mean Truku sentences</td>
<td>40</td>
<td>23</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td>Percentages of nonstructural erosions/hesitation</td>
<td>0.03%</td>
<td>10%</td>
<td>14%</td>
<td>70%</td>
</tr>
</tbody>
</table>

4.4 DISCUSSION

The results from the four proficiency tasks described in this chapter support three findings.

First, compared to the LCI, all four groups, OA, AD, YA, and YO, exhibit a linguistically reduced variety of Truku on three linguistic levels; they are in a cline of decreasing phonological, morphological, and syntactic proficiency. Table 4-19 summarizes the accuracy of all participants in responding to the repetition test and picture naming tasks as well as the percentage of code choice from Truku to Mandarin.
Table 4-19. Mean accuracy/percentage on the proficiency tasks across four age groups

<table>
<thead>
<tr>
<th>Linguistic level</th>
<th>Task</th>
<th>OA (%)</th>
<th>AD (%)</th>
<th>YA (%)</th>
<th>YO (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonological</td>
<td>Repetition test</td>
<td>82</td>
<td>64</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Morphological</td>
<td>Picture naming:</td>
<td>45</td>
<td>40</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Plural marker</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oblique marker</td>
<td>48</td>
<td>30</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>Syntactic</td>
<td>Non-Truku code choice</td>
<td>0*</td>
<td>0.22*</td>
<td>2.52*</td>
<td>4.52*</td>
</tr>
</tbody>
</table>

* Proportion

The results from these proficiency tests correlate between the age groups; the older participants (i.e., OA and AD) perform better on linguistic measures of proficiency than younger generations (i.e., YA and YO). In other words, the results of these tasks show a generational decline; as the cohort becomes younger, Truku accuracy becomes lower for the phonological and morphological tests. Similarly, the tendency of Mandarin use/shift in the syntactic task grows stronger as the age group becomes younger. Nevertheless, in line with the findings from the body-part and nature-image naming tasks discussed in Chapter 3, young adults and youth equally manifest a comparable level of accuracy on the phonological level. This, again, may be related to the additional vocabulary instruction that the younger Truku receive in the after-school and summer programs.

Moreover, from a Truku language perspective, all the data from these groups show more grammatically reduced or deviant structures than the control group/LCI data. First, on the phonological level, the four groups manifest a smaller number of phonological distinctions, a tendency toward optimal syllabification, and a lack of dorsal harmony. Second, the morphological decline can be shown by the lack of control over the oblique noun, absence of the agent voice, misuse of tense or aspect markers, and the use of paraphrasing. Third, they show a narrower repertoire of knowledge than the LCI by producing a larger proportion of code-
switching, syntactic reduction, preference for analytic syntax, morphosyntactic transfer, circumlocution/rephrasing, abandonment, and nonlinguistic consequences of linguistic erosion.

The second finding from these results is related to the correlation between the proficiency levels and language use. These sets of data show that the less Truku is used, the less accurate participants are, consistent with the finding in the HALA tests. As noted earlier, the intergenerational decline shows on all linguistic levels, which correlates with participants’ reported Truku daily use (74% in OA, 45% in AD, 20% in YA, and 17% in YO). However, YA and YO show a comparable level in accuracy and reported use. Restricted use arises in two different situations: a break in linguistic tradition and restriction in Truku use. First, the participants in the OA group were forbidden to speak Truku in schools during 1945–1987. Moreover, their linguistic input and interaction became inadequate due to their decreasing participation in traditional domains of use (see Chapter 5). Second, the remaining three groups (AD, YA, and YO) are significantly restricted in Truku use because they are acquiring the more prestigious language, Mandarin, for political, socio-economic, and/or individual reasons. As the natural cycle suggests, the infrequent use causes the PTUs to have relatively slower access in Truku, and they therefore become more reluctant to use it, which decreases its accessibility even more, creating the cycle that leads to partial acquisition, attrition, and ultimately loss.

Finally, the spoken data from the Frog story suggest that the most difficult lexical items to access or produce are infrequent and specific nouns such as specific animal terms. To compensate for the difficulty in producing these terms, speakers employ different strategies such as paraphrasing, using a word similar in meaning, switching to Mandarin, or simply not responding for the specific objects. The assumption is that they have not acquired or learned those Truku terms in their Mandarin-dominant environment, do not frequently use those words,
or are not substantially exposed to competent speakers who are able to use these terms in their daily lives. In other words, what lexicon they have retained, and that shows up in their narrations, is made up of common or highly-frequent items that they use in everyday life. This finding is also in line with the underlying logic of the HALA tests; that is, frequency of use is the factor that contributes most directly to the maintenance of a linguistic system.

4.5 CONCLUDING REMARKS

The HALA tests described in the previous chapter help diagnose the intergenerational shift from Truku to Mandarin in the current speech community. As this language shift continues, the lack of opportunity to use the language almost certainly will cause further erosion of speakers’ language proficiency. In this sense, loss of proficiency can also be studied as an indicator of language shift. To assess loss of proficiency, this chapter has attempted to (i) explore the correlation between the HALA age groups with supported measures of general proficiency, and (ii) answer the specific question “What is participants’ knowledge of the use of phonological and morphosyntactic properties compared with the linguistically-competent individual (LCI)’s knowledge of these properties?”

The four proficiency tasks—repetition, picture naming, act-out, and picture-based storytelling—are employed to measure the collective notion of participants’ proficiency. Specifically, the repetition test is used to assess their phonetic variances; picture naming is a production task to measure their use of plural and oblique markers; the act-out task is a comprehension task to probe their knowledge of a variety of affixes; and picture-based storytelling is used to elicit their free spoken data.

Together with the findings from the HALA tests presented in Chapter 3, the results from these tasks support four main conclusions. First, the four cohorts, OA, AD, YA, and YO, all
exhibit a linguistically reduced variety of Truku on three linguistic levels compared to the LCI; they are on a cline of decreasing phonological, morphological, and syntactic proficiency. Second, older participants (i.e., OA and AD) perform better on linguistic measures of proficiency than younger generations (i.e., YA and YO). Third, these sets of data show that the older adults can be categorized as competent bilinguals. Recognizing this bilingual status is significant because this helps determine if Truku is in the stage of emergent bilingualism (see Chapter 5). Fourth, lexical accuracy from all tasks correlates with self reports on language use: the less Truku is used, the less accurate the participants are.

Based on the findings reported in this and the previous chapters, we can see that Truku is undergoing the natural cycle previously discussed. First, it has clearly been experiencing an overt change from the use of non-dominant Truku to the use of dominant Mandarin across age groups. Then, the limited use of Truku causes erosion of language proficiency for the community as a whole. Finally, as Truku is less accessible through infrequent use, its speakers or learners become more reluctant to use it, which decreases its accessibility and creates the cycle that leads to partial acquisition, attrition, and ultimately loss.

Even though we have no control over this ongoing linguistic erosion across all age groups, many scholars agree that frequency of use can help to maintain the accessibility of a language. As O’Grady (2011:6) points out, “There is nothing we can do to change children’s linguistic abilities, but we can perhaps change the conditions under which they are exposed to language.” Nevertheless, increasing or creating the domains of use under which children can receive substantial amounts of input involves factors beyond the purely linguistic. It is widely acknowledged that attitude, prestige, and other socioethnic factors very much influence the chances that a minority or indigenous language has to survive (e.g., Dorian 1982; Leets and Giles
1995; among others). This is convincing, because it is easy to conceive that a language will have a higher chance of being transmitted to the younger generation if the present generation thinks that it will be useful. Chapter 5 proposes a micro-level language planning project designed to stem further Truku erosion and to attempt reversal of the current critical shift toward Mandarin.
CHAPTER 5
TRUKU LANGUAGE POLICY AND PLANNING

5.1 INTRODUCTION

The results from the HALA experiments and proficiency tasks described in the preceding chapters help determine that Truku is in the stage of emergent bilingualism, meaning people become increasingly efficient in their new language while still retaining competence in their old. This is the stage where there is a real chance to slow down the process of decline and to attempt reversal of a critical shift toward the dominant language (Crystal 2000:79). Specifically, the tests suggest that people between 41 and 65 are becoming increasingly efficient in their new language (Mandarin) while still retaining competence in their old (Truku). However, contact-induced use of Chinese has accelerated since the 1960s, and urgent remedial action needs to be taken if Truku is to survive for another generation. Otherwise, by the third stage—where monolingualism in Mandarin occurs in the Truku speech community—it will be too late.

Language policy and planning (LPP) is interested in addressing the social problems that often involve language, and in proposing realistic remedies (Ricento 2006a:11). Some notions that are crucial to the discussion of Truku LPP are discussed in this chapter. I begin with an introduction to the history of Taiwan’s languages, attempts to revitalize indigenous languages, and Truku language use in multicultural contexts in Section 5.2. In Section 5.3, factors affecting Truku language shift and language attrition are discussed. Section 5.4 discusses micro-level Truku LPP. Finally, the concluding remarks of this chapter are provided in Section 5.5.

52 Crystal states that the stages of cultural assimilation to another language are (i) immense pressure on the people to speak the dominant language, (ii) emergent bilingualism, and (iii) monolingualism in the dominant language.
5.2 LINGUISTIC HISTORY AND CURRENT TRENDS

The languages currently used in multicultural Taiwan are (i) Mandarin, the official language of China; (ii) two Chinese “dialects”—Southern Min and Hakka; and (iii) the indigenous languages that belong to the Austronesian family.\(^{53}\) I follow Mo (2000:4) who categorized aboriginal languages, Hakka, and Southern Min together as the *Taiwanese languages* (TLs), as opposed to the dominant language, Mandarin, because this division shows the languages’ sociopolitical status. The population of 23 million is composed of the indigenous people (1.7%); Hakka (12%); mainlanders who speak Mandarin Chinese (13%), and Southern Min speakers (73.3%).\(^{54}\) Section 5.2.1 introduces the history of Taiwan’s languages in this multicultural context. Section 5.2.2 discusses the attempts to revitalize indigenous languages and culture. Section 5.2.3 describes the current preference for Mandarin use.

5.2.1 History of Taiwan’s languages

In the past century, TLs have been in a subordinate position whereas Mandarin has had privileged status; TLs have been mainly suppressed by the Japanese and the Kuomingtong (KMT, or the Nationalist Party) governments. After the Austronesian speakers arrived in Taiwan around 3,500 B.C. (Blust 1996:31), the process of the TLs struggle in Taiwan can be divided into four different stages as shown in Figure 5-1.

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\(^{53}\) Southern Min, Hakka, and Mandarin share the same writing system but there is no mutual intelligibility among them.

\(^{54}\) “Mainlanders” refers to those who fled from mainland China to Taiwan during 1949–1951.
First, during the period when the Dutch had a trading colony (1624–1661), their interaction with the local population was limited to trade, agriculture, and efforts to evangelize people. Second, during the years 1661–1895, the dramatic increase in the number of settlers from China brought forth integration between Taiwan and China. The majority of the settlers were either from Fujian province, and are the ancestors of Southern Min speakers, or from Guangdong province, and are the ancestors of Hakka speakers. These settlers displaced the indigenous people who lived on the western coastal plain. Next, during the period from 1895 to 1945, the Japanese colonized Taiwan and sought to assimilate TL speakers by implementing obligatory Japanese education. Consequently, 51% of the population could understand Japanese by the year 1940, and the amount rose to 71% by 1944 (Huang 1995:96).

Fourth, the KMT government replaced the Japanese regime in 1945, and Mandarin has since been greatly promoted to “create a sense of nationhood and legitimize the KMT’s hegemony” (Mo 2000:2). Over 94% of the population can use Mandarin to communicate.

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55 This figure is adapted from Sandel (2003:527).
whereas the TLs have receded, with the indigenous languages struggling the most—at a loss of 15.8% in two generations and 31% across three generations (Huang 1995:227). This situation results from the government’s adoption of policies aiming at the sinification of the indigenous population in the 1950s (Friedman 2005:192). The “Mountain Reserve Policy” for sinification included two aspects relevant to language: (i) Political Education was designed to wipe clean Japanese thinking, forbidding the use of Japanese language, correcting wrong ideas about freedom, and teaching the concept of rule by law; and (ii) Mandarin Language Education, which was part of a larger campaign to teach Mandarin to all people living in Taiwan, means that all students are obliged to pass a Mandarin proficiency examination in order to graduate. In addition, the Ministry of Education officially proclaimed linguistic unity as a national policy on March 24, 1973 (Chen 2010:86).

5.2.2 Attempts to revitalize the indigenous culture and languages

Since the mid 1980s, TLs have been reintroduced to formal education, and their domains of use have been expanded among the public. Mo (2000:91) explains that the language policy in Taiwan has dramatically changed for four political and social reasons. First, a newly formed opposition party, the Democratic Progressive Party, emphasized greater Taiwanese ethnicity by promoting the revitalization of TLs because they are a potent symbol of a distinct Taiwanese identity. Second, the termination of martial law ended military intervention in civilian affairs. Third, to strengthen the islanders’ Taiwanese identity, traveling to Mainland China was banned. Fourth, the easing of restrictions on the media became a powerful way to revitalize the TLs and local traditions.
Some efforts at revitalizing indigenous languages and culture in this multicultural context have been made since 1988:\(^{56}\)

1988 Indigenous people protested against the government’s depriving them of their ownership of their lands.\(^{57}\)

1990 The first indigenous language textbooks were published.

1993 Indigenous people were allowed to use Chinese characters to spell their indigenous names by the Ministry of Interior.

1994 The term *yuanzumin* ‘indigenous people’ was adopted by the National Assembly as an additional Article of the Republic of China Constitution.

1996 The Council of Indigenous Peoples (CIP) was established at a ministry level under the Executive Yuan in Taiwan.

1998 The CIP entrusted 12 radio stations with some form of indigenous programs.

1999 Native language education became a part of the national curriculum with the announcement of the nine-year curriculum (Friedman 2005:47).

2001 Mother Tongue Language Policy: Ministry of Education implemented a policy that TLs, including indigenous languages, were offered for one class period per week in elementary schools, beginning with the first grade in 2001, expanding to second and third grade in 2002, and to all of middle school the following year (Sandel 2003:530).

2007 The CIP organizes indigenous language comprehension tests and study programs for qualified indigenous people, to raise their language ability.\(^{58}\)


\(^{57}\) Over 87% of the land is state-owned forest and the indigenous people have only 12.2% of the reserved area to cultivate. Though they can cultivate in the reserved area, they do not own the land (Liang 1994:87).
5.2.3 Preference for Mandarin use in the current Truku community

As can be seen from the chronology above, efforts have been made to stem further erosion of TLs and to attempt reversal of a critical shift toward Mandarin since the language policy was liberalized and martial law was lifted in 1987. Nevertheless, use of Mandarin has continued to increase while the use of TLs has greatly decreased due to the harsh enforcement of the Mandarin-only policy for 40 years (Young 1989). In other words, Mandarin has still enjoyed the higher rate in intergenerational transmission and continues to invade the domains that previously had been reserved for the TLs (Mo 2000:133). Similarly, the results of a study by Huang in 1995 show that Mandarin is currently spoken by 94% of the contemporary Taiwanese population and dominates in all domains of use. In contrast, indigenous languages, including Truku Seediq, have been undergoing intergenerational shift and intragenerational attrition, as shown by the HALA and proficiency tests described in preceding chapters.

On the one hand, two observations from the LEAP-Q show that the preference for Mandarin use becomes stronger as the cohort becomes younger in the current Truku speech communities. First, young Truku report zero dominance in Truku, while AD and OA report 31% and 71% Truku dominance, respectively. Second, as the cohort becomes younger, the percentage of reported language use reflects the gradual increase of Mandarin preference (26% > 55% > 79% > 82%) and disadvantage in Truku use (75% > 45% > 20% > 17%) as shown in table 5-1 and figure 5-2.

58 A description of this vision can be found in the Policy Implementation of CIP 5 (5) at http://www.apc.gov.tw/portal/docDetail.html?CID=DDF410A86746AEB7&DID=3E651750B400646700818BC81378EE9E
Table 5-1. Percentage of reported language use.

<table>
<thead>
<tr>
<th>Cohort</th>
<th>OA (Older Adults)</th>
<th>AD (Adults)</th>
<th>YA (Young Adults)</th>
<th>YO (Youth)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truku</td>
<td>73.5%</td>
<td>45%</td>
<td>19.7%</td>
<td>16.8%</td>
</tr>
<tr>
<td>Mandarin</td>
<td>25.9%</td>
<td>54.5%</td>
<td>79%</td>
<td>81.5%</td>
</tr>
<tr>
<td>Japanese</td>
<td>0.6%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>English</td>
<td>0%</td>
<td>0.3%</td>
<td>1.3%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Southern Min</td>
<td>0%</td>
<td>0.2%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Figure 5-2 Reported % of Mandarin and Truku use

On the other hand, Mandarin has encroached into many domains that were formerly reserved for Truku such as at home, church, and work, and in public places.\(^{59}\) Truku is restricted to the family domain or among seniors who are still competent in Truku use. However, the subjects below age 25 do not speak Truku in any domain; they report zero Truku dominance in their daily life. This is consistent with Chan’s (1994) study on TLs that analyzes their domains of use. She

\(^{59}\) For instance, from my personal observation I can report that ministers in the Presbyterian churches in Truku villages need to mingle Truku with Mandarin in the hope that the older and younger generations can all understand their sermons. In addition, those in the older generations often try to speak Mandarin with those in the younger generations.
shows that the order of frequency of Mandarin use in terms of interactants follows this order: school associates > strangers > work associates > close friends > family members; however, the order for the TLs’ use was just the reverse (136).

5.3 FACTORS AFFECTING LANGUAGE SHIFT AND ATTRITION

What are the factors that cause the shift of entire communities from Truku to Mandarin, resulting in substantial changes in the linguistic systems and tremendous decrease in use of Truku? Given recent changes in multilingual Taiwan, we may be missing an important point if we limit our discussion of language attrition or loss simply to the linguistic factors. According to Schmid (2002:19), it is widely acknowledged that language attrition is partly determined by intralinguistic factors (see Chapters 3 and 4), but extralinguistic factors also play a role.

Lambert (1989) makes a distinction between linguistic and extralinguistic factors, where the former influences inner language skill attrition and the latter may cover other variables, such as individual characteristics or motivation, learning context, and other sociolinguistic variables. This section focuses on a discussion of the extralinguistic factors that affect Truku language shift and attrition. Section 5.3.1 discusses external factors, and the internal variables are described in Section 5.3.2.

5.3.1 External factors

Davis (1999:69) states that in the overall field of language planning, little attention has been paid to the social, political, cultural, and economic conditions of language use and attitudes. As discussed earlier, Taiwan’s political and socioeconomic structures have undergone dramatic changes that have caused the loss of Truku speakers and domains of use, both of which are
crucial to the survival of a language (Romaine 2007:117). Hence, the political, economic, educational, and social factors are sequentially discussed in the following subsections.

5.3.1.1 Political inequality

Three power relations have led to the current decrease of Truku speakers and domains of use. First, as noted earlier, in 1946 the National Language Policy was developed and Mandarin was successfully imposed as the national and official language at the expense of the development of TLs (Chen 2010:85–86). Second, in view of the need to globalize, the old and new English Language Policies (ELP) have been issued. In the old ELP, the Ministry of Education followed the policy of implementing English as its first target in foreign language education and scheduled English instruction starting in fifth and sixth grades from September 2001 and in third grade from 2005. Furthermore, the focus of instruction was on the development of English reading and writing for the purpose of academic, professional, or technical use only (Tse 1987). In the new ELP, the Central Government allows the students in the third grade and above to receive two 40-minute periods of English weekly. However, English is introduced at even lower grade levels and for more hours by many local governments. Moreover, the existing ELP has been revised in two other dimensions: (i) the use of English as a medium of instruction in part of the curriculum of higher education, i.e., in colleges, and (ii) the promotion of basic English skills for people from all walks of life, i.e., people who come into contact with English-speakers on a regular basis (Chen 2010:90).

Third, a decrease in domains of Truku use has occurred since the indigenous people were forced into losing ownership of their land; occasions such as collective rice cultivation or hunting

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60 Former president Chen Shui-Bian strongly suggested that English should be Taiwan’s second official language in 2002. The ELP implementation is cited from http://www.slideshare.net/aidenyeh/language-policy-in-taiwan.
have diminished or terminated. Chen (2010:95) points out that Mandarin dominates in five major domains in people’s daily lives—school, workplace, religion, friendship, and family—whereas the use of TLs in these five domains is drastically lower than that of Mandarin (see Section 5.3.2.3).

5.3.1.2 Educational disadvantage

Education disadvantage may turn out to be a crucial explanatory factor for language shift and attrition for three reasons. First, compared to Mandarin, current Truku instruction in school is rather limited; the Mother Tongue Language Policy is not effectively implemented. Qualitatively, Chen (2006:327) states that although “native culture instruction activity” takes place in the primary schools weekly, very limited time is devoted to real language teaching. In addition, a lack of well-designed textbooks or appropriate resources hampers the revitalization efforts. Quantitatively, while Truku is taught for one class period (40 minutes) per week, English is taught for at least two class periods and Mandarin is used as the primary medium to instruct TLs (2006:331). Moreover, the teaching of Southern Min dominates the implementation of the Mother Tongue Language Policy in some schools (2006:326). In other schools, TL instruction is incorporated into Mandarin classes. Consequently, the Mother Tongue Language Policy’s attempt to save the TLs turns out to be a new form of oppression that threatens some of the minority languages (Hsiau 1997:313).

Second, because Mandarin is the primary medium of instruction at all levels of schooling, the higher the level of education a Truku pursues, the less Truku proficiency that person tends to have. This educational inequality may facilitate collective language shift to Mandarin, in part perhaps because a higher familiarity with the written code offers more chances for contact.
through reading (Jaspaert and Kroon 1989:92). In addition, young Truku who receive formal education may have a better mastery of Mandarin, making its retention easier. Yeh, Chan, and Cheng (2004:100) confirm that people with higher levels of education speak significantly better Mandarin than those with lower levels of education across all three of the ethnic groupings—Mainlander, Hakka, and indigenous—that they use in their study. Specifically, indigenous people with higher education lose more of their proficiency in their native tongues than those with lower education.

Third, the shortage of trained Truku teachers contributes to the downward cycle: as Truku speakers become less fluent through frequent use of Mandarin, they become incapable of transmitting Truku to following generations, further increasing the rate of shift that ultimately leads to partial acquisition/or language loss. In addition, low pay and little respect, mainly from mainstream teachers, make Truku teachers reluctant to teach in school.61

5.3.1.3 Economic disadvantage

Economic development is a crucial factor in language shift and loss (Davis 1999:82). Attitudes toward Truku living under traditional circumstances undermine indigenous language and culture, and further lead Truku to shift to Mandarin and its culture of power as well. According to Davis (1999:78), these attitudes, as Gegeo and Watson-Gegeo (forthcoming) suggest, are an imposition where Western economic development has served to devalue indigenous language and identity; they suggest that the growing numbers of people in the Solomon islands “emphasize speaking English and Pijin as a sign of salvation and modernization, and they imply that local languages are ‘backward’.”

61 During their separate interviews, Truku two-year instructors Wang and Tien expressed their reluctance to return to teach Truku in school this year (2011 pers. comm.).
In the same vein, the knowledge of both Mandarin and English is required for Truku to gain national and global advantages in three different domains. First, schools often link students’ Mandarin or English proficiency with their prospective economic and social mobility. Next, workplaces require Truku people to speak Mandarin or English to access wider socioeconomic opportunities. Third, due to poverty, family members desire to achieve economic benefits by using Mandarin and English because survival has priority over identity. The situation with Truku affirms May’s (2001) proposal regarding voluntary shift, which describes a tendency for ethnolinguistic minorities to bring up their children in a more prestigious language because their native languages possess rather low socioeconomic and political status.

5.3.1.4 Frequent social contact

Another significant explanatory factor for language shift and attrition is the current Truku substantial contact with Mandarin speakers. Schmid (2002:23) claims that “contact” depends on two factors: choice and opportunity, where the former is controllable by an individual while the latter is not. However, a Truku has no choice but to use Mandarin in three main domains. First, young people are required to use Mandarin with their Chinese-speaking teachers in schools even when they are enrolled in an indigenous elementary school. Second, use of Mandarin in everyday interaction is no longer a choice but becomes a necessity for those who work outside the villages. Third, young Truku must speak Mandarin with members of other ethnic groups like Mainlanders, Hakka, and other indigenous people groups in playgrounds, schools, churches, and other social events. By contrast, Truku is confined to specific, limited domains, such as the home.
5.3.2 Internal factors

On the one hand, the “external” factors including political inequality, educational disadvantage, economic disadvantage, and frequent social contact described in the previous section partly determine the current Truku shift and attrition. On the other, there is a strong influence from psychological or “internal” factors, as I label them here, as well. Schmid and Köpke (2007:23) contend that the sociolinguistic/external factors bring forth psycholinguistic/internal consequences. For instance, they conclude that “the amount of contact has direct consequences on frequency of activation of L1, and thus influences the psycholinguistic balance between the two languages” (see Section 5.3.2). The internal factors are discussed in three subsections. Section 5.3.2.1 discusses attitude and motivation. Then, Section 5.3.2.2 describes the issue of language and identity. Finally, ethnicity as a factor that affects Truku shift and attrition is discussed in Section 5.3.2.3.

5.3.2.1 Attitude and motivation

As discussed earlier, language shift and attrition are largely determined by notions like attitude and identity in two ways. First, attitude and motivation are largely based on the individual’s perception of the situation and on how the “minority” group is perceived by the “majority” group (Schmid 2002:26). Second, motivation usually arises from external factors such as socioeconomic and ideological contexts (Köpke 2007:25). For example, at the turn of the twentieth century, Jewish people in Palestine successfully reversed their language shift from Hebrew to Yiddish to serve their communicative needs and as a sign of the revival of their nation (Nahir 1988:276). The initial step and key factor for their grassroots Reversing Language Shift (RLS) movement was their strong motivation to revive this prestigious language and their nation.
that led to their positive attitude toward Hebrew. In other words, their children were infused with a positive attitude toward Hebrew.

In contrast, present-day Truku show overall ambivalence toward their native language; Truku has a symbolic value as the language of elders, family, and community. Nevertheless, Mandarin is still perceived as a language that is socioeconomically more advantageous. This type of attitude can affect language maintenance for several reasons. First, as just noted, Truku provides little instrumental motivation whereas Mandarin is necessary for life opportunities. In the short interview after the HALA experiments, most participants expressed the view that Truku is significant in family and community but Mandarin is socioeconomically desirable. Another relevant observation is that most parents currently bring up their children and seek to school them in Mandarin while holding a concept of Truku as having a low political and socioeconomic status. This suggests that the ideology of Truku as a monolingual identity has been shifting to a yearning to become multilingual Truku.

The second factor affecting attitude toward use of Truku is linked to age. Adults are different from children in that the Truku language is a significant part of their identity that cannot be easily forsaken. In contrast, younger generations are prone to be integrated into Mandarin environments because their motivation to learn or maintain Truku is comparatively low.

The third type of motivation depends on Truku people’s view of the current cultural context including their attitude toward language competence and bilingualism, their origin, and their integration into the Mandarin community. Truku perceptions of the current situation can be preliminarily summarized as follows. First, senior speakers of Truku generally expect younger

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62 Reversing Language Shift refers to “the turning around of the existing trend in the usage of a particular language” (Paulston 1994:100).
63 This observation is based on the three types of motivation that affect language maintenance proposed by Köpke (2007:25–26).
speakers to have native-like pronunciation and become “real” speakers. Because of this, Truku youth express a fear of being teased for their linguistic errors, although they have a desire to learn Truku.\textsuperscript{64} Second, younger generations see Truku language attrition and shift as a natural consequence of integration into the Mandarin community while the older ones are prone to deem this phenomenon a loss of individual and ethnic identity. Third, the dominant/Mandarin group generally perceives Truku and other indigenous groups as members of a less prestigious society that has low political and socioeconomic status. These attitudes suggest that the motivation to maintain Truku as the symbolic language of family and community for adults has been shifting to have a lower value for youth.

\textbf{5.3.2.2 Identity}

The speakers’ sense of identity is another determining factor for their language choice that can lead to the infrequent use of an endangered language. As discussed earlier, Schmid’s study on L1 German Jews in 2002 suggests that language shift or attrition might not be a threat to ethnolinguistic identity; instead, individual identity may involve a shift in dialect, register, or linguistic system. As Le Page and Tabouret-Keller (1985:181) argue, an individual will conform to patterns of linguistic behavior through which she will resemble that group of people to which she wishes to belong.

In the same vein, Phyak (2009:18) suggests that identity is not fixed or unitary in a multilingual/multicultural context. Rather, it is constructed, multiple, hybrid, and dynamic. As Norton (1997:10) argues, while individuals use language:

\textsuperscript{64} This observation is based on my personal experience and the short interview I had with the youth and young adults after they did the HALA experiment in 2009.
They are not only exchanging information with their interlocutors; they are also constantly organizing and reorganizing a sense of who they are and how they relate to the social world. They are, in other words, engaged in identity construction and negotiation. Furthermore, Ha (2008:25) argues that “we construct identity through language, as language is used about us, by us and for us. Language acts as a means through which identity is communicated, extended, conformed, constructed, negotiated, and reconstituted.”

I agree with Hansen and Liu (1997:571), who claim that “rather than choosing to belong to one group or the other, as Tajfel’s theory maintains, the individual may wish to identify with a certain group in specific contexts i.e. speak different languages in different situations.” Like other indigenous groups in multilingual and multicultural Taiwan, Truku people produce an ambivalent type of identity. Although Truku has symbolic and practical value as the language of ancestors, community, and family, Truku people tend to shift to Mandarin to access power and achieve social identities. For instance, in my own case, although I lament the endangerment of Truku, I have constructed my multiple identities through Mandarin and English to be able to communicate with other language groups in Taiwan and in the global context.

The content of this section can be summarized in three statements. First, language is essential to identity and cultural revival. Second, an individual’s identity depends on his or her interrelations with other groups in specific contexts. Third, in multilingual Taiwan, where socioeconomic and political power is ascribed to Chinese-speaking society, Truku and other marginalized groups internalize a less prestigious status and thus accept or shift to dominant/Mandarin language for survival or improvement of their life styles.
5.3.2.3 Ethnicity

Another affective factor that determines Truku language attrition or shift is ethnicity. The current Truku speech community has a lower degree of Ethnolinguistic vitality, i.e., it has negative or inadequate social identity for three reasons. First, Truku receives less formal and informal support from various institutions including the mass media, the educational system, and government services. Second, although the rate of immigration and emigration is 2% and 3% respectively, the majority of adults or young adults temporarily move from village to town for better educational or socioeconomic opportunities. Third, most Truku live in Syiu-lin Township (秀林鄉), which is perceived as a less prestigious region by the dominant society.

5.4 TRUKU LANGUAGE PLANNING

The extralinguistic factors involved in Truku language shift and language attrition so far appear to be intertwined and interdependent. The process starts from the external factors including political inequality, educational dominance, economic disadvantage, and frequent social contact, which trigger the shift from Truku to Mandarin through internal factors such as attitude, motivation, identity, and ethnicity. Then this shift creates the natural cycle described by O`Grady et al. (2009:104): people become reluctant to use the language because of its lesser accessibility from infrequent use, further decreasing its accessibility and creating the downward spiral that ultimately leads to language loss (Figure 3-1). This is manifested in two ways in the Truku community: loss of speakers and loss of domains of use, both of which are critical to the survival of a language (Romaine 2007:117). As current Truku is in

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65 Ethnicity is “rightly understood as an aspect of a collectivity’s self-recognition as well as an aspect of its recognition in the eyes of outsiders. Ethnic recognition differs from other kinds of group-embedded recognition in that it operates basically in terms of paternity rather than in terms of patrimony and exegesis thereupon”(Fishman 1980:16).
the stage of emergent bilingualism, where there is still a real chance to slow down the process of decline and attempt reversal of the critical shift toward Mandarin, perhaps the most crucial question to ask at this point is “How do we increase the number of speakers and domains of use in the Truku speech community?” In an attempt to answer this question and stop the trend of language erosion, a micro-language planning project for Truku is proposed in Section 5.4.2, after the general concepts of language policy and planning are introduced in Section 5.4.1.

5.4.1 Language policy and planning

Language policy and planning (LPP) is interested in “addressing social problems which often involve language, to one degree or another, and in proposing realistic remedies” (Ricento 2006a:23). However, as already discussed, and as Chen (2010:101–102) also points out, three modern Taiwanese language policies—National Language Policy, Mother Tongue Language Policy, and New English Language Policy—are working against indigenous language maintenance. The first and third policies have been directly developing Mandarin and English as the first two official languages of Taiwan. The second policy—the Mother Tongue Language Policy—has not been effectively implemented because TLs have not been standardized or promoted. Moreover, indigenous language teaching was integrated into Mandarin, Southern Min, or extracurricular courses in some schools. In competing with the national and international lingua francas, Truku, together with other ethnic languages, continues to rapidly lose its functions and lacks protection and promotion from the government. This implies that there is a need to reexamine and redefine the current language policy in Taiwan to provide a balanced

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67 A general definition of LPP is that it refers both to plans and policies external to local groups, such as national language policies, and to plans and policies internal to local groups, such as community or even family language policies (Hinton 2008a:39).
argument for providing “realistic remedies” through incorporating the external and internal factors discussed above; it is not sufficient to understand the issue of language shift only from the political position in this multilingual context; postmodern language policy is about mapping language policy against changing economic and political conditions (see Section 5.4.2).

According to Kaplan and Baldauf (2003:6), in LPP, policy and planning refer to two closely related but different activities. They define language policy as “a body of ideas, laws, regulations, rules, procedures, and practice intended to achieve the objects of a policy.” Language planning (LP) refers to “deliberate efforts to influence the behavior of others with respect to the acquisition, structure, or functional allocation of their language code” (Cooper 1989:45). In addition, Davis (1994) points out that since language planners are likely to encounter conflicts in relation to issues of tradition, change, and equality, analyses are needed to examine the interrelationships among policy levels and historical, economic, and cultural factors in the actual implementation process. Hence, writes Davis, “LP is likely to involve the need for re-evaluation of cultural assumptions among participants in the process of implementation” (191).

There are two levels of LP—macro and micro—where the former describes language planning taking place at the government level or state formation, whereas the latter occurs at the local level or in interpersonal communication (Kaplan and Baldauf 1997:52; Ricento 2006b:129). To face the multi-factored linguistic challenge in Taiwan and to examine its process of actual implementation, micro-LP is judged to be the most appropriate type of planning for the current Truku community. As King (2004:336) and Phyak (2009:63) argue for other regions, micro-level or localized language planning, supported by national policy and ideology to integrate ethnolinguistic, national, and global identities, is essential in a multilingual and
multicultural context like Taiwan. Section 5.4.2 presents the reasons for focusing on a micro-LP approach. A scheme for the study of LP in the Truku context will be discussed in the following subsections from 5.4.2.1 to 5.4.2.7.

### 5.4.2 Micro-language planning

The focus should be on the micro-level rather than the macro-level of LP in the Truku situation for five reasons. First, bottom-up initiatives rather than top-down approaches are a top priority. Presently, endangered languages benefit from a trend in public opinion that demonstrates empathy toward linguistic rights, as seen, for example, in Article 1 in the Universal Declaration of Linguistic Rights produced at Barcelona in 1996 (see Appendix C1) and Article 13.1 in the Declaration of Rights of the Indigenous People adopted by the United Nations General Assembly in 2007 (see Appendix C2). It is at this crucial juncture that the top-down policy statements need to be implemented at the local level. As Perta (2008:1222) argues, “where there is a collective willingness to restore vigor to their own language, in the first place a bottom-up approach should be applied, focusing on two levels—the family and community.”

Second, micro-LP ensures that the community plays a significant role and stays in charge of its own long-term language maintenance. Many linguists agree that only the indigenous community itself can save its language (e.g., Crystal 2000:111; Hinton 2008b:51; Valiquette 1998:107, among others). In addition, in his study on the Hungarian diaspora in Australia, Hatoss (2006:287) argues that a community is not a “passive recipient” of the government’s actions, but “active agents and advocates” to sustain their mother tongue and cultural identity. He indicates

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that Hungarian immigrants are successful in maintaining their language and cultural identity through various community-based activities.

Third, rather than merely focusing on linguistic cause, micro-LP offers a way to relieve the multi-faceted pressures on the language and to provide an opportunity to boost speakers’ confidence as a community. This is necessary because, as Crystal (2000:130–144) explains, an endangered language will progress if its speakers (i) increase their prestige within the dominant community; (ii) increase their legitimate power in the eyes of the dominant community; (iii) increase their wealth relative to the dominant community; (iv) have a strong presence in the educational system; (v) can write their language; and (vi) can make use of electronic technology. Based on these six postulates, micro-LP is proposed as the best tool to progress toward the goal of Truku being used in the home and neighborhood as a medium of intergenerational communication.

Next, micro-LP involves collaborative work and partnership between researchers and the community, and between older and younger speakers. The task of preserving an endangered language is so complex that it needs planning and management, commitment of people with individual skills, and a way to ensure that those involved are acting on behalf of the community as a whole (Crystal 2000:154). Furthermore, as Czaykowska-Higgins (2009:15) emphasized in her model of Community-Based Language Research, linguists need to be actively engaged partners working collaboratively with language communities.

Finally, macro-LP or government-based language policy instead of micro-LP is limited in three aspects. First, it “may create socio-political problems like misunderstanding among different language communities in a multilingual society” (Phyak 2009:18). Next, this top-down perspective may ignore the grassroots reality, voice, and attitude of speakers. Moreover,
government-based language policy tends not to be serious in analyzing the ideological issues or identities that people construct through the multilingual context (Block 2007). In Taiwan, all linguistic decisions have been made and acted upon by the Ministry of Education in accordance with the national language policy designed to promote Mandarin and English at all costs. However, Article 30 of the Indigenous People Basic Law adopted by the Council of Indigenous People in 2005 states that the government shall respect and protect the lawful rights of minorities in dealing with indigenous affairs including language (see Appendix C3).

Considering the great number of variables involved in language endangerment, and attempting to describe and explain LP from an emic perspective, I agree that language planning can be viewed as decision making. I follow Cooper’s accounting framework for the study of language planning, organized around the question “What actors attempt to influence what behaviors of which people for what ends under what condition by what means through what decision-making with what effect?” as shown in Figure 5-3 (Cooper 1989:98). In other words, to give a descriptively adequate account of language planning in the Truku context, I should provide the following rubrics in this framework: (1) What actors, (2) attempt to influence what behaviors, (3) of which people, (4) for what ends, (5) under what conditions, (6) by what means, (7) through what decision-making process, and (8) with what effect? These will be discussed in the following subsections from 5.4.2.1 to 5.4.2.8.
5.4.2.1 What actors

This rubric helps answer the question “Who makes decision for this micro-LP”? In a setting like the Truku community where shift is already evident, a strong body of agents is needed to exercise sufficient influence on regaining the choice of Truku use in various domains. Taking up trends from endangered language and youth culture studies, I suggest that we should consider five influential types of individuals—youth, family members, educators, researchers, and elders—as cultural and political actors in this endangerment setting. First and foremost, many researchers in indigenous language practice emphasize the need to view youth as actors in their endangerment settings (e.g., McCarty and Wyman 2009:287; Messing 2009:361, among others) because young people are able to thoughtfully and critically express the underlying causes of language endangerment. In addition, the pulse of a language clearly lies in the youngest generation (Romaine 2007:121). Against the stereotypical assumption that indigenous youth simply orient away from local communities and identities toward dominant languages, McCarty and Wyman (2009:279) argue that young people “negotiate relationships of power, assumptions about languages, and diminishing opportunities for ancestral language learning in rapidly
changing sociolinguistic ecologies.” However, they caution that youth cannot be expected to act alone.

Hence, the second actor required to do LP is the youths’ authorizing agents—families. LP cannot be done and implemented without families’ affirmation and support. However, as noted in Section 5.3.1.3, Truku families tend to bring up their children in Mandarin because they feel that Truku language possesses rather low socioeconomic and political status. Therefore, awareness of the significance of speaking Truku needs to be raised and taught to family members before they are involved in promoting Truku language revitalization efforts. While doing language planning collectively, they become more proactive in native tongue reclamation.

Third, because they have a strong incentive to revive Truku, local educators such as Truku language activists and teachers should be part of the group of actors who attempt to affect individuals’ choices on Truku. They can help identify the most receptive individuals, negotiate promotional strategies with funding agencies or other authorities, and provide healthy opportunities for youth and community to develop community-based programs, i.e., bilingual education (see 5.4.2.6.1) and integrative community-based programs (see 5.4.2.6.2). Next, positioned as experts, researchers can become members of the discourse community that shapes the appropriation of language policy and planning (Johnson 2009:72). Last but not least, elders are concerned with the issues of Truku language survival and identity; therefore, they can serve as advisors to the language planners, i.e., youth, families, and educators, and as authorizing agents to the community throughout the process of language planning.
5.4.2.2 What behaviors

Truku ethnolinguistic identity appears to be ambivalent. On one hand, due to the limitations on accessing political power and economic resources, it is difficult for Truku to keep their ethnolinguistic identity in this multilingual and multiethnic context; they, especially the younger generations, identify themselves as Mandarin speakers (see table 5-1 and figure 5-2). Their instrumental motivation to speak Mandarin negatively influences their attitudes toward their Truku identity. On the other hand, they simultaneously tend to value their Truku ethnolinguistic identity. When asked to “Please name the cultures with which you identify” in question 6 in the LEAP-Q that accompanied the HALA experiments, the cultural identification averages 60% Truku and 37% Mandarin across the age groups as shown in Figure 5-4.

![Figure 5-4 Reported cultural identification](image)

This suggests that the ideology of Truku as a monolingual identity has been shifting to a desire to become a multilingual Truku for socioeconomic reasons; shifting from Truku to Mandarin does not only refer to the shift of Truku language identity but also the addition of
Mandarin speaker identity. Considering the need for linguistic survival, I suggest that the actors of this micro-LP should ultimately focus upon (i) enhancing Truku proficiency, (ii) increasing its domains of use in the Truku speech community, and (iii) maintaining Mandarin proficiency. Hence, based on the four stages of acceptance of a language behavior proposed by Cooper (1989:61–62), the actors should first foster the awareness of Truku endangerment and positive attitudes toward the usefulness of Truku before planning how to increase the ability to use Truku and its actual frequency of use.69

5.4.2.3 Of which people

What motivates these actors to do Truku micro-LP? As can be seen clearly in 5.3.1.1 to 5.3.1.4, the political, economic, educational, and social inequality for Truku living under traditional circumstances undermine indigenous language and culture. These hegemonic conditions cause stress, and it is known that a rise in stress will damage public confidence; this is the primary motivation for the formulation of public policy to address the current situation of Truku people (Cooper 1989:90–91). Low confidence in a community manifests itself in various ways such as poverty, alcoholism, high rates of divorce, young marriages, high drop-out rates from schools, low educational attainment, and above all, loss of individual and ethnic identity. Therefore, as long as indigenous language speakers like Truku suffer from a sense of insecurity and inferiority, the tendency to shift to more prestigious languages—like Mandarin—will continue to prevail (Letsholo 2009:590).

To ease the stress or neutralize the threat posed by this hegemonic and multilingual context, both Truku adults and youth are expected to encounter two linguistic behavioral consequences

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69 He proposes four stages of acceptance of a language behavior: (i) awareness (knowledge that the phenomenon exists), (ii) evaluation (forming a favorable attitude toward the usefulness of the language behavior), (iii) proficiency (ability to use the language), and (iv) usage (actual frequency of language use).
after the implementation of the LP. On the one hand, people will need to possess a high level of motivation and a strong sense of security to maintain Truku as the symbolic language of family and community, considering that (i) language is a marker of identity in both individuals and ethnic groups (Schmid 2002:28); (ii) “the decision to abandon one’s own language always derives from a change in the self-esteem of the speech community” (Brenzinger, Heine, and Somner 1991:37); and (iii) the heart of language attrition is the speaker’s identity and self-perception (Schmid 2002:191).

On the other hand, it is necessary for young Truku to gain the additional ability to speak Mandarin and even English in the later stages of their education for socioeconomic and general cognitive development. Much work has been done on bilingualism and education that indicates the educational, cognitive, sociocultural, and economic benefits of bilingualism for the individual language user. As Freeman (2004:16) points out, proficient bilinguals have a wide range of professional opportunities open to them, especially in the increasingly global economy. In addition, bilingual individuals tend to be superior to their monolingual counterparts on cognitive tasks that call for divergent thinking, pattern recognition, and problem solving. Moreover, they tend to have better academic achievement, demonstrate greater knowledge about the structural properties of language, and have a generally broader understanding of the world (Freeman 2004:16; García-Vázquez, Vázquez, López, and Ward 1997:334; see also Sections 5.4.2.5 and 5.4.2.6.1).

5.4.2.4 For what ends

How do the language planners arrive at decisions? Cooper (1989:92) points out that the way one defines the problem influences the policy and planning that is intended to deal with the
problem. Based on Ruiz’s (1984) classification, there are three different political views toward language: language as a problem, language as a right, or language as a resource. First, those who view language as a problem often assume that language minorities should be incorporated into the mainstream culture and society. Next, those who view language as a right often hold an ideology that people should be permitted to choose and practice whatever language they like. The last orientation is viewing language as a resource. In this view, both the use of languages and the people who speak them are viewed as assets for purposes of wider communication.

In Taiwan, the current government views language as a problem where the indigenous languages including Truku are minimally incorporated into the school curriculum that heavily promotes Mandarin and English. Conversely, Truku micro-LP takes the view of language as a resource for three reasons. First, language is a resource that “build[s] social bridges…between cultures” (Baker 1996:357). The use of both Mandarin and ethnic languages is inevitable in multilingual and multicultural Taiwan; for national unity and linguistic diversity to coexist peacefully, multilingualism must be viewed as a benefit. Second, this view allows indigenous languages to be used in the school system, i.e., in bilingual or multilingual education, hence encouraging maintenance of the ethnic language and the cultural identity it represents. In addition, the young indigenous voice can be heard and considered. Third, viewing language as a resource considers linguistic diversity a benefit rather than a deficit because the primary goal of multicultural education is to build on the strengths that students bring to school (Nieto 2002:133, 136). The ideology of this orientation, i.e., language as a resource, points to the significance of bilingual or multilingual education, which will be discussed in Section 5.4.2.6.1.
5.4.2.5 Under what conditions

What are the conditions which influence policy? As noted above, sociolinguistic/external factors bring forth psycholinguistic/internal consequences. Of all of these factors, speakers’ identity and motivation have been shown by many language scholars to greatly influence their language choice (e.g., Baker 2006:6; Brenzinger, Heine, and Somner 1991:37; Letsholo 2009:590; Schmid 2002:191, among others). Motivation arises from socioeconomic or ideological contexts (Köpke 2007:25). Ben-Rafael and Schmid’s study in 2007 investigates how motivation is dependent on context for different groups of immigrants in Israel. The results show that language maintenance is much higher among more recent Russian immigrants who have more economic and hence instrumental motivation. Furthermore, this hybrid of language identity is necessary because “a change in economic fortunes has a more fundamental and positive impact on the self-esteem of a community, as long as the increase in prosperity is gradual, and is well managed” (Crystal 2000:132).

Similarly, many Truku tend to use Mandarin, which helps them access socioeconomic resources in the multiethnic context. Hence, economic development cannot be excluded from micro-LP. However, Gegeo and Watson-Gegeo (forthcoming) argue that the Western economic development model undermines the values of indigenous language and identity and implies that local languages are “backward.” Therefore, economic development needs to be based on indigenous epistemology that keeps both their dignity and autonomy (Gegeo 1998:297). In addition, Davis (1999:82) points out that it is essential to consider the impact of school language choices on local economic practices because one of the main goals of schooling is to prepare young people for better economic opportunities. Hence, “both economic and educational

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70 Indigenous epistemology refers to “a cultural group’s ways of thinking and of creating and reformulating knowledge using traditional discourses and media of communication (e.g., face-to-face interaction) and anchoring the truth of the discourse in culture” (Gegeo 1998:290).
development at the roots, or community level, are more likely to be successful than externally imposed and controlled models” (1999:90). This micro-LP comprising indigenous educational and community-based LPs is proposed to meet the educational and economic needs of individuals in the Truku speech community, which will be discussed in the following subsection.

5.4.2.6 By what means

The indigenous educational and community-based LPs should attempt to increase Truku use and proficiency as well as maintain Mandarin by means of promoting a modified two-way immersion program and economic development in the community. Section 5.4.2.6.1 discusses the benefits and approaches of the two-way immersion program. Integrative community-based language planning is described in Section 5.4.2.6.2.

5.4.2.6.1 Indigenous educational language planning

Fishman’s (1991:395) Graduated Intergenerational Dislocation Scale (GIDS) helps determine the current educational issues involved in the process of implementation of Truku LP. Based on GIDS, Truku falls into stage 7 and close to stage 8, indicating that the cultural interaction in Truku primarily involves the community-based older generation. The Truku language that is used is most often non-authentic Truku and the L2 Truku acquired by adults.71 It is suggested that the indigenous educational or language-in-education LP should acknowledge children’s language and cultural identities when integrating traditional indigenous language and cultural knowledge into the curriculum. Furthermore, education should be realized as “a philosophy of

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71 Non-authentic Truku refers to the current Truku language that loses many linguistic characteristics such as prefixes, suffixes, circumfixes, reduplication, and so forth (Yudaw Pisaw, 2011 pers. comm.).
adding another set of language and culture abilities to those a student already possesses” (Davis 1999:89).

Indigenous educational LP has two components. From a top-down perspective, it remains crucial to simultaneously negotiate Mother Tongue Education with the current language policymaker—the Ministry of Education—through the support of the Council of Indigenous People in Taiwan, while keeping the emphasis on grassroots or community-based efforts. As a bottom-up strategy, the modified two-way immersion program (TWI) or two-way bilingual program with indigenous epistemology in the curriculum is desirable. Its definition, goals, benefits, and implementation are discussed here. The two-way immersion program is a program model that provides content-area instruction through both languages to all students (Freeman 2004:47), and its primary goals are to “develop bilingual proficiency, academic achievement, and positive cross-cultural attitudes and behaviors among all students” (Nieto 2002:141–142). Nevertheless, with the linguistic challenges Truku currently encounters, a modified TWI (MTWI) program is proposed, which differs in two ways from TWI in the literature. First, this MTWI will mostly have Mandarin-speaking young Truku rather than balanced numbers of Mandarin speakers and speakers of Truku due to the existing language shift. Second, the international language—English—will be added in the later grades to address socioeconomic needs. Based on Nieto’s concepts of bilingual education, MTWI is judged to be a more effective program model than the current Mandarin alone with a few hours of Mother Tongue education for six reasons.

1. Bilingual education (BE) has generally been found to be beneficial for academic performance, which helps develop self-esteem among indigenous students and decrease
the dropout rate from schools. Thomas and Collier’s study in 1997 showed that language minority students who received BE reached or exceeded the 50th national percentile in all content areas, whereas those who received even well-implemented ESL-pullout instruction reached between the 10th and 18th national percentile. They further indicate that TWI is the most effective program model of all. Similarly, Asimov’s study in 1998 confirms that students who completed BE performed better than native English-speaking children in reading, language, spelling, and math.

2. It is widely acknowledged that the amount of contact with the language or the frequency of language use is a crucial factor in language retention. To maintain the accessibility of two languages in a multilingual context, a sufficient amount of input and output in both languages is indispensable.

3. Students in a TWI program learn to appreciate the language and culture of others, and to empathize with their peers in the difficult process of developing fluency in a language not their own. Moreover, this approach gives an opportunity for cooperative learning and peer tutoring, and it holds the promise of expanding our linguistic resources and improving relationships between majority and minority groups.

4. TWI may reinforce close relationships among children and their family members, promoting more communication with senior Truku. In her study in a Shipibo community in Peru, Tacelosky (2001:53) found that Shipibo parents do not feel pressured to prepare children for school by speaking Spanish to them since they know Shipibo is being taught in school. Hence, they can continue speaking Spanish at home.

72 BE here refers to the additive rather than subtractive form of bilingual education. The former means to build on student’s previous literacy whereas the latter refers to one language being substituted by another (Nieto 2002:140). In her study in 2000, Nieto found that maintaining language and culture were essential in supporting and sustaining academic achievement.
5. The cognitive advantages may motivate parents to adopt this program as the educational choice for their children. First, “bilingual children have enhanced metalinguistic awareness that is considered a crucial factor in the development of reading in young children and a key component of cognitive development because of its documented relation to language ability, symbolic development, and literacy skills” (Bialystok 1991:138). Second, according to Davis (1999:87), many researchers find that children who are permitted to develop literacy and other cognitive skills in their first language outperform those submerged in a second language and culture (e.g., Collier 1995; Cummins 1994; Cummins and Swain 1986; Genesee 1987; Ramírez, Yuen, and Ramey 1991).

6. TWI can help children access more social, educational, and economic opportunities; they are able to take jobs that require bilingual or trilingual skills. This is crucial for both parents and children because better job potential motivates them to choose to be in a TWI program.

In terms of the implementation plan, following Freeman’s (2004:77) suggestions, the MTWI should begin in the early elementary grades, and all students should receive 50 percent of their content-area instruction in Truku and 50 percent in Mandarin in each grade. By the time they finish their primary education, they will have acquired bilingual skills that will give them sufficient confidence to pursue their further education outside the community, as it is widely acknowledged that students need five to seven years to make a successful transition from their native language to another language (Cummins 1981; Thomas and Collier 1997). Fortunately, there are a number of qualified Truku teachers who have received their Indigenous Peoples
Language Skill Certification provided by CIP. In addition, the existing pedagogical materials are sufficient for early education, and other materials, such as a comprehensive dictionary, are now being developed by the Truku Dictionary Committee. However, the Truku teachers should receive additional training before teaching at this school and will often collaborate with Truku elders or fluent native speakers in school instruction. In addition to bilingual education in elementary schools, a specific program should be provided to the very youngest children (i.e., from birth to the start of elementary school) for early Truku input. This can be introduced by Truku senior speakers or audio media to ensure that the youngest children will be at least passively exposed to Truku speaking environments.

Because the indigenous epistemology in the curriculum is a crucial component in MTWI, the adoption of place-based education is recommended to help Truku connect the process of learning to everyday life in the real community. It is distinguished from other traditions in that it identifies both the cultural and ecological environments of local communities as powerful contexts for curriculum development and inquiry (Gruenewald 2003:6). It comprises the following characteristics: (i) learning in this approach is rooted in what is local: the unique history, environment, culture, and art of a community; (ii) community members can serve as resources in every aspect of teaching and learning; (iii) it provides an opportunity for teachers, students, and community members to collaborate to make the place even better (Chinn 2010, pers. comm.).

The implementation of the MTWI program, however, requires certain procedures due to the restrictions of current language policy in Taiwan and possible impediments from the community.

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itself. On the one hand, it is necessary to have a top-down strategy to gain governmental permission for this innovative program to be embedded in the current Truku kindergartens and elementary schools. To this end, the first step is to organize a series of workshops or community meetings to (i) mobilize Truku language activists and educators as agents of these educational and social changes, and (ii) develop a coherent understanding of the goals of the educational plan as well as the means to reach those goals (Freeman 2004:254). Once a consensus is reached, the next step is to urge the development of a remedial linguistic plan by showing the compelling data derived from the present study, and then promote as well as negotiate for the MTWI program to be implemented in current Truku kindergartens and elementary schools with the representatives from the CIP and Ministry of Education in Taiwan. On the other hand, bottom-up efforts should go hand in hand with this top-down planning for promoting the MTWI program; this will be addressed in the following section.

5.4.2.6.2 Integrative Community-Based Language Planning

As noted earlier, along with indigenous educational LP from the grassroots, the other component of micro-LP is the community-based LP aimed at meeting the economic needs of individuals in the Truku speech community. Integrative Community-Based Planning (ICBP) is proposed to stem further Truku erosion in the community with the following sequential goals: (i) fostering a positive attitude, (ii) ensuring intergenerational transmission, and (iii) increasing the number of speakers and domains of Truku use.75

First, the short-term goal of ICBP is fostering a positive attitude toward Truku language and culture because only if speakers’ inner abilities are strengthened can we face the ongoing

75 Many researchers agree that the ultimate goals for preserving endangered languages are to increase the number of speakers and domains of language use, and to transmit the language to their children (e.g., de Bot 1997:581; Yamamoto, Brenzinger, and Villalón 2008:68, among others).
linguistic challenge. To this end, an actual year-long project is proposed to create opportunities for community members to take the lead and develop autonomy in strengthening inter-generational ties and expanding indigenous historical, cultural, and linguistic spaces.\textsuperscript{76} Through everyone’s consistent efforts, including year-long workshops, summer camps, and periodic visits to other Seediq communities (e.g., Tkdaya and Teuda), the old and young Truku will collaborate to pass down and activate the cultural and linguistic resources of the tribe, with the ultimate goal of affirming Truku identity and rebuilding cross-generational relationships. The action plans for this year-long project are briefly described here.

1. Weekly Language and Tribal Stories Documentation Workshops: Similar to the format of the LDTC at the University of Hawai‘i at Mānoa, the participants learn how to collect and digitally document the oral language, stories, songs, and idioms of the tribe. Through the Internet and periodic presentations, the participants will be able to share their findings with the tribe and larger audiences. It is hoped that through participating in these workshops, the younger participants will interact with the elders more, grow renewed appreciation for the experiential knowledge of the old, and willingly share the responsibility for language revitalization. During the periodic meetings, the urgency of the collective revitalization efforts should be emphasized to all participants including parents and young generations.

2. Youth Mountain Camps: Traditional Truku people relied on the natural resources of the mountains and lived self-sufficient lives. Our ancestors accumulated precious knowledge about the plants, animals, weather, land, etc., that has yet to be passed onto the current younger generations. In this youth mountain camp, 12 healthy Seediq boys and 6 professional guides will be recruited. The 18 people will be further divided into three

\textsuperscript{76} This project proposal was submitted to the Genographic Legacy Fund Grant on June 15, 2011; the result will be known in November 2011.
groups, with one guide ensuring the safety of two young participants. The activities in the
mountains will include: rock climbing, tree climbing, river crossing, identifying traditional
territory and historic sites, using Truku language, and so forth.

3. Visit Other Seediq Communities (e.g., Tkdaya and Teuda): As Truku people are the
Seediq people who migrated from central Taiwan to the eastern part of the island, there
has been a lack of connection between the Truku and the other Seediq communities. Through the trip, the young Truku from Qowgan village will be able to understand the
migratory history of their ancestors and enhance their Seediq identity. It will build
solidarity between different groups of minorities and pave the way for collaboration
between Seediq communities in the future. This significant “tracing-the-roots” journey
will be videotaped and become part of our Seediq history that can be passed down to the
younger generations.

Next, the intermediate goal is to ensure intergenerational transmission. To this end, four
initiatives are proposed to mobilize the older generations to transmit Truku to the younger ones: a Master-Apprentice program, immersion classrooms, family-focused promotion, and
documentation and pedagogy. The goals and programs for ICBP are shown in Figure 5-5 below.

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77 Similarly, Tkdaya and Teuda are definitely endangered dialects of Seediq, and they are mutually intelligible with Truku dialect.
First, a Master-Apprentice program is to be developed to encourage the younger adults to improve their proficiency by learning from the older native speakers. Teams are to be constituted of the master (native speaker) and the apprentice (language learner), and they need to spend at least twenty hours a week and use only Truku throughout the time they spend together. The program is based on the concept that people learn a language best by being immersed in it for significant amounts of time, without translation to the dominant language. In this program, translated as the equivalent of “Big Hands Holding Small Hands,” the master and apprentice go about their daily lives in Truku and do everyday or special activities together. Weekly meetings will be organized for participants to share their progress and challenges. Moreover, active language teaching and learning strategies will be provided for all participants.

Second, immersion classrooms where only Truku instruction is carried out are to be designed for the preschools, the after-school Truku learning program, and all schools that offer Truku

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78 *Master-Apprentice language program* is a program that teaches native speakers and young adults to work together intensively so that the younger members may develop conversational proficiency in the language (Hinton 2008c:217).
language learning in Hualien County. All Truku language teachers are required to have a national indigenous language teacher certification. Third, family-focused promotion is a series of regular visitations where a team is divided into groups to help ensure that Truku is being transmitted to the younger generations in an individual family. Workers or volunteers will be sent out weekly to help read traditional stories, practice reading Truku texts, or interact with the whole family in Truku. Last, documentation and pedagogy should go hand in hand with preservation efforts. This program provides an opportunity for linguists and community speakers to collaboratively work and partner together for documentary projects. In addition, it offers a chance for younger speakers to work together with native speakers to create pedagogical materials. For instance, young Truku can use their knowledge and skills in technology to record the native speakers’ sounds or stories, design animated programs on the computers, or make films that help preserve traditions, the authentic language, and cultural heritage.

The long-term goal of ICBP is to increase the number of language domains of use and the number of speakers (see Figure 5-5). By doing so, the Truku community will discover its uniqueness and develop a sense of pride about its heritage. However, this goal can only be reached when the current economic, social, cultural, and educational pressures are reduced. Four community-based programs are designed to support long-term Truku maintenance. First, an Economic Committee will be formed to plan how to bring about a change in the economic situation. As noted in Section 5.4.2, Crystal claims that an endangered language will progress if its speakers increase their wealth relative to the dominant community. This is crucial because (i) economic security will enable people to survive without immigrating to towns, so they can stay in the village where they can use the language frequently; and (ii) people feel motivated to think of long-term language maintenance only once their basic needs are met. Two service industries
are being considered that are expected to bring considerable economic benefits. One is selling products such as weaving, crops, and musical instruments to the wider community. To maintain the long-term operation of such an industry, it is indispensable to sharpen the relevant skills with outsiders’ assistance and training. The other is tourism, with plans for a resort and a Truku museum, where traditional stories, festivals, and concerts can be presented, to be developed in Qowgan village, located between Hualien city and Truku Gorge National Park.

The second contributive sector that the community needs to have for expanding the domains of use is the Educational Program. The aims are to (i) provide native speakers or parents to teach the language or tell stories in school settings; (ii) train younger generations to be future language teachers; and (iii) empower parents to transmit the language at home. Third is to form a Social Program to plan the social activities that will create opportunities for people to use Truku. One can be opening up a karaoke shop where Truku songs and lyrics can be found. Others can be activities that are based on mutual interests, such as small Truku Bible study groups where older and younger generations mingle together. Still others can be helping one another grow their crops like bamboo, taro, sweet potato, and so forth. The last task for increasing the domains of use is to establish a Cultural Program. It aims to support traditional arts including crafts, songs, dances, drama, story-telling, and weaving that can be demonstrated either on the stage, at festivals, or in exhibitions.

ICBP is expected to be implemented in a non-formal system. Siegel (1997:221) suggests that “community involvement, non-government organizations and decentralized programs should be factored into any language planning equation.” Hence, forming a non-governmental organization

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79 This is actually taking place in Qowgan village where the local Presbyterian Church holds small Bible study groups every Wednesday evening. There are around five or six groups and 10 people per group.
(NGO) is judged to be the most effective way to execute the plans of ICBP.\textsuperscript{80} The governance within the NGO will be designed to ensure the implementation of intergenerational language learning and community-based initiatives as shown in Figure 5-6 below.

Figure 5-6 Board Structure of Integrative Community-Based Planning

5.4.2.7 Through what decision-making process

The seventh rubric that Cooper suggests language planners address in their case of language planning is “through what decision making process.” All decisions and rules, including the formulations of goals and means proposed above, need to be agreed upon by at least three-fifths of the actors or language planners throughout the process.

\textsuperscript{80} There are three people who show an interest and willingness to financially and linguistically help implement this ICBP, so I am motivated to expand the current NGO, the Hualien Multicultural Association, to a higher-capacity NGO to be called \textit{Truku Language and Culture Center} with Mrs. Tien Jyu-fen (my aunt and the director of the current NGO). The current NGO is located in Qowgan village (花蓮縣原住民多元文化協會 http://tw.myblog.yahoo.com/safe-joyful).
5.4.2.8 With what effect

The expected effects of this micro-LP are that (i) Trukus’ beliefs about language use and practice will become aligned with those that the language planners are developing. Then the LP can be effectively developed and implemented; (ii) the domains of Truku use and number of speakers will be increased; and (iii) Truku younger generations will develop hybrid linguistic identities which will enable them to speak both Truku and Mandarin in different contexts for different purposes. In his study, Berard (2005:67) finds that the indigenous minority language speakers construct multiple identities through different languages in different contexts for different purposes in the multilingual context.

However, Cooper (1989:96) points out that it should come as no surprise if the actual outcome of a policy does not conform to the predicted consequences of that policy for various reasons. Planning is not so much an answer to a question, but a question in the form of an answer: provide a plan.

5.5 CONCLUDING REMARKS

Like other indigenous languages in Taiwan, Truku Seediq is in danger of extinction due to the political and socioeconomic development that has changed the three languages’ (or language groups’) functional distributions in the multilingual context: (i) Mandarin is almost universally used and is associated with prestige and prosperity; (ii) English is viewed as the lingua franca of globalization and has socioeconomic value; (iii) TLs including Truku Seediq are considered as symbolic languages of family and community with few pragmatic functions in the modern world. The inequalities or hegemonic conditions for Truku living under traditional circumstances undermine their indigenous language as well as culture and cause stress and problems for
individuals, communities, and society as a whole. To retain individual and ethnic identity, linguistic diversity, and human knowledge, Truku Seediq should be maintained, and because of the particular linguistic situation of emergent bilingualism in Truku communities, the next 10 to 20 years will provide a real chance to slow down the intergenerational decline.

Efforts have been made to stem further erosion of TLs since the language policy was liberalized and martial law was lifted in 1987. Nevertheless, Mandarin has continued to increase while the use of TLs has greatly decreased. As the HALA experiments and proficiency tasks reported in this dissertation suggest, Truku has still, inevitably, been undergoing intergenerational shift and attrition. It is widely acknowledged that immediate policymaking and planning are essential to stop this trend and erosion; it is crucial to provide a balanced argument for supporting Truku now through incorporating both external factors (political inequality, educational disadvantage, economic disadvantage, and frequent social contact) and internal factors (attitude and motivation, identity, and ethnicity) in any discussion of the language situation.

Cooper’s accounting framework for the study of language planning is adopted to design the impactive strategies and micro-LP that comprise indigenous educational and community-based LPs, which are proposed to meet the educational and economic needs of all individuals in the Truku speech community. As for indigenous educational or language-in-education LP, a modified two-way immersion program is judged to be the most effective approach in this multilingual and multicultural context. In terms of community-based LP, Integrative Community-Based Planning is proposed to foster a positive attitude, ensure intergenerational transmission, and increase the number of speakers and domains of Truku use.
To be able to give an adequate account of Truku language planning, this chapter provides a picture of how grassroots efforts may get this endangered language moving forward by answering Cooper’s question “What actors attempt to influence what behaviors of which people for what ends under what condition by what means through what decision-making with what effect?” It is hoped that the bottom-up strategies described here can be accepted, developed, and implemented by the community itself and be supported by the government to ease the existing stresses that are faced by Truku and other minority language speakers in Taiwan. In addition, it is greatly hoped that this micro-level language planning incorporating bilingual intercultural education and community-based efforts can serve as an agent of Truku language maintenance and a successful model for the other Formosan endangered languages.
CHAPTER 6
CONCLUSION

In this final chapter, the research objectives posed in the introductory chapter will be addressed and the findings of this Truku study will be summarized. Recommendations and avenues for future research will be discussed, and finally, the contributions and limitations of the study will be identified.

6.1 RESEARCH OBJECTIVES: SUMMARY OF FINDINGS

Returning to the six objectives posed at the beginning of this study, it is now possible to state that (i) the HALA project is a reliable psycholinguistic tool that offers a sensitive measure of relative language strength in a bilingual setting and can serve as an early diagnostic measure of language loss and to assess language maintenance efforts; (ii) Truku shows strong signs of cross-generational decline and further erosion in the youth compared to the young adults, suggesting the need for urgent remedial action if it is to survive another generation in multilingual Taiwan; (iii) compared to the LCI, the range of participants, from age 10 to age 65, are on a cline of decreasing phonological, lexical, morphological, and syntactic proficiency; they exhibit a linguistically reduced variety of Truku on three linguistic levels; (iv) the psycholinguistic record of Truku relative strength and the structure-specific proficiency measures above provide quantitative data that can be used in efforts to convince the government and Truku local communities to take urgent remedial action for Truku Seediq and the other indigenous languages in Taiwan; (v) the baseline results of the current study can serve as a point of comparison for further assessing Truku language skills, and as a starting point for developing Truku conservation programs in the near future; and (vi) micro-level LP, which comprises indigenous
educational and community-based LPs, is judged to be the most effective approach to help maintain the use of and proficiency in the indigenous language in the current Truku community.

This dissertation has investigated two main topics. The first is the process of language loss or maintenance in a language contact situation. The second is the assessments of language use and language proficiency that serve as indexes for language loss or maintenance.

6.1.1 Studies of language loss and maintenance

The process of language loss has been studied from many different angles. Some researchers merely investigate structural phenomena of dying languages and suggest that the language loss process is determined by intralinguistic factors. For instance, specific features of a certain language may be more vulnerable to attrition than others in a contact situation (Schmid 2002:19). Others deal with this process by invoking classical social-economic variables like age, education, and economic status without describing the decaying linguistic phenomena. Still others present the status of a disappearing language without showing the resistance to this disappearance. However, the process of language loss cannot be completely understood by investigating only one of these factors. As Köpke (2007:31) argues, “attrition cannot be considered as an ‘abnormal condition’, characterized by very specific symptoms and ascribable to one principal organic cause.”

To understand the process of language loss including language shift and language attrition, this dissertation has given an account of the course of a disappearing language. It supports Köpke’s view that the language loss process needs to be considered within a multi-component view that takes into consideration intralinguistic factors, socio-economic factors, individual factors like identity and motivation, and societal factors like ethnicity, relying unavoidably on the complementary contributions of several disciplines of the humanities. In other words, this
study has shown that both intralinguistic and extralinguistic factors reliably contribute to language loss in a language contact situation, and as such, must be included in any methodology that attempts to predict outcomes of language contact.

It was also shown that language maintenance efforts should focus on retention of both use and proficiency. To maintain both, micro-level language planning, based on holistic, semiotic/emic, and ethnological perspectives, proposes realistic remedies that involve these multi-faceted factors and integrate ethnolinguistic, national, and global identities in a multilingual context. In other words, micro-level planning provides a comprehensive analysis that includes examination of issues related to language policy development, cultural experiences, implementation of language policies, and formal or informal language learning practices.

6.1.2 Assessments of language shift and language attrition

The second major finding was with respect to the assessment tools for language shift and language attrition. As Köpke and Schmid (2004:24) point out, a major obstacle to the current study of language shift and language attrition relates to methodological issues of data collection and analysis. Traditional approaches such as self report, specialized surveys, questionnaires, interviews, or vocabulary tests are often used to provide a diagnosis of language shift. Nevertheless, these tests are fundamentally impractical for many endangered languages due to certain of their properties, including subjectivity, labor-intensiveness, longer time consumption, difficulty in design, or limited number of participants.

This study has found that early diagnosis of language loss and the assessment of language maintenance efforts are possible and quite essential if a community chooses to cling to its native language in spite of the great pressures it may be facing. This investigation has supported Anderson’s (1982:84) view that language attrition/loss research should adopt a language use
perspective. This would include both comprehension and production, both oral and written use of language, and both the traditional linguistic areas of phonology, morphology, syntax, and lexicon and the pragmatic side of language use, including functions, domains of use, and activities.

To assess intergenerational change in language use—an index of language shift—this research has shown that the psycholinguistic measure (the HALA tests) that views response times as a key and potent indicator of language strength serves as a reliable tool in detecting the subtle differences between a bilingual’s two languages. To assess intragenerational change in language proficiency—an indicator of collective language attrition—this study suggests a wide array of structure-specific proficiency measures to investigate individual or collective proficiency. These include on-line and off-line measurements, production and comprehension tasks, and tests of skills at linguistic levels ranging from phonetics to syntax. The results of these two measures show strong signs of cross-generational decline and further erosion in the youth compared to the young adults. In addition, the results, taken together, make it clear that the members of the entire Truku speech community, from ages 10 to 65, are currently on a cline of phonological, lexical, morphological, and syntactic proficiency that decreases with age.

6.2 RECOMMENDATIONS AND FUTURE RESEARCH

The findings of this study suggest that Truku has still, inevitably, been undergoing intergenerational shift and attrition. Immediate policymaking and planning are essential to stop this trend. The community-based policy makers mentioned in Chapter 5 should provide a balanced argument for supporting Truku now through incorporating the external factors (political inequality, educational disadvantage, economic disadvantage, and frequent social contact) and internal factors (attitude and motivation, identity, and ethnicity) in any discussion of the language situation. Immediate action should be taken and Truku people should be aware of the
urgency of action, because the evidence of this study indicates that Truku is in the stage of emergent bilingualism, when there is a real chance, which exists now but soon will not, to slow down the process of decline and to attempt reversal of a critical shift toward the dominant language. Moreover, the Council of Indigenous People and Ministry of Education in Taiwan should be informed of the urgency of the situation, and advised to begin effectively supporting community-based Formosan language maintenance at this juncture.

This research has raised many questions in need of future investigation. From a theoretical perspective, it is suggested that a closer examination of the value of an individual’s ethnolinguistic identity should be incorporated in future studies of language loss and maintenance. As noted previously, speaker identity and motivation have repeatedly been shown to influence their language choice. From a methodological perspective, the substantial work that has been done at the lexical level will enable future research to concentrate on investigating methods of assessing comparative measures of response times at a phrase-building level in a language contact situation. Furthermore, as was noted earlier, youth identity in an endangered language setting has important consequences for understanding language shift and revitalization. Therefore, using ethnographic observation and interviews where community members’ emic experience is emphasized, future research might investigate the underlying reasons for youths’ and young adults’ sense of ambivalence toward their native language use and identity.

6.3 CONTRIBUTIONS AND LIMITATIONS

The present study makes several noteworthy contributions to the studies of language loss and language maintenance. First, it confirms previous findings and contributes additional evidence that to understand language loss we need linguistic description to account for what is being lost, a sociolinguistic perspective to explain why the linguistic loss occurs, and a psycholinguistic
point of view to illuminate how this process of loss affects the linguistic elements. An adequate account of the process of language loss is crucial in a language contact situation, especially when a social minority group is involved, because it helps us conduct language planning with a more comprehensive analysis.

Second, for an early diagnosis of language loss and for the assessment of language maintenance efforts, the psycholinguistic tool to measure relative language strength and the wide array of proficiency measures used in this language contact situation can be applied to other language contact situations elsewhere in the world. They are easy to use and appropriate for language attrition or language loss research. This study confirms previous findings and contributes additional evidence that (i) a natural consequence of lack of language use is lower accessibility (Köpke and Schmid 2004:23); (ii) research on lexical change in language loss needs to be done with tasks that include some sort of time pressure, and that are ideally on-line (de Bot 1997:582); (iii) both of the languages in a bilingual setting and both productive as well as receptive skills should be considered in L1 attrition studies (Schmid 2007:151).

Practically, the results of these measures can serve as hard evidence to convince the government and Truku local communities to take urgent remedial action for Truku Seediq and most other indigenous languages in Taiwan. Moreover, the baseline results of the current study can serve as a point of comparison for further assessing Truku language skills, and as a starting point for developing Truku conservation programs in the near future.

There are a number of important limitations that need to be considered. The first limitation lies in the fact that the psycholinguistic and proficiency measures encounter some difficulty in estimating the amount of passive exposure. Even if older adults “use” Truku more than Mandarin, they may “hear” Mandarin more than Truku, and this may naturally...
affect the test results in ways that are difficult to measure. Second, this study does not evaluate either written use of the language or proficiency on a discourse level or in different domains such as home, church, and social occasions due to the participants’ inability to write and to time restrictions. Another unavoidable factor, which affects the study’s validity, is that the number of linguistically competent individuals serving as a control group in this study is very small. Finally, the current study is unable to include an ethnographic approach that would examine how Truku or endangered language ideologies are constructed across generations. This is significant because the ethnographic report from local community members will help us understand the complexity and agentive potential of language as well as identity construction, and will further contribute to the theory-building in LPP, especially in an indigenous community. 

6.4 CLOSING REMARKS

From a theoretical point of view, this study started from my own feelings toward my ethnolinguistic identity. Attempting to account for the process of language loss, the cognitive aspects in a regression framework were first applied in a previous study, then moved to include several assumptions based on language-internal principles, and arrived back at the recent frameworks that are based on internal reasons such as cognitive and psycholinguistic perspectives. This development in the theoretical approach using these various frameworks is also evident within applied language attrition studies (Köpke and Schmid 2004:24).

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81 This notion is from Kathryn Davis, “Methodological Perspectives in Language Policy” (class lecture, Language Policy and Planning, University of Hawai‘i at Mānoa, Honolulu, Hawai‘i, February 7, 2011). To explore this perspective, my co-investigator, Lin Man-chiu, and I are collaborating on a project entitled “Speaking Truku: Dialogues in Progress—A Case Study on One Indigenous Family in Taiwan,” to be presented at the 110th American Anthropological Association Conference at Montréal, Canada, November 16–20, 2011.
From a practical point of view, this development in theoretical considerations can be used as justification for the process of language maintenance efforts. Before aiming at increasing the number of native speakers and domains of use in a multilingual context, maintenance efforts should start from psycholinguistic factors such as a speaker’s identity and attitude. As Schmid (2002:191) concludes, “what is at the heart of language attrition is not so much the opportunities to use the language, nor yet the age at the time of emigration. What matters is the speaker’s identity and self-perception.” I agree with Schmid that if a speaker, user, or learner identifies himself or herself as part of a community and wants to be recognized as a member, s/he must be willing to exercise even limited abilities in the native language under various pressures. The more such individuals are willing to use their mother tongue, the greater its accessibility becomes, creating the cycle that ultimately leads to full acquisition and hence healthy language maintenance.
Appendix A

LEAP-Q

Northwestern Bilingualism & Psycholinguistics Research Laboratory

Language Experience and Proficiency Questionnaire (LEAP-Q)

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Today’s Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Date of Birth</td>
<td>Male □ Female □</td>
</tr>
</tbody>
</table>

1. Please list all the languages you know in order of dominance:
   1 □ 2 □ 3 □ 4 □ 5 □

2. Please list all the languages you know in order of acquisition (your native language first):
   1 □ 2 □ 3 □ 4 □ 5 □

3. Please list what percentage of the time you are currently and on average exposed to each language.
   *(Your percentages should add up to 100%)*
   | List language here: |
   | List percentage here: |

4. When choosing to read a text available in all your languages, in what percentage of cases would you choose to read it in each of your languages? Assume that the original was written in another language, which is unknown to you.
   *(Your percentages should add up to 100%)*
   | List language here: |
   | List percentage here: |

5. When choosing a language to speak with a person who is equally fluent in all your languages, what percentage of time would you choose to speak each language? Please report percent of total time.
   *(Your percentages should add up to 100%)*
   | List language here: |
   | List percentage here: |

6. Please name the cultures with which you identify. On a scale from zero to ten, please rate the extent to which you identify with each culture. *(Examples of possible cultures include US-American, Chinese, Jewish-Orthodox, etc.)*
   | List cultures here: |
   | (click here for scale) |

7. How many years of formal education do you have?
   Please check your highest education level (or the approximate US equivalent to a degree obtained in another country):
   - Less than High School
   - High School
   - Professional Training
   - Some College
   - Some Graduate School
   - College
   - Ph.D./M.D./J.D.
   - Masters
   - Other:

8. Date of immigration to the USA, if applicable. If you have ever immigrated to another country, please provide name of country and date of immigration here.

9. Have you ever had a vision problem □, hearing impairment □, language disability □, or learning disability □? *(Check all applicable).* If yes, please explain (including any corrections):
Language:

This is my (please select from pull-down menu) language.

All questions below refer to your knowledge of .

(1) Age when you:

<table>
<thead>
<tr>
<th>began acquiring</th>
<th>became fluent</th>
<th>began reading</th>
<th>became fluent reading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(2) Please list the number of years and months you spent in each language environment:

<table>
<thead>
<tr>
<th>A country where is spoken</th>
<th>Years</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A family where is spoken</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A school and/or working environment where is spoken</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(3) On a scale from zero to ten please select your level of proficiency in speaking, understanding, and reading from the scroll-down menus:

Speaking  | (click here for scale)  | Understanding spoken language | (click here for scale)  | Reading  | (click here for scale)

(4) On a scale from zero to ten, please select how much the following factors contributed to your learning:

<table>
<thead>
<tr>
<th>Interacting with friends</th>
<th>(click here for pull-down scale)</th>
<th>Language tapes/self-instruction</th>
<th>(click here for pull-down scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interacting with family</td>
<td>(click here for pull-down scale)</td>
<td>Watching TV</td>
<td>(click here for pull-down scale)</td>
</tr>
<tr>
<td>Reading</td>
<td>(click here for pull-down scale)</td>
<td>Listening to the radio</td>
<td>(click here for pull-down scale)</td>
</tr>
</tbody>
</table>

(5) Please rate to what extent you are currently exposed to in the following contexts:

<table>
<thead>
<tr>
<th>Interacting with friends</th>
<th>(click here for pull-down scale)</th>
<th>Listening to radio/music</th>
<th>(click here for pull-down scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interacting with family</td>
<td>(click here for pull-down scale)</td>
<td>Reading</td>
<td>(click here for pull-down scale)</td>
</tr>
<tr>
<td>Watching TV</td>
<td>(click here for pull-down scale)</td>
<td>Language/lab/self-instruction</td>
<td>(click here for pull-down scale)</td>
</tr>
</tbody>
</table>

(6) In your perception, how much of a foreign accent do you have in ?

(7) Please rate how frequently others identify you as a non-native speaker based on your accent in :
### Appendix B

1. Word list for the Repetition test

<table>
<thead>
<tr>
<th>Truku word</th>
<th>Pronunciation</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>wahir</td>
<td>['wahr]</td>
<td>‘leaves of vegetable’</td>
</tr>
<tr>
<td>sedelut</td>
<td>['sədəlʊt]</td>
<td>‘to stick’</td>
</tr>
<tr>
<td>bais</td>
<td>['bais]</td>
<td>‘partner’</td>
</tr>
<tr>
<td>ngusul</td>
<td>['ŋusul]</td>
<td>‘nasal mucus’</td>
</tr>
<tr>
<td>iyah</td>
<td>['ijak]</td>
<td>‘come’</td>
</tr>
<tr>
<td>qrack</td>
<td>['qərək]</td>
<td>‘scratch’</td>
</tr>
<tr>
<td>lala</td>
<td>['lələ]</td>
<td>‘many’</td>
</tr>
<tr>
<td>udaw</td>
<td>['udəw]</td>
<td>‘proud’</td>
</tr>
<tr>
<td>rap</td>
<td>['rap]</td>
<td>‘sound of wave’</td>
</tr>
<tr>
<td>belbul</td>
<td>['bəlbul]</td>
<td>‘banana’</td>
</tr>
<tr>
<td>mek-dawi</td>
<td>[mək-'dawi]</td>
<td>‘lazy’</td>
</tr>
<tr>
<td>iyax</td>
<td>['ijax]</td>
<td>‘gap’</td>
</tr>
<tr>
<td>rebu</td>
<td>['rəbu]</td>
<td>‘morning’</td>
</tr>
<tr>
<td>csdamat</td>
<td>[təs'damat]</td>
<td>‘lonely’</td>
</tr>
<tr>
<td>kuxul</td>
<td>['kuxul]</td>
<td>‘to like’</td>
</tr>
<tr>
<td>peapa</td>
<td>[pə'apa]</td>
<td>‘to carry’</td>
</tr>
<tr>
<td>cyaqung</td>
<td>['təcaqʊŋ]</td>
<td>‘crow’</td>
</tr>
<tr>
<td>geqeguq</td>
<td>[gə'qəqʊŋ]</td>
<td>‘abyss’</td>
</tr>
<tr>
<td>hic</td>
<td>['hi]\c</td>
<td>‘later’</td>
</tr>
<tr>
<td>dedima</td>
<td>[də'dyima]</td>
<td>‘bamboo’</td>
</tr>
<tr>
<td>xiluy</td>
<td>['xi]\c</td>
<td>‘metal’</td>
</tr>
<tr>
<td>mk-Qowgan</td>
<td>[məq-'Qowgan]</td>
<td>‘from Qowgan’</td>
</tr>
<tr>
<td>berbur</td>
<td>['bərbur]</td>
<td>‘to disturb’</td>
</tr>
<tr>
<td>pais</td>
<td>['pais]</td>
<td>‘enemy’</td>
</tr>
<tr>
<td>meyx</td>
<td>[meyx]</td>
<td>‘right on!’</td>
</tr>
<tr>
<td>tatat</td>
<td>['tətət]</td>
<td>‘puppy’</td>
</tr>
<tr>
<td>sedalih</td>
<td>[sə'daləh]</td>
<td>‘close; near’</td>
</tr>
<tr>
<td>rebagan</td>
<td>[rə'bəgən]</td>
<td>‘summer’</td>
</tr>
<tr>
<td>gerig</td>
<td>['gərəj]</td>
<td>‘dance’</td>
</tr>
<tr>
<td>lebu</td>
<td>['lebu]</td>
<td>‘short’</td>
</tr>
<tr>
<td>hug</td>
<td>[huw]</td>
<td>‘question marker’</td>
</tr>
<tr>
<td>qi</td>
<td>[qi]</td>
<td>‘to eat (IMP)’</td>
</tr>
<tr>
<td>yayung</td>
<td>['jəwuŋ]</td>
<td>‘river’</td>
</tr>
<tr>
<td>ram</td>
<td>[ram]</td>
<td>‘to eat without teeth’</td>
</tr>
<tr>
<td>katay</td>
<td>['katay]</td>
<td>‘damaged’</td>
</tr>
<tr>
<td>eniq</td>
<td>['əniq]</td>
<td>‘to be’</td>
</tr>
<tr>
<td>tehowlang</td>
<td>['təho'ləŋ]</td>
<td>‘boss/officer’</td>
</tr>
<tr>
<td>iq</td>
<td>[iə]</td>
<td>‘yes’</td>
</tr>
<tr>
<td>geeguy</td>
<td>[gə'gəjuŋ]</td>
<td>‘to steal’</td>
</tr>
<tr>
<td>hengeras</td>
<td>[hə'nəras]</td>
<td>‘to nag’</td>
</tr>
</tbody>
</table>
### 2. Henang Kari Truku ‘Likert scale on Truku naturalness’

<table>
<thead>
<tr>
<th>Older Adults (OA)</th>
<th>Ini bi kedeka henang Truku</th>
<th>Ini kedeka henang Truku</th>
<th>Ini mu kelayi muway spug</th>
<th>Medeka henang Truku</th>
<th>Balay bi hntag Truku</th>
</tr>
</thead>
<tbody>
<tr>
<td>OA01</td>
<td>‘Strongly disagree’</td>
<td>‘Disagree’</td>
<td>‘Neither agree nor disagree’</td>
<td>‘Agree’</td>
<td>‘Strongly agree’</td>
</tr>
<tr>
<td>OA02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>OA03</td>
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<td>OA04</td>
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<td>OA05</td>
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<td>OA06</td>
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<tr>
<td>OA07</td>
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<td>OA08</td>
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<td>OA09</td>
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<td>OA10</td>
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<td>OA11</td>
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<tr>
<td>OA12</td>
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<td>OA13</td>
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<td>OA14</td>
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<td>OA15</td>
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<td>OA16</td>
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<td>OA17</td>
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<tr>
<td>OA18</td>
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<td>OA19</td>
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<tr>
<td>OA20</td>
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</tr>
<tr>
<td>OA21</td>
<td></td>
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</tr>
</tbody>
</table>
3. Summary of pluralization

Except for the VC reduplication where the schwa is inserted before a vowel-initial base, all plurals need to undergo at least two processes: (i) reduplicating the element, and (ii) weakening the vowel to /ə/ in the reduplicated element.

<table>
<thead>
<tr>
<th>Type of reduplication</th>
<th>Syllable structure</th>
<th>Reduplicated portion</th>
<th>Function</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full</strong></td>
<td>VC</td>
<td>base</td>
<td>emphasis</td>
<td>1. iq → iq-iq (reduplication)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. aqiq (vowel reduction)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. aq-ə-iq (schwa insertion)</td>
</tr>
<tr>
<td></td>
<td>CVC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Partial</strong></td>
<td>VCVC</td>
<td>VC</td>
<td>augmentation</td>
<td>1. `alang → al-alang</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. al-alang</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. al-ə-alang</td>
</tr>
<tr>
<td></td>
<td>CV</td>
<td>CV</td>
<td>plural</td>
<td>1. `kuung → ku-kuung</td>
</tr>
<tr>
<td></td>
<td>CVCV</td>
<td>CVVC</td>
<td></td>
<td>2. kə-`kuung</td>
</tr>
<tr>
<td></td>
<td>CVVC</td>
<td>CVC</td>
<td>plural</td>
<td>1. `Lowking → Lk-Lowking</td>
</tr>
<tr>
<td></td>
<td>CVCV</td>
<td>CVC</td>
<td></td>
<td>2. Lək-`Lowking</td>
</tr>
<tr>
<td></td>
<td>CVCV</td>
<td>CVCV</td>
<td>plural</td>
<td>1. `bərah → bəra-bərah</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. bərə-bərah</td>
</tr>
</tbody>
</table>

4. Voice and tense/aspect paradigm

<table>
<thead>
<tr>
<th>AV</th>
<th>GV</th>
<th>RV</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRS</td>
<td>-em-</td>
<td>-un (GV1)</td>
</tr>
<tr>
<td>PRF</td>
<td>-em-en-</td>
<td>-en-an</td>
</tr>
<tr>
<td>PST</td>
<td>wada -em-</td>
<td>wada -un</td>
</tr>
<tr>
<td>PROG</td>
<td>gaga -em-</td>
<td>gaga-un</td>
</tr>
<tr>
<td>FUT</td>
<td>mpe-</td>
<td>-un</td>
</tr>
</tbody>
</table>
5. Spoken data for the picture story ‘Frog, where are you?’

Images are from http://childes.psy.cmu.edu/manuals/frog.pdf
a. Yudaw Pisaw, the LCI

(1) nii hini ka Lowking nii qmita qepatur tnbgal na nina qrasun qmita.
(2) ni deha huling niya, huling naka hangan na ni Kumay.
(3) kiya do o, niyi deha qrasun qmita ni ska yuqow ka niyi yuqow ka qepatur niyi.
(4) mkru balay keman sida, yasa niqan ka idas gaga rmidax lihaw gaga hki.
(5) ni duri keman mtaqi sida do o, deha huling na mtaqi srakaw baraw ka Lowking niyi.
(6) kiya ka kiya ni, tlung mtaqi sida do o, qpadul ga dmbgal hiya ka ni mniq yuqow niyi o, wada
(7) qduriq da! kika kiaya do o, babaw na sida do o, wada inu wada qduriq inu msa naqih kuxul
 naka Lowking niyi ni. ngarun naka e raimil niya "kuju" niya aji na dliing hini hug sunsa
 miying ka "kuju" o ungat hiya uri.
(8) sida do o, dmlung naka Lowking niyi ka sunna drmux kska yoqo hiya ka tunux niya.
(9) rubang sa musa miying e qepatur ka hiya uri o daay tunux naka mnsa rmnux ska yoqu da.
(10) kiya ka kiya ni, huling niyi da ga, Lowking ni miying wada su inu da qepatur pslawa naka
 qepatur.
(11) siida o, Kumay ni da ga, ida ki mrmux ska yoqo ka tunux niya o, mtucing paah baraw do o,
(12) kiya do o mgrung ka yuqo na niyi da.
(13) yasa wada gmrunq ka yuqo niyi uri da ni patul na o wada qduriq uri do o, Lowking ga, saw
niyi naqih bi kuxul na hiya siida.
(14) ya wada inu da hug msa ni kiya do, mradat ngangut ni, saan deha mrawa ka qepatur wada qduriq niyi.
(15) kiya ka kiya ni siida qmita taay na ga kingal tmunan dgiya ga pusu gesida qhowni hiya ka dhiya niyi do o, kiya da ni, Lowking ni da ga, niqan ka bring ni kska e qhowni paru hiya, aji ga hiya qepatur hug mnsa ni, saan na e miying ka bling e saan na qmita.
(16) taay saw, kiya ka kiya ni, towma dgxgal ka ga hiya ga bling towma dxgal o, saan na qmita kiya uri.
(17) kela su ha, aji ga 'qring' dowma dxgal hini mnsa ni, sa qmita dxgal hiya o, asi bi taay sriyu paah hiya ka kingal qowrit.
(18) kiya ka kiya ni, siida lowking ka huling na niya saan na rmru dgiya da ga, kiya do o, kingal bnnunun biya ka ni sngun sida qhowni hiya o, yasa snlu na do o, mtucing ka hnu da, tmunan dgiya da ga.
(19) kiya ni, yasa siida do o, Lowking ga, musa qmita e langax e qhowni paru, ida bi ga hini ka qepatur msa o, kela sa hka untag hiya ka qepatur.
(20) kiya ni kska bling towma dxgal o sruyi hiya ka qowrit. bukuy na hiya do o, brhagun dgiya, cina bgiya ka hbaral balay cina bgiya ka ga hmraw Lkingan wada qduriq ka Lowking niyi.
(21) paah kska bling o, kela su hka, kelaan sa ga hini ka qepatur mnsa ka Lowking saan na mita o, sriyu paahhiya ka kingal purung.
(22) kska paah bling da ga, kiya do o, ungat ka muda babaw na siida do o, Lowking da ga, kiya do o, musa qduriq ni, mnsa siyaw tasil paru.
(23) musa mkaraw tasil paru ka hiya o, kiya do o, kela su ha ga qmita kingal siida qhowni, yaasa sida qhowni ka Lowking ni da dlungun na ka sida qhowni niyi o, taay aji sida qhowni, melawa ka Lowking niyi, qepatur ga su inu da hug?
(24) wada su inu da hug mnsa miying. qilan deha smayang deha miying ka qepatur niyi ni, kiya do o, eniq kiya tasil hiya ka Lowking huling na niyi ha.
(25) manu siida do o, mkluyi ka e, rqnux, kela sa ha ka knsa sida qhowni ka tlngun niya do o, mkluyu ka rqnux niyi, mduduy ka rqnux.
(26) ga asi lu dmapa babaw tunux rqnux ka Lowking niyi da.
(27) ga qmita paah baraw ka e puring ni ka mniq kska bling dngradax ha!
(28) kiya do o, yasa mkruyi ka rqnux ni o, mani yasa ni paapa bukuy ni e kmartar siida e tunux rqnux ka Lowking niyi do o, mkruyi ka rqnux ni dmarang ka hiya, dmarang ka hiya o smngun hiya dmarang ka e Lowking huling na niyi uri.
(29) kela su ha bera na siida do o, dehuq qemiri e siyaw yayung ka siida do o, kiya he,...ano, kela su haya ka e yawung paru ka druma ni, dorwas ka berah na hiya do o, aisi do remdu ka remedu siyaw doras hiya ka rqnux do o, wada sera huq paah tunux penepaan na hiyi maka Lowking niyi da ga, bosh mtucing yawung.
(30) dmarang ka e Lowking huling na niyi meuyas ka qeputur da.
(31) ga asiq kiyi tasil hiya ka Lowking niyi da.
(32) ga mtucing hiya ka Lowking niyi uri da.
(33) kiya ka kiya ni mtucing yawung siida do o, tg?ngarun maka Lowking Lowking huling niya ah..Kumay ka huling na niyi ni, Lowking niyi ga gpaa a e hirang Lowking niyi ka huling naka Kumay niyi, bukuy na siida do o, bahang e ngat ka muuyas ka qepatur da.
(34) kiya o renagan maka hnu da ka e huling Lowking na niyi ni, Lowking niyi ni rngagan maka Kumay huling nya, iya squwaq iya squwaq suun niya do o, yaasa siida meuyas ka qepatur hki.
(35) saan deha mqiri bukuy do o, kela su haya niyi hiya ka e bubu qepatur ni tama qepatur.
(37) taan deha, hlayan deha niyi hiya. yaasa hbaraw ka muuyas uri do "qwaq qwaq qwaq qwaq"  
(38) mnsa muyas ka qepatur o, bhangan deha do o, kela su ha taan na ka tama ni bubu qepatur,  
ni, miying eniq hiya ka wawa na uri, hbaraw bi ka wawa qepatur ka miniq tuhuy buwa na 
hiya o, wada asi starir sqo e starir quri Lkingan ka kingal wawa qepatur dbgan niya da.  
(39) saw kiya do o, Lowking niyi da ga, taay qaras ni asi na jiyi baga ka psawun na babaw baga 
niya ka qepatur tnbgan niya ni, kiya do o, hmnici smwayay dhyaan.  
(40) swayay ta da ha, mowsa nami da mnsa ni, kiya do, hmnici mqowaq baga mha nami da mnsa 
ni, kiya do o, wada mqaras musa sapah ka Lowkign niyi ni Kumay huling na niyi da.

b. Spoken data for the Older Adults [OA]

OA 002

Niqan kigal laqi senaw ni kingal huling. Kingan lungaw na hiya o, niqan kingal qepatur. 
Keman sida na mtaqi sida da o, wada qduqiq ka qepatur niya. Ni, jiyi da o, tutuy ka laqi senaw 
ni deha huling niya o, ungat seka hiya ka qepatur niya da. Mgsmay miying ka laqi niyi ni huling 
niya o, asi long msa sekna lungaw hika huling niya. Pqeyya hiya ka seka tunux na ka lungaw niya 
dani, mmsay bi ka laqi senaw ni, asi lung msa mstaring ngangut ka huling ni da o, mrung ka 
langaw niya. Kika duwa mqaras ka huling na niyi. Kiya ni laqi senaw niyi da o, kingan jiyax 
musa melatat ngangut ni, aji da o musa seka dgiyaaq sida o, strung mniq niqan daka siwiping seka 
qehuni hika keradaw. Kiya ni, mqlas ka laqi senaw ni o; huling ni da o, musa mlelu daka walu 
heyi sida da o, Qyuti kradaw ka laqi senaw na ni da. Kiya niyi, saan na mlelu sida ka e kradaw ni 
da o; mtucung paah qehuni ka kradaw niya da. Kiya ni, laqi senaw niyi nurr o, pstlong deha 
urung. Mklwi ka laqi senaw niya da, nklalah paah seka qehuni ka urung. Ni, mestaling, 
mbhlagan kradaw ka huling niya. Ni, sida da o, msliyu hinu nurr da rehug. Melawaw hey sida o, 
miying huling niya ka laqi sinaw niyi. Kela hi syda do o, mstrung kingan lequerung qalas balay 
mlupung ni kika mqlas bi smuway ka dhiya uri da.

OA 008

Niqan kingan ka laqi, kuxun na balay ka qepatur ni, qepatur nii o nii na psaun kingan 
lungaw, ey… rowan lungaw hinu; huling uri. Metaqi ka laqi nida ni, qepatur ni da o, paah kingan 
lungaw, ruwan kingan lungaw ni ga qeduriq da, ya maha ngangut hug…ni, mtutuy ka laqi ni do, 
ruwan lungaw hinu do, ungat ka qepatur da, miyah ka laqi nida ni, miying ni, ida miying giman 
naka qepatur, ini na helay. Ida na miying, miying musa nganhut ni pah beling melawaw, melawa 
qepatur nini; gasu inu, wada su inu…da msa, deha huling nii miying, miying da ni, sida do o 
huling ni o, ngali naka lungaw wada nanaq meremux tunux na hey ka huling ni; remmux ey 
ruwan lungaw nini. Miyah ka laqi ngali naka huling ni…. ida na ini helay ka henu… qepatur ga. 
Musa ni, musa ngangut duri, wada miying... ida sa qepatur ga su inu, ga su inu. Dega huling ni 
ida miying...ni nakayh bi kuhul na ka laqi nii, deha huling nii, yasa kuxul na bika qepatur nii. 
Wada miying wada ngangut ni, ida miying ida miying...niqan kingan ka hnu, qehuni ga, miying 
kana bling ana inu...kana bbuyu dan na miying, ida na ini helayi. Naqih bi kuhul naka laqi niyi. 
Niqan kingan ka beling, beling hiya o... paah beling hiya ngagan naka beling ni "qepatur , gasu 
inu, gasu inu, iyah nehari da." ma ka laqi melawa ni, sereyyu paah beling ka henu da, qepatur ni, 
mita ka laqi ni, tayan qaras na, ga merawa hiya kana dehiya ni....wada ni... saw musa kingan 
qehuni paru balay ka laqi ni o, qmita ruwan seka qehuni hiya niqan kingan beling, ya melawa
hey ka laqi, asi ka sleyyu hey ka purung, purung sleyyu paah paru qehuni beling, sleyyu hini, sekelui ka laqi ni metakul truma ka laqi ni da; qemita ka huling na da ni, miyah nehari ni,...wada sikiya da, purung ni wada sikiya ni, asi qetay melawa: ga inu da qepatur ni? Miyah ka laqi ni, asi tay strong reqnux, mita reqnux,..., huling wada ni, ga papa tunux reqnux hey ka laqi nini, wada ni metakul.. wada muda dgiyaq ni, mtakulka laqi ni, mtakul ka huling uri; kiya do takul dani, truma o yayung, qsiya yayung. gayayung ga terebuq yayung ka huling ni laqi. Ga terebuq hey do binaw wah, ngali ka huling, pani na heyrang ka huling nini, seka yayung; miyah ni...musa siyaw da, niqan ka kingan qehuni, papa babaw qehuni hini huling uri, ya dehuq siyaw yayung do, qepatur ni huling msupu jiya kana. Dhugq siyaw do, wada da ni, niqan ka deha qepatur.

OA 011

qelabun naka...gisu demuy qepatur kingan. Huling na o, gisu sebelayiq balay..., gisu babaw qesiya. Ni, melawa, ka melawa o, trawah ka qowaq na ka huling ni, ka hemuya hug mesa. Ni twlung babaw na hini...babaw qlon, qehuni ka deha qepatur. Saru, kingan senaw ni kuyuh dayan ka Wawa na ni...metaru, empitu, Kingan ka gisu metucing, tucing truma.

OA 019


c. Spoken data for the Adults [AD]

AD 001


AD 002

AD 006


AD 007


AD 012


d. Spoken data for the Young adults [YA]

YA 001

Kingan laqi ni kingan huling. 他們養了一隻 qepatur 的時候, 然後那隻 qepatur 不見 da.他們一直在找那隻青蛙，然後一直找不到他們在森林裡, 遇到很多 kuwi. 還有 kowlit, 然後他們跑到樹裡面找。結果有一隻鳥，但是，他們還是找不到...他們遇到一隻 miyit，那隻 mirit beheragan, 推到懸崖底下, 他們掉到水裡, 還是找不到, 結果他們在木頭後面找到.

YA 002


YA 007

就...有一天，男孩可能在養青蛙吧；就對這隻青蛙放在瓶子裡面養。到了半夜，趁小孩們睡覺的時候，那隻青蛙就跑了出來。於是等小孩們起來的時候，就發現青蛙已經不見了。他們就怎麼找都找不到了，一直找一直找。於是這隻狗就跳了出來。把它頭上的玻璃瓶打破。小男孩也是在外面...他們到外面一直找青蛙。一直大喊一直講；怎麼樣也找不到。於是小孩要跳了出來；把它頭上的玻璃瓶打破。小男孩也是在外面...他們到外面一直找青蛙。一直大喊一直講；怎麼樣也找不到。於是小孩要跳了出來；把它頭上的玻璃瓶打破。小男孩也是在外面...他們到外面一直找青蛙。一直大喊一直講；怎麼樣也找不到。
有那個小男孩.他在看那個青蛙.然後他睡覺.然後青蛙跑出去.等到起來的時候.青蛙就不見了.然後他一直找一直找.然後找不到.他就不...把蜜蜂窩給弄倒了.結果招來很多蜜蜂.他們就一直找一直找.然後就跌倒了.跌到一個池塘裡面.結果之後他終於找到青蛙.他就把那隻青蛙帶回家.

YO 014


YO 017

有一個 laqi 跟 huling ,在養一隻 qepatu. Qepatur 跟 huling 在睡覺的時候.qepatur 就跑走了.然後 raki 跟 Huling 一直找...一直找; 然後...raki 跟 huling 去蜜蜂窩那裡找. raqi 就跑到一個大石頭上那邊.又掉到麋鹿的頭上.麋鹿把 laqi. huling,丢到池塘裡面. raqi 就找到一個木頭; 去後面找又找到了.Qepatur 跟它一家人就...
Appendix C

1. The Universal Declaration of Linguistic Rights (Article 1)

This Declaration considers as a *language community* any human society established historically in a particular territorial space, whether this space be recognized or not, which identifies itself as a people and has developed a common language as a natural means of communication and cultural cohesion among its members. The term *language specific to a territory* refers to the language of the community historically established in such a space.

2. Declaration of Rights of the Indigenous People adopted by United Nation General Assembly (Article 13.1)

Indigenous peoples have the right to revitalize, use, develop and transmit to future generations their histories, languages, oral traditions, philosophies, writing systems and literatures, and to designate and retain their own names for communities, places and persons.

3. The indigenous people basic law, Council of Indigenous People (Article 30)

The government shall respect tribal languages, traditional customs, cultures and values of indigenous peoples in dealing with indigenous affairs, making laws or implementing judicial and administration remedial procedures, notarization, mediation, arbitration or any other similar procedure for the purpose of protecting the lawful rights of indigenous peoples. In the event that an indigenous person does not understand the Chinese language, an interpreter who speaks the tribal language shall be provided.
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