

Heritage Language Development and Maintenance of Heritage Speakers of Korean in Australia in Primary School Years

Author:

Jung, Sin Ji

Publication Date:

2022

DOI:

<https://doi.org/10.26190/unsworks/23971>

License:

<https://creativecommons.org/licenses/by/4.0/>

Link to license to see what you are allowed to do with this resource.

Downloaded from <http://hdl.handle.net/1959.4/100264> in <https://unsworks.unsw.edu.au> on 2024-04-20



**Heritage Language Development and Maintenance
of Heritage Speakers of Korean in Australia
in Primary School Years**

Sin Ji Jung

A thesis in fulfilment of the requirements for the degree of
Doctor of Philosophy

School of Humanities and Languages

Faculty of Arts, Design and Architecture

September 2021

Thesis Title and Abstract

Thesis Title

Heritage Language Development and Maintenance of Heritage Speakers of Korean in Australia in Primary School Years

Thesis Abstract

Sparked by the interesting observation of non-native acquisition of heritage languages despite early and continuous exposure, the study of heritage languages has endeavoured to explore the end results of heritage language acquisition while mostly neglecting the pathway that heritage speakers undergo before arriving in that state. This study investigated how the heritage language develops and is maintained over primary school years in heritage speakers of Korean who grow up in Australia. Linguistic abilities in Korean of 243 heritage speakers of Korean of primary school age in Australia, compared to their school-year-level-matched native speakers of Korean in the Republic of Korea (South Korea), have been examined in the three broad linguistic areas of the sound system, lexis and grammar with a battery of tasks.

The results of the tasks indicated that the heritage speakers generally fell behind the native speakers in the linguistic abilities in Korean examined but their gap to the native speaker controls differed between the linguistic areas examined. Regarding the sound system, the heritage speakers did not show reliably lower perception of speech sounds in Korean than those of the native speakers, and their speech sound perception, which is supposed to have developed and been stabilised in early childhood, appeared to be retained well over primary school years. On the contrary, they exhibited a great shortfall in lexical knowledge in Korean compared to their native speaker peers, and this gap appeared to widen from the middle primary school year levels where the lexical knowledge of the native speakers expands explosively. In comparison, their linguistic abilities in grammar exhibited a varying degree of divergence to the native speaker norms by linguistic aspect. The results suggested that they acquired basic syntactic structures and semantic features that develop early in first language acquisition of Korean to a level comparable to that of their native speaker peers and their understanding of sentences made of such linguistic aspects was maintained well over the primary school period. In contrast, they exhibited a considerable delay in the acquisition of certain grammatical aspects that are mastered relatively late by the native speakers, and the heritage speakers' acquisition of these aspects did not seem to progress greatly over primary school years. They also showed a substantial gap to the native speaker controls in understanding passive sentences and scrambled active sentences, and this gap is likely to have arisen from their greater processing difficulty.

Mostly paralleling the linguistic abilities of adult heritage speakers attested in previous research, the results of this study underline that the linguistic abilities in Korean of heritage speakers of Korean in Australia diverge from their (age- or) school-year-level-appropriate native norms already in their primary school years. Although the linguistic aspects that are mastered early in first language acquisition such as phoneme distinction or basic syntactic structures seem to be acquired to a level comparable to their school-year-level-appropriate native norms and be retained well over the first half of their compulsory schooling, the linguistic abilities that should develop further through primary school years show signs of stagnation (if not attrition) and such signs are much more prominent at the middle primary school year levels. This implies that in Australia where English-Korean bilingual education programs are not readily accessible to heritage speakers of Korean, it will be extremely difficult for them to develop high proficiency in Korean which requires mastery of complex grammatical aspects and extensive vocabulary. The results of this study not only alarm the Korean ethnolinguistic community in Australia and other stakeholders about the level of Korean language abilities developed and maintained by the heritage speakers in primary school years, but also provide detailed information on in which linguistic aspects they may have greater delays in the development, by which degree they show such delays and when the delays are likely to intensify over the course of primary school years.

Originality statement, Copyright and Authenticity Statements

ORIGINALITY STATEMENT

☒ I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the award of any other degree or diploma at UNSW or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by others, with whom I have worked at UNSW or elsewhere, is explicitly acknowledged in the thesis. I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception or in style, presentation and linguistic expression is acknowledged.

COPYRIGHT STATEMENT

☒ I hereby grant the University of New South Wales or its agents a non-exclusive licence to archive and to make available (including to members of the public) my thesis or dissertation in whole or part in the University libraries in all forms of media, now or here after known. I acknowledge that I retain all intellectual property rights which subsist in my thesis or dissertation, such as copyright and patent rights, subject to applicable law. I also retain the right to use all or part of my thesis or dissertation in future works (such as articles or books).

For any substantial portions of copyright material used in this thesis, written permission for use has been obtained, or the copyright material is removed from the final public version of the thesis.

AUTHENTICITY STATEMENT

☒ I certify that the Library deposit digital copy is a direct equivalent of the final officially approved version of my thesis.

Inclusion of Publications Statement

UNSW is supportive of candidates publishing their research results during their candidature as detailed in the UNSW Thesis Examination Procedure.

Publications can be used in the candidate's thesis in lieu of a Chapter provided:

- The candidate contributed **greater than 50%** of the content in the publication and are the "primary author", i.e. they were responsible primarily for the planning, execution and preparation of the work for publication.
- The candidate has obtained approval to include the publication in their thesis in lieu of a Chapter from their Supervisor and Postgraduate Coordinator.
- The publication is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in the thesis.

☒ The candidate has declared that **their thesis contains no publications, either published or submitted for publication.**

Candidate's Declaration



I declare that I have complied with the Thesis Examination Procedure.

Abstract

Sparked by the interesting observation of non-native acquisition of heritage languages despite early and continuous exposure, the study of heritage languages has endeavoured to explore the end results of heritage language acquisition while mostly neglecting the pathway that heritage speakers undergo before arriving in that state. This study investigated how the heritage language develops and is maintained over primary school years in heritage speakers of Korean who grow up in Australia. Linguistic abilities in Korean of 243 heritage speakers of Korean of primary school age in Australia, compared to their school-year-level-matched native speakers of Korean in the Republic of Korea (South Korea), have been examined in the three broad linguistic areas of the sound system, lexis and grammar with a battery of tasks.

The results of the tasks indicated that the heritage speakers generally fell behind the native speakers in the linguistic abilities in Korean examined but their gap to the native speaker controls differed between the linguistic areas examined. Regarding the sound system, the heritage speakers did not show reliably lower perception of speech sounds in Korean than those of the native speakers, and their speech sound perception, which is supposed to have developed and been stabilised in early childhood, appeared to be retained well over primary school years. On the contrary, they exhibited a great shortfall in lexical knowledge in Korean compared to their native speaker peers, and this gap appeared to widen from the middle primary school year levels where the lexical knowledge of the native speakers expands explosively. In comparison, their linguistic abilities in grammar exhibited a varying degree of divergence to the native speaker norms by linguistic aspect. The results suggested that they acquired basic syntactic structures and semantic features that develop early in first language acquisition of Korean to a level comparable to that of their native speaker peers and their understanding of sentences made of such linguistic aspects was maintained well over the primary school period. In contrast, they exhibited a considerable delay in the acquisition of certain grammatical aspects that are mastered relatively late by the native speakers, and the heritage speakers' acquisition of these aspects did not seem to progress greatly over primary school years. They also showed a substantial gap to the native speaker controls in understanding passive sentences and scrambled active sentences, and this gap is likely to have arisen from their greater processing difficulty.

Mostly paralleling the linguistic abilities of adult heritage speakers attested in previous research, the results of this study underline that the linguistic abilities in Korean of heritage speakers of Korean in Australia diverge from their (age- or) school-year-level-appropriate native norms already in their primary school years. Although the linguistic aspects that are mastered early in first language acquisition such as phoneme distinction or basic syntactic structures seem to be acquired to a level comparable to their school-year-level-appropriate native norms and be retained well over the first half of their compulsory schooling, the linguistic abilities that should develop further through primary school years show signs of stagnation (if not attrition) and such signs are much more prominent at the middle primary school year levels. This implies that in Australia where English–Korean bilingual education programs are not readily accessible to heritage speakers of Korean, it will be extremely difficult for them to develop high proficiency in Korean which requires mastery of complex grammatical aspects and extensive vocabulary. The results of this study not only alarm the Korean ethnolinguistic community in Australia and other stakeholders about the level of Korean language abilities developed and maintained by the heritage speakers in primary school years, but also provide detailed information on in which linguistic aspects they may have greater delays in the development, by which degree they show such delays and when the delays are likely to intensify over the course of primary school years.

Table of Contents

ABSTRACT	I
TABLE OF CONTENTS.....	III
LIST OF TABLES	X
LIST OF FIGURES	XII
LIST OF ABBREVIATIONS	XIV
CHAPTER 1 INTRODUCTION	1
1.1 Background.....	1
1.2 Purpose of study	3
1.3 Significance of study	4
1.4 Organisation of study.....	5
1.5 Limitations of study	5
CHAPTER 2 HERITAGE SPEAKERS OF KOREAN IN AUSTRALIA AND THEIR HERITAGE LANGUAGE EDUCATION.....	7
2.1 Heritage Speakers of Korean in Australia.....	7
2.1.1 Korean ethnolinguistic community in Australia	7
2.1.2 Language maintenance in the Korean ethnolinguistic community in Australia.....	9
2.2 Education of Korean as a Heritage Language in Australia	12
CHAPTER 3 LITERATURE REVIEW	15
3.1 Definition of terminologies: Heritage languages and heritage speakers	15
3.1.1 Definition from perspectives in sociolinguistics.....	15
3.1.2 Definition from perspectives in educational linguistics.....	16

3.1.3 Definition from perspectives in theoretical linguistics	18
3.1.4 Heritage languages and heritage speakers in the current study	18
3.2 Heritage language acquisition	20
3.3 Heritage language acquisition outcomes—Adult heritage speakers’ linguistic characteristics.....	22
3.3.1 Heritage speakers compared to adult second language learners	23
3.3.1.1 Linguistic profiles of adult heritage speakers	23
3.3.1.2 Heritage advantages	25
3.3.2 Heritage speakers compared to native speakers	28
3.3.2.1 Heritage speakers’ divergence from native norms by linguistic domain.....	29
3.3.2.2 Heritage speakers’ divergence from native norms by proficiency .	32
3.4 Linguistic characteristics of English-speaking heritage speakers of Korean	33
3.4.1 Heritage language sound system	34
3.4.2 Heritage language lexis	37
3.4.3 Heritage language grammar	38
3.5 Factors affecting heritage language acquisition	42
3.5.1 Heritage language experience	42
3.5.2 Language internal factors	45
3.5.3 Cross-linguistic influences	47
3.6 Summary	48
CHAPTER 4 METHODOLOGY	50
4.1 Research design	50
4.2 Research questions	51
4.3 Research methods.....	52
4.3.1 Research participants	52
4.3.2 Assessment of Korean language abilities.....	54

4.3.2.1 Test development	54
4.3.2.2 Preparation of test administration	55
4.3.2.3 Task administration	57
4.3.3 Information on language background	58
4.3.3.1 Questionnaire design	58
4.3.3.2 Questionnaire administration	58
4.3.4 Transcription and analysis	59
 CHAPTER 5 DEVELOPMENT AND MAINTENANCE OF HERITAGE	
LANGUAGE SPEECH SOUND PERCEPTION	60
 5.1 Task design	60
 5.2 Results	64
5.2.1 Comparison between speaker groups—KHSs’ differences from their KNS peers in phoneme distinction	65
5.2.2 Comparison between school year levels—KHSs’ change in phoneme distinction	70
5.2.3 Comparison between test items—KHSs’ difficulty with particular phonemic contrasts	73
5.2.3.1 Analysis of accuracy by test item	73
5.2.3.2 Further analysis of accuracy by sound property	79
 5.3 Discussion of results	82
5.3.1 KHSs’ divergence from native norms in phoneme distinction	82
5.3.2 KHSs’ change in phoneme distinction	87
5.3.3 KHSs’ difficulty with particular phonemic contrasts	93
 5.4 Summary	97
 CHAPTER 6 DEVELOPMENT AND MAINTENANCE OF HERITAGE	
LANGUAGE VOCABULARY	99
 6.1 Task design	99
 6.2 Results	102

6.2.1 Comparison between speaker groups—KHSs’ differences from their KNS peers in receptive vocabulary	104
6.2.2 Comparison between school year levels—KHSs’ change in receptive vocabulary.....	107
6.2.2.1 Comparison between test items—KHSs’ difficulty with particular vocabulary	110
6.2.2.1.1 Analysis of accuracy by test item	110
6.2.2.2 Further analysis of accuracy by lexical property	114
6.2.2.2.1 Accuracy by REVT-R item number.....	114
6.2.2.2.2 Accuracy by word frequency	118
6.2.2.2.3 Accuracy by word formation/origin (native-Korean vs Sino-Korean)	122
6.2.2.2.4 Accuracy by word class (nouns vs. verbs).....	124
6.3 Discussion.....	125
6.3.1 KHSs’ differences from their KNS peers in receptive vocabulary	125
6.3.2 KHSs’ change in receptive vocabulary	131
6.3.3 KHSs’ difficulty with particular vocabulary	136
6.3.3.1 Accuracy by test item—KHSs’ relatively low accuracy on particular test items	136
6.3.3.2 Accuracy by lexical property	138
6.3.3.2.1 Accuracy by REVT-R item number.....	138
6.3.3.2.2 Accuracy by word frequency	139
6.3.3.2.3 Accuracy by word formation/origin (native-Korean vs Sino-Korean)	141
6.3.3.2.4 Accuracy by word class (nouns vs verbs).....	143
6.4 Summary	144
 CHAPTER 7 DEVELOPMENT AND MAINTENANCE OF HERITAGE LANGUAGE GRAMMAR	 148
7.1 Task design	148
7.1.1 Task 3—A picture selection task for multiple syntactic and semantic aspects.....	149

7.1.2 Task 4—A GJ task for four different linguistic aspects.....	150
7.1.3 Task 5—A picture selection task for the passive	154
7.2 Results	154
7.2.1 Comparison between speaker groups—KHSs’ differences from their KNS peers in grammatical abilities	157
7.2.1.1 Comparison of performance between speaker groups	157
7.2.1.1.1 Task 3—A picture selection task for multiple syntactic and semantic aspects	157
7.2.1.1.2 Task 4—A GJ task for four different linguistic aspects.....	158
7.2.1.1.3 Task 5—A picture selection task for the passive	158
7.2.1.2 Statistical significance of performance difference between speaker groups.....	159
7.2.2 Comparison between year levels—KHSs’ change in grammatical abilities.....	164
7.2.2.1 Comparison of performance between school year levels.....	164
7.2.2.1.1 Task 3—A picture selection task for multiple syntactic and semantic aspects	164
7.2.2.1.2 Task 4—A GJ task for four different linguistic aspects.....	165
7.2.2.1.3 Task 5—A picture selection task for the passive	165
7.2.2.2 Statistical significance of performance difference between year levels	168
7.2.3 Comparison between test items—KHSs’ difficulty with particular grammatical aspects.....	172
7.2.3.1 Task 3—A picture selection task for multiple syntactic and semantic aspects	172
7.2.3.2 Task 4—A GJ task for four different linguistic aspects.....	175
7.2.3.3 Task 5—A picture selection task for the passive	181
7.3 Discussion.....	183
7.3.1 KHSs’ differences from their KNS peers in grammatical abilities.....	183
7.3.1.1 Task 3—Relatively small difference in basic syntax and semantics	184

7.3.1.2 Task 4—Large difference in linguistic aspects mastered late.....	187
7.3.1.3 Task 5—Large difference in comprehension of passive sentences	189
7.3.2 KHSs’ change in grammatical abilities.....	193
7.3.2.1 Task 3—Maintenance of basic syntax and semantics.....	194
7.3.2.2 Task 4—Stagnant development of linguistic aspects mastered late	196
7.3.2.3 Task 5—Maintenance of comprehension of passive sentences	201
7.3.3 KHSs’ relative difficulty with particular linguistic aspects	204
7.3.3.1 Task 3—Particular syntactic structures or semantic pictures	204
7.3.3.2 Task 4—Particular linguistic aspects	207
7.3.3.3 Task 5—Passive sentences and OSV sentences	210
7.4 Summary.....	213
CHAPTER 8 HERITAGE LANGUAGE ABILITIES AND HERITAGE LANGUAGE EXPERIENCE	217
8.1 Correlations among heritage language abilities in different linguistic areas	217
8.2 Heritage language experience and heritage language abilities	220
8.2.1 Participant backgrounds related to heritage language experience	221
8.2.2 Correlation between language backgrounds and heritage language abilities.....	226
CHAPTER 9 DISCUSSION.....	233
9.1 Summary of findings.....	233
9.2 Theoretical implications and directions for future research	234
9.2.1 Development and maintenance of HL sound system.....	234
9.2.2 Development and maintenance of HL vocabulary	238
9.2.3 Development and maintenance of HL grammar	242
9.2.3.1 Basic syntax and semantics.....	242
9.2.3.2 Linguistic aspects mastered late.....	245

9.2.3.3 Comprehension of passive sentences	250
9.3 Practical implications for KHSs in Australia	253
9.3.1 Need for provision of bilingual education programs	253
9.3.2 Korean immigrant families	256
CHAPTER 10 CONCLUSION	259
APPENDICES	266
REFERENCES	305

List of Tables

Table 2.1 Languages Other than English spoken at home in Australia	7
Table 2.2 Number of people speaking Korean at home among the Australian population of Korean ancestry in 2016 Census.....	11
Table 4.1 Number of participants in the study	53
Table 5.1 Numbers, mean scores and standard deviations of scores of KHSs and KNSs in Years 1–6 in girls and boys.....	65
Table 5.2 Results of Welch t-tests for between-speaker-group differences at Years 1–6 in girls and boys	68
Table 5.3 Results of pairwise Welch t-tests for mean score differences between year levels in KHSs and KNSs in girls and boys	72
Table 5.4 Test items with a ‘relatively’ large between-speaker-group difference in the accuracy rate at Years 1–6 in girls and boys (with the accuracy rate difference shown in the rightmost parentheses)	76
Table 6.1 Numbers, mean scores and standard deviations of scores of KHSs and KNSs in Years 1–6 in girls and boys.....	103
Table 6.2 Results of Welch t-tests for between-speaker-group differences at Years 1–6 in girls and boys	106
Table 6.3 Results of Welch t-tests for mean score differences between the paired year levels in KHSs and KNSs in girls and boys.....	109
Table 6.4 Test items with a ‘relatively’ large between-speaker-group difference in the accuracy rate at Years 1–6 in girls and boys (with the accuracy rate difference shown in parentheses)	111
Table 7.1 Numbers, mean scores and standard deviations of scores of KHSs and KNSs in Years 1–6 in girls and boys on Tasks 3, 4 and 5	155
Table 7.2 Results of Welch t-tests for between-speaker-group differences at Years 1–6 in girls and boys for Tasks 3, 4 and 5	160
Table 7.3 Results of pairwise Welch t-tests for mean score differences between year levels in KHSs and KNSs in girls and boys for Tasks 3, 4 and 5	168
Table 8.1 Correlations between tasks in performance of KHSs at Years 1–6.....	218

Table 8.2 Demographic information and level of Korean language exposure and use of KHS participants in Years 1–6	222
Table 8.3 Correlations between language backgrounds and performance of Tasks 1–5 of KHSs at Years 1–6.....	227

List of Figures

Figure 5.1 Boxplots of scores of KHSs and KNSs in Years 1–6 in girls and boys	67
Figure 5.2 Comparison of mean scores between KHSs and KNSs at Years 1–6 in girls and boys (excluding extreme outliers)	70
Figure 5.3 Change of mean score by year level in KHSs and KNSs in girls and boys ..	71
Figure 5.4 Adjusted mean accuracy rates of KHSs and KNSs in girls and boys on individual test items	75
Figure 5.5 Comparison of mean accuracy rates between the items for a distinction between similar consonants and the items for a distinction between similar vowels in KHSs and KNSs in Years 1–6 in girls and boys	80
Figure 5.6 Comparison of adjusted mean accuracy rates between the five consonant sets in KHSs and KNSs in girls and boys	82
Figure 6.1 Boxplots of scores of KHSs and KNSs in Years 1–6 in girls and boys	105
Figure 6.2 Comparison of mean scores between KHSs and KNSs at Years 1–6 in girls and boys.....	107
Figure 6.3 Change of mean scores by year level in KHSs and KNSs in girls and boys	108
Figure 6.4 Adjusted mean accuracy rates of KHSs and KNSs in girls and boys on individual test items ordered by REVT-R item number	116
Figure 6.5 Comparison of mean accuracy rates between the first and second half of the test items in KHSs and KNSs in Years 1–6 in girls and boys	118
Figure 6.6 Adjusted mean accuracy rates of KHSs and KNSs in girls and boys on individual test items ordered by their occurrence in the Korean national corpus	120
Figure 6.7 Comparison of mean accuracy rates between mid-frequency words and low- frequency words in KHSs and KNSs in Years 1–6 in girls and boys.....	122
Figure 6.8 Comparison of mean accuracy rates between Native-Korean and Sino-Korean words in KHSs and KNSs in Years 1–6 in girls and boys.....	123
Figure 6.9 Comparison of mean accuracy rates between nouns and verbs in KHSs and KNSs in Years 1–6 in girls and boys	125

Figure 7.1 Comparison of mean scores between KHSs and KNSs at Years 1–6 in girls and boys for Tasks 3, 4 and 5 (excluding extreme outliers)	163
Figure 7.2 Change of mean scores by year level in KHSs and KNSs in girls and boys for Tasks 3, 4 and 5	167
Figure 7.3 Adjusted mean accuracy rates of KHSs and KNSs in girls and boys on individual test items in Task 3.....	173
Figure 7.4 Adjusted mean accuracy rates of KHSs and KNSs in girls and boys on test items by linguistic feature tested in Task 4	176
Figure 7.5 Change of mean accuracy rates by year level in KHSs and KNSs in girls and boys on linguistic aspects tested in Task 4.....	178
Figure 7.6 Comparison of adjusted mean accuracy rates between grammatical and ungrammatical test items in KHSs and KNSs in girls and boys for Task 4	179
Figure 7.7 Comparison of adjusted mean accuracy rates between grammatical and ungrammatical items for linguistic aspects tested in Task 4 in KHSs and KNSs in girls and boys.....	181
Figure 7.8 Comparison of adjusted mean accuracy rates by sentence type in Task 5 in KHSs and KNSs in girls and boys	183

List of Abbreviations

AoA	Age of Acquisition
GJ	Grammaticality Judgement
HL	Heritage Language
HS	Heritage Speaker
KHS	Heritage Speaker of Korean
KNS	Native Speaker of Korean
LOTE	Language Other Than English
LSSC	Language Scale for School-aged Children
L1	First Language
L2	Second Language
NPI	Negative Polarity Item
NS	Native Speaker
PPVT	Peabody Picture Vocabulary Test
REVT	Receptive and Expressive Vocabulary Test
REVT-E	Expressive Vocabulary Test (of REVT)
RVET-R	Receptive Vocabulary Test (of REVT)
SLA	Second Language Acquisition
SSCT	Syntax/Semantics Comprehension Test
TL	Target Language

This study uses the Yale Romanisation System for the romanisation of Korean characters.

Capstone Editing provided copyediting and proofreading services for Chapters 1–7, according to the guidelines laid out in the university-endorsed national ‘Guidelines for Editing Research Theses’.

Chapter 1 Introduction

1.1 Background

Many children in Australia grow up in a household in which a Language Other than English (LOTE) is spoken. These children become bilingual, being able to understand and speak English, which is the majority language spoken in the wider community of Australia, as well as the other language spoken at home. While much research has focused on the acquisition of English of such children in the field of theoretical and applied linguistics, their acquisition of the home language has received relatively less attention from researchers. Over the past two decades, research interest in the acquisition of the home language among bilingual (or multilingual) speakers growing up in a minority-language-speaking home in an immigrant context has increased remarkably in the language research community, especially in North America. These speakers and their home languages have been increasingly denoted as Heritage Speakers (HSs) and Heritage Languages (HLs), respectively, in the relevant fields. As these terms have gained global currency, this study adopts them to refer to those raised in a LOTE-speaking immigrant home in Australia and their home languages. (A detailed discussion on the terminologies is provided in section 3.1.)

The current study concerns a particular group of HSs in Australia: Heritage Speakers of Korean (KHSs). One may expect that KHSs attain high proficiency in Korean and English, as they are naturally exposed to Korean at home from birth, and at the same time, they receive English-medium education in their Australian mainstream schools. However, it is more often observed that they end up having limited proficiency in Korean while they have full command of English by the time that they reach adulthood. This indicates that early Age of Acquisition (AoA) of a Target Language (TL) and continuous exposure to it in a natural acquisition environment throughout life does not guarantee the attainment of high proficiency in the TL (Hyltenstam & Abrahamsson, 2003; Montrul, 2008b, 2012). It also implies that it will be a challenging task for a KHS to develop high proficiency in Korean and maintain it in the current Australian context, given the language's sociolinguistic minority status and limited opportunities for bilingual education.

Despite the predictable difficulties for KHSs in Australia in attaining high proficiency in Korean, there has been a dearth of studies from which direct implications on their HL acquisition could be drawn. To date, only a handful of studies have investigated KHSs in Australia concerning their HL acquisition as follows: HL use patterns and attitudes towards the HL and its learning among KHSs at the primary and secondary level (Ko S & Shin, 2010; Shin S-C, 2008b); speaking, listening, reading and writing skills in heritage learners in Years 6/7, 10 and 12 (Scarino et al., 2011); errors in Korean compositions of heritage learners (Joo, 2018; Joo & Shin, 2016; Shin S-C & Joo, 2015); the relationship between HL proficiency and attitude, motivation and age at immigration in adult KHSs (Jee, 2018). With the recent large influx of Korean immigrants in Australia and the presumable subsequent increase in the number of the Australian population with Korean ethnolinguistic backgrounds (see section 2.1.1), it is timely and necessary to investigate how the Korean language develops and is maintained among KHSs growing up in Australia where they are placed in a Korean–English-in-contact setting (cf. KHSs in, e.g., China, Japan and Russia) with the country’s unique sociolinguistic environment (cf. KHSs in other English-speaking countries such as US, Canada, UK or New Zealand).

Though still small, the number of studies conducted on KHSs in English-speaking countries has been growing, especially in the US. These studies have started to uncover the linguistic profiles of English-speaking KHSs, yielding valuable insights into acquiring Korean as an HL (KHL) in Korean–English-in-contact situations. Nevertheless, attributes of the acquisition of KHL in cross-linguistic bilingualism remain largely unexplored to date. Moreover, previous research has primarily focused on examining acquisition outcomes in adult KHSs; it has neglected how KHL develops and is maintained in the corresponding non-adult population. For providing adequate explanations for the acquisition outcomes observed in the adult population, an examination of the pathway before adulthood is a prerequisite. To this end, this study attempts to explore the development and maintenance of Korean during primary school years among KHSs in Australia.

1.2 Purpose of study

This study explores certain aspects of HL development and maintenance over primary school years in KHSs growing up in Australia. It investigates to what extent they develop and maintain their HL over primary school years and if and in what way their level of HL development and maintenance changes during this period. The study investigates the extent and change by cross-sectionally examining their linguistic abilities in Korean. This means that it measures the linguistic abilities of KHSs in different primary school year levels rather than measuring the abilities of the same participants at different year levels longitudinally. To describe the KHSs' level of development and maintenance of the HL, the study compares their linguistic abilities in Korean with those of their school-year-level-matched Native Speakers of Korean (KNSs).

As the literature indicates that HL acquisition outcomes differ by linguistic domain and linguistic aspect even within the same domain (see section 3.3.2.1), the study assesses the KHSs' linguistic abilities in Korean in three broadly divided linguistic areas: the sound system, lexis and grammar. For each linguistic area, it examines the KHSs' differences from their school-year-level-appropriate native norms, developmental patterns over primary school years and linguistic aspects (e.g., constructions, structures, features or phenomena) that show a greater difference from the native norms. The study also examines variations among the KHSs in their level of HL development and maintenance since grown-up HSs have been widely observed to show individual differences in their HL acquisition outcomes—from mere receptive skills to native-like proficiency. The study explores possible reasons for the variation (if observed) in relation to their HL experiences such as their family background and HL use.

This study attempts to provide linguistic explanations for the underlying reasons behind the observations of the above-mentioned aspects of HL development and maintenance over primary school years in KHSs growing up in Australia. Thereby, it aims to understand the nature of their HL acquisition during the first half of the compulsory school years in relation to their bilingualism of the Korean–English-in-contact condition and their dual language acquisition in the sociolinguistic environment that Australia provides.

1.3 Significance of study

The foremost significance of this study lies in the provision of empirical information on the level of linguistic abilities in Korean developed and maintained by Australian KHSs in primary school years. Its findings will reveal their attainment and retainment of HL abilities in the sound system, lexis and grammar during these years. The provided information will have theoretical implications on HL acquisition for the primary school period in Australian KHSs concerning their dual language acquisition in the given sociolinguistic environment. In addition, the information will form the basis for addressing practical issues related to HL maintenance in the local Korean ethnolinguistic community in Australia (e.g., raising awareness of the current level of Korean language maintenance of their children in Korean immigrant families) and the Korean language education for KHSs in Australia (e.g., discussing the need for more schools offering an English–Korean bilingual education program). This information is essential for not only the future development of curricula but also the improvement of the current practice of Korean language education for KHSs in Australia.

The study also addresses the lack of understanding of the development of KHL before its presumable end state in adulthood among English-speaking KHSs. As an increasing number of studies have examined the linguistic abilities in Korean of English-speaking adult KHSs in relation to various research questions, the language research community has a better understanding of characteristics of KHL under the Korean–English-in-contact condition as well as of HL acquisition in general. However, researchers working closely on KHSs frequently face difficulties in providing adequate explanations for the acquisition outcomes observed among adult KHSs. This is often due to a lack of information on the developmental trajectory in the acquisition of Korean in KNSs and the developmental pathways in KHSs regarding the linguistic features in question. Addressing this lack of understanding, the findings of this study will inform researchers on the course of the HL acquisition of KHSs in a Korean–English-in-contact setting, especially for the primary school period.

Further, the findings of this study will have significant implications on the relationship between HL experience and HL abilities. The relationship between HL experience and HL acquisition outcomes is complex and far from well understood. (See section 3.5.1.) Moreover, the magnitude of the effect of HL experience has been shown to vary between linguistic domains. Seeking explanations for the observed level of

linguistic abilities in Korean regarding the sound system, lexis and grammar attained and retained by KHSs of primary school age in Australia, this study investigates the impact of HL experience on HL acquisition in each of the three linguistic areas examined. The findings will shed some light on the role of HL experience in HL development and maintenance in different linguistic areas, furthering our understanding of the sufficient and necessary conditions for successful HL acquisition.

1.4 Organisation of study

This study is organised in the following chapters. Chapter 2 briefly depicts the sociolinguistic profiles of KHSs in Australia in relation to the local Korean ethnolinguistic community in the country and their HL education in its current sociolinguistic context. Chapter 3 reviews relevant studies conducted on HSs in general and English-speaking KHSs in particular; the review lays the groundwork for the theoretical and methodological frameworks of this study. Chapter 4 outlines the research questions of the study and describes the research methods used to examine the questions. Chapter 5 reports the results of a phoneme discrimination task that was used to examine the perception of speech sounds in Korean in KHSs in Australia in primary school years in comparison to their KNS peers in the Republic of Korea (South Korea). Chapter 6 describes their lexical knowledge in Korean, which was measured by a picture selection task for receptive vocabulary. Chapter 7 reports the results of three tasks that measured their grammatical abilities in Korean regarding various linguistic aspects. Chapter 8 analyses the relationship between their linguistic abilities in Korean and their Korean language experience in each of the areas examined and discusses their implications. Chapter 9 discusses theoretical and practical implications of the findings of the study and provides directions for future research. Chapter 10 concludes with summarising the key finding of the study and highlighting their significance.

1.5 Limitations of study

This study has some limitations in its scope and depth. Although the population of interest in this study—KHSs in Australia who are in primary school years—are bilingual speakers of Korean and English, the study only investigates their linguistic abilities in Korean because the main interest of the study lies on their development and

maintenance of the Korean language, not that of English. This means that the study examines and presents only half of the picture of their total language competency.

The study examines the KHSs' linguistic abilities in Korean compared to the abilities of their school-year-level-matched KNSs in South Korea despite potential criticisms (e.g., Campbell & Rosenthal, 2000). This comparison will inevitably make their linguistic abilities in Korean appear defective or inferior, given the common observation of non-native (i.e., deviant from NSs) achievement in HL acquisition. However, it should be emphasised that this study does not intend to present their linguistic abilities in the HL as deficient or faulty compared to those of the NSs. It simply tries to ascertain the level of their linguistic abilities in Korean. This requires standards or criteria and their school-year-level-matched KNSs will unequivocally provide a baseline because NS competence is what a language learner tries to achieve ultimately.

This study recruited its research participants—KHSs in Australia in primary school years—from Korean community schools in Sydney to collect research data effectively. Accordingly, its findings concerning KHSs' linguistic abilities in Korean, its explanations for the observed level of acquisition and its implications on their HL development and maintenance may be limited to KHSs who attend an ethnic language school.

Chapter 2 Heritage Speakers of Korean in Australia and Their Heritage Language Education

2.1 Heritage Speakers of Korean in Australia

2.1.1 Korean ethnolinguistic community in Australia

The Korean ethnolinguistic community in Australia is one of the important minority groups in Australia, given its substantial number of people. According to the 2016 Census by the Australian Bureau of Statistics (ABS, 2020), 98,775 people reported having been born in South Korea.¹ Among them, the great majority (95,668 people) reported being of Korean ancestry.² Including those born outside South Korea, a total of 123,032 people residing in Australia identified themselves as being of Korean ancestry.³ For the parental birthplace question, 120,878 people reported that their mother was born in South Korea, and 116,046 people reported having a South Korea-born father. Among those with a South Korea-born father, 112,759 people reported their mother was also born in South Korea, indicating endogamy is predominant in the Korean ethnolinguistic community in Australia. More importantly, in the census, 108,999 people reported speaking Korean at home, placing it in the eleventh place in the list of LOTEs by the corresponding number of speakers in Australia, as shown in Table 2.1.

Table 2.1 *Languages Other than English spoken at home in Australia*

Order	Language	Number of speakers	Percentage of speakers in Australia (%)
1	Mandarin	596,713	2.6
2	Arabic	321,723	1.4
3	Cantonese	280,947	1.2
4	Vietnamese	277,405	1.2
5	Italian	271,598	1.2
6	Greek	237,586	1.0

¹ According to the 2016 Census, 74 people residing in Australia reported being born in North Korea (ABS, 2020).

² For the ancestry question in the census, a respondent can report up to two ancestries. Among the South Korea-born population (98,775 people), 93,576 people chose Korean for the first ancestry response and 2,092 people for the second response.

³ Among these people, 113,671 chose Korean as their first response for the ancestry question and 9,352 as their second response.

7	Hindi	159,653	0.7
8	Spanish	140,818	0.6
9	Punjabi	132,490	0.6
10	Tagalog	111,277	0.5
11	Korean	108,999	0.5
12	German	79,357	0.3
13	Tamil	73,162	0.3
14	Filipino	71,221	0.3
15	French	70,872	0.3
16	Urdu	69,300	0.3
17	Indonesian	67,894	0.3
18	Macedonian	66,020	0.3
19	Sinhalese	64,606	0.3
20	Nepali	62,004	0.3

Data sourced from TableBuilder Basic (ABS, 2020)

Since Koreans started to come to Australia for various reasons (whether to stay for the short term or live permanently), the Korean ethnolinguistic community here has grown continuously (see Han [2000] or Yang [2010] for an overview of the history of the settlement of Koreans in Australia), and it has a great potential for further growth. The increase in the South Korea-born population in Australia has been persistent, and the increase in the last decade was especially remarkable. In 2006, 52,763 people in Australia reported having been born in South Korea. The number increased to 74,538 in 2011—a significant increase of 41.3%. It grew further to 98,775 in 2016—a 32.5% increase. Given the consistent increase in the South Korea-born population in Australia in the past, the influx of immigrants from South Korea is likely to continue, although it is difficult to predict the magnitude of the increase.

While the South Korea-born population in Australia has almost doubled between the last three census years (i.e., 2006, 2011 and 2016), the Australian population with Korean ancestry has increased to more than double. The population with Korean ancestry increased from 60,868 in 2006 to 88,970 in 2011 (i.e., a 46.2% increase) and further to 123,032 in 2016 (i.e., a 38.3% increase). This increase in the Australian population of Korean ancestry between 2006 and 2016 was larger than that in the South Korea-born population (i.e., from 52,763 to 98,775 between 2006 and 2016). This suggests that the influx of Korean immigrants has led to a further increase in the Australian population with Korean heritage.

In addition, the relative youthfulness of the Korean community compared to other ethnolinguistic migrant groups in Australia should be noted when predicting the future growth of the population with Korean ethnolinguistic heritage. According to the report by ABS (2018) based on the 2016 Census, the median age of the South Korea-born population was 34 years, compared to 44 years for all of the overseas-born population and 38 years for the total Australian population. Further, 73.6% of the population was under 45 years: 6.7% was aged 0–14 years, 15.1% was aged 15–24 years, and 51.8% was aged between 25–44. Although the recent trend of a remarkable increase in the South Korea-born population is not guaranteed to continue, the large influx of the population, especially in the last decade, and its youthfulness suggest that the population with Korean ethnic and cultural heritage in Australia—who may speak Korean as their HL—is likely to grow for the foreseeable future.

2.1.2 Language maintenance in the Korean ethnolinguistic community in Australia

Based on the continuous immigration of people from South Korea and the high rate of young people in that population, it is reasonable to predict that the number of people who speak Korean as their HL in Australia will increase at least in the foreseeable future. The potential increase of KHSs in Australia can also be expected due to the positive tendency of HL maintenance found among the Korean ethnolinguistic community in Australia (for an overview of the language maintenance and shift in the Korean community in Australia, see Shin S-C and Jung [2016]). According to Clyne and Kipp (1997), who investigated HL maintenance among immigrant communities in Australia based on the 1986, 1991 and 1996 Census data through examining language shift to English, the Korean ethnolinguistic population was one of the immigrant groups that showed a low shift rate. For instance, in 1996, the language shift rate of the Korean community was 11.6% in first-generation immigrants (i.e., South Korea-born people) and 18.0% in second-generation immigrants (i.e., people who had at least one parent born in South Korea).⁴ More recently, Karidakis and Arunachalam (2016) examined the

⁴ Note the intergenerational language shift rates found among other ethnolinguistic groups in 1996: 95% of people with Netherlands-born parents spoke English at home, 89.7% with Germany-born parents, 77.7% with France-born parents, 63.0% with Spain-born parents, 28% with Greece-born parents, 57.6% with Japan-born parents, 35.7% with Hong Kong-born parents, 21.0% with Taiwan-born parents, 20.1% with Lebanon-born parents, 16.1% with Turkey-born parents.

language shift to English among first-generation immigrants in Australia using the 2011 Census data, adopting the methodology used in Clyne and Kipp (1997). Their results showed that first-generation Korean immigrants, with a language shift rate of 9.3%, retained their HL well compared to other ethnolinguistic immigrant groups.

The relatively low rate of language shift to English—which, in turn, indicates a high rate of HL maintenance in the Korean community—seems to have continued to the recent census (Shin S-C & Jung, 2018). As mentioned previously, in the 2016 Census, 108,999 people in Australia reported speaking Korean at home, increasing from 79,786 in 2011 and from 54,624 in 2006. This number may not represent HL maintenance in the Korean ethnolinguistic community in Australia accurately because it may include Second Language (L2) speakers of Korean, however, since the number of people speaking Korean at home as an L2 is presumed to be very small in the current Australian context. Thus, it seems reasonable to suggest that the number of people speaking Korean at home accurately represents the HL maintenance of the Korean ethnolinguistic community in Australia. In fact, among the 123,032 people who reported Korean ancestry in the 2016 Census, 105,453 people answered that they spoke Korean at home, indicating an HL maintenance rate of 85.7%. Among those born in South Korea, the HL maintenance rate was apparently higher; 91.2% (87,235 people) of the South Korea-born population with Korean ancestry (95,668 people) reported speaking Korean at home.

Although the Korean ethnolinguistic community in Australia appears to maintain its HL well, especially among the first-generation immigrants, exposure to Korean at home does not automatically assure high proficiency in that language and its maintenance among children. In the aforementioned study by Karidakis and Arunachalam (2016), among the first-generation Korean immigrants, children and the younger population showed higher language shift rates to English than the older population in the 2011 Census. While 5.1% of the people between the ages 35 and 64 spoke only English at home, 12.4% of those between 15 and 35 spoke only English at home. Among those attending school, the shift rate was even higher, as 15.3% of those between five and 14 reported speaking only English at home. This tendency of lower HL maintenance rates among the younger population—which denote higher rates of a shift to English—continued in the 2016 Census. Table 2.2 shows the percentage of people speaking Korean at home (i.e., those who maintain their HL) among those of Korean ancestry in the 2016 Census. The higher language shift rates observed among second-generation Korean immigrants

compared to first-generation immigrants and those observed among the younger population compared to the older population in the first-generation immigrants imply that it will be difficult for young KHSs in Australia to develop and maintain their HL.

Table 2.2 *Number of people speaking Korean at home among the Australian population of Korean ancestry in 2016 Census*

Age (years)	People with Korean ancestry	People speaking Korean at home among the people with Korean ancestry	People speaking Korean at home among the people with Korean ancestry (%)
0–4	9,265	6,636	71.6
5–9	8,165	6,234	76.4
10–14	6,754	5,014	74.2
15–19	7,282	5,884	80.8
20–24	11,997	10,346	86.2
25–29	14,597	12,480	85.5
30–34	15,340	13,044	85.0
35–39	13,036	11,731	90.0
40–44	10,254	9,365	91.3
45–49	8,147	7,488	91.9
50–54	5,343	5,016	93.9
55–59	4,506	4,260	94.5
60–64	2,891	2,760	95.5
65–69	1,969	1,863	94.6
70–74	1,512	1,467	97.0
75–79	1,008	974	96.6
80–84	583	553	94.9
85–89	234	230	98.3
90–94	101	98	97.0
95–99	28	28	100.0
100 +	3	3	100.0

The statistical analysis of the census data provides a valuable overview of language shift to English and maintenance of the HL in the Korean ethnolinguistic community in Australia. Nevertheless, such analysis has limitations in that it does not provide much information about the degree of HL use in Korean immigrant families or in the Korean community in Australia or the HL proficiency of KHSs. This analysis should be complemented by future research that investigates actual HL use and

proficiency of the Australian population with the Korean heritage to provide a comprehensive understanding of language maintenance in the Korean ethnolinguistic community in Australia.

2.2 Education of Korean as a Heritage Language in Australia

The Korean language is regarded as one of the most important foreign languages in Australia due to South Korea's growing economic and political importance to Australia. The importance of the Korean language is reflected in several government initiatives for promoting Korean language education in Australian schools along with three other Asian languages: Chinese, Indonesian and Japanese. These initiatives clearly recognise the long-term economic profits to the nation of its population learning specific languages. This rather profit-oriented goal of Korean language education may be reached relatively easily by KHSs, as they have already developed some competence in the language and cultural knowledge compared to L2 learners.

In contrast to some efforts to promote learning of the Korean language in Australian schools by several government-led initiatives, developing and maintaining proficiency in Korean among young KHSs in Australia appears to have been managed overall by their individual families and the local Korean community (Shin S-C & Jung, 2015). The initiatives to encourage school children to learn Chinese, Indonesian, Japanese and Korean such as NALSAS or NALSSP were, in fact, somewhat unrelated to supporting HSs of these languages to develop their HL proficiency and maintain it.⁵ These policies were often criticised for their economic rationalism and disregard of the local communities not only of the four languages but also of other Asian languages (e.g., Clyne & Kipp, 2006; Kipp, 2008; Liu & Lo Bianco, 2007). The initiatives' neglect of the presence of HSs is reflected by the low number of student enrolments in Korean courses among HSs (see Shin S-C (2018) for detailed reports). Students with Korean ethnolinguistic background in Australian schools—that is, KHSs—appeared not to utilise the opportunity to learn and maintain their HL provided within the education system;

⁵ The Australian Government has committed funding for the National Asian Languages and Studies in Australian Schools (NALSAS) strategy during 1996–2002 to support Asian language learning (Chinese, Indonesian, Japanese and Korean) and Asian studies, as well as for the National Asian Languages and Studies in School Program (NALSSP) during 2008–2012 to increase opportunities for students to become familiar with the culture and languages of Australia's four key regional neighbours (China, Indonesia, Japan and Korea).

instead, they seemed to turn to ethnic schools in the local Korean community (Shin S-C, 2006, 2008a). Among many limitations, the inadequate eligibility criteria derived from the dichotomy of Background Speakers versus L2 learners have been identified as one of the main reasons for these students' reluctance to participate in the Korean classes (Shin S-C, 2006, 2008a).⁶

In 2011, the Korean course for HSs, recently renamed 'Korean in context' (originally named 'heritage Korean'), was implemented at the senior secondary level (in Years 11–12) in NSW along with the other three NALSSP language courses for HSs. This was, indeed, a necessary measure for preventing HSs from being disadvantaged when competing with first language (L1) speakers in the same class because the presence of L1 speakers in background courses for NALSSP languages was frequently pointed out as a problem (e.g., Oguro & Moloney, 2012; Orton, 2008; Shin S-C, 2006, 2008a, 2010; Sturak & Naughten, 2010). Considering the generally small number of schools currently providing Korean (Shin S-C, 2010), however, this action might be regarded as a passive measure to encourage KHSs to learn their HL and foster proficiency in the Australian education system. Even though other measures have also been introduced to support students with limited accessibility to their desired language courses (e.g., accreditation of language courses in the Saturday School of Community Language or Open High School in NSW), these actions may not cause a fundamental change in HSs' enrolments in the Korean courses in Australian schools.⁷ In fact, Shin S-C (2018) shows that the number of students with Korean background (including HSs as well as L1 speakers) learning Korean in primary and secondary schools stagnated in the past decade, despite the substantial increase in the number of schools offering Korean (from 38 in 2010 to 71 in 2017) and student enrolments (from 4,174 in 2010 to 8,621 in 2017).

⁶ Students from Korean-speaking homes (i.e., HL students) were specified as 'Background Speakers' regardless of their proficiency in Korean. In these classes, where HL students are taught together with Korean international students with native-like competence in Korean, HL students could be discouraged and possibly disadvantaged when competing against the international students.

⁷ Korean ethnolinguistic children's participation in Korean classes is a complicated matter influenced by many factors interacting with each other, such as the children's willingness to learn and foster Korean, their parents' and families' desire for their children to develop high proficiency in Korean and willingness to assist them, the children's and their family's volition to facilitate the provided courses, the accessibility to such provisions and the rationality and soundness of language policies regarding the structure and administration of these courses.

Since 2009, the Australian Curriculum, Assessment and Reporting Authority (ACARA) had developed language-specific curricula for 11 languages⁸ and the Framework for Aboriginal Languages and Torres Strait Islander Languages under the *Australian Curriculum: Languages, Foundation to Year 10* (ACARA, 2013). The curriculum for Korean was among them, and it was finally implemented in May 2014. For most of the languages, a curriculum for one pathway was developed, pitched to the dominant cohort of its learners; the implemented curriculum for Korean was pitched to L2 learners (ACARA, 2014). This indicates that the majority of students learning Korean at the primary and junior secondary level in Australian schools are L2 learners, as also shown in the report by Shin S-C (2018). Conversely, it implies that a separate curriculum specifically developed for HSs from Kindergarten to Year 10 is still absent—although the curriculum and syllabus for the heritage Korean course at senior secondary level are at least in place. The development of such curriculum and syllabus will not be valid nor viable without empirical data showing HSs' linguistic abilities in Korean.

What language researchers, educators and policymakers should pay more attention to regarding HL education for KHSs in Australia is the provision of appropriate courses to accommodate HSs' particular needs in instructional settings and the assurance of their quality (Shin S-C, 2010, 2018). However, previous research on KHS in Australia is scarce to date (e.g., Ko S & Shin, 2010; Shin S-C, 2008b); moreover, studies examining HSs' actual linguistic performance in Korean are limited. The paucity of such studies in Australia indicates that the Korean classes for HSs not only in Australian schools but also in ethnic schools in the local Korean community are currently being operated based upon little empirical linguistic information, apart from language instructors' impressionistic observations and language researchers' superficial assumptions drawn from other related studies. This implies a great need for an investigation into KHSs in Australia, and more specifically, the necessity of an examination of their actual performance in Korean.

⁸ The 11 languages are Arabic, French, Chinese, German, Indonesian, Italian, Japanese, Korean, Modern Greek, Spanish and Vietnamese.

Chapter 3 Literature Review*

3.1 Definition of terminologies: Heritage languages and heritage speakers

This study concerns the HL development and maintenance of KHSs in Australia in primary school years. As the terms ‘heritage language’ and ‘heritage speaker’—often referred to as ‘heritage language speaker’—have been used inconsistently in different fields of study, it is important to understand how the terms are defined in relevant fields, and it is necessary to clarify what they refer to in this study.

In the last two decades, HLs and HSs have received significant attention from researchers in theoretical and applied linguistics, especially in North America. With the rapidly growing research interest in HLs, some researchers claim that the study of HLs has emerged as a new field of inquiry (e.g., Brinton et al., 2008; Kagan & Dillon, 2008; Kondo-Brown, 2006). It is also advocated that language researchers look into HLs because the investigation can offer a new perspective of the understanding of the language faculty and acquisition since HLs provide a natural testing ground for linguistic theories (Benmamoun et al., 2010, 2013; Polinsky & Kagan, 2007; Rothman, 2009). However, some scholars view such advocacy with scepticism. In particular, the sceptics speak with one voice on the necessity of clear definitions of the terms ‘heritage language’ and ‘heritage speaker’ to delimit the object of the study, especially if the advocates of the study of HLs desire it to be an independent field of study like Second Language Acquisition (SLA) (e.g., Kupisch, 2013; Meisel, 2013). Therefore, the following sections, 3.1.1, 3.1.2 and 3.1.3, review how the terms are understood and used in different fields, and section 3.1.4 explains what they refer to in this study.

3.1.1 Definition from perspectives in sociolinguistics

In a broad sense, HLs can be understood as societal minority languages in a multilingual sociolinguistic context, and HSs as those who speak a societal minority language in this context. As Meisel (2013) notes, the terms ‘heritage language’ and ‘heritage speaker’ are based on sociolinguistic notions. In fact, ‘heritage language’ is a

* Some part of this literature review has been presented at the 1st Conference on Korean Language Education in Australia, Sydney, Australia (2016, November).

terminology that has been used in Canada and the US to refer to a societal minority language in reference to their own sociolinguistic contexts. According to Cummins (2005), the term ‘heritage language’ originated in Canada in the 1970s and started to be used in the US in the late 1990s. It refers to the languages of immigrant, refugee and indigenous groups in the US context (cf. Fishman, 2001). From that perspective, it is similar to the term ‘ethnic minority language’ used in Europe or the term ‘community language’ used in Australia (Montrul, 2012).⁹ If the term ‘heritage language’ is regarded as a sociolinguistic term equivalent to ‘ethnic minority language’ or ‘community language’, research on HLs may encompass studies dealing with various aspects of the languages such as intergenerational language shift in ethnolinguistic minority communities or L1 attrition among first-generation immigrants.

3.1.2 Definition from perspectives in educational linguistics

When the dialogue on the study of HLs was on the horizon in the relevant academic circles in the US, discussions initially centred on HL education (i.e., teaching and learning HLs) in foreign language instructional settings.¹⁰ Consequently, the study focused largely on so-called heritage learners. The foreign language instructional settings naturally exclude certain cohorts of sociolinguistically defined HSs (i.e., minority language speakers) from heritage learners. For instance, those who possess native competence in their HL from having lived in their home country up to adolescence or adulthood before immigration would not come to a foreign language classroom to learn the language. Rather, they would be considered NSs of the TL of the instruction. However, even after excluding NSs of the TL, it was still difficult to determine who should be identified as HSs—precisely speaking, heritage learners. This was because the term could

⁹ The term ‘community language’ has been used in Australia since 1975 to denote Languages Other Than English (LOTEs) to accentuate that they are not really foreign languages, but languages spoken in the Australian community (Clyne, 1991; Clyne & Fernandez, 2008). Although the terms ‘heritage language’ and ‘community language’ may not be ‘interchangeable identifiers’ (Wiley, 2005, p. 223), e.g., in regards to the inclusion of indigenous languages, in Australia the term ‘community language’ is probably closest to the term ‘heritage language’ used in the US (Mercurio & Scarino, 2005).

¹⁰ Since the late 1990s, many researchers in the US have called for attention to teaching HLs, especially at post-secondary level. This was initially due to the noticeable increase in the presence of HSs in foreign language courses in US tertiary institutions at that time (Kagan & Dillon, 2008; Peyton et al., 2001) and their different instructional needs from typical foreign language learners (Valdés, 2005; Wiley, 2001). This call for attention to HL education was based on the critical need of language competence in LOTEs in the US (Brecht & Ingold, 2002; Peyton et al., 2001). It had been frequently rationalised by the assumption that HSs have greater potential to achieve native-like competence in the TL compared to L2 learners. The rationale was further promoted by the increased awareness of their national security caused by the events of September 11, 2001 (Kagan & Dillon, 2008; Valdés, 2005; Van Deusen-Scholl, 2003).

embrace any person whose home or ancestral language was other than the societal majority language.¹¹ An HS could be someone who has ‘particular family relevance’ to the TL (Fishman, 2001, p. 81). Somewhat more narrowly defined, an HS could be someone with ‘a strong cultural connection’ to the TL ‘through family interaction’ (Van Deusen-Scholl, 2003, p. 222).¹² In these definitions, the ethnolinguistic heritage of a person shaped the core of the notion of the terms, and actual HL exposure or HL competence was not a critical requirement to be identified as an HS.

From the pedagogical perspective, however, it was much more useful to limit the inclusion of HSs to those who had attained some degree of HL proficiency through home language experience (Lee JS & Shin, 2008; Van Deusen-Scholl, 2003). If a person comes to a foreign language classroom without prior linguistic knowledge in the TL attained from the TL exposure at home, he or she will not be different from any other novice foreign language learner. Therefore, many studies adopted a narrow definition of the term ‘heritage speaker’ with actual HL competence as a decisive criterion, such as the definition from Valdés (2001). According to her, an HS—for instance, in the US context—refers to ‘someone who has been raised in a home where a non-English language is spoken, who speaks or merely understands the heritage language, and who is to some degree bilingual in English and the heritage language’ (Valdés, 2001, p. 35). This definition delineates an HS as someone who has had exposure to the HL at home, possesses actual competence in his or her HL and, as a result, is bilingual in the HL and the societal majority language. As the primary concern in HL education was placed on the identification of linguistic characteristics of heritage learners contrasting with those of typical foreign language learners (Peyton et al., 2001; Wiley, 2001), HSs in language education were primarily confined to those with actual HL competence obtained from home language experience.

¹¹ This is partly because the word ‘heritage’ denotes some sort of familial or ancestral connections between the language and the person of concern.

¹² One should note that Van Deusen-Scholl’s (2003) notion of heritage learners stands somewhere between the above-mentioned understanding of HSs from Fishman (2001) and the narrow definition of HSs from Valdés (2001). She also made a distinction between ‘heritage learners’ and ‘learners with a heritage motivation’ who can be understood as learners with more remote ethnic connection to the TL (Van Deusen-Scholl, 1998 as cited in Van Deusen-Scholl, 2003, p. 222).

3.1.3 Definition from perspectives in theoretical linguistics

More recently, the study of HLs has expanded its territory to theoretical linguistics, with an increasing number of studies examining HLs to better account for language faculty and acquisition. The aspects of HL acquisition that have drawn particular attention from language researchers have been the inclination towards less-than-native attainment—that is, ‘incomplete acquisition’ (Montrul, 2012)—observed in HSs as well as the significant variability in the degree of the less-than-nativeness among the speakers—that is, wide variation in HL proficiency. Thus, some researchers describe an HL as a language that was ‘first in the order of acquisition but was not completely acquired because of the individual’s switch to another dominant language’ (Polinsky & Kagan, 2007, pp. 369-370). Some researchers characterise an HL as the language acquired first and exclusively before the onset of schooling in many cases (e.g., Cabo & Rothman, 2012); thus, they place a more significant emphasis on sequential bilinguals than simultaneous bilinguals. As researchers pay attention to the tendency of incomplete acquisition in HL acquisition, some researchers specify a cut-off point for an HS’s AoA of the majority language to distinguish HSs from NSs.¹³ It is relatively common for researchers to recruit speakers with particular sociodemographic profiles (e.g., those born in the host country or arrived in the host country before a particular age) as HS participants in their studies. Moreover, some researchers apply speaking the societal majority language as the speaker’s dominant language (in terms of language use and language competence) as a criterion for an HS in addition to the criteria specified by Valdés (2001). Even though researchers often delimit the inclusion of HSs based on the objective of their research, they generally acknowledge and adopt the description from Valdés (2001) as the rudimentary definition for HSs because it is most widely used in the relevant fields.

3.1.4 Heritage languages and heritage speakers in the current study

As reviewed above, the terms ‘heritage language’ and ‘heritage speaker’ can be used to refer to minority languages and minority language speakers in a broad sense based on their origin and use in sociolinguistics. Into the vast pool of sociolinguistically defined HSs, researchers have cast different nets to capture specific cohorts of minority language

¹³ For instance, Benmamoun et al. (2010, p. 15) describe an HS as ‘someone born to an immigrant family in the country of their dominant language ... or someone who arrived in the United States as a young person, early enough to learn English as a bilingual and not as a foreign language learner—the cut-off age for this is assumed to be around age four or five’ (Schwartz 2004, Unsworth 2005, Cho et al. 2004).

speakers as HSs for the purpose of their study. As the discourse of studies regarding HLs has evolved, the research scope has changed in connection with primary questions and objectives of individual studies; this has resulted in varying definitions of HL and HS. Based on this understanding of the reasons for inconsistent definitions of the terms, this study does not necessarily insist on confining the use of the terms to the narrower definitions used in more recent studies regarding HL education or HL acquisition.

Nevertheless, this study recognises that with the evolving dialogue of the study of HLs in North America and elsewhere, the term ‘heritage speaker’ is normally understood as early bilinguals of the minority language and the majority language, especially in—but not necessarily limited to—the context of immigration. Therefore, the use of the terms ‘heritage language’ and ‘heritage speaker’ in this study will follow the general understanding of the terms in the field based on the definition by Valdés (2001). Thus, HSs in this study, for instance, in the Australian context, refer to bilingual speakers who have an ethnolinguistic family background other than the English-speaking Australian one, are raised in a LOTE-speaking home and, as a result, possess linguistic competence in that language. The language they speak at home is their HL. Accordingly, KHSs in Australia are those who have a Korean family background, grow up in a Korean-speaking home environment and, consequently, have developed some competence in Korean from their exposure to the language at home. Since KHSs also speak English, which is the majority language spoken in the wider Australian society, they are bilingual in Korean and English; to them, Korean is their HL.

The population of interest in this study is children of Korean immigrant families, and the object of the study is the acquisition of the Korean language in such children, especially their development and maintenance of the language during primary school years. To refer to the population of interest and the language in question, the study adopts the terms ‘heritage speaker’ and ‘heritage language’ among several options such as Korean–English (or English–Korean) bilinguals, Korean Australians, first language and home language. This was primarily because of the increasing use of the terms in the language research community around the globe with the emergence of the study of HLs as a new field of inquiry. However, it should be emphasised that this adoption would have been fallacious if the population and language of interest in this study were incongruent with the definitions of the terms widely used in the field. In other words, the children of Korean immigrant families in Australia who grow up speaking Korean at home fit into

the description of the research subjects in the study of HLs. Therefore, research findings and discussions in the study of HLs are relevant to and important for understanding the acquisition of the Korean language in these children. Thus, this study will set out its research questions based on previous research findings in the field and discuss its findings in relation to them.

In short, following the general understanding of the terms ‘heritage language’ and ‘heritage speaker’, KHSs in Australia in this study refer to early Korean–English or English–Korean bilingual speakers with the Korean family background, possessing some linguistic competence in Korean acquired through their exposure to the language at home. For these speakers, Korean is their HL. However, since this study adopted the terms to label its population and language of interest, it refrains from further discussing issues related to the definition of the terms, such as the criteria for an HS—for example, what should be the cut-off age for the AoA of the majority language to be classified as an HS? Must an HS be dominant in the majority language? Should HSs exclude simultaneous bilinguals?

3.2 Heritage language acquisition

As described in the definition of HSs above, an HS is a bilingual person speaking a minority language—that is, their HL—at home and in their local ethnolinguistic community and the societal majority language in the wider community. In theory, a bilingual can attain the proficiency of corresponding NSs in each of his or her two languages, but such bilingual is rare in reality (Haugen, 1987). In other words, many bilingual speakers achieve less-than-native skills in one of their two languages. For HSs, native proficiency appears more challenging to attain in their HL than in the majority language of the wider community. In fact, a commonly observed pattern of acquisition outcomes in the two languages of an HS is that the majority language is usually attained to the native or near-native level or becomes his or her dominant and stronger language, whereas the HL is inclined to be attained incompletely and become the weaker language of the speaker (Benmamoun et al., 2013; Montrul, 2012). The relatively unsuccessful results of HL acquisition must have been derived from the sociopolitical minority status of that language and its resultant sociolinguistic attributes. According to Montrul (2012), the speaker’s HL is perceived to be less powerful, less beneficial and less valuable than

the majority language not only by the wider community but also often by the speaker himself or herself. The HL is used only in a limited range of contexts such as home and immediate ethnolinguistic community, and there are limited opportunities for mainstream education in and about the language. These attributes of the HL contribute to the less successful results in the acquisition of the HL compared to the majority language.

An HS acquires his or her HL in a unique acquisition environment created by a combination of many sociolinguistic and psycholinguistic factors. However, HSs as a group, compared to NSs or adult L2 learners, seem to go through a similar passage in their HL acquisition, as they are under the same sociolinguistic condition that their HL is a societal minority language. In their preliminary but comprehensive chapter on HL education in the L2 instructional context, Campbell and Rosenthal (2000) illustrated the course of HL development of a fictitious HS, called Namhee, who is a third-generation Korean-American living in Los Angeles as follows:

As a toddler, Namhee developed sufficient ability in spoken Korean to fulfill her needs at home and in similar households in the neighborhood. This happened because Korean was the language of communication between her parents and grandparents and the only language available for communication between herself and her grandparents. Indeed, by the time Namhee turned 5, she had become—in the same natural way that all normal children acquire their first language—quite proficient in the language of her parents and grandparents. Thus, she could carry out all of the usual verbal functions necessary for communication between children and adults in a typical household and could question, answer, describe, compare, persuade, suggest, deny, invite, demand, and transact other functions as required for social interaction. Her utterances conformed to the linguistic structures (phonology, morphology, syntax, discourse rules, etc.) of the adult Korean-speaking members of her home. She also had a vocabulary appropriate to these functions that corresponded to her life experiences at that age.

However, at age 5, Namhee entered a typical American elementary school, and immediately, every effort was made to mainstream her into the English medium curriculum. At school, she had no opportunity to build on her 5-year-old Korean competencies nor to acquire Korean literacy skills. In fact, after 2 years of elementary school, Namhee moved rapidly toward English monolingualism. Now, she rarely initiated conversations in Korean—even with her grandparents. Although her parents wanted Namhee to attend a community language school to retain her “native” language, things just did not work out. Thus, Namhee’s further

development in Korean was aborted, and English became her dominant language.

Later, at the age of 18, Namhee entered college and enrolled in a Korean language course designed specifically for heritage language (HL) students such as herself. Although completely illiterate in Korean (she could not read or write in Korean), Namhee had retained some degree of communicative competence. (pp. 165-166)

Though fictitious, the above portrayal of Namhee's HL development along her growth into adulthood represents the course of the HL development of a typical HS well. As reflected in Namhee's story, an HS is assumed to have the following: exclusive exposure to and use of HL at home in preschool years; abrupt change in the input and use of the HL with the onset of schooling; sudden or gradual language shift to the societal majority language; language dominance of the majority language in terms of language use and bilingual competencies in his or her two languages in adulthood (Montrul, 2009b). Simply put, before formal schooling, many HSs are exposed chiefly to their HL, as they spend most of their time at home, so their HL would develop in a similar way and at a similar rate as it would develop in their monolingual peers in the home country. With the onset of schooling, their HL no longer develops further in the same way or at the same rate because the amount of HL input and use undergoes a reduction, and the domain of HL input and use does not expand beyond their home and immediate ethnolinguistic community. As a result, HSs in adulthood or even in early adolescence come to speak the societal majority language as their dominant language since it is the medium of communication in school, work and the wider society; in contrast, many of them end up with limited abilities in their HL.

3.3 Heritage language acquisition outcomes—Adult heritage speakers' linguistic characteristics

With an increasing research interest in HLs in recent years, studies endeavoured to reveal the linguistic characteristics of HSs because this could have practical implications for HL pedagogy and theoretical implications for linguistic theories. In this section, previous research findings on linguistic characteristics of adult HSs are reviewed, as they will manifest the results of HL acquisition. The characteristics of adult HSs in

comparison to adult L2 learners found in previous research are presented in 3.3.1, and those in comparison to NSs are provided in 3.3.2.

3.3.1 Heritage speakers compared to adult second language learners

In HL education, the description of sociolinguistic profiles and linguistic characteristics of HSs in comparison to adult (i.e., post-puberty) L2 learners has often occupied the core of the research. This was mainly because a comprehensive characterisation was needed to provide a theoretical and methodological foundation for teaching HLs in foreign language instructional settings or operating a separate learning track for heritage learners. Summarising the study findings, the following subsections describe linguistic characteristics of adult HSs in comparison to adult L2 learners: 3.3.1.1. provides an outline of linguistic profiles of adult HSs compared to adult L2 learners in instructional settings; 3.3.1.2. reviews research findings on linguistic competence of HSs compared to adult L2 learners concerning the question of ‘heritage advantages’.

3.3.1.1 Linguistic profiles of adult heritage speakers

In studies related to language education, especially at the post-secondary level, adult HSs have been observed to have several characteristics in common that differ from those of adult L2 learners.¹⁴ Whereas novice foreign language learners usually come to a foreign language class without any knowledge of the TL or the culture associated with it, adult HSs come to the classroom with some pre-acquired competence in the TL from their exposure to the TL at home, which is usually aural and oral proficiency (i.e., listening and speaking skills) (Campbell & Rosenthal, 2000; Kagan & Dillon, 2008).

HSs often show unbalanced command of their HL, as they typically have better perceptual competence than productive competence in the HL (Benmamoun et al., 2013). Their written language skills in the HL tend to be less developed compared to the level of their oral proficiency in the language (Benmamoun et al., 2013; Campbell & Christian, 2003; Peyton et al., 2001), and many of them have no functional literacy skills in their HL (Kagan & Dillon, 2008). Even HSs with high oral fluency in their HL may lack some types of oral language skills that are developed through formal education (Kagan & Dillon, 2008). They may not have sufficient oral language skills to communicate in ‘interpretative’

¹⁴ In this study, the term ‘Second Language Learning’ (SLA) or L2 learning is used as the term that encompasses foreign language learning. In other words, it does not differentiate foreign language learning from L2 learning based on their learning contexts. Accordingly, L2 learning and L2 learners are used to refer to foreign language learning and foreign language learners.

and ‘presentational’ modes even when they have seemingly native-like proficiency in ‘interpersonal’ mode (Valdés, 2001, p. 66). Moreover, although HSs already possess and use internalised linguistic knowledge to understand and speak the HL, they may lack metalinguistic knowledge about the language (Benmamoun et al., 2013; Valdés, 2001), compared to adult L2 learners who are believed to learn the TL mostly with domain-general cognitive abilities.

As often pointed out as a critical issue in teaching some languages such as Chinese, Arabic or Spanish, not only as an HL but also as an L2, many HSs speak a language variety of a given TL that is different from its standard variety with respect to country or region, formality (i.e., diglossia) and other sociolinguistic factors (e.g., gender, age and socioeconomic status). Thus, HSs sometimes display linguistic features often observed among speakers of different varieties (Kagan & Dillon, 2008). In addition, the HL input that an HS receives from his or her family at home or from other bilingual members in his or her ethnolinguistic community can also be deviant from the monolingual standard TL norm, as it could have been ‘mutilated’ through attrition or incomplete acquisition (De Bot & Weltens, 1991, p. 42, as cited in Valdés, 2001, p. 46). Therefore, HSs also exhibit some traits that can be traced back to their ‘émigré languages’ (Kagan & Dillon, 2008, p. 147).

Based on observations of their own and others working in HL pedagogy, Campbell and Rosenthal (2000) compared the linguistic competence of adult HSs with that of foreign language learners in language classes at the tertiary level. According to their account, heritage learners come to a foreign language classroom usually having acquired the following linguistic competence: near-native level of the phonological system with native-like pronunciation, stress and intonation; much of the grammatical system necessary for perception and production; extensive vocabularies but with a limited range confined to home, community and religious institutions; and sociolinguistic rules with which they can control the choice of registers in verbal communications with various interlocutors, but with limited contexts in the family and ethnic community.

As reviewed above, adult HSs in instructional settings are observed to have linguistic profiles distinct from those of adult L2 learners on account of their pre-acquired TL competence from their exposure to the language, primarily in the home environment. In some studies, the description of linguistic profiles of HSs has been incomplete, informal or even unreliable because it was often based on the researcher’s observations

rather than analyses of empirical linguistic data. Nevertheless, such descriptions have provided a reliable groundwork for further examining linguistic characteristics of HSs compared to adult L2 learners, which will be reviewed in the next section.

3.3.1.2 Heritage advantages

The question of how adult HSs differ from adult L2 learners has often been investigated under the theme ‘heritage advantages’ in language learning. In SLA, post-puberty L2 learning is considered to contrast with (monolingual) child L1 acquisition in that its results do not reliably converge on the uniform success like the results of child L1 acquisition (Bley-Vroman, 2009). Adult L2 learners’ failure to achieve native competence in the TL is normally ascribed to the late AoA of the TL (i.e., their L2), which may impose a changed condition for language acquisition based on maturational decay (Gleitman & Newport, 2002; Long, 1990), and the existence of their L1, which is firmly established before the L2 learning starts. In contrast to adult L2 learners, adult HSs are exposed to the TL (i.e., their HL) during the ‘critical period’ (Lenneberg, 1967) or ‘sensitive period’ (Oyama, 1976) for language acquisition, and their HL is the first language that they acquire from birth, either simultaneously with the majority language of the wider society or before learning the majority language. Because of such early and timely exposure to the HL, adult HSs are expected to have advantages in learning or re-learning their HL in adulthood—at least some properties in the HL that develop and solidify early, such as the sound system (Au et al., 2002).

Findings from research on HSs indicate that early exposure to the TL yields advantages to HSs over adult L2 learners, at least for TL phonetics and phonology. In their investigation into long-term effects of childhood language experience on the perception and production of TL speech sounds, Oh et al. (2003) examined three different groups of learners of Korean—that is, ‘childhood speakers’ and ‘childhood overhearers’ (i.e., HSs) and adult L2 learners enrolled in first-year Korean classes at the tertiary level—compared to NSs of Korean. The results of their study showed that in perception, the HSs who spoke or overheard the TL during their childhood outperformed adult L2 learners. However, in production, the childhood speakers outperformed the childhood overhearers, who were not substantially different from the L2 learners. The results of the study clearly indicate that early TL experience may remain latent to some degree and bring advantages to HSs in learning or re-learning TL phonology in adulthood (Oh et al.,

2003).¹⁵ Such heritage advantages over adult L2 learners in phonetic and phonological competence have also been demonstrated in KHSs (Chang, 2016; Cheon & Lee, 2013; Lee-Ellis, 2012) and HSs of Russian (Lukyanchenko & Gor, 2011) with respect to perceptual sensitivity, as well as in HSs of Mandarin (Chang et al., 2011) and KHSs (Ko I, 2013; Shin E, 2005) concerning production.

The same researchers (Au et al., 2002; Knightly et al., 2003) also investigated the benefits of early TL experience beyond phonetics and phonology. This time, they compared the task performance of two groups of tertiary-level learners of Spanish, childhood overhearers and adult L2 learners enrolled in second-year university Spanish courses. The researchers found that in the oral production tasks measuring the participants' phonetic and phonological competence, the HSs had more native-like pronunciation in Spanish than the adult L2 learners. On the contrary, in the tasks assessing their morphosyntactic knowledge in Spanish, the HSs and the L2 learners performed equally poorly compared to NSs of Spanish. Based on the results, the researchers concluded that the advantages in linguistic competence derived from early TL experience might be restricted to some linguistic domains such as phonetics and phonology.

In contrast to the consistent research findings indicating advantages gifted to HSs over adult L2 learners in learning TL sound system, studies have shown contradicting results regarding heritage advantages in learning TL aspects in other linguistic domains. Some studies found no meaningful difference between heritage learners and L2 learners when they tested the learners' knowledge of the following linguistic aspects: wh-movement in Korean (Kim J-T, 2001) and in Spanish (Montrul et al., 2008b), nominal particles in Korean (Kim EJ, 2003; Kim S-Y, 2013; Lee Sun-Hee et al., 2009) and oral perception of relative clauses in Korean (O'Grady et al., 2001). Although not all the studies investigated heritage advantages deliberately, no statistically significant difference was observed between HSs and adult L2 learners in their performance of the given tasks. This indicates that early TL exposure does not automatically grant benefits to HSs over adult L2 learners in learning TL aspects in other linguistic areas beyond phonetics and phonology in adulthood.

Conversely, some studies have found partial heritage advantages beyond those domains. For instance, Au et al. (2008) continued their investigation of the effect of early

¹⁵ Some studies have demonstrated the effect of early TL experience on re-learning of the TL to some degree among HSs or international adoptees (e.g., Bowers JS et al., 2009; Oh et al., 2010).

TL experience in HL learning in adulthood and found some evidence supporting heritage advantages even in morphosyntax. They tested three different groups of tertiary-level learners of Spanish—childhood speakers, childhood overhearers and adult L2 learners—compared to NSs of Spanish with the same tasks used in their previous studies. The researchers found that the childhood speakers performed better than the L2 learners and the childhood overhearers in some of the tasks designed to test their morphosyntactic knowledge in Spanish despite being outperformed by the NSs. Although the better performance of the HSs was not demonstrated in all the tasks that measured the participants' morphosyntactic competence in Spanish, the study results indicate that certain types of childhood TL exposure may help HSs in learning or re-learning some TL morphosyntactic aspects in adulthood.

Similarly, in her investigation into the differences and similarities between L2 acquisition and L1 loss, Montrul (2005) compared tertiary-level heritage and L2 learners of Spanish at three different proficiency levels regarding their syntactic and semantic knowledge on unaccusativity in Spanish. Her results showed that the heritage learners performed better overall than the L2 learners on the given tasks, especially when their language proficiency was factored in. In another study, Montrul et al. (2008a) examined oral production, written comprehension and written recognition of gender in Spanish among tertiary-level heritage and L2 learners of Spanish. The researchers found that the L2 learners performed better than the heritage learners in the written tasks but were outperformed by the heritage learners in the oral task.¹⁶ The findings from these studies indicate that benefits of childhood TL exposure enjoyed by HSs may extend to the linguistic domains beyond phonetics and phonology, though they seem selective.

As reviewed in this section, studies have demonstrated that HSs generally have better phonetic and phonological competence in the TL in question (i.e., their HL) than adult L2 learners. However, regarding their TL competence in other linguistic domains, such as morphology or syntax, studies have shown contradicting results. Bringing these research findings together, it can be summarised that heritage advantage is present in learning TL aspects regarding the sound system but not necessarily in other linguistic areas.¹⁷

¹⁶ Reviewing these contrasting results, Montrul (2012) warns of the possible effect of proficiency level and test modality when interpreting test results.

¹⁷ Nevertheless, some researchers working in language education often suppose that heritage learners possess better linguistic abilities overall than adult L2 learners and their learning progresses faster than that

3.3.2 Heritage speakers compared to native speakers

In this section, study findings with implications for the linguistic characteristics of HSs compared to (monolingual) NSs are reviewed. The review focuses on the linguistic competence of adult HSs compared to their NS controls found in previous studies, as it will reflect the results of HL acquisition in comparison to (monolingual) L1 acquisition.

Many studies have examined HSs' linguistic competence in their HL compared to the linguistic competence of the NSs of the same language to scrutinise their 'divergences' (Benmamoun et al., 2010) from native norms. This may have been primarily because the results of HL acquisition do not converge on the uniform success like in L1 acquisition but rather resemble the non-convergent results of adult L2 acquisition (Montrul, 2009b; Rothman, 2009). Indeed, the non-convergence of HL acquisition results clearly contrasts with the uniform success in L1 acquisition, despite their commonality in the AoA (i.e., from birth) and the mode of acquisition, especially before schooling begins (i.e., learning the TL mainly in a natural acquisition environment in contrast to learning the TL mostly in a language classroom in the case of post-puberty L2 learning). Accordingly, researchers working on HLs have been investigating HSs' differences from native norms and the underlying reasons for the observed differences.

An increasing body of literature has indicated that the degree of divergence in HSs' linguistic competence in the HL from native norms varies depending on linguistic aspects and the level of proficiency (Benmamoun et al., 2010, 2013; Laleko & Polinsky, 2013; Rothman, 2009). Simply speaking, certain linguistic aspects are observed to be more fully acquired than others in an HL, and linguistic aspects incompletely acquired in low-proficiency HSs are different from those in high proficiency HSs. As Laleko and Polinsky (2013, p. 40) explain, 'not all phenomena may be of equal difficulty to all heritage language speakers, and not all HSs can be expected to exhibit divergences from the baseline language, i.e., the language of monolingual native speakers, on all variables'. Following this account, study findings on HSs' divergences from native norms in their

of L2 learners (Kondo-Brown, 2003). However, it should be noted that adult heritage learners do not start learning the TL from scratch; they come to the TL class with pre-acquired TL skills unlike L2 learners, as reflected in the definition of HSs from Valdés (2001). This means that HSs must have better abilities than novice L2 learners at least at the start of the TL instruction. This is the reason that researchers should only count in the TL competence gained from the TL instruction when testing for heritage advantages, although this is very difficult. Heritage advantage needs to be investigated further with more fine-grained research methods to specifically measure the gains in the TL competence from TL instructions.

linguistic competence in the HL are reviewed by linguistic domain in section 3.3.2.1. and by the speakers' proficiency level in section 3.3.2.2.

3.3.2.1 Heritage speakers' divergence from native norms by linguistic domain

Phonetics and phonology are the linguistic areas in which HSs are considered to have native-like abilities. The observations made by researchers working in the field usually speak for the overall impression that many HSs sound like NSs (e.g., Peyton et al., 2001). However, HSs' consistent advantages for HL phonetics and phonology conferred by early TL experience may be confined to speech perception in the HL, only to a certain degree. In some studies, HSs showed no (statistically significant) difference from their NS controls in their perception of some phonetic or phonemic distinctions in their HL (e.g., Chang, 2016; Lukyanchenko & Gor, 2011; Oh et al., 2003). In other studies, however, HSs were found to perform (statistically significantly) less well than their NS controls in perceiving phonemic contrasts in the HL (e.g., Ahn et al., 2017; Cheon & Lee, 2013; Lee-Ellis, 2012). Interestingly, HSs showed less-than-native performance in cognitively more demanding tasks, as shown in the study by Lee-Ellis (2012), and their level of performance of given tasks correlated with their age of reduced input in the HL, as seen in the study by Ahn et al. (2017).

Regarding their productive competence in HL phonetics and phonology, such as pronunciation, HSs did not consistently demonstrate native-level command. For instance, in the aforementioned study by Knightly et al. (2003), the HSs who grew up overhearing Spanish up to five years of age were not rated as highly as native speakers in their phonemic and narrative accent in Spanish. In the aforementioned study by Oh et al. (2003), the HSs who used to speak Korean in childhood were also evaluated to be non-native in the overall accent rating despite being judged to be closer to the native speakers compared to the childhood overhearers or the L2 learners. Similarly, in their investigation of the constraints on native attainment of pronunciation in L1 and L2, Yeni-Komshian et al. (2000) found that the Korean–English bilinguals who immigrated to the US earlier (at ages one to 11)—who could be labelled KHSs—received lower accent ratings than those who arrived in the country later (at ages 12–23) and received accent ratings more comparable to NSs of Korean.

More interestingly, studies have found differences in the quality of articulation of specific speech sounds between HSs and NSs. For example, Godson (2004) examined the production of vowels in (Western) Armenian by two groups of Armenian–English

bilinguals living in the US, divided by their AoA of English (i.e., before the age of eight or in adulthood), compared to one NS of the language. The overall results showed that the bilinguals articulated Armenian vowels differently from the NS. More importantly, it was observed that the two groups of bilinguals differed from each other in terms of the quality of the Armenian front (i.e., /i/ and /ε/) and central vowels (i.e., /a/) that they produced. The early bilinguals articulated those vowels close to their corresponding vowels in English, indicating an influence of their dominant language (i.e., English) on their HL (i.e., Armenian). Similar results indicating a possible influence of the dominant language phonetics and phonology on the HL were observed in other studies, for example, for Italian stops (MacKay et al., 2001), Arabic vowels (Saadah, 2011) and Korean consonants (Ko I, 2013). The subtle differences in pronunciation between HSs and NSs of a given language may contribute to the HSs' accent being detected as non-native relatively instantly by NSs despite their high oral fluency in the language (Benmamoun et al., 2013; Polinsky, 2018).

Concerning their linguistic knowledge in other linguistic domains in the HL, HSs show a varying degree of mastery. Some grammatical knowledge appears to be more difficult to acquire and retain than others, displaying differing acquisition rates (Rothman, 2009). Regarding morphology, a large number of studies have shown the less-than-native performance of HSs on various morphological aspects (e.g., Albirini et al., 2013; Montrul, 2002, 2009a; Montrul et al., 2008a; Pires & Rothman, 2009; Polinsky, 1995a, 2006, 2008; Rothman, 2007; Silva-Corvalán, 1994). Reviewing a large number of studies on HSs' morphological competence, Benmamoun et al. (2013) summarise that HSs exhibit the following tendencies regarding HL morphology: HSs exhibit greater difficulty with functional categories than lexical categories; within functional morphology, they may find nominal morphology more challenging to master than verbal morphology; and even within verbal morphology, there is a variation in the degree of mastery.

Compared to morphology, HSs show good command of syntactic knowledge of their HL. As Benmamoun et al. (2013, p. 148) put it, '[t]here is a tendency for heritage language speakers to retain the basic, perhaps universal, core structural properties of their language'. Despite appearing to have acquired essential and principal syntactic knowledge of their HL, HSs still exhibit deficits regarding more complex syntactic features such as recursion and higher CP projections, pro-drop feature and anaphors (Benmamoun et al., 2013). Studies have examined HSs' performance regarding various

syntactic structures and found deviance from native norms, for example, for pro-drop (Albirini et al., 2011; De Groot, 2005), long-distance binding (Kim J-H et al., 2009; Polinsky, 2006), wh-movement (Montrul et al., 2008b) and relative clauses (Kim H-SH, 2005; O'Grady et al., 2001; Polinsky, 2011b; Sánchez-Walker, 2012).

HSs' knowledge of HL semantics appears to be understudied compared to other linguistic areas, as few studies have examined their performance of semantic aspects (Benmamoun et al., 2013). As an exception, Montrul and Ionin (2010, 2012) examined the interpretation of definite articles with plural noun phrases among HSs of Spanish who spoke English as their dominant language. The researchers observed that the HSs performed indifferently from the NSs of English on the tasks assessing their interpretations of definite articles and plural noun phrases in English. In the tasks in Spanish, however, the HSs tended to use bare nouns for generic references, which is ungrammatical in Spanish, as well as interpreting definite articles as specific, whereas the NSs of Spanish interpreted them as generic. These results indicate not only that HSs can diverge from native norms in HL semantics but also that their semantic knowledge in the HL can be influenced by the dominant language semantics.

Regarding lexical knowledge, HSs appear to deviate further away from native norms. They were observed to know fewer words and expressions in their HL and be slower at retrieving HL vocabulary than NSs. Studies, though only a few, have shown that HSs have a smaller vocabulary and slower lexical processing in the HL than their NS controls, indicating a relationship between language experience and lexical competence in the TL. In her study of language loss among Dutch immigrants in New Zealand, Hulsen (2000) examined three different groups of Dutch immigrants for vocabulary access in perception and production in Dutch and English (in terms of retrieval accuracy and speed) with a picture-matching task and a picture-naming task. The overall results revealed an intergenerational language shift or a loss of Dutch in the Dutch immigrant community. On the tasks for Dutch vocabulary, the first-generation performed best and the second-generation performed significantly worse than the first-generation but far better than the third-generation; for English vocabulary, the reverse pattern was true. In addition, the results suggested the effect of input/output frequency and cognate status of words on lexical retrieval as high-frequency words and cognates were recognised more accurately and quickly than low-frequency ones in both languages. In a recent study, Blasingame (2018) found similar results; HSs of Spanish in the US were less accurate at identifying

real words in Spanish than their NS controls, and they recognised early acquired words and high-frequency words faster than late acquired words and low-frequency words in Spanish. His findings indicate the effect of AoA of individual words and word frequency on lexical retention, which had been previously demonstrated in the study by Montrul and Foote (2014).

Such findings suggest that the HL vocabulary of HSs is generally smaller than that of the single language vocabulary of its NSs, and HSs are generally slower with processing their HL vocabulary compared to NSs. HSs are frequently observed to borrow words from their dominant language and use them in their HL speech (i.e., code-switching) (Benmamoun et al., 2010; Campbell & Rosenthal, 2000). They do so to fill the gaps in their HL vocabulary and complement their slower lexical retention in the HL. With respect to bilingual lexical competence of HSs, studies also have shown slower processing in their HL than in their dominant language (e.g., O'Grady et al., 2009; Schafer et al., 2009) and a correlation between lexical competence and grammatical competence in their HL (e.g., Polinsky, 1995a, 1995b; 2006).

3.3.2.2 Heritage speakers' divergence from native norms by proficiency

Linguistic attributes of HSs that are explained in terms of their divergences from native norms in the linguistic abilities in different linguistic domains can also be examined in terms of the degree of divergences by their level of HL proficiency. Simply speaking, HSs' gap to native norms, given their less-than-native abilities in the HL, appears to be more prominent in low-proficiency HSs than those with high proficiency. According to Laleko and Polinsky (2013), HSs with low or intermediate proficiency tend to show consistent struggles with inflectional morphology and complex syntactic structures, while more proficient HSs will show fewer deviations in their knowledge and use of HL morphology and syntax, and some of them may exhibit even 'virtually error-free production and comprehension' (Laleko & Polinsky, 2013, p. 41).

However, even highly proficient HSs have been observed to have some deficits in linguistic knowledge mediated at interfaces between linguistic domains (e.g., Laleko, 2010; Laleko & Polinsky, 2013, 2016; Lee EH & Zaslansky, 2015). This can be explained by the so-called interface phenomenon based on the 'interface' hypothesis put forward by Sorace and her colleagues (Sorace, 2004, 2011; Sorace & Filiaci, 2006; Sorace & Serratrice, 2009). According to their hypothesis, certain linguistic features associated with different linguistic domains or interfaces are more difficult to acquire completely in

L2 and are more susceptible to attrition in L1 than other linguistic features; for example, features mediated at interfaces are less likely to be acquired completely than those within a specific domain; phenomena involving knowledge of syntax-discourse interface than those involving knowledge of other interfaces. Although Sorace (2011) cautions against misinterpretations or unwarranted extensions of the hypothesis to all L2 learners (not just L2 learners with near-native proficiency) or intergenerational attrition, others argued for the viability of such extensions (e.g., Lardiere, 2011; Montrul & Polinsky, 2011; White, 2011). Indeed, a growing number of studies regarding HL acquisition have demonstrated that the hypothesis holds true for HSs as well (e.g., Laleko & Polinsky, 2016; Lee EH & Zaslansky, 2015).

3.4 Linguistic characteristics of English-speaking heritage speakers of Korean

This section reviews study findings in relation to HL competence of English-speaking adult KHSs. This review will show the HL acquisition outcomes of KHSs in a Korean–English-cross-linguistic context relevant to HL development and maintenance of KHSs in Australia in primary school years (i.e., the population of interest of this study). Research on KHSs has been most active in North America, where English is the majority language of the broader community in most areas. An increasing number of studies have been conducted on KHSs in the US (Lee JS & Shin, 2008; Polinsky, 2011a). This is because KHSs have often been the subject of study for researchers working in teaching Korean due to their strong presence in the Korean language courses in tertiary institutions in the country.¹⁸ It is also because the growing interest in HSs and their acquisition of HLs in the language research community around the globe has inspired research into the properties of KHL in Korean–English bilingualism. The studies conducted on English-speaking KHSs started to show their linguistic abilities in Korean, providing insights into the acquisition of KHL in Korean–English-in-contact conditions. In the following subsections, findings from such studies are reviewed in the three broad linguistic areas—sound system, vocabulary and grammar—because such a review is necessary for refining research questions of this study and discussing its results in later chapters.

¹⁸ The presence of HSs was a common phenomenon in the post-secondary-level language courses for Less Commonly Taught Languages in the US (Kim H-SH, 2001).

3.4.1 *Heritage language sound system*

A few studies have examined the HL abilities of KHSs who grew up in a Korean–English-in-contact setting (predominantly in the US) with respect to the sound system, as Korean differs from English not only in its sound inventory but also in its specifics of phonology. Despite some contradicting results, overall findings indicate that regarding the sound system, English-speaking KHSs have more native-like abilities than adult L2 learners of Korean but still show some differences from native norms.

Many studies have attested to the superiority of KHSs over adult L2 learners, especially in perceiving Korean speech sounds. A well-known example is the aforementioned study by Oh et al. (2003), where KHSs demonstrated better competence in perceiving denti-alveolar stops in Korean (i.e., /t/, /t*/ and /t^h/) than adult L2 learners. This finding is important in that even the KHSs who only overheard Korean (without speaking it actively) during childhood could differentiate the stops better than the L2 learners who normally have difficulty with perceiving the three-way laryngeal contrast due to its absence in English. Similar results were also observed in the study by Cheon and Lee (2013) on the perception of Korean stops by heritage and non-heritage learners of Korean at a university in the US. In their study, the heritage learners were more accurate than the non-heritage learners in the task of matching an auditory stimulus in Korean—that is, a Korean syllable made of one of the three-way-contrasting stops (i.e., /p/–/p*/–/p^h/, /t/–/t*/–/t^h/ and /k/–/k*/–/k^h/) and the vowel /a/—with its corresponding writing in Korean. Moreover, in the task of labelling the auditory stimuli in Korean with one of the given words written in English—that is, *pa*, *ba*, *fa*, *va*, *ta*, *da*, *ka* and *ga*—the heritage learners patterned with the native speakers while the non-heritage learners showed a different labelling pattern. In addition, in the study by Chang (2016) that investigated the benefits of early TL exposure on the perception of speech sounds in both languages of HSs, the English-speaking KHSs were found to be as accurate as KNSs in correctly perceiving the Korean stops /p/, /t/ and /k/ that were pronounced unreleased in the word-final position, compared to NSs of English who performed relatively poorly on the task due to the reduced acoustic cue (i.e., pronounced unreleased) that they use for differentiating the stops in English.

The superior performance of KHSs than adult L2 learners has also been observed for pronunciation in Korean. In the study by Ko I (2013), KHSs who were enrolled in first-year Korean courses at a university in the US received better ratings than non-

heritage learners in first- and second-year Korean courses for their pronunciation of target words containing a coronal consonant in Korean (i.e., /t/–/t*/–/t^h/, /c/–/c*/–/c^h/ and /s/–/s*/) that were embedded in a Korean sentence even if the differences between the three groups of learners (i.e., first-year heritage, first-year L2 and second-year L2 learners) in the ratings were not found statistically significant. Moreover, in Shin E’s (2005) investigation of the function of prosody in identifying foreign accents, heritage learners were better at producing basic tonal patterns in Korean than non-heritage learners, and KNSs detected a foreign accent less frequently in heritage learners’ utterances than in non-heritage learners’ utterances.

Study findings that demonstrated better phonetic and phonological competence in Korean of KHSs than adult L2 learners, however, do not necessarily infer native-like competence in the HL phonetics and phonology. Regarding their overall accent in Korean especially, English-speaking KHSs are likely to be judged as having a non-native accent, as observed in the studies by Yeni-Komshian et al. (2000), Oh et al. (2003) and Shin E (2005). With respect to the articulation of certain speech sounds in Korean at the syllable level, they may show no difference from KNSs, as in the study by Oh et al. (2003). The study of the effect of the AoA of English on the perception of the stop contrast in Korean and English by Kang and Guion (2006) showed similar results; the HSs (referred to as early Korean–English bilinguals) displayed no statistically significant difference from the native norm in their articulation of three-way-contrasting Korean stops in terms of the VOT, the amplitude difference between the first two harmonics and the fundamental frequency. Nevertheless, a study with more fine-grained research methods might disclose subtle differences between KHSs and the native speakers in the articulation of Korean speech sounds, as in the aforementioned study by Ko I (2013). Using static palatography, his study demonstrated that KHSs (i.e., low-proficiency heritage learners enrolled in first-year Korean courses) articulated Korean coronal consonants differently from the native speakers in terms of the place and manner of articulation such as the parts of oral articulators contacted or the length of the contact.

English-speaking KHSs have shown divergences from the native norm even in perceiving speech sounds in Korean. At first glance, KHSs may appear to have native competence in perceiving phonemic contrast in Korean, as seen in the aforementioned study by Chang (2016), where they differentiated the unreleased Korean stops /p/, /t/ and /k/—which are distinguished by their place of articulation—as accurately as KNSs.

However, with phonetic features that are specific to Korean, KHSs may show lower competence in perception compared to native norms. In the aforementioned study by Cheon and Lee (2013), for instance, KHSs were statistically significantly less accurate than the native speakers in identifying the three-way-contrasting stops in Korean; they had 89% accuracy on the matching task compared to 98% accuracy that the native speakers had.

Moreover, in her dissertation, Lee-Ellis (2012) showed that English-speaking adult KHSs could not distinguish the Korean lax and tense sibilant fricatives (i.e., /s/ and /s*/) as accurately as KNSs in the AX task and the sequence recall task when the test stimuli produced by multiple speakers were given.¹⁹ The researcher interpreted the results as evidence that the initially established L1 (i.e., the HL) representation can be restructured later to accommodate the L2 (i.e., the majority language spoken in the wider society) if the L2 input is early enough and dominant, suggesting that input dominance plays a more important role than early exposure in the long-term bilingual competence of HSs.

The possibility of loss or restructuring of early established L1 phonological representation in HSs was also observed in the study by Ahn et al. (2017). In their study, English-speaking adult KHSs were not as accurate as KNSs on the phonemic contrasts specific to Korean (i.e., between /t/ and /t*/ and between /s/ and /s*/) in comparison to the contrast common in Korean and English (i.e., between /n/ and /l/), and their accuracy correlated with their age of reduced contact with Korean (measured by their age of arrival in the US). The researchers interpreted these results as an indication of an age effect on attrition of L1 (i.e., HL) speech perception, showing that the earlier the speaker experiences a reduced contact with his or her L1, the less likely he or she is to perceive L1 phonemic contrasts accurately. Together with the results of the study by Lee-Ellis (2012), the study results seem to indicate that even perceptive abilities in the HL phonetics and phonology can undergo an erosion or restructuring.

In addition, some studies on frequent orthographic errors found in the Korean writings of English-speaking heritage learners of Korean have indicated that some of the errors may have arisen from the learners' inability to detect a phonemic contrast between

¹⁹ Together with the results from the perception of a consonant cluster in English, Lee-Ellis (2012) concluded that the HSs have non-native phonological competence in their L1, (i.e., Korean, their HL) while they have native-like phonological competence in their L2 (i.e., English, their dominant language), as their performance patterned more closely with the NSs of English than the NSs of Korean.

similar sounds in Korean (Choe Yoon, 2007; Kim M, 2001; Park H, 2015).²⁰ Although these studies did not directly test the KHSs' perception of Korean speech sounds and the explanations on the cause of the errors might be subjective, the observations alone indicate that further investigation of their perception of Korean speech sounds would be useful.

As reviewed above, studies have shown that early TL experience remains as latent or active phonetic and phonological competence in the TL in English-speaking adult KHSs, so they exhibit superior abilities not only in perception but also in the production of Korean speech sounds than adult L2 learners of Korean. Conversely, the findings have also indicated that KHSs may diverge from the native norm even in the HL phonetics and phonology as they are constantly rated to have non-native accents and show signs of difficulties in perceiving some phonemic contrasts absent in English. The study findings that suggest a possibility of erosion in perceptive abilities in HL phonology or restructuring of HL speech sounds are particularly interesting because they present counter-evidence for the prevailing view of the early establishment of phonological competence and its strong resilience to attrition in language acquisition in general.

3.4.2 Heritage language lexis

Regarding lexical knowledge in the HL, few studies have examined KHSs. This is probably because it is very difficult to gauge one's mental lexicon, and, at the same time, it is highly predictable that HSs will show a substantial degree of deficit regarding lexical knowledge in their HL compared to NSs of the language and the range of their HL vocabulary will be confined to words and expressions frequently used in the contexts that they use the HL. Exceptionally, a few studies examined lexical errors produced by KHSs. Wang (1995, 1997) analysed errors in the written composition of heritage learners enrolled in the intermediate-level Korean courses at a university in the US. She categorised the errors by the type and cause (e.g., intralingual, interlingual or combined) and lexical category (e.g., noun, verb and adjective) and calculated error rates. In both studies, the errors caused by the similarity in meaning or code-switching comprised a large proportion of the total occurrence. Unlike her first study (i.e., Wang, 1995), in which

²⁰ It is also possible that those orthographic errors are derived from ambiguity in differentiating between similar phonemes in colloquial speech, as Joo (2018) explains. In other words, the incorrect orthography produced by KHSs may be accurate representations of the speech sounds that they receive in their HL input where native speakers do not always pronounce each sound clearly to be distinguished from its similar sounds in their speech.

the relative percentage of interlingual errors was relatively high (51%), the percentage of interlingual errors was relatively low (30%) in her later study. In contrast, in their study of lexical errors produced by heritage learners of Korean at the secondary level in Australia using the same method, Shin S-C and Joo (2015) found that combinational errors were most frequent (47.3%), followed by interlingual errors (35.3%) and intralingual errors (17.4%). They also reported that errors of simplification and redundancy (36.4%) or errors of code-switching (28.1%) were most frequent in terms of error type.

As lexical errors of KHSs were not directly compared with those of adult L2 learners in those studies, it is difficult to claim that KHSs are more prone to making errors of a specific type, cause or lexical category than adult L2 learners. Nevertheless, the studies provided valuable insights into the lexical knowledge of Korean that English-speaking KHSs in adolescence and adulthood typically have. In particular, Shin S-C and Joo (2015) note KHSs' strong reliance on childhood vocabulary, the reiteration of previously heard utterances and the influence of their dominant language (i.e., English). They explain that such characteristics are related to the lack of formal education in the HL and interference of vocabulary learning in the HL during their schooling in English. This explanation is in line with the observations made in the relevant studies. For instance, Wang (1997) found that HSs made more lexical errors when writing on a less familiar topic. A similar effect related to genre (or task type) on the writing performance of KHSs was observed in the study by Kim SHO (2012).

3.4.3 Heritage language grammar

Since grammar of a language virtually covers all linguistic domains (from phonology to pragmatics), it is difficult to claim that KHSs have better linguistic abilities in HL grammar than their proficiency-matched adult L2 learners of Korean. Moreover, studies found contradicting results regarding whether KHSs possess better linguistic abilities than the adult L2 learners with respect to different linguistic aspects of Korean grammar.²¹ Some studies have deliberately examined heritage advantage regarding

²¹ Previous study results should be interpreted carefully because the proficiency in Korean of KHSs was often not measured deliberately but simply indicated by the level of the courses in which they were enrolled (e.g., beginner, intermediate or advanced). Moreover, the possible effect of test modality was also frequently ignored even though L2 learners are likely to perform better than heritage learners in tasks involving written language or meta linguistic knowledge, whereas in tasks involving oral language skills

certain grammatical aspects of Korean but found no significant difference between heritage and adult L2 learners. For instance, Kim J-T (2001) examined heritage advantage in overcoming the dominant language (i.e., English) interference regarding the two parameters, wh-movement and pro-drop, on which Korean differs from English. He administered four written production tasks to a small number of learners of Korean ($N = 9$) in the first-year Korean class at a university in the US. He found that the heritage learners did not perform significantly better than the L2 learners and both heritage and L2 learners generally employed the features appropriately; however, the results of the study should be interpreted with caution because of its small number of participants and its test modality (i.e., written tasks). Similarly, Kim EJ (2003) compared two groups of intermediate-level learners of Korean (10 heritage learners and 11 L2 learners) enrolled in a Korean language course to examine differences between them, especially on nominal particle errors in their written productions. She found neither a significant difference in the overall accuracy of particle usage nor the overall pattern of errors between the groups.²² Similar results were found in other studies on the use of case-marking particles in heritage and non-heritage learners of Korean (e.g., Kim S-Y, 2013; Lee Sun-Hee et al., 2009).²³

Despite no significant differences observed between heritage and adult L2 learners of Korean in terms of error rate, it should be noted that the patterns or types of errors between the two groups were slightly different. For example, in the study by Lee Sun-Hee et al. (2009), the following patterns were observed: a higher rate of omission errors in nominative and accusative case particles among heritage learners than L2 learners; a higher rate of substitution errors in accusative case particles among L2 learners than heritage learners; and a higher rate of particle malformation errors among heritage

the reverse will be true, as observed in the study by Montrul et al. (2008a). In addition, the number of research participants was often too small to generalise the findings from the studies.

²² However, it should be noted that the L2 learners' error rate on delimiter particles was higher than that of heritage learners; their error rate on the topic particles (*-un/-nun*) was especially high. She interpreted these results as L2 learners having greater difficulty in dealing with discourse-related features.

²³ In her dissertation, Kim S-Y (2013) also found no heritage advantage. She examined particle errors (case markers, post-position markers and affixal connectives) in written production by heritage learners ($N = 20$) and L2 learners ($N = 29$) in beginner, intermediate and advanced level and compared the error rates of different particles and the pattern of errors between the groups. The results showed that the heritage status exhibited no effect on error rate across proficiency level. The finding was further confirmed by the results of a grammaticality judgement task given to the same participants. With a slightly bigger number of participants, Lee Sun-Hee et al. (2009) investigated particle errors detected in a corpus of writing samples from 100 learners of Korean—25 learners in each of the four groups divided by proficiency level (low or intermediate) and heritage status (heritage or L2). In the result shown by the error rates, no differences in terms of the overall accuracy in particle use was observed.

learners (e.g., writing *-ey* for the possessive particle *-uy* as it would be normally pronounced so in spoken Korean). This implies that heritage learners do not always have difficulties with the linguistic aspects that L2 learners find difficult to learn.

In contrast, some studies have shown that KHSs had better linguistic abilities than the L2 learners regarding certain linguistic aspects in Korean. For instance, in her dissertation, Kim H-SH (2005) looked into the processing of relative clauses by five groups of learners of Korean at a university in the US ($N = 128$, divided by heritage status and the dominant language spoken before age five).²⁴ She gave a picture selection task to the learners to measure the comprehension accuracy and examine the patterns of incorrect interpretations. She found that the groups whose childhood dominant language had a Subject-Object-Verb (SOV) word order (i.e., the KHSs who spoke mostly Korean before five and the L2 learners whose L1 was Japanese) outperformed the other groups. The overall results suggested that all groups had greater difficulty with object-gap relative clauses than subject-gap relative clauses, reflecting the effect of ‘noun phrase accessibility hierarchy’ (Comrie, 1977), which was also demonstrated in previous studies (e.g., O’Grady et al., 2001, 2003),²⁵ and low- and intermediate-level learners than advanced level learners had greater difficulty. Her results suggest that the early TL experience (i.e., speaking an SOV language before five) yielded some advantages to some learners (i.e., those who predominantly spoke an SOV language in childhood) in understanding relative clauses in Korean.

Although the findings reviewed above indicate that English-speaking adult KHSs (may) have better linguistic abilities than the adult L2 learners regarding certain linguistic aspects in Korean, this does not mean that the KHSs have native abilities regarding those aspects. In fact, where KHSs were compared not only with the L2 learners but also with NSs of Korean as a control group, KHSs frequently showed a lower level of performance than that of the NS controls, indicating divergences from native norms. These divergences that KHSs exhibit with respect to certain linguistic aspects in Korean may have arisen from their incomplete acquisition of the aspects, based on the explanation of Montrul

²⁴ They were three groups of heritage learners of Korean who spoke mostly Korean, both Korean and English or mostly English before age five, as well as two groups of L2 learners of Korean whose L1 had the SVO word order such as English, Chinese or Russian or whose L1 was Japanese, which has the SOV word order like Korean.

²⁵ In contrast, in her study of relative clause production by KHSs and NSs of Korean, Lee-Ellis (2011) did not find a clear asymmetry between the object-gap and subject-gap relative clauses, but a modest correlation between their proficiency in Korean and individual response patterns among the KHSs.

(2008a). An example of incomplete acquisition can be found in the study of verb conjugation in KHL by Choi H-W (2003). The researcher observed that KHSs in the US consistently inserted the vowel ‘U’ (i.e., *u* or *a/e*) between a consonant-final verb stem and certain verb endings (e.g., *ip-U-ko* instead of *ip-ko* for the verb *ip-* ‘wear’ and the conjunctive suffix [i.e., conjunctive] *-ko* ‘and’). She explained that KHSs reanalysed verb stems from the verb forms that they receive in spoken Korean, such as those ending with *-a/e* in the intimate speech style or with *-a/eyo* in the polite speech style, and then conjugate the reanalysed verb stem according to the conjugation rule for vowel-final verb stems. She argued that the reanalysis was derived from the confines in the range of registers that KHSs are exposed to and use in Korean. In fact, such verb conjugation errors are commonly observed in monolingual Korean-speaking children, but they eventually overcome such developmental errors and produce correct forms. In contrast, some (but certainly not all) KHSs continue making such errors until adulthood, as observed in the study.

More recently, studies have examined divergences of the KHSs from native norms more deliberately and found less-than-native abilities regarding certain linguistic aspects. For instance, Kim J-H et al. (2009) investigated binding interpretations of the anaphors, *caki*, *casin* and *caki-casin* ‘self’ by early and late Korean–English bilinguals (i.e., 22 early bilinguals born in the US—i.e., KHSs—29 late bilinguals who arrived in the US between ages 11–19) compared to NSs of Korean. Presupposing that *caki* and *casin* are (preferably) long-distance anaphors and *caki-casin* is a local anaphor, the researchers examined the degree of acceptance of each anaphor either as long-distance or local anaphor in a truth-value judgement task. Their results showed a significant difference between the groups in the task performance; compared to the US-born KNSs, the late arrivals performed more closely to the NSs. The NSs and late arrivals tended to interpret *caki* and *casin* as a long-distance anaphor while interpreting *caki-casin* as a local anaphor; in comparison, the US-born KHSs preferred to interpret *casin* as well as *caki-casin* as a local anaphor.

Similarly, Kim S-J (2015) examined two groups of KHSs, whose AoA of English was between birth and two years or between seven and 10, compared to KNSs regarding their knowledge of the Negative Polarity Item (NPI), *amwuto* ‘anyone’ as the object with a grammaticality judgement test. While both Korean and English allow local licensing of object NPIs, Korean does not allow long-distance licensing of embedded object NPIs, contrary to English. His study results revealed that both groups of KHSs had fully

acquired the local licensing of the object NPI, as they showed an accuracy rate as high as that of the NSs. In contrast, he found that the KHSs had incompletely acquired the long-distance licensing of the embedded object NPIs. Interestingly, no age effect was found between the two groups of KHSs.

3.5 Factors affecting heritage language acquisition

Except for pathological cases, the results of L1 acquisition across individuals mostly converge on uniform success despite the variations present in their acquisition settings with respect to numerous psychological and sociological factors (e.g., language aptitude, intelligence, TL experience, socioeconomic status and level of education). In contrast, the results of HL acquisition do not converge on uniform success (Benmamoun et al., 2010); its outcomes tend to be divergent from native norms, and the degree of divergence varies greatly between individuals (Benmamoun et al., 2010). Such non-convergent results must have been derived from specific properties of HL acquisition in that it is a type of bilingual acquisition but has its unique attributes. This section briefly reviews some of the factors that can influence HL acquisition based on the findings of relevant studies.

3.5.1 Heritage language experience

Many HSs achieve less-than-native competence in their HL, and this may be because they obtain less input (or experience) in the HL compared to the corresponding NSs (Krashen et al., 1998).²⁶ (In this study, the term ‘language experience’ will be used to embrace language input [or exposure] as well as language output [or use] because it is often difficult to separate language input from language output, and not only language input but also language output may be related to language acquisition.) HSs must split

²⁶ The non-convergent results of HL acquisition seem to be closely related the differences in the amount and quality of TL input that HSs receive in comparison to monolingual native speakers, as well as the differences between individual HSs. Regardless of the view on language acquisition—either nativist or non-nativists (e.g., functionalists, emergentists, researchers based on socio-pragmatic or usage-based models), most language researchers agree that successful language acquisition requires an acquisition faculty (either the faculty of language as the mechanism and process, which drive and control language acquisition, or other sorts of innate abilities unique to human beings, such as cognitive abilities), language input and the right timing of input (Lee-Ellis, 2012). If these three factors are indeed the prerequisites for successful language acquisition, neither language learning faculty nor the timing of input can be responsible for the non-convergent results in HL acquisition because HSs must be equipped with a language learning faculty just like any other human being and they have the same timing of TL input as their monolingual peers, as they receive HL input since birth.

their waking hours for learning their two languages—that is, their HL and the majority language of the wider society. This means that, on average, HSs' time spent on learning their HL must be less than that spent on learning the same language by monolingual NSs. This less-than-native time spent on the HL must be, to a certain extent, the reason for their tendency to achieve less-than-native abilities in the HL. In addition, the time spent on learning the HL must vary between individuals even among HSs; this could account for the great variation in the HL abilities observed within HSs.

An accumulating body of literature has indicated that the variation in the results of HL acquisition observed among HSs is due to their differences in the amount of language experience that they have in the HL. Some studies reported a relationship between linguistic abilities of HSs regarding certain HL aspects (or HL proficiency in general) and some of their language background variables that can be tallied up in terms of the amount of HL experience they have. In their study of the relationship between some language background variables and HL maintenance among HSs of (Mexican) Spanish ($N = 308$) at senior secondary level in California, Hakuta and D'Andrea (1992) found that adult HL use at home (e.g., use of the HL by parents or grandparents), as well as the HSs' age of arrival in the US (together with parental birthplace),²⁷ was related to their HL proficiency. In a group-wise comparison, the participants with later age of arrival and more HL experience at home performed better than those with earlier age of arrival and less HL experience at home on the tasks measuring their proficiency in Spanish.²⁸ Even though the effects of the HSs' age of arrival in the host country and amount of HL input at home were not measured separately in the study, its results clearly indicate that the combination of the two had effects on the outcomes of HL acquisition among the HSs.

Some studies have more deliberately shown that the results of HL acquisition can be influenced by the AoA of the majority language (often measured in the age of arrival in the host country). For instance, in her study of the linguistic knowledge of tense and aspect in Spanish among adult HSs of (Hispanic) Spanish in the US whose exposure to English had begun at various ages, Montrul (2002) observed that the early bilinguals

²⁷ The influence of age of arrival on HL maintenance was measured in combination with parental birthplace (possibly reflecting parental L1) as follows: students who arrived in the US after age 10; students who arrived between ages six and 10; students who arrived before age six; US-born students with both parents born in Mexico; US-born students with one parent born in the US; and US-born students with one parent and associated grandparents born in the US. The effects manifested as differences in HL proficiency between the groups.

²⁸ The participants' proficiency was measured by three tasks: a vocabulary production task, a grammaticality judgement test and a cloze test.

(AoA of English: birth to three years) were less accurate than the early child L2 learners (AoA of English: four to seven years) who, in turn, were significantly less accurate than late child L2 learners (AoA of English: eight to 12 years). She interpreted the results as that the earlier an HS was exposed to the majority language, the more likely his or her acquisition of the HL features is incomplete. She explained that an earlier age of exposure to the majority language leads to a greater reduction in HL experience in HSs, and this results in a higher chance of incomplete acquisition of the HL. Similar results indicating the age effect on the results of HL acquisition across linguistic domains or in certain domains have also been observed in other studies (e.g., Ahn et al., 2017; Jee, 2018; Moon, 2012).

Studies also have shown that the results of HL acquisition can be affected by various other language background variables. In the aforementioned study of the processing of Korean relative clauses by Kim H-SH (2005), the effect of the dominant language spoken in childhood (between birth and five years) on the overall accuracy in processing relative clauses was found among the heritage learners. The heritage learners who predominantly spoke Korean before the age of five were more accurate in understanding relative clauses correctly than those who spoke both Korean and English before five; these heritage learners, in turn, outperformed those who mainly spoke English in childhood. Similarly, the results of the studies by Oh et al. (2003) and Knightly et al. (2003) indicated that the degree of HL use in childhood (e.g., speaking versus simply overhearing) can influence certain HL abilities. Moreover, in her study of linguistic profiles of heritage learners of Japanese, Kondo-Brown (2005) observed the effect of parental HL use on HL proficiency among the heterogenous group of learners. She found that the learners with at least one parent speaking Japanese performed significantly better than those without a Japanese-speaking parent but at least one Japanese-speaking grandparents or those with remote Japanese heritage (i.e., without a Japanese-speaking parent or grandparent) on measures of Japanese proficiency.

Taken together, the findings of previous studies indicate that the results of HL acquisition of individuals can be influenced by their language background variables such as the AoA of the majority language, dominant language spoken in childhood, family constellation or parental HL use. Although it is often difficult to disentangle the effect of a particular variable from that of another because many variables are interrelated, in one way or another, they represent the amount of language experience that HSs have in their

HL. For example, HSs with both parents speaking the HL are more likely to be exposed to and use their HL than those with only one parent speaking the HL; HSs who have arrived in the host country later and consequently started learning the majority language at a later age probably have had more HL experience than those born in the host country; and HSs who predominantly spoke their HL in childhood will have had more HL experience than those who use both the HL and the majority language to a similar rate. Therefore, the study findings reviewed above reveal that the amount of HL experience, which can be measured in various language background variables of HSs, influences HL acquisition, resulting in the variation between individuals in the HL abilities.

In addition, not only the amount of HL experience but also the quality of HL experience regarding the type, modality (oral or written) or manner (natural or formal) of HL experience can affect HL acquisition outcomes (Montrul, 2012). Some studies have examined the relationship between the quality of TL experience and TL abilities in bilingual acquisition (e.g., Bowers EP & Vasilyeva, 2011; Place & Hoff, 2011); some implications on the effect of quality of HL experience in HL acquisition can be drawn from these studies. However, the influence of the quality of HL experience on HL acquisition results has been largely unexplored to date, most likely because it is often impossible to separate the quality of language experience from the quantity of language experience. Future research investigating this relationship is necessary for providing more information on the impact of the quality of HL experience on HL acquisition results.

3.5.2 Language internal factors

As described in section 3.3.2.1., the divergence of HSs from native norms can vary between different linguistic domains. For instance, HSs seem to exhibit a relatively lower degree of divergence from native norms in their linguistic abilities regarding HL sound system compared to other linguistic areas such as vocabulary or morphology. This varying degree of divergence observed between linguistic domains may be explained based on the ‘critical period’ (Lenneberg, 1967) or ‘sensitive period’ (Oyama, 1976) hypothesis. For instance, the critical or sensitive period for the discrimination of different native phones is assumed to open and close much earlier than that for the aspects in other linguistic domains (Long, 1990; Williams, 1980). This may account for the HSs’ relatively superb performance of phoneme discrimination tasks observed in previous studies (e.g., Chang, 2016; Cheon & Lee, 2013; Oh et al., 2003). In L1 acquisition, different linguistic aspects are assumed to be acquired by certain times following the

natural acquisition order (Brown, 1973). This developmental schedule has been observed to be the same in monolingual and bilingual acquisition in children (Dulay & Burt, 1974). If there is indeed a natural order of acquisition that every child follows and the existence of such order also holds true for HL acquisition, HSs should have fewer difficulties with linguistic features acquired earlier than those acquired later in childhood in general. This is because the features to be acquired and solidified from early on have a higher chance of being fully acquired, based on the pattern of HL experience of typical HSs, which is that they are normally exposed predominantly to their HL in preschool years, and the amount of HL experience decreases with the onset of schooling (Montrul, 2012). In fact, some linguistic aspects known to be mastered later in the order of acquisition such as relative clauses or reflexives are more often observed to be incompletely acquired by HSs than those observed to be acquired earlier, as observed in some studies (e.g., Kim J-H et al., 2009; Polinsky, 2011b; Sánchez-Walker, 2012). This is possibly because the linguistic aspects acquired late are often much more complex and difficult to learn.

Interestingly, linguistic aspects that are complex or intricate appear more often to be incompletely acquired by HSs. According to Gathercole (2002c, 2007), some linguistic aspects are indeed more complex or have opaque form-function mappings than others; thus, they require a greater amount of TL experience to master. As a result, they take longer to be acquired than others and are expected to be mastered later. In her respective studies of Spanish–English (i.e., HSs of Spanish) and Welsh–English bilingual children Gathercole (2002, 2007) observed that the bilingual children and their monolingual peers (i.e., the control group) acquired the simpler or more transparent structures more easily than the structures that are more complex or opaquer such as the ‘that-trace effect’ in English or grammatical gender in Welsh. Supposing the ‘critical mass’ of input effect, she explains that more complex or opaquer aspects have a higher level of critical mass for the language learner to draw out regular patterns and use them productively. These language internal factors—that is, the varying degree of complexity for different aspects—might have contributed to the observations that HSs perform similarly to monolingual speakers regarding some structures but perform very differently on others. Some HSs may never gain full command of some of the complex or opaque structures if they grow out of the time window to acquire these aspects before mastering them (Gathercole & Thomas, 2009).

3.5.3 *Cross-linguistic influences*

To better understand the divergences of HSs from native norms in their linguistic abilities in the HL, the cross-linguistic influences between the two languages of HSs should be taken into consideration.²⁹ This is because cross-linguistic interactions will be present in any type of bilingualism. As bilinguals are not simply two monolinguals residing in one person's body (Grosjean, 1985), it is reasonable to expect that the two languages interact with each other to some degree. Although many questions regarding bilingualism remain controversial, there has long been a consensus among the researchers working in the field that a bilingual person has separate language systems for each of his or her two languages (e.g., De Houwer, 1990; Genesee, 1989; Meisel, 1989) and the two systems influence each other (e.g., Döpke, 2001; Müller, 1998; Paradis J & Genesee, 1996; Yip & Matthews, 2000, 2007). Therefore, many researchers warn against possible misinterpretations of the results of studies that compare the performance of bilingual speakers with that of corresponding monolingual speakers because it is very unlikely that the linguistic abilities of bilingual speakers parallel exactly that of corresponding monolingual speakers. This is partly because the bilingual speakers' learning context for one of their two languages can differ from that of the corresponding monolingual speakers (Gathercole, 2016). Moreover, 'the knowledge of each language has the potential of influencing the knowledge of the other language, in that bilingual speakers may naturally draw linkages between components of the two languages at some points of development and at some points of the linguistic structures' (Gathercole, 2016).

Some studies on HSs have shown evidence of cross-linguistic influences. For instance, regarding the domain of phonology, which is known to be most resilient to incomplete acquisition or attrition in HL acquisition, studies have found that HSs pronounce some consonants and vowels in their HL closer to their counterparts in the majority language (Godson, 2004; Ko I, 2013; Saadah, 2011), indicating a possible influence from the dominant language of the speakers. Similarly, in a study of young KHSs (aged three to 12), Song M et al. (1997) observed the tendency that the young Korean–English bilinguals who spoke English as their dominant language rely on word order cues rather than case particle cues when processing (comprehending) scrambled

²⁹ Cross-linguistic influence is also referred to as cross-linguistic transfer or interference.

sentences, possibly due to the influence of English. Cross-linguistic influences have been widely observed among HSs since they are bilingual.

3.6 Summary

The review of relevant studies outlined above indicates that despite an early AoA of and continuous exposure to the TL, many HSs do not attain their HL to the native level, exhibiting non-native abilities in various linguistic aspects in the HL. The review also indicates that individual HSs attain their HL to a different degree, so there is significant variation in the level of HL attainment even within the same group of HSs. Moreover, study findings suggest that HSs acquire different linguistic aspects in the HL to a different degree because HSs appear to have attained phonetics, phonology and the core syntax of their HL relatively well compared to morphology, complex syntax or interface phenomena. Although the study findings have enhanced the understanding of the language research community on attributes of HL acquisition, more research examining HSs in various languages-in-contact conditions should complement the literature to reveal which linguistic aspects in which conditions are acquired well by HSs and which are not since such information is necessary for a better understanding of language faculty and acquisition in general (Montrul, 2016).

Forming a substantial part of the growing literature of the study of HLs, many studies have examined linguistic abilities in the HL of KHSs in English-speaking countries, especially the US, and their findings have started to reveal information on the outcomes of HL acquisition in KHSs in Korean–English-in-contact conditions, as reviewed in section 3.4. Undoubtedly, the studies have provided valuable information on the properties of KHL in Korean–English bilingualism. However, previous research has often failed to provide adequate accounts for the observed properties in relation to HL acquisition. This was often due to a lack of research on the developmental trajectory in monolingual L1 acquisition of Korean and the developmental patterns in English-speaking KHSs before adulthood regarding the linguistic aspects in question. Researchers working on KHS had to examine linguistic competence in the linguistic aspects in question not only in adult KHSs and their KNS controls but also in child KHSs and KNSs to better understand the attributes of HL acquisition that can result in divergences from native norms (e.g., Chung ES, 2013; O'Grady et al., 2011). However, such an examination

is often difficult to operationalise due to researchers' limited resources and time, so it is very rare. Nevertheless, there will be no disagreement that for a better understanding of acquisition outcomes of adult HSs, it is necessary to investigate the development of linguistic aspects in question in monolingual L1 acquisition and that in child HSs. As previous research on KHSs in the Korean–English-in-contact setting has centred on investigations into competence outcomes in adult HSs, a study to provide information on the development of KHL prior to adulthood is timely and necessary.

In addition, previous studies indicate that the significant variation observed among HSs (e.g., some achieve near-native proficiency and some attain mere perceptive skills) and varying degrees of attainment of different linguistic aspects in the HL (e.g., relatively better attainment of phonetic and phonological competence and relatively greater difficulty with complex syntax) are closely associated with HL experience that can vary greatly between individuals but can also have commonalities to a certain degree. However, the relationship between HL experience and HL abilities is far from well understood. Further research on the relationship between the HL experience and HL acquisition outcomes in different linguistic aspects is needed to provide adequate linguistic accounts for the variation among HSs and the varying degrees of non-native attainment of different linguistic aspects. This study attempts to contribute by examining the linguistic abilities in the HL of the HS population of interest and their language background variables relevant to their HL experience and investigating the relationship between them.

Chapter 4 Methodology

4.1 Research design

The primary goal of this study is to understand the nature of the HL development and maintenance during primary school years in KHSs who grow up in Australia. To achieve the goal, various aspects of their HL development and maintenance for the period of interest are examined, and linguistic explanations for the observations made on the examined aspects are sought.

This study examines Australian KHSs' development and maintenance of the Korean language during primary school years cross-sectionally. This is primarily because it is not feasible to longitudinally measure their development and maintenance of Korean for the primary school period, given the time frame of this study. Thus, it examines the level of their development and maintenance in KHSs in different primary school year levels, from Years 1 to 6.

The KHSs' level of development and maintenance of the Korean language is measured by their Korean language abilities in this study. Based on research findings on HL acquisition reviewed in Chapter 3, Australian KHSs in primary school years are likely to show a varying degree of attainment of their HL abilities by linguistic domain and linguistic aspect (e.g., construction, structure, feature or phenomenon) within a domain. Thus, the study assesses their HL abilities in three broadly divided linguistic areas: the sound system, lexis and grammar. It measures their speech sound perception, vocabulary and grammar in Korean.

The study examines the KHSs' speech sound perception, vocabulary and grammar in Korean compared to those of their school-year-level-matched KNSs living in South Korea. This is because KNS will provide less controversial norms for the description of the KHSs' level of the Korean language abilities despite the possible criticism of comparing bilingual speakers' language abilities in one of their two languages with those of monolingual speakers as well as variations within NSs to a certain degree.

As the literature indicates that the results of HL acquisition vary greatly between individuals, KHSs growing up in Australia may differ from one another in their level of attainment of HL abilities. Thus, the study examines if the KHSs in their primary school years exhibit any within-group variation in their level of HL development and

maintenance. If variations are observed, the study further examines the relationship between their level of HL attainment and HL experience to explore possible reasons for the observed variability. Thus, the study adopts a correlational research design to examine the relationship between the KHSs' HL attainment and their language background variables that may affect their HL experience.

4.2 Research questions

The following questions guide this study to investigate various aspects of HL development and maintenance during primary school years in Australian KHSs:

- 1) Do Australian KHSs in different primary school year levels differ from their school-year-level-matched KNSs in their Korean language abilities regarding speech sound perception, vocabulary and grammar? If so, what are the differences in each linguistic area examined?
- 2) Do the KHSs' Korean language abilities regarding each linguistic area show a change across the school year levels? If it does, what is the pattern of the change (e.g., progress, stagnation or attrition)?
- 3) Are there linguistic aspects (e.g., constructions, structures, features or phenomena) in the linguistic areas examined in which the KHSs appear to show a great degree of difference from their NS controls at each school year levels or across the year levels? If so, what are they?
- 4) Is there a relationship between the KHSs' level of attainment in Korean between different linguistic areas examined? If so, what is it? Do the KHSs' abilities in one linguistic area correlate with those in another area?
- 5) Do the KHSs show within-group variations in their Korean language abilities regarding the linguistic areas examined? If so, what is the degree of variations in each linguistic area?
- 6) Do any of the KHSs' language background variables show a correlation with their level of Korean language abilities? If so, what are they? How much of the observed variation do they explain?

4.3 Research methods

4.3.1 *Research participants*

With the cross-sectional comparative design of the study, an assessment of speech sound perception, vocabulary and grammar in Korean of Australian KHSs in Years 1 to 6 compared to the school-year-level-matched KNSs in South Korea forms the basis of the current study. To collect the research data, ethics approval for data collection was obtained from the UNSW Human Research Ethics Advisory Panel B (HREAP B) (Approval number HC 180180). The study recruited its KHS participants from local Korean community schools in Australia to collect data efficiently and effectively.³⁰ To compensate for the convenience sampling, the study tried to investigate all students in Years 1 to 6 from one school rather than examine a small number of students from many different schools. Korean community schools in Sydney, Melbourne and Brisbane that offer Korean language classes for two to three hours on the weekend were contacted;³¹ two ethnic Korean schools in Sydney agreed to help with recruiting participants and collecting data. Except for a few students unwilling to participate,³² most of the students in the schools who met the eligibility criteria for participation took part in the study with parental consent. In total, 243 students from the two ethnic schools in Sydney participated in the study. (The details of the number of participants in this study are in Table 4.1.) The eligibility criteria for participation were as follows:

- The participant was born in Australia or arrived in Australia before the age of three.
- The participant is from a home where Korean is spoken, and he or she can understand and speak the language.
- The participant does not speak any other languages besides Korean and English on a regular basis.

³⁰ For the result of an examination to accurately reflect the linguistic reality of the research population of interest, random sampling is crucial. When dealing with HSs, however, random sampling is often difficult to pursue due to the limited accessibility to the population and their reluctance to participate. It is very difficult to reach HSs who are not significantly involved in the local ethnolinguistic community of their HL. In addition, those who are not interested in HL maintenance or learning are generally unwilling to participate in a study on or about them.

³¹ The list of ethnic Korean schools in Australia by Korean Education Centre in Sydney provided the contact details for the schools.

³² Some students and their parents were unwilling to participate in the study; their number was very small—fewer than 10 students in each school.

- The participant did not attend an English–Korean bilingual program in an Australian school.
- The participant has not attended a regular school in South Korea for more than three months.
- The participant does not have any history of language impairment or learning difficulties.

To obtain the NS norms for each primary school year level, primary school children in South Korea were also recruited. Matching the sampling condition of KHSs in Australia, primary schools in South Korea were contacted and asked for assistance with participant recruitment and data collection; one primary school in a small city in South Korea was willing to help.³³ With help from the school, almost all students from the school participated in the study; a total of 515 students from that school participated, as detailed in Table 4.1. (More detailed information on the KHS participants’ backgrounds related to their degree of exposure to and use of Korean such as demographic information and measure of their language use is presented and analysed in 8.2.1.)

Table 4.1 *Number of participants in the study*

School Year	KHSs			KNSs	Total
	School A	School B	KHS Total	School C	
1	42	4	46	73	119
2	26	14	40	89	129
3	26	32	58	87	145
4	15	22	37	93	130
5	5	19	24	89	113
6	11	27	38	84	122
Total	125	118	243	515	758

³³ The city is in the central region of South Korea and has a population over 110,000. People living in the city speak its regional dialect, which is not very different from the standard Korean (i.e., the Seoul dialect), compared to Gyeongsang or Jeolla dialects, which are quite different from the standard Korean with many distinctive features.

4.3.2 Assessment of Korean language abilities

4.3.2.1 Test development

The central question of this study addresses the level of the Korean language abilities that Australian KHSs in different school year levels have attained and retained in comparison to their year-level-matched KNSs in South Korea. The study examines the KHSs' level of attainment in speech sound perception, vocabulary and grammar in Korean, instead of evaluating their Korean language proficiency globally in terms of the four language skills (i.e., listening, speaking, reading and writing) or using other widely used measures of language development in children such as speech rates (e.g., mean length of utterances) or errors in their naturally occurring or elicited speech. Findings from this examination will contribute to identifying linguistic areas and aspects in Korean in which the Australian KHSs are likely to have different linguistic representations from their KNS controls.

To assess the research participants' speech sound perception, vocabulary and grammar in Korean, a test with five different tasks was devised as follows:

- Task 1: Phoneme discrimination task for speech sound perception
- Task 2: Picture selection task for receptive vocabulary
- Task 3: Picture selection task for comprehension of simple or complex sentences with various syntactic and semantic aspects
- Task 4: Grammaticality judgement task for four different linguistic aspects
- Task 5: Picture selection task for comprehension of passive sentences

Task 1 is a phoneme discrimination task with non-words devised to test the participants' perception of speech sounds in Korean. Task 2 is a picture selection designed to test the participants' receptive lexical knowledge in Korean. Tasks 3, 4 and 5 are devised to assess their linguistic abilities regarding grammar in Korean. Task 3 is a picture selection task to test the participants' understanding of sentences that contain various syntactic structures and semantic features; Task 4 is a grammaticality judgement task to test their linguistic knowledge regarding the verb conjugation, passive, Negative Polarity Items (NPIs) and the semantic-pragmatic mapping of the verbs *o-* 'to come' and *ka-* 'to go'; and Task 5 is a picture selection task to test their comprehension of passive sentences in comparison to active sentences. Detailed descriptions of each task are provided in the relevant chapters.

All five tasks aimed to assess the research participants' receptive abilities only. This was due to the infeasibility of assessing both receptive and productive abilities, given the time and resources of the study. With its cross-sectional research design, this study employed a quantitative research method with which it tried to yield its results based on a statistical analysis of a data set from a large number of research participants, so it was impracticable to examine both comprehension and production of the linguistic area or feature in question. The study focused only on the research participants' receptive abilities in Korean, considering HSs' common characteristic that they have better receptive language skills than productive skills in their HL (as reviewed in 3.3.1.1). The findings on the KHSs' difference from their NS peers in receptive abilities in Korean (e.g., a large difference) will bear implications on their difference from the NS controls in productive abilities in the language to some degree (e.g., an even larger difference).

The five tasks were designed so the exercise of literacy skills in Korean (i.e., reading and writing in Hangul, the Korean writing system) could be avoided if possible. This was to prevent the KHSs from being at a disadvantage when their performance is compared with that of their KNS peers on a task involving reading and writing in Korean. HSs, in general, possess less-developed written language skills in their HL, probably due to the lack of formal education in and about the HL. If a task involved reading and writing in Korean, any difference in the performance of the task between KHSs and their KNS controls could be a result of the task modality, rather than a representation of genuine differences between the two speaker groups. Therefore, all tasks in this study were designed to provide test stimuli (i.e., words or sentences to test the linguistic aspects in question) aurally and avoid the participants' use of literacy skills as much as possible.

4.3.2.2 Preparation of test administration

Due to the sensitivities associated with administering a test of five tasks to primary school-age children face to face, such as the possibility that they, especially those in the lower year levels, may become intimidated by being tested by a stranger, the research participants were tested in their normal classroom setting under the supervision of their class teacher. Accordingly, an audio file was prepared to guide the participants through the test. All instructions and test stimuli were recorded with Google's Text-to-Speech

program unless described otherwise.³⁴ They were recorded with the following configuration: ‘WaveNet’ for the voice type, ‘ko-KR-WaveNet-A’ for the voice name and ‘0.8’ for the speed and ‘1.0’ for the pitch. The recorded instructions and test stimuli were put together and edited with appropriate intervals and then compiled into an audio file. All the instructions were given only in Korean after having consulted with the teachers in the two Korean community schools who predicted no difficulties for their students with understanding the simple instructions in Korean used in the test.

Each task was prepared to start with an announcement of the task name followed by a short description of the task (e.g., for Task 2, ‘This is a task to see if you know the meaning of a word in Korean’) and an instruction on what a participant should do in the task (e.g., ‘For each question, listen carefully to a word and choose the picture that best matches the meaning of the word. You will listen to the word twice’). To familiarise participants with each task prior to the actual test items, two or three trial items for each task were provided with an instruction and the correct answer. Each test item in a task started with a ding-dong sound to draw the participants’ attention, followed by its item number in the task and its test stimulus. For each test item in a task, 10 seconds were given for the participant to choose their answer unless otherwise stated. The task finished with an acknowledgement of the end and a direction on what to do next—that is, either to move to the next task or take a break.

Considering the age of the research participants, the test should not take too long. The test was organised to be administered in two sessions—that is, the first session with Tasks 1, 2 and 3 and the second session with Tasks 4 and 5; each session was to take approximately 30 minutes. The participants were to take a break for 10 to 15 minutes after the first session for the first three tasks and then complete the remaining two tasks in the second session.

To administer the designed test in a classroom setting, a test booklet was prepared. (An example page of each task is presented in Appendix 1.) This was to provide each participant with the answer choices for each test item in a task (e.g., pictures for a picture selection task) and collect his or her answers. In the test booklet, the five tasks were

³⁴ Due to limited resources, it was not viable to have the tasks recorded with a professional voice actor for Korean. Among speech synthesis programs that convert written text into speech at no cost, the Text-to-Speech program by Google generates speech in Korean that sounds most natural and closest to speech produced by a human. Moreover, recording the tasks with this program would enable a replication of the tasks in another study.

presented in the order of their numbers (i.e., from Tasks 1 to 5). Each task had its title and trial items on the first page, and they were followed by the actual test items with their numbers and answer choices printed on the following pages on the booklet. The participants were to complete the tasks as they followed through the test booklet while listening to the recording of the instructions and test stimuli, marking their answers directly in the booklet. As all test stimuli were presented aurally, no additional writing of target stimuli or task instructions was provided on the booklet.

4.3.2.3 Task administration

The designed test was administered to the research participants (i.e., 243 KHSs and 515 KNSs) recruited from two Korean community schools in Sydney and one primary school in South Korea. For the KNS participants, the test was administered in September 2018, which was the beginning of the second semester after the summer school holidays in South Korea. This means, by the time of the test, the KNSs had finished the first half of their academic year and just started the second half. For the KHSs in Sydney, the test administration was carried out from the end of September to the end of October 2018. This was either the end of Term 3 or the beginning of Term 4 of the school year.³⁵ This means they had (nearly) completed three-quarters of the school curriculum for that school year.

The participants took the test in their normal classroom under the supervision of their class teacher sometime during their regular school hours. The participants' class teacher was given instructions on how to carry out the test before administering it. He or she was advised to stop the test and call the researcher if any technical troubles or unforeseen problems arose; the researcher was on standby outside the classroom to immediately react to any problems. Before starting the test, the teacher briefly explained the test and its procedure to the participants, as instructed. After the teacher introduced the test and explained its procedure, each participant was given a test booklet and asked to write his or her information necessary for identification, such as his or her name, the name of the school and the class in the marked space in the booklet. When the participants in the classroom were ready for the test, the teacher played the recorded audio file. The

³⁵ While a school year is comprised of two semesters in South Korea, in Australia, it consists of four terms, each of which runs for about ten weeks. Despite the difference in how a school year is comprised of in the two countries, the days of school attendance is similar: ca. 190 days in South Korea and ca. 200 days in Australia.

participants completed the test following the instructions from the recording. After completing the first three tasks in the first session, the participants were given a break for 10 to 15 minutes and then resumed the test for the second session. When they finished the test, the teacher collected the test booklets and handed the booklets over to the researcher.

4.3.3 Information on language background

4.3.3.1 Questionnaire design

For information on the nature and amount of HL experience of each participant in the HS group, his or her language background must be investigated. To survey the participants' language background, a questionnaire was devised by adapting and modifying questionnaires used in previous studies on HSs. The questionnaire included questions on a range of factors related to HL experience, such as birthplace, age of arrival in Australia, participant's language use patterns (e.g., the percentage of language input and output in Korean in the total language input and output), experiences in attending ethnic schools, frequency and duration of visiting South Korea, parents' L1, parents' language use with the participant at home, occupation and level of education. (See Appendix 2.) With the length of the questionnaire and complexity of the questions, primary school children were expected to be incapable of answering the questions adequately. The questionnaire was thus designed to be completed by a parent (or a carer/guardian) of the participant. The questionnaire was prepared in the two languages, Korean and English, so that its respondent could choose the language in which he or she was most comfortable with understanding and answering the questions. The information gathered from the survey was used primarily to examine the relationship between participants' HL experience and their performance on the test.

4.3.3.2 Questionnaire administration

The questionnaires were sent home to parents, guardians or carers of the research subjects in the HS group only; they were asked to complete and return the questionnaire to the participant's teacher. The parents, guardians or carers filled out the questionnaire at their convenience and returned it once completed. Most of the questionnaires were answered by a participant's parent; only one questionnaire was completed by a grandparent. In total, 181 parents (or grandparents) filled the questionnaires and returned them to the researcher.

4.3.4 Transcription and analysis

Once test booklets and questionnaires were returned to the researcher, the researcher manually encoded the answers from the test booklets and the questionnaire in a Microsoft Excel file. When the first transcription was completed, a third person who was neither involved in any part of the study nor aware of the details of the study checked the transcribed answers with the answers on the booklets and questionnaire once more; the person marked where discrepancies between them were observed. After the check by the third person, the researcher went through the discrepancies and corrected the transcribed answers when verified. The transcribed answers were analysed with IBM SPSS Statistics (Version 26) and with R—if SPSS does not offer the specific statistical test needed—for basic statistics of the participants' performance of the task (e.g., means, standard deviations and accuracy rates of individual items) as well as for statistical tests related to the research questions (e.g., the statistical significance of an observed performance difference between KHSs and KNSs or the correlation between the participants' performance and their language background variables).

Chapter 5 Development and Maintenance of Heritage Language Speech Sound Perception

Speech sound perception is a linguistic ability of which HSs show mastery relative to other linguistic abilities. HSs' relatively successful attainment and retainment of speech sound perception in their HL are assumed to be derived from their early exposure to the language (Benmamoun et al., 2013), which is crucial for the native-like acquisition of that ability, possibly due to maturational constraints (Johnson JS & Newport, 1989). However, research findings also indicated that early developed perception of HL speech sounds may erode or phonological representations established early in the HL may be restructured despite HSs' continuous exposure to the language. This suggested a need for further scrutiny of their perception of HL speech sounds, together with a need for an investigation into their development and maintenance of HL speech sound perception before adulthood. To this end, a phoneme discrimination task was devised to examine the perception of speech sounds in Korean of KHSs in primary school years in Australia. The task was administered to the KHSs in Years 1 to 6 and their school-year-level-matched KNSs for comparison. This chapter illustrates the design of the task, reports its results and discusses the implications of the results in reference to previous research findings along with their limitations. (This chapter addresses the research questions (1), (2), (3) and (5) presented in 4.2 regarding sound system.)

5.1 Task design

HSs are often assumed to possess native-like abilities in perceiving speech sounds in their HL, despite being more often perceived to have a non-native accent in their HL. However, as reviewed in section 3.3.2.1, some studies have indicated that their phonetic or phonological competence in the HL—even for speech sound perception—may not converge with that of NSs as clearly as expected (e.g., Ahn et al., 2017; Lee-Ellis, 2012). Such findings suggest that HSs' perception of speech sounds in their HL may erode even with their continuous exposure to the language, contrary to the widely held supposition that one's perception of speech sounds is acquired early and highly resilient to attrition. This called for a further investigation into whether HSs can perceive a phonemic contrast between similar speech sounds in their HL as accurately as NSs of that language.

Moreover, thus far, it is largely unexplored if HSs' speech sound perception in their HL changes after early childhood and, if so, in what way the change takes place. Thus, a phoneme discrimination task—that is, Task 1 in this study—was devised to investigate the development and maintenance of the HL speech sound perception over primary school years in KHSs growing up in Australia.

The phoneme discrimination task was designed to examine whether KHSs can differentiate between different Korean phonemes with similar sound quality as accurately as their school-year-level-matched KNSs in Korea. The designed task had the format of matching an auditory stimulus in Korean with its written form; in the task, a research participant was asked to listen to a word containing a Korean phoneme and choose its correct written form among the three given choices, which differed only by one phoneme.

Examining the KHSs' perception of different speech sounds in Korean compared to their school-year-level appropriate NS norms, the study attempted to identify the phonemic contrasts that KHSs exhibit a relatively greater degree of difficulty in perceiving correctly. Therefore, the task was designed to test numerous phonemic contrasts with a minimal token and frequency instead of testing a few phonemic contrasts with multiple tokens and numerous frequencies. Considering the duration of the task and the whole test (i.e., Tasks 1–5), to ensure it was appropriate for the participants' age, the task was made up of 30 test items to test 30 different phonemes in Korean.

The task was designed to examine the perception of phonemic contrasts not only between similar consonants but also between similar vowels in Korean—monophthongal vowels as well as diphthongal vowels with glides.³⁶ This was done to overcome the shortcoming of most previous studies that tested KHSs' phoneme discrimination with a limited number of consonant sets in Korean.³⁷ Therefore, 14 consonants and 16 vowels were selected as the target phonemes for the task as follows:

³⁶ In this study, vowels refer to monophthongs as well as diphthongs with glides (often regarded as semivowels) because diphthongs constitute the nucleus in a syllable in Korean. However, it should be noted that Korean linguists often describe the Korean sound system as consisting of 19 consonants, 10 vowels, two semivowels (i.e., glides) and 11 diphthongs (e.g., Lee & Ramsey, 2000; Sohn, 2001). The two glides [w] and [j] combine with a monophthong to form the 11 diphthongs (i.e., *ya, ye, yo, yu, yay, yey, wa, we, way, wey* and *uy*).

³⁷ Most studies tested their participants with the three-way-contrast (lax vs. tense vs. aspirated) in voiceless stops such as *p–pp–ph, k–kk–kh* or *t–tt–th* (e.g., Cheon & Lee, 2013; Oh et al., 2003). Each set of consonants has the same place and manner of articulation, but the consonants differ from one another in terms of tenseness and aspiration. *p, t* and *k* are lax (or lenis) stops with the phonetic features [-tense, -aspirated]; *pp, tt* and *kk* are tense (or fortis) stops with [+tense, -aspirated]; *ph, th* and *kh* are aspirated stops with [+tense, +aspirated].

target consonants: *p* (/p/), *pp* (/p̚/), *ph* (/pʰ/), *t* (/t/), *tt* (/t̚/), *th* (/tʰ/), *c* (/t͡ɕ/), *cc* (/t͡ɕ̚/),
ch (/t͡ɕʰ/), *k* (/k/), *kk* (/k̚/), *kh* (/kʰ/), *s* (/s/), *ss* (/s̚/)
target vowels: *a* (/a/), *ya* (/ja/), *e* (/ɛ/), *ye* (/jɛ/), *o* (/o/), *yo* (/jo/), *wu* (/u/), *yu* (/ju/),
u (/ɯ/), *i* (/i/), *ay* (/E/), *yey* (/jE/), *wa* (/wa/), *we* (/wɛ/), *oy* (/ø/), *wi*
(/wi/).³⁸

For each test item, its target phoneme was paired with two other phonemes in Korean that are well known for being difficult for English-L1 learners of Korean to differentiate from the target phoneme because the specific contrast that makes the target phoneme phonemically distinguished from them in Korean is absent in English.

The phoneme discrimination task employed non-words as its test stimuli.³⁹ This was to avoid using phonemic minimal pairs from the Korean lexis so that the participants' lexical knowledge in Korean does not interfere with their performance on the task.⁴⁰ For the length of a non-word as a test stimulus, three syllables were considered appropriate, based on the results of previous studies that used a non-words repetition task on preschoolers and primary school children.⁴¹ Considering the basic structure of a syllable

³⁸ The pronunciation of *ay* as well as that of *ey* is labelled as /E/, following Yu Cho's (2016) description. In modern Korean, the front-mid-unrounded vowel *ey* (i.e., /e/) and the front-low-unrounded vowel *ay* (i.e., /ɛ/) merged into one sound. It has been observed already in Lee H's (1971) study that younger speakers of Korean (i.e., below 30) did not distinguish between the two vowels, and a large number of studies have reported the merging of the two sounds (e.g., Chung H-Y et al., 1988; Hong, 1991). It has been demonstrated that middle-aged and younger speakers of Korean no longer make distinctions between *ey* and *ay* not only in production but also in perception (e.g., Shin J, 2015; Yoon & Kang, 2014).

³⁹ Non-words refer to the words that do not exist in an actual language. They are also called nonce words or nonsense words. Language researchers often make up words in a language that do not exist in the vocabulary of that language. These words are not real words because they do not have a sound-meaning association used in common by the speakers of that language, but the words abide by the phonological rules of that language.

⁴⁰ A picture selection task with minimal pairs was deemed inappropriate for solely testing phoneme discrimination because the participants' performance may depend on their lexical knowledge acquired before taking the task to some degree. To assess the participants' ability to differentiate between similar phonemes by a picture selection task with minimal pairs, a researcher must ensure that the participants know the meanings of all the minimal pairs prior to the task and can choose the right picture upon hearing one of them. Due to HSs' generally small vocabulary in their HL, it is difficult to ensure that research participants know the meanings of particular words chosen for test stimuli; the picture selection format with minimal pairs was thus avoided in this study.

⁴¹ One or two syllable words were assumed to be too simple to reveal the difference between HSs and their NS controls in performance. For instance, the study by Oh et al. (2003) showed that even adult L2 learners of Korean obtained an accuracy rate of around or over 80% on many of the three-way-contrasting stops in the phoneme discrimination task when tested with one syllable words. Conversely, non-words of four or more syllables were presumed to be too challenging for the research participants because even typically developing school-age children were observed to perform significantly less well on repeating non-words of four syllables in length compared to shorter nonwords (e.g., Dollaghan & Campbell, 1998). Similar

in Korean and some phonological rules in the language, the trisyllabic non-words were coined in either CV.CV.CV or CV.V.CV structure with the final position of all three syllables (i.e., the coda of each syllable) left empty. This was because of the re-syllabification rule in Korean as well as an assimilation or a tensification of the coda of the preceding syllable and/or the onset of the following syllable that occurs when both positions are filled (e.g., in CVC.CV).

The non-words coined for testing the perception of phonemic contrasts between similar consonants (e.g., *pwu.to.li* [pu.do.ri] as the test stimulus in comparison with *ppwu.to.li* [pu.do.ri] and *phwu.to.li* [p^hu.do.ri] for the phonemic contrasts between *p* [/p/] and *pp* [/p^h/] and between *p* [/p/] and *ph* [/p^h/]) had the target phoneme in the onset position of the first syllable (i.e., the word-initial position). This was to prevent the voiceless stops and affricates *p*, *t*, *k* and *c* (i.e., /p/, /t/, /k/ and /tɕ/, respectively) from undergoing voicing when placed between voiced sounds such as vowels (e.g., in CV.CV). Conversely, the non-words for testing the perception of contrasts between similar vowels (e.g., *po.a.cay* [po.a.dzE] as the target stimulus in contrast with *po.ya.cay* [po.ja.dzE] and *po.e.cay* [po.Λ.dzE] for the phonemic contrasts between *a* [/a/] and *ya* [/ja/] and between *a* [/a/] and *e* [/Λ/]) had the target phoneme in the second syllable so that the research participants did not focus only on the first syllable of each stimulus. (The list of the non-words invented for the task is presented in Appendix 3). The test items were placed in a random order in the task.

Research participants were asked to listen to a non-word (e.g., *pwu.to.li*) and choose its corresponding form written in Hangul from the three given options which differ from one another by one phoneme (e.g., *pwu.to.li*, *ppwu.to.li* and *phwu.to.li*). The use of written Korean in the task was inevitable because a picture selection format was not available with non-words as its test stimuli.⁴² For each test item, the research participants listened to the target word twice with an interval of three seconds; they had 10 seconds to choose their answer and mark it on the test booklet before hearing a ding-dong sound that signalled the start of the next item. Once the participants completed the whole test (i.e.,

observations were also made in studies with a non-word repetition task on Korean-speaking preschoolers and primary school children (e.g., Lee HJ et al., 2013; Park H & Schwarz, 2012). Non-words of four or more syllables will be much more difficult to repeat correctly since they require children a greater degree of phonological working memory for storing phoneme information even for a short time.

⁴² Informal consultations with the teachers of the two Korean community schools from which the research participants were recruited assured that their students are highly familiar with Hangul since they start learning to read and write in Hangul from the Kindergarten level and the school's curricula at the Kindergarten and Year 1 levels focus mainly on literacy.

Tasks 1–5), the test booklets were collected, and their answers were transcribed and analysed. (For more details on the task administration for the whole study, see section 4.3.2.3.)

5.2 Results

The results of a total of 725 participants—224 KHSs (125 girls and 99 boys) and 501 KNSs (253 girls and 248 boys)—were analysed for the task, excluding the results of some participants.⁴³ For each participant, the total number of correct responses out of the 30 test items was counted as his or her raw score on the task. This raw score was converted into a percentage and denoted as the participant's per cent correct score on the task. This per cent correct score was analysed as the measure of the participant's performance of the task that represents his or her ability to perceive phonemic contrasts between similar speech sounds in Korean and match the auditory stimuli with their correct written forms.

With the individual participants' scores, the mean scores of the participant subgroups divided by gender, year level (i.e., Years 1–6) and speaker group (i.e., KHS or KNS) were calculated.⁴⁴ Table 5.1 shows the mean scores of KHSs and KNSs in Year 1 to Year 6 in girls and boys, respectively. The preliminary inspection of the participant subgroups' mean scores presented the following trend: boys tended to score slightly lower than the girls of the same speaker group and year level; the participants in a lower-year generally scored lower than those in a higher-year level within a speaker group in a gender; and KHSs scored lower than their KNS peers of the same gender. The participants' performance of the task was analysed more closely, according to the study's research questions as elaborated in section 4.2 and presented in the following subsections.

⁴³ The participants who did not complete the task due to their lateness or absence for the task session were automatically excluded from the analysis. The participants who exhibited a sign of ill performance such as selecting answers in a pattern (e.g., choosing the same answer for all test items) as well as those who did not answer to or selected multiple answers for more than three questions (i.e., over 10% of the task) were also excluded as they were regarded to have not paid enough attention to the task or not fully understood how to complete the task. Accordingly, the results of 33 participants were excluded from the analysis as follows: 6 female KHSs (i.e., 2 in Year 1, 2 in Year 2, 1 in Year 5 and 1 in Year 6), 13 male KHSs (6 in Year 1, 1 in Year 2, 3 in Year 3, 1 in Year 5 and 2 in Year 6), 3 female KNSs (all in Year 1) and 11 male KNSs (7 in Year 1, 2 in Year 2, 1 in Year 4 and 1 in Year 6).

⁴⁴ The gender difference in the participants' performance of the task was not a question that this study sought to answer at the outset. However, because the gender ratio was slightly unbalanced and some performance differences between the genders were observed, the performances of girls and boys were analysed separately, and their performance was compared where the difference was notable.

Table 5.1 *Numbers, mean scores and standard deviations of scores of KHSs and KNSs in Years 1–6 in girls and boys*

Gender	Year level	KHS			KNS		
		<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Female	1	22	73.8	18.4	34	88.6	14.0
	2	21	87.3	12.1	50	93.5	7.6
	3	30	89.7	13.0	41	94.3	6.2
	4	20	91.2	6.1	45	95.5	4.8
	5	13	94.9	4.2	41	96.3	3.3
	6	19	93.9	8.9	42	95.7	4.9
	Total	125	87.9 ^a	13.7 ^a	253	94.1 ^a	7.6 ^a
Male	1	16	72.7	16.5	29	89.1	9.0
	2	16	76.3	17.8	37	90.7	12.4
	3	25	84.9	12.4	46	93.1	7.5
	4	17	90.6	8.9	47	93.0	6.3
	5	9	80.0	16.6	48	95.3	5.1
	6	16	90.6	9.6	41	97.1	5.5
	Total	99	83.0 ^a	14.9 ^a	248	93.3 ^a	8.1 ^a

^aTotal means and total standard deviations shown here are pooled means and pooled standard deviations.

5.2.1 Comparison between speaker groups—KHSs’ differences from their KNS peers in phoneme distinction

The participant subgroups’ mean scores were first compared between the speaker groups to examine KHSs’ differences from their gender- and year-level-matched NS controls in the performance of the task. In general, KHSs scored lower on the task than did the NS controls, as Table 5.1 shows. At each year level in each gender, the KHSs’ mean score was lower than that of their KNS counterparts.

At the lower-year levels, the KHSs’ mean scores were considerably lower than the mean scores of their KNS counterparts. For instance, the mean score of female Year 1 KHSs was 73.8, while that of their KNS peers of the same gender was 88.6. The mean scores of male KHSs in Years 1 and 2 (i.e., 72.7 and 76.3, respectively) were also markedly lower than those of their same-gender KNS peers (i.e., 89.1 and 90.7, respectively).

At the middle- and upper-year levels, the KHSs' performance was more comparable to that of their KNS counterparts, especially in girls. For example, the mean score of female Year 5 KHSs was 94.9, while that of their KNS counterparts was 96.3; the difference in the mean score between the KHSs and KNSs was smaller than 3%, which was fewer than one test item. In boys, the mean score difference between the speaker groups was also relatively small at Years 4 and 6, compared to the lower-year levels. Male Year 5 KHSs ($M = 80.0$), however, scored remarkably lower than their KNS counterparts ($M = 95.3$); such lower performance of the KHSs was rather unexpected, considering the mean score of the male KHSs in Year 4 ($M = 90.6$) and in Year 6 ($M = 90.6$).

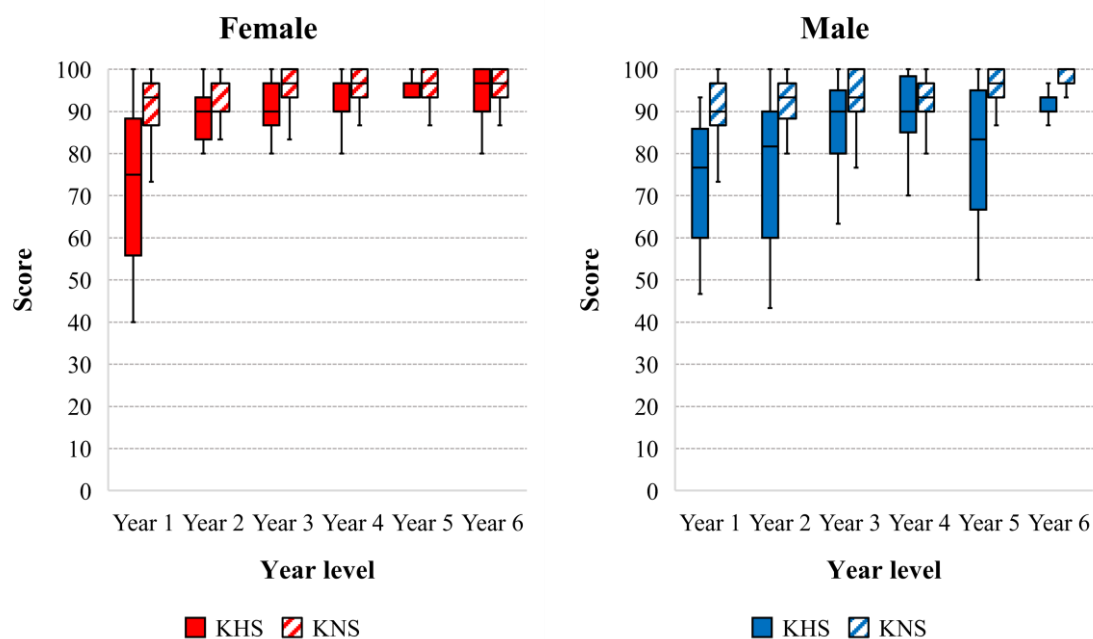
To compare the overall performance of KHSs and KNSs in each gender (i.e., collapsing the six year levels), their adjusted mean scores—corrected for the different numbers of participants between the six year levels in each speaker group in each gender—were calculated (cf. the pooled means shown under 'total' in Table 5.1).⁴⁵ The adjusted mean score of female KHSs was 88.4, while that of female KNSs was 94.0. In boys, the adjusted mean score of KHSs was 82.5, compared to that of KNSs being 93.0. These adjusted mean scores of KHSs than KNSs in both genders confirmed that, on average, KHSs scored lower on the task than their same-gender NS controls.

The comparison of the standard deviations of the scores between KHSs and KNSs at each year level in each gender indicated that the performance of KHSs on the task varied more significantly than that of their KNS counterparts. Across the year levels and genders, the standard deviations were larger in KHSs than in KNSs, as shown in Table 5.1. The adjusted standard deviation of female KHSs—corrected for the imbalance in the number of participants between different year levels in the speaker group in the gender—was 10.5, compared to that of female KNSs at 6.8. The adjusted standard deviation of male KHSs was 13.6, whereas that of male KNSs was 7.6 (cf. the pooled standard deviations shown under 'total' in Table 5.1).

⁴⁵ The adjusted mean score of a speaker group in a gender is simply the grand mean of the mean scores of all subgroups in the speaker group in the gender. For instance, the adjusted mean score of female KHSs was calculated by computing the average of the six mean scores of the six year-level subgroups in female KHSs as follows: adjusted mean score of female KHSs = (mean score of female Year 1 KHSs + mean score of female Year 2 KHSs + mean score of female Year 3 KHSs + mean score of female Year 4 KHSs + mean score of female Year 5 KHSs + mean score of female Year 6 KHSs)/6.

To visually inspect the within-group difference of the participants' performance of the task, their scores were plotted in Tukey boxplots, as shown in Figure 5.1. The boxplots confirmed that KHSs' scores ranged more widely than those of the KNS counterparts at most year levels in each gender, as indicated by the boxplots' length. The wider range of the scores of KHSs than their KNS counterparts was more pronounced at the lower-year levels than at the middle- or upper-year levels as well as in boys than in girls.

Figure 5.1 *Boxplots of scores of KHSs and KNSs in Years 1–6 in girls and boys*



To test the statistical significance of the difference in the mean score between KHSs and KNSs at each year level in each gender, independent-samples t-tests were conducted. As reviewed in Chapter 3, the literature indicated that great variability in the HL abilities exists among HSs, implying a more considerable variance in the TL abilities to be observed within a group of HSs compared with a group of NSs of the TL. This held true for the results of the phoneme discrimination task of the current study with the larger standard deviations as well as the wider ranges of the scores observed in KHSs than in their KNS counterparts. As equal variances across the speaker groups were not assumed, Welch t-tests were employed. The participants' scores were not normally distributed in many subgroups, as indicated by the Shapiro–Wilk test of normality. Nevertheless, Welch t-tests were carried out because the test is robust to deviations from a normal distribution.

Extreme outliers with a score outside three times the interquartile range in each subgroup were removed.⁴⁶ Accordingly, the results of 10 participants were excluded from the statistical tests.⁴⁷ Using the Bonferroni correction for the 12 t-tests (2 gender \times 6 year levels) run simultaneously, the alpha level for the statistical significance was set at .004 by dividing .05 by 12. The results of the Welch t-tests are shown in Table 5.2. (Note the mean scores and the standard deviations were recalculated after removing extreme outliers for the statistical tests.)

Table 5.2 *Results of Welch t-tests for between-speaker-group differences at Years 1–6 in girls and boys*

Gender	Year level	KHS		KNS		Mean difference = $M_h - M_n$				
		<i>N</i>	<i>M_h</i> (<i>SD</i>)	<i>N</i>	<i>M_n</i> (<i>SD</i>)	<i>M</i>	<i>t</i> (<i>df</i>)	<i>p</i>	99.6% CI	
Female	1	22	73.8 (18.4)	33	90.4 (9.5)	-16.6	-3.899 (28.573)	.001*	-30.0	-3.3
	2	20	89.7 (5.5)	48	94.7 (4.4)	-5.1	-3.652 (29.588)	.001*	-9.4	-0.7
	3	29	91.7 (6.6)	41	94.3 (6.2)	-2.6	-1.657 (58.146)	.103	-7.3	2.1
	4	20	91.2 (6.1)	45	95.5 (4.8)	-4.3	-2.789 (29.650)	.009	-9.1	0.5
	5	13	94.9 (4.2)	41	96.3 (3.3)	-1.4	-1.088 (16.808)	.292	-5.6	2.9
	6	18	95.4 (6.2)	42	95.7 (4.9)	-0.3	-0.210 (26.617)	.835	-5.5	4.8
Male	1	16	72.7 (16.5)	29	89.1 (9.0)	-16.4	-3.684 (20.046)	.001*	-30.8	-1.9
	2	16	76.3 (17.8)	36	92.4 (7.1)	-16.2	-3.510 (17.138)	.003*	-31.4	-0.9
	3	25	84.9 (12.4)	46	93.1 (7.5)	-8.2	-3.009 (33.589)	.005	-16.6	0.2

⁴⁶ Many researchers follow Tukey's fences to detect an outlier, according to which, data points outside 1.5 times the interquartile range are defined as outliers and those outside three times the interquartile range are denoted as extreme outliers. In this study, however, removing data points outside 1.5 times the interquartile range was deemed too conservative; it may result in eliminating data points that genuinely represent a great variability in the HL abilities among KHSs. Therefore, only extreme outliers with data points outside three times the interquartile range were removed from the statistical tests.

⁴⁷ Among girls, three KHSs (i.e., one in Year 2, one in Year 3 and one in Year 6) and three KNSs (i.e., one in Year 1 and two in Year 2) were excluded from the statistical tests. Among boys, one KHS in Year 6 and three KNSs (i.e., one in Year 2, one in Year 4 and one in Year 6) were excluded.

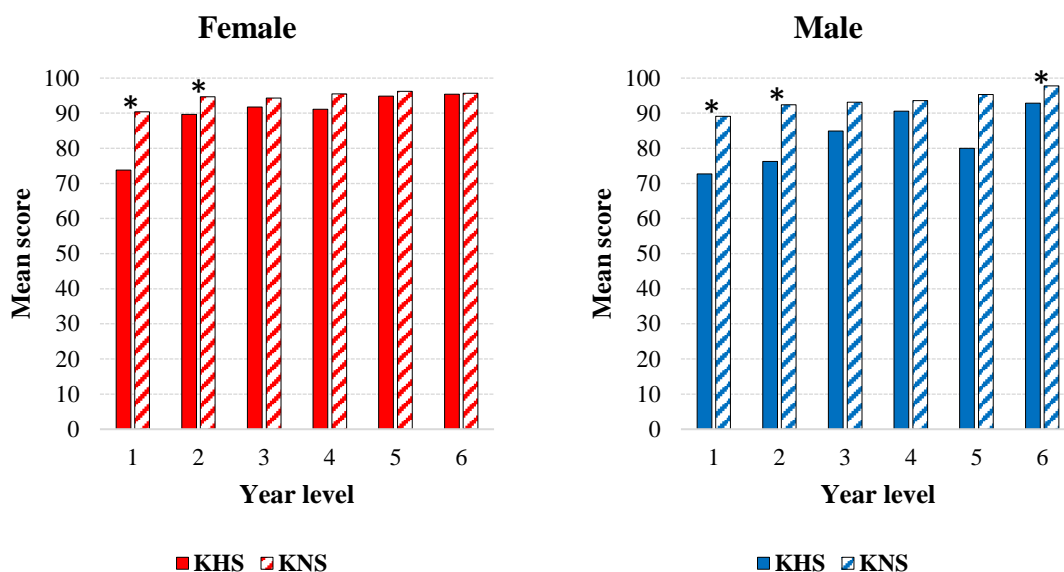
4	17	90.6 (8.9)	46	93.6 (5.0)	-3.0 (19.901)	-1.296	.210	-10.4	4.5
5	9	80.0 (16.6)	48	95.3 (5.1)	-15.3 (8.290)	-2.739	.025	-37.3	6.7
6	15	92.9 (3.3)	40	97.8 (3.4)	-4.9 (25.940)	-4.820	.000*	-8.0	-1.7

Note. A statistically significant p-value is marked with an asterisk (*).

In girls, there was a statistically significant difference in the mean score between KHSs and KNSs at Year 1, $M = -16.6$, $t(28.573) = -3.899$, $p = .001$ and at Year 2, $M = -5.1$, $t(29.588) = -3.652$, $p = .001$. However, the mean score difference between the speaker groups at all other year levels in the gender was not statistically significant. In boys, the mean score difference between the speaker groups was statistically significant also at Year 1, $M = -16.4$, $t(20.046) = -3.684$, $p = .001$ and at Year 2, $M = -16.2$, $t(17.138) = -3.510$, $p = .003$. In addition, the between-speaker-group difference at Year 6, $M = -4.9$, $t(25.940) = -4.820$, $p < .001$, was also found statistically significant. (The mean scores of KHSs and KNSs, excluding the extreme outliers, at each year level in each gender are presented in the bar charts in Figure 5.2, highlighting the statistically significant between-speaker-group differences with an asterisk.)

In short, across the year levels and genders, the mean score of KHSs was lower than that of their KNS counterparts. These lower scores of KHSs compared to their same-gender KNS peers were tested for statistical significance. The results of the statistical tests informed that KHSs scored statistically significantly lower than their KNSs counterparts at Years 1 and 2 in both genders. However, the lower mean scores of KHSs than the NS controls at the middle- and upper-year levels were mostly found statistically non-significant.

Figure 5.2 Comparison of mean scores between KHSs and KNSs at Years 1–6 in girls and boys (excluding extreme outliers)



Note. A statistically significant difference between KHSs and KNSs at a given year level in a gender is marked with an asterisk (*).

5.2.2 Comparison between school year levels—KHSs’ change in phoneme distinction

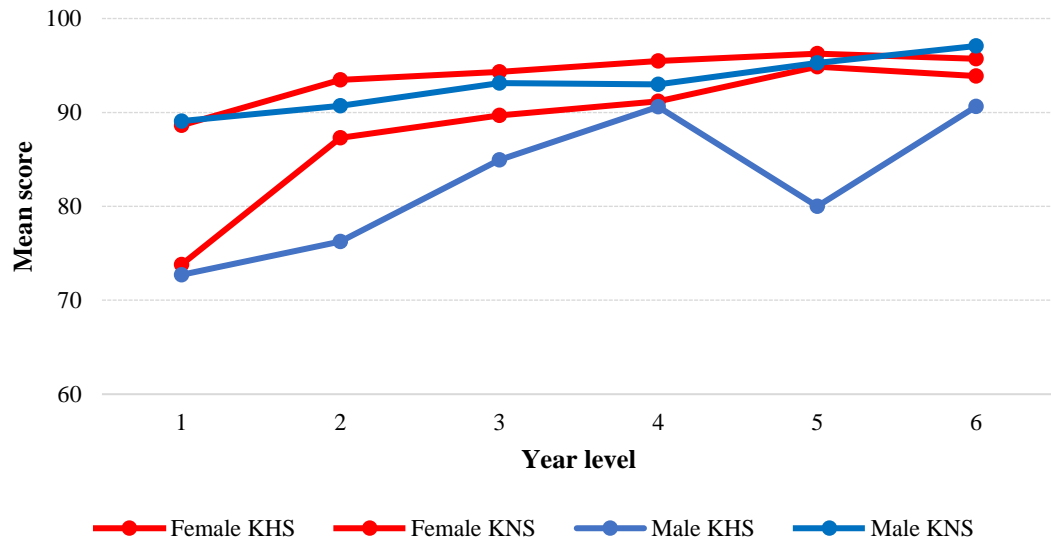
If any, the difference in the participants’ performance of the task between the school year levels may reflect a change in their phoneme distinction in Korean over primary school years. The change in their mean score by year level was thus examined within each speaker group in each gender. As shown in Table 5.1, in each speaker group in each gender, the mean score increased by school year level overall.

In girls, the mean score rose as the year level went up in both speaker groups, as can be seen more clearly in Figure 5.3. In female KHSs, the mean score of 73.8 at Year 1 leapt to 87.3 at Year 2 and steadily rose to 94.9 at Year 5 but fell slightly to 93.9 at Year 6. In female KNSs, those in Year 1 had a mean score of 88.6, which was considerably higher than that of their same-gender KHS peers; at Year 2, the mean score exceeded 90, and it continued to increase gradually between the year levels, reached its peak of 96.3 at Year 5 and fell slightly to 95.7 at Year 6.

The tendency of mean score increase by year level was also evident in boys. In male KHSs, the mean score of 72.7 at Year 1 rose to 76.3 at Year 2, made a small leap to 84.9 at Year 3 and continued to rise to 90.6 at Year 4; it fell sharply to 80.0 at Year 5 but

went up again to 90.6 at Year 6. In comparison, male KNSs exhibited small but relatively consistent increases in the mean score between the year levels; the mean score of 89.1 at Year 1 rose steadily through to 97.1 at Year 6, except for a minimal fall between Year 3 ($M = 93.1$) and Year 4 ($M = 93.0$).

Figure 5.3 *Change of mean score by year level in KHSs and KNSs in girls and boys*



To test the statistical significance of the mean score differences between different year levels within each speaker group in each gender, pairwise t-tests were conducted with a Bonferroni adjustment applied for the multiple comparisons in each pairwise t-test. As equal variances across the year levels were not assumed, Welch t-tests were employed.⁴⁸ The 10 extreme outliers excluded from the statistical tests for the between-speaker-group differences presented in the previous subsection were also removed from the pairwise t-tests for the differences between year levels. Following the Bonferroni correction for the four pairwise t-tests (2 genders \times 2 speaker groups), the alpha level was set at .0125 by dividing .05 by 4.

The statistical tests revealed that most of the pairwise comparisons between two different year levels in a speaker group in a gender were not statistically significant, as shown in Table 5.3. In female KHSs, the mean score of the Year 1 participants was statistically significantly lower than that of the participants in all other year levels,

⁴⁸ The tests were run in R (Version 4.0.0) because SPSS does not offer pairwise t-tests for data with equal variance not assumed.

respectively. In female KNSs, however, none of the mean score differences between the compared year levels reached statistical significance. Similarly, in male KHSs, all the mean score differences between the compared year levels turned out to be statistically non-significant, except for that between Years 1 and 6. In male KNSs, the mean score of the Year 6 participants was statistically significantly higher than that of those in Years 1, 2, 3 and 4, respectively.

To sum up, in both speaker groups in a gender, the participants in a higher-year level generally scored higher than those in a lower-year level. This trend was tested for statistical significance, and the results indicated that most of the observed higher mean scores of the participants in a higher-year level were not statistically significant. Only the difference between Year 1 and some higher-year levels in KHSs and between Year 6 and some lower-year levels in male KNSs reached statistical significance.

Table 5.3 *Results of pairwise Welch t-tests for mean score differences between year levels in KHSs and KNSs in girls and boys*

Gender	Group	Year level	<i>N</i>	<i>M</i>	<i>SD</i>	Mean difference (<i>i - j</i>)				
		(<i>i</i>)				Year level (<i>j</i>)				
Female	KHS	1	22	73.8	18.4					
		2	20	89.7	5.5	-15.9*				
		3	29	91.7	6.6	-17.9*	-2.1			
		4	20	91.2	6.1	-17.4*	-1.5	0.6		
		5	13	94.9	4.2	-21.1*	-5.2	-3.1	-3.7	
		6	18	95.4	6.2	-21.6*	-5.7	-3.6	-4.2	-0.5
	KNS	1	33	90.4	9.5					
		2	48	94.7	4.4	-4.3				
		3	41	94.3	6.2	-3.9	0.4			
		4	45	95.5	4.8	-5.1	-0.8	-1.2		
		5	41	96.3	3.3	-5.9	-1.5	-2.0	-0.8	
		6	42	95.7	4.9	-5.3	-1.0	-1.4	-0.2	0.5
Male	KHS	1	16	72.7	16.5					
		2	16	76.3	17.8	-3.5				
		3	25	84.9	12.4	-12.2	-8.7			
		4	17	90.6	8.9	-17.9	-14.3	-5.7		

	5	9	80.0	16.6	-7.3	-3.8	4.9	10.6	
	6	15	92.9	3.3	-20.2*	-16.6	-8.0	-2.3	-12.9
KNS	1	29	89.1	9.0					
	2	36	92.4	7.1	-3.3				
	3	46	93.1	7.5	-4.0	-0.7			
	4	46	93.6	5.0	-4.5	-1.1	-0.4		
	5	48	95.3	5.1	-6.2	-2.9	-2.2	-1.7	
	6	40	97.8	3.4	-8.7*	-5.3*	-4.6*	-4.2*	-2.5

Note. A statistically significant difference between the compared year levels is marked with an asterisk (*).

5.2.3 Comparison between test items—KHSs’ difficulty with particular phonemic contrasts

5.2.3.1 Analysis of accuracy by test item

An analysis of the participants’ performance of individual test items in the task may provide insight into the relative difficulty of the perception of the phonemic contrasts tested. Accordingly, the participants’ accuracy on individual test items was analysed to examine if KHSs found some phonemic contrasts more difficult to correctly perceive than others tested in the task when compared with the gender- and school-year-level-matched KNSs.

For each subgroup, the participants’ accuracy rate on a specific test item was calculated by computing the percentage of the participants who chose the correct answer for that item. (See Appendix 4 for each subgroup’s accuracy rates on individual test items plotted in bar charts.) The calculated accuracy rates were first compared to one another within a subgroup to inspect the relative difficulty of the test items for a given speaker group at a year level in a gender. The comparison showed that a subgroup’s accuracy on test items varied considerably between the items. Notably, the accuracy rate on certain test items appeared particularly low. For instance, in female Year 4 KHSs, the participants’ accuracy rate on *kay.ye.to* (*ya* and *e*) as well as *po.wi.sa* (*i* and *uy*) was particularly low—that is, 65 and 55, respectively—given their average accuracy rate on all test items being 91.2. (Here and hereafter, the test stimulus of an item is presented with its target phoneme underlined and its two contrasting phonemes presented in its following parenthesis.)

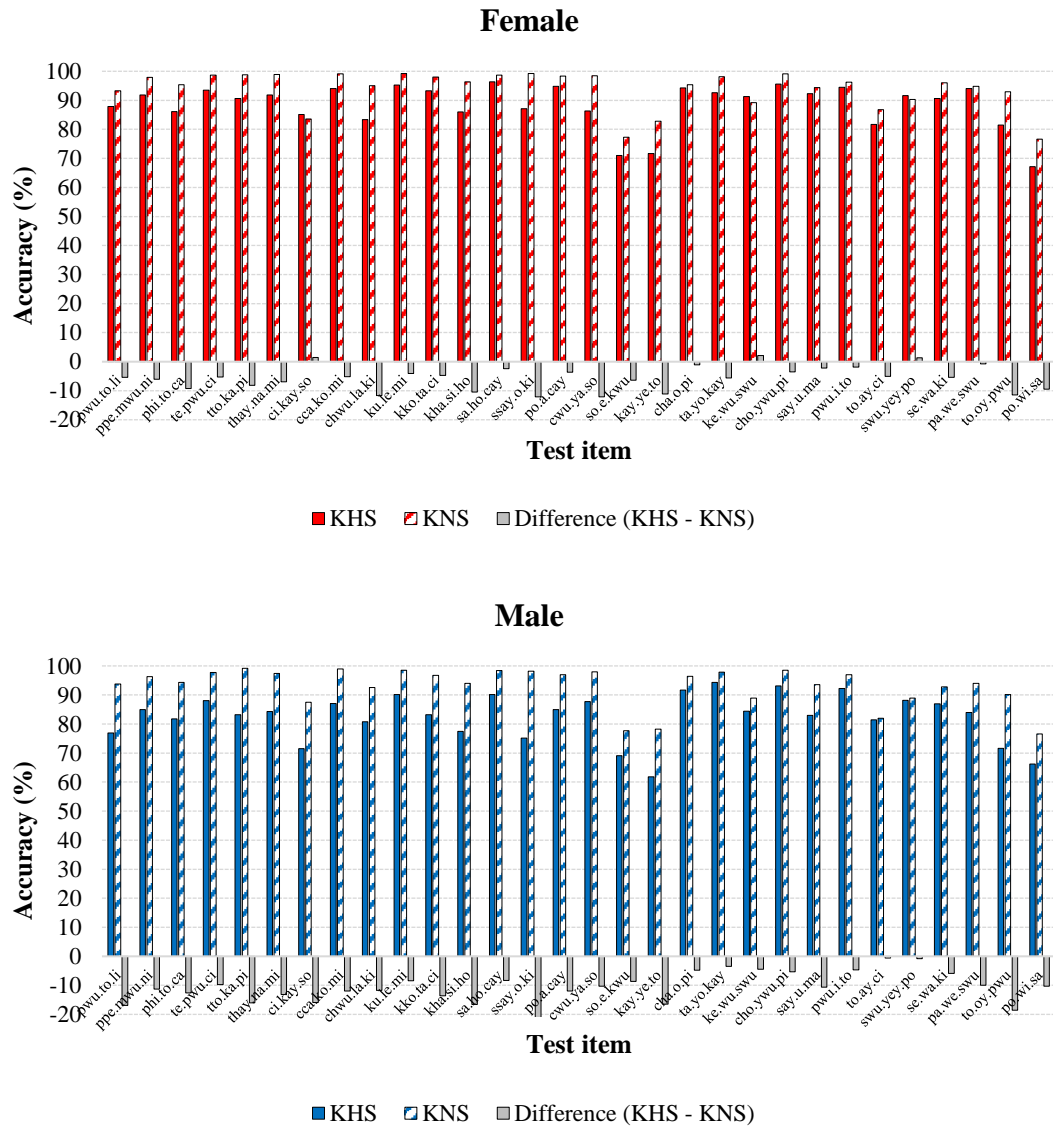
The accuracy on individual test items was also compared between the participant subgroups. The results of the comparison revealed that the participants' accuracy on *so.e.kwu* (*a* and *o*), *kay.ye.to* (*ya* and *e*) *to.ay.ci* (*i* and *yey*) and *po.wi.sa* (*i* and *uy*) was low across the subgroups. For instance, the participants' accuracy rate on *po.wi.sa* (*i* and *uy*) was comparatively low in most subgroups: 36, 65, 62, 55, 100 and 94 at the respective year levels from Year 1 to Year 6 in female KHSs; 44, 56, 68, 94, 67 and 67 in male KHSs; and 67, 77, 73, 87, 80 and 79 in female KNSs; 59, 78, 72, 76, 83 and 93 in male KNSs. A low accuracy on those test items observed across the participant subgroups indicates that the participants generally found the items more difficult than the others to perceive correctly and match with the correct written forms regardless of their speaker group, year level or gender.

To examine KHSs' relative difficulty with certain test items compared to their KNS counterparts, the participants' accuracy rates on individual test items were compared between KHSs and KNSs at each year level in each gender. For the ease of comparison, the between-speaker-group difference in the accuracy rate was calculated for each item—by subtracting the KNSs' accuracy rate on the test item from its corresponding accuracy rate of the KHS counterparts—and plotted in the bar charts in Appendix 4 together with the participants' accuracy rates. The comparison revealed that the between-speaker-group difference was comparatively large for some test items at a year level in a gender, possibly indicating the KHSs' greater difficulty with the items compared to their KNS counterparts. For instance, at Year 1 in girls where the average of the between-speaker-group accuracy rate differences of all test items was -16.6 , the difference appeared comparatively large for *ssay.o.ki* (*s* and *c*), *tto.ka.pi* (*t* and *th*), *chwu.la.ki* (*c* and *cc*) and *po.wi.sa* (*i* and *uy*), as it was over -30 (in terms of the magnitude, not the arithmetic value).

For an overview of the between-speaker-group differences in individual test items, the adjusted accuracy rate of KHSs and KNSs in each gender—collapsing the six year levels in the speaker group in the gender—was calculated for each item and then the difference between the speaker groups in each gender was calculated. The adjusted accuracy rate of KHSs and KNSs of each gender on individual items and the between-speaker-group accuracy rate difference are presented in Figure 5.4. The between-speaker-group difference in the adjusted accuracy rate appeared relatively large on some items. In girls, the accuracy rate difference for *cwu.ya.so*, (*a* and *ye*) (-12), *ssay.o.ki* (*s* and *c*) ($-$

12), *chwu.la.ki* (*c* and *cc*) (–12) and *kay.ye.to* (*ya* and *e*) (–11) was comparatively large, considering the average difference of all test items was –5.5. In boys, *ssay.o.ki* (*s* and *c*) (–23), *to.oy.pwu* (*ay* and *uy*) (–19), *pwu.to.li* (*pp* and *ph*) (–17), *kha.si.ho* (*k* and *kk*) (–17), *kay.ye.to* (*ya* and *e*) (–16) and *tto.ka.pi* (*t* and *th*) (–16) showed a comparatively large between-speaker-group accuracy rate difference, given the average difference was –10.5. When compared between the genders, however, only *ssay.o.ki* (*s* and *c*) and *kay.ye.to* (*ya* and *e*) were found to overlap between the genders as having a comparatively sizeable between-speaker-group difference.

Figure 5.4 Adjusted mean accuracy rates of KHSs and KNSs in girls and boys on individual test items



However, the adjusted accuracy rates on individual test items calculated for KHSs and KNSs in each gender could have been distorted by a particularly low accuracy rate of participants in some year levels. For instance, female KHSs had an accuracy rate of 59 on *ssay.o.ki* (*s* and *c*) at Year 1, while their accuracy rate at all other year levels was close to or above 90; their particularly low accuracy rate on the item at Year 1 seems to have dragged down their adjusted accuracy to 87, resulting in a comparatively large between-speaker-group difference in the adjusted accuracy. Therefore, a list of test items that showed a ‘relatively’ large between-speaker-group difference at each year level in each gender was drawn and compared across the genders and year levels. A ‘relatively’ large between-speaker-group difference at a year level in a gender was defined as being equal to or below the first quartile when the differences were rank-ordered low to high. The test items that showed a relatively large between-speaker-group difference at Year 1 to Year 6 in girls and boys are listed in Table 5.4.

Table 5.4 *Test items with a ‘relatively’ large between-speaker-group difference in the accuracy rate at Years 1–6 in girls and boys (with the accuracy rate difference shown in the rightmost parentheses)*

Year level	Gender					
	Female			Male		
1	<i>ssay.o.ki</i>	(<i>s</i> and <i>c</i>)	(–41)	<i>ssay.o.ki</i>	(<i>s</i> and <i>c</i>)	(–53)
	<i>tto.ka.pi</i>	(<i>t</i> and <i>th</i>)	(–36)	<i>tto.ka.pi</i>	(<i>t</i> and <i>th</i>)	(–31)
	<i>chwu.la.ki</i>	(<i>c</i> and <i>cc</i>)	(–33)	<i>kay.ye.to</i>	(<i>ya</i> and <i>e</i>)	(–28)
	<i>po.wi.sa</i>	(<i>i</i> and <i>uy</i>)	(–30)	<i>pwu.to.li</i>	(<i>pp</i> and <i>ph</i>)	(–28)
	<i>kha.si.ho</i>	(<i>k</i> and <i>kk</i>)	(–29)	<i>cca.ko.mi</i>	(<i>c</i> and <i>ch</i>)	(–28)
	<i>cwu.ya.so</i>	(<i>a</i> and <i>ye</i>)	(–27)	<i>thay.na.mi</i>	(<i>t</i> and <i>tt</i>)	(–24)
	<i>se.wa.ki</i>	(<i>a</i> and <i>ya</i>)	(–26)	<i>say.u.ma</i>	(<i>i</i> and <i>wu</i>)	(–24)
	<i>kay.ye.to</i>	(<i>ya</i> and <i>e</i>)	(–23)	<i>po.a.cay</i>	(<i>ya</i> and <i>e</i>)	(–24)
	<i>cca.ko.mi</i>	(<i>c</i> and <i>ch</i>)	(–23)			
	<i>say.u.ma</i>	(<i>i</i> and <i>wu</i>)	(–23)			
2	<i>phi.to.ca</i>	(<i>p</i> and <i>pp</i>)	(–19)	<i>ssay.o.ki</i>	(<i>s</i> and <i>c</i>)	(–41)
	<i>ci.kay.so</i>	(<i>cc</i> and <i>ch</i>)	(–19)	<i>tto.ka.pi</i>	(<i>t</i> and <i>th</i>)	(–35)
	<i>kko.ta.ci</i>	(<i>k</i> and <i>kh</i>)	(–15)	<i>ci.kay.so</i>	(<i>cc</i> and <i>ch</i>)	(–33)
	<i>pwu.to.li</i>	(<i>pp</i> and <i>ph</i>)	(–15)	<i>kko.ta.ci</i>	(<i>k</i> and <i>kh</i>)	(–31)

	<i>po.wi.sa</i>	(i and uy)	(-12)	<i>phi.to.ca</i>	(p and pp)	(-28)
	<i>to.oy.pwu</i>	(ay and uy)	(-12)	<i>kha.si.ho</i>	(k and kk)	(-22)
	<i>thay.na.mi</i>	(t and tt)	(-10)	<i>ppe.mwu.ni</i>	(p and ph)	(-22)
	<i>kha.si.ho</i>	(k and kk)	(-10)	<i>po.wi.sa</i>	(i and uy)	(-22)
	<i>ssay.o.ki</i>	(s and c)	(-10)			
	<i>cwu.ya.so</i>	(a and ye)	(-10)			
	<i>ku.le.mi</i>	(kk and kh)	(-10)			
	<i>po.a.cay</i>	(ya and e)	(-10)			
3	<i>to.ay.ci</i>	(i and yey)	(-21)	<i>phi.to.ca</i>	(p and pp)	(-24)
	<i>kay.ye.to</i>	(ya and e)	(-15)	<i>say.u.ma</i>	(i and wu)	(-24)
	<i>po.wi.sa</i>	(i and uy)	(-11)	<i>kay.ye.to</i>	(ya and e)	(-19)
	<i>cwu.ya.so</i>	(a and ye)	(-10)	<i>te.pwu.ci</i>	(tt and th)	(-16)
	<i>kha.si.ho</i>	(k and kk)	(-9)	<i>kko.ta.ci</i>	(k and kh)	(-16)
	<i>to.oy.pwu</i>	(ay and uy)	(-8)	<i>pwu.to.li</i>	(pp and ph)	(-16)
	<i>tto.ka.pi</i>	(t and th)	(-7)	<i>to.oy.pwu</i>	(ay and uy)	(-13)
	<i>chwu.la.ki</i>	(c and cc)	(-7)	<i>ppe.mwu.ni</i>	(p and ph)	(-12)
4	<i>se.wa.ki</i>	(a and ya)	(-7)	<i>cca.ko.mi</i>	(c and ch)	(-12)
				<i>sa.ho.cay</i>	(ss and cc)	(-12)
	<i>po.wi.sa</i>	(i and uy)	(-32)	<i>ssay.o.ki</i>	(s and c)	(-21)
	<i>kay.ye.to</i>	(ya and e)	(-17)	<i>ku.le.mi</i>	(kk and kh)	(-18)
	<i>to.oy.pwu</i>	(ay and uy)	(-13)	<i>to.oy.pwu</i>	(ay and uy)	(-13)
	<i>so.e.kwu</i>	(a and o)	(-12)	<i>thay.na.mi</i>	(t and tt)	(-10)
	<i>phi.to.ca</i>	(p and pp)	(-10)	<i>kha.si.ho</i>	(k and kk)	(-10)
	<i>thay.na.mi</i>	(t and tt)	(-10)	<i>pa.we.swu</i>	(e and ye)	(-10)
5	<i>kha.si.ho</i>	(k and kk)	(-10)	<i>kay.ye.to</i>	(ya and e)	(-6)
	<i>ta.yo.kay</i>	(o and wu)	(-8)	<i>ppe.mwu.ni</i>	(p and ph)	(-6)
				<i>te.pwu.ci</i>	(tt and th)	(-6)
	<i>chwu.la.ki</i>	(c and cc)	(-15)	<i>tto.ka.pi</i>	(t and th)	(-6)
	<i>so.e.kwu</i>	(a and o)	(-13)	<i>sa.ho.cay</i>	(ss and cc)	(-6)
	<i>pwu.i.to</i>	(ay and u)	(-13)	<i>kha.si.ho</i>	(k and kk)	(-44)
	<i>to.ay.ci</i>	(i and yey)	(-11)	<i>pwu.to.li</i>	(pp and ph)	(-40)
				<i>so.e.kwu</i>	(a and o)	(-30)
				<i>kay.ye.to</i>	(ya and e)	(-28)

<i>cwu.ya.so</i> (a and ye) (-11)	<i>chwu.la.ki</i> (c and cc) (-27)
<i>kay.ye.to</i> (ya and e) (-8)	<i>tto.ka.pi</i> (t and th) (-22)
<i>te.pwu.ci</i> (tt and th) (-8)	<i>thay.na.mi</i> (t and tt) (-22)
<i>ku.le.mi</i> (kk and kh) (-8)	<i>cca.ko.mi</i> (c and ch) (-22)
	<i>sa.ho.cay</i> (ss and cc) (-22)
	<i>po.a.cay</i> (ya and e) (-22)
	<i>cwu.ya.so</i> (a and ye) (-22)
	<i>pa.we.swu</i> (e and ye) (-22)
<i>to.oy.pwu</i> (ay and uy) (-14)	<i>ci.kay.so</i> (cc and ch) (-39)
<i>kay.ye.to</i> (ya and e) (-12)	<i>po.wi.sa</i> (i and uy) (-26)
<i>ssay.o.ki</i> (s and c) (-9)	<i>kay.ye.to</i> (ya and e) (-22)
<i>ppe.mwu.ni</i> (p and ph) (-6)	<i>to.oy.pwu</i> (ay and uy) (-20)
<i>phi.to.ca</i> (p and pp) (-6)	<i>phi.to.ca</i> (p and pp) (-11)
6 <i>kha.si.ho</i> (k and kk) (-6)	<i>kha.si.ho</i> (k and kk) (-11)
<i>cwu.ya.so</i> (a and ye) (-6)	<i>to.ay.ci</i> (i and yey) (-7)
<i>cha.o.pi</i> (yo and e) (-6)	<i>thay.na.mi</i> (t and tt) (-7)
	<i>kko.ta.ci</i> (k and kh) (-7)
	<i>pwu.i.to</i> (ay and u) (-7)

The list of the test items that showed a relatively large between-speaker-group difference at a year level in a gender was compared between the genders at a year level first. Some of the items listed were found to overlap between the genders; such items are presented in bold in Table 5.4. However, the comparison of the list between the genders and year levels found no test item displaying a relatively large between-speaker-group difference across the genders and year levels. Only *kay.ye.to* (ya and e) (listed at Years 1, 3, 4, 5 and 6 in both genders) and *kha.si.ho* (k and kk) (listed at Years 1, 2, 3, 4 and 6 in girls and Years 2, 4, 5 and 6 in boys) were listed at more than half of the year levels in a given gender. This indicates that a test item observed to have a relatively large between-speaker-group difference at a particular year level in a gender was more often not found at another year level in the gender or at the same or another year level in the other gender. In other words, the appearance of test items with a relatively large between-speaker-group difference was rather sporadic than consistent when they were inspected across the year levels and genders. Therefore, it was difficult to specify the test items that KHSs

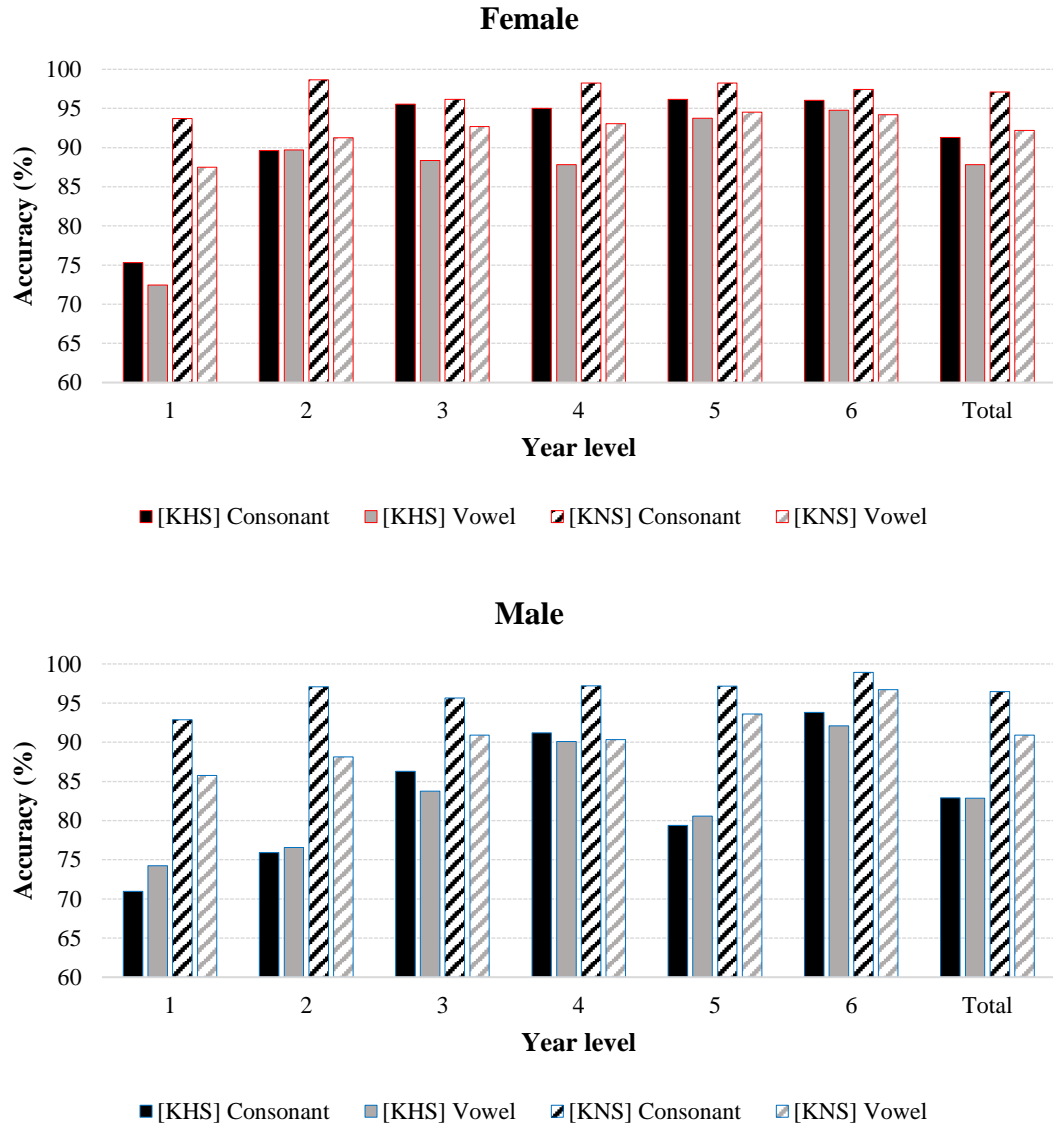
consistently had greater difficulty perceiving correctly and finding the correct written form.

5.2.3.2 Further analysis of accuracy by sound property

The participants' accuracy on test items was further analysed by some sound properties of the phonemic contrasts tested in the task. First, the accuracy was compared between the items for testing the perception of contrast between similar consonants and the items for testing the perception of contrast between similar vowels. The results of the comparison showed that both KHSs and KNSs were generally more accurate with the test items that tested for the perception of a consonantal contrast than the items that tested for that of a vocalic contrast, as shown in Figure 5.5. In most participant subgroups, the mean accuracy rate of the 14 items for a consonantal contrast was higher than that of the 16 items for a vocalic contrast, although the mean accuracy rate difference between the two groups of items was not very large. In female KHSs, the adjusted mean accuracy rate of the items for a consonantal contrast was 91.2, while that of the items for a vocalic contrast was 87.8.⁴⁹ Female KNSs showed the same trend as the adjusted mean accuracy rate of the items for a consonantal contrast was 97.1 compared to that of the items for a vocalic contrast at 92.2. In boys, the same trend held true for the KNSs, but for the KHSs, the adjusted mean accuracy rate was the same between the items for a consonantal contrast and the items for a vocalic contrast (i.e., 82.9). This seems to have been derived from the opposite trend (i.e., a higher adjusted mean accuracy rate for the items for a vocalic contrast) observed at Years 1, 2 and 5.

⁴⁹ The mean accuracy rate of the test items for a consonantal contrast as well as those for a vocalic contrast was corrected for the unbalance in the participant number between the six year levels within the speaker group in the gender.

Figure 5.5 Comparison of mean accuracy rates between the items for a distinction between similar consonants and the items for a distinction between similar vowels in KHSs and KNSs in Years 1–6 in girls and boys

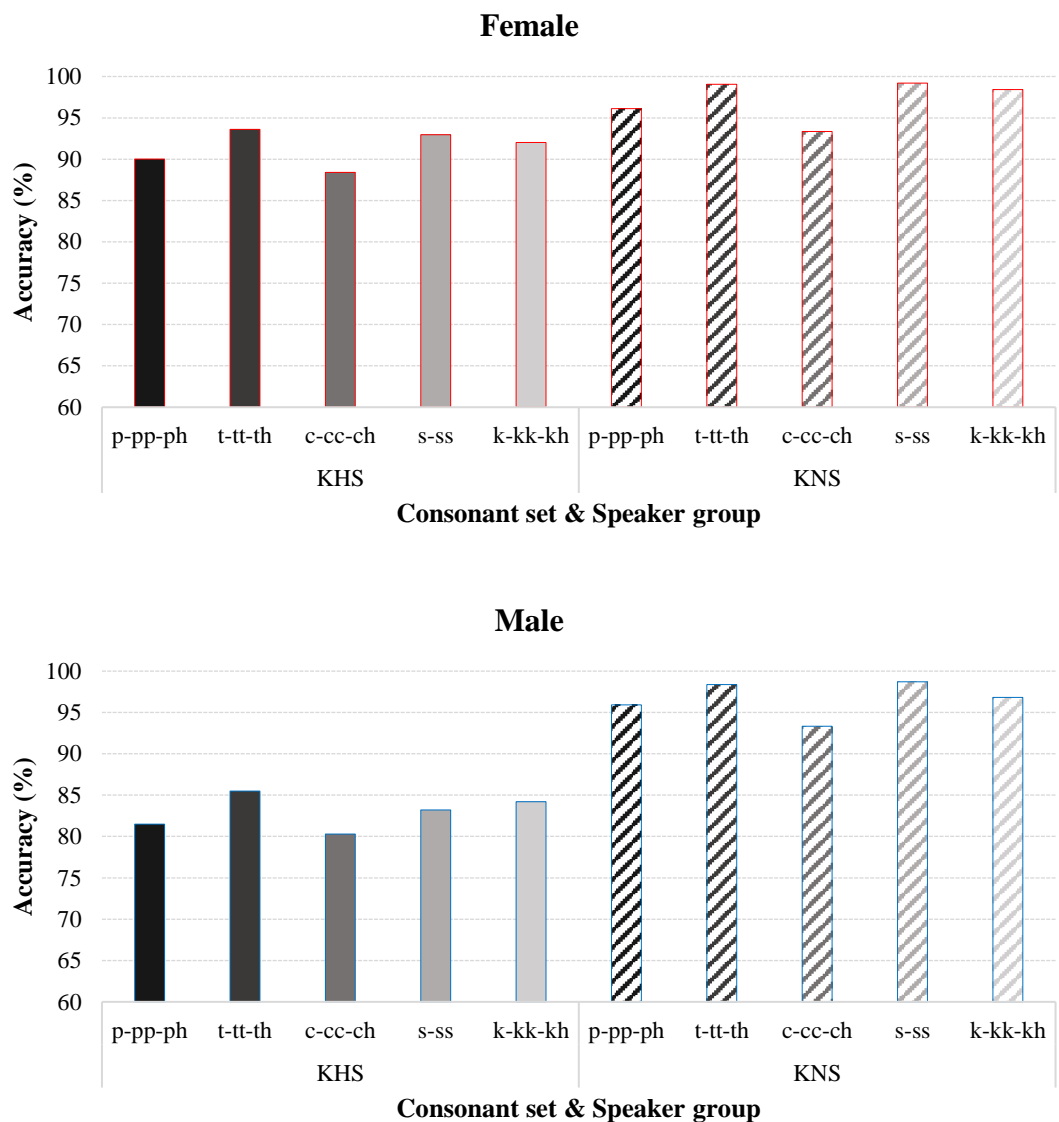


The participants' accuracy on the test items for a distinction between similar consonants were analysed further by the consonant set categorised by the manner and place of articulation of the target consonants—that is, bilabial stops (*p*, *pp* and *ph* [i.e., /p/, /p/ and /p^h/, respectively]), alveolar stops (*t*, *tt* and *th* [i.e., /t/, /t/ and /t^h/, respectively]), alveolar affricates (*c*, *cc* and *ch* [i.e., /tʃ/, /tʃ/ and /tʃ^h/, respectively]), alveolar fricatives (*s* and *ss* [i.e., /s/ and /s/ , respectively]) and velar stops (*k*, *kk* and *kh* [i.e., /k/, /k/ and /k^h/, respectively]). The mean accuracy rate of the test items for the distinction between a given consonant set (e.g., the items *pwu.to.li*, *ppe.mwu.ni* and *phi.to.ca* tested for the contrasts

between the bilabial stops, *p*, *pp* and *ph*) was calculated for KHSs and KNSs at each year level in each gender. With this, the adjusted mean accuracy rate of KHSs and KNSs in each gender was for each consonant set and then compared.

As shown in Figure 5.6, in both speaker groups in both genders, the accuracy rates on the test items for the contrast between the alveolar stops (*t*, *tt* and *th*) and the alveolar fricatives (*s* and *ss*) were the highest among the five consonant sets. However, in male KHSs, the accuracy rate on the items for the fricatives was slightly lower than that for the stops. This was probably due to the KHSs' particularly low accuracy rate on the item *ssay.o.ki* (*s* and *c*) at Year 1 (44) and Year 2 (56). The highest accuracy rate on the test items for the contrast between the alveolar stops and the alveolar fricatives was followed by that on the items for the velar stops (*k*, *kk* and *kh*) and then that on the items for the bilabial stops (*p*, *pp* and *ph*); the accuracy rate on the items for the alveolar affricates (*c*, *cc* and *ch*) was the lowest in both speaker groups in both genders. However, it should be noted that in each speaker group in each gender, the differences in the accuracy on the items between the five consonant sets were generally small. For instance, in female KHSs, the adjusted mean accuracy rate on the test items for the alveolar stops, which was the highest, was 93.6, while that on the test items for the alveolar affricates, which was the lowest, was 88.4.

Figure 5.6 Comparison of adjusted mean accuracy rates between the five consonant sets in KHSs and KNSs in girls and boys



5.3 Discussion of results

5.3.1 KHSs' divergence from native norms in phoneme distinction

The analysis of the participants' per cent correct scores on the phoneme discrimination task (i.e., Task 1) by gender, year level and speaker group informed that, on average, KHSs scored lower than KNSs at each year level in each gender. However, the statistical significance tests for the observed lower scores of KHSs than their gender- and year-level-matched KNS counterparts presented different results between the year levels. The mean score difference between KHSs and KNSs was statistically significant

at Years 1 and 2 in both genders, but the difference at the middle- and upper-year levels did not reach statistical significance, except for Year 6 in boys.

KHSs' lower but statistically non-significant performance at the middle- and upper-year levels

A non-significant statistical test result means that the effect observed in the data does not provide enough evidence to support the alternative hypothesis—which supposes that an effect genuinely exists in the underlying population—and accordingly, the null hypothesis cannot be rejected. Therefore, the non-significant results of the statistical tests found at Year 3 through to Year 6, except for Year 6 in boys, indicate that the participants' performance of the task did not provide sufficient evidence to conclude that KHSs in the underlying population will score lower than their gender- and year-level-matched NS controls if given the same task. Thus, with respect to one of the primary questions of this study—that is, if Australian KHSs in primary school years are different from the NS controls in their linguistic abilities in Korean, it is difficult to claim, at least for those in the middle or upper primary school year levels, that KHSs have lower abilities in phoneme distinction in Korean than the NS controls.

This study's null hypothesis of the statistical significance tests corresponded with the generally prevalent assumption that HSs possess native-like competence in perceiving speech sounds in their HL based on research findings (e.g., Chang, 2016; Oh et al., 2003). This assumption also has its theoretical and empirical basis from the speech perception studies in child L1 acquisition, according to which the perception of speech sounds in one's native language develops very early. (More discussion of this follows in 9.2.1.) Then, the non-significant results found at most of the middle- and upper-year levels in each gender may be interpreted as in line with the assumption that HSs have a native-like perception of phonemic contrasts in their HL. In fact, at some of the middle- and upper-year levels, the KHSs' performance of the task was comparable to that of their KNS counterparts. For example, at Years 3, 5 and 6 in girls, the mean score difference between KHSs and KNSs (excluding the extreme outliers) was fewer than 3%. Given such comparable performance in addition to no statistical significance found between the speaker groups at most of the middle- and upper-year levels, it is not plausible to conclude that KHSs in primary school years in Australia have lower abilities in distinguishing similar phonemes in Korean than the gender- and year-level-matched KNSs, even though they generally scored lower than the NS controls on the given task.

KHS's statistically significantly lower performance than KNSs at the lower-year levels in both genders and at Year 6 in boys

Contrary to the statistically non-significant differences found at most middle- and upper-year levels, the performance differences between KHSs and KNSs at Years 1 and 2 in each gender and at Year 6 in boys were statistically significant. These results clearly indicate that in the underlying population, KHSs in those year levels in the gender are highly likely to score lower than their KNS counterparts on the task. However, the statistically significant performance difference between the speaker groups is likely to have been derived from their difference in the task- or performance-related factors such as literacy skills in Korean rather than from their difference in phoneme distinction in Korean.

The phoneme discrimination task with non-words in this study involves at least four different processes for completion: perceive an auditory stimulus (i.e., a trisyllabic non-word in Korean); hold the perceived stimulus in the short-term memory; read an answer choice; and compare it with the temporarily stored stimulus until the matching one is found. The participants' skills exercised in those processes must be reflected in their performance of the task. Among the skills required for completing the task, reading skills seem to best account for the statistically significant performance differences found only at the lower-year levels in each gender and Year 6 in boys. This is mainly because there are neither theoretical nor empirical grounds that can justify the explanation that KHSs have lower abilities than KNSs in perceiving phonemic contrasts in Korean or in storing an auditory stimulus in their short-term memory only at Years 1 and 2 in both genders and Year 6 in boys.

Looking at the KHSs' performance more closely, it was noted that those in Year 1 in both genders, as well as those in Year 2 in boys, scored considerably lower than their KNS counterparts on the task, yielding a large between-speaker-group mean score difference; this large gap between the speaker groups narrowed by Year 2 in girls and by Year 3 in boys. However, this improvement observed between those year levels in the gender cannot be explained easily in terms of the developmental change in speech perception or short-term memory over primary school years. This is because it is improbable that the KHSs' speech sound perception in Korean or short-term memory improves greatly between Years 1 and 2 in girls and between Years 2 and 3 in boys. It seems much more reasonable to assume that the performance improvement resulted from

their advancement in literacy skills in Korean. This is because literacy skills are the most likely factor that improves significantly over the lower primary school year levels in KHSs. The relatively large standard deviations observed among female KHSs in Year 1 and male KHSs in Years 1 and 2 also support this assumption. Given the performance improvement observed between Years 1 and 2 in female KHSs and between Years 2 and 3 in male KHSs, as well as the larger standard deviations seen at Year 1 in the girls and Years 1 and 2 in the boys, it seems reasonable to ascribe the much lower performance of KHSs than KNSs at Year 1 in girls and Years 1 and 2 in boys to their non-mastery of basic literacy skills in Korean.

In the case of the girls in Year 2, the mean score difference between the speaker groups was not very large (i.e., -5.1). Nevertheless, the difference turned out to be statistically significant. In fact, at Year 2 in girls, the standard deviations of both speaker groups were quite small (i.e., 5.5 in the KHSs and 4.4 in the KNSs, excluding extreme outliers). With the small standard deviations of both speaker groups, the relatively small mean score difference between the speaker groups reached statistical significance. Despite being statistically significant, the performance difference between the speaker groups at Year 2 in girls is also likely to have resulted from the KHSs' less-developed literacy skills in Korean compared to their same-gender KNS peers. Although other explanations for the KHSs' lower performance than their NS controls exist (which will be discussed later in the section), the most likely cause is their less-developed literacy skills in Korean, in line with the account given for the statistically significant performance difference found at Year 1 in both genders and Year 2 in boys.

According to the teachers at the Korean community schools of the study participants, the lessons at Kindergarten and Year 1 focus mainly on learning to read in Korean because virtually all students can understand and speak Korean quite well from their exposure to the language at home. The basic literacy education in Korean that the KHSs have received from their community school attendance in the initial couple of years, however, does not seem to have equipped them with enough reading skills to perform to their year-level-appropriate NS levels on the given task.

The ascription of the statistically significant results found at the lower-year levels to the difference between KHSs and KNSs in the literacy skills may also explain the same result found at Year 6 in boys. Although male Year 6 KHSs performed well on the task ($M = 92.9$, excluding extreme outliers), their same-gender KNS peers performed even

better ($M = 97.8$, excluding extreme outliers), resulting in a statistically significant difference between them given their within-group variations. This superb performance of the KNSs was probably derived from their much more developed reading skills, with which they could employ some tactics in completing the task, such as reading the answer choices quickly before listening to the auditory stimulus and trying to identify the phonemic contrasts to be tested in advance.

KHSs' consistently lower performance than KNSs on the task

The possibility that KHSs in primary school years in Australia indeed have a lower level of perception of phonemic contrasts in Korean remains despite the statistically non-significant performance differences found at most middle- and upper-year levels. This is because a failure to reject a null hypothesis does not infer its automatic acceptance. In other words, a statistically non-significant result does not necessarily imply that there exists no effect in the underlying population; instead, it simply means that the sampled data do not provide sufficient evidence to support the alternative hypothesis. In this study, the alpha level for the statistical significance was adjusted to reduce a Type I error; if the alpha level were set at the conventional level of .05, the differences at more year levels would have been found statistically significant in each gender. Moreover, KHSs in this study performed consistently less well than KNSs across the year levels and genders; their constantly lower performance, especially at the middle- and upper-year levels, may not be so easily ascribed to their less-developed literacy skills in Korean alone. This, in turn, points to a possibility that KHSs indeed do not perceive phonemic contrasts in Korean less well than their NS controls and thus scored lower than the NS controls on the given task even if the difference is likely to be small like one or two test items with the given task.

In addition, other factors might have contributed to the KHSs' lower level of performance than the NS controls in this study along with the task- or performance-related factors specific to the given task such as literacy skills as described above. One of them is a possible difference between KHSs and KNSs in their phonological working memory in Korean. Some studies have shown that bilingual children's performance of a non-word repetition task was poorer than that of their age-matched monolinguals, indicating a possible effect of the TL experience on the phonological working memory in the TL (e.g., Gutiérrez-Clellen & Simon-Cerejido, 2010; Kohnert et al., 2006). Although, in this study, the test stimulus was played twice for each item to reduce the potential effect of the

participants' short-term memory on their performance, such a possibility cannot be ruled out completely.

Further, the participants' performance could have been affected by the task administration settings. Some studies on HSs' speech perception in their HL in adverse acoustic conditions suggested that HSs' performance in speech perception in noise deteriorates more greatly than that of their NS controls' (e.g., Blasingame & Bradlow, 2012; Gor, 2014).⁵⁰ In the current study, the phoneme discrimination task was administered in a normal classroom setting instead of a one-to-one test setting in a sound-attenuated room. Although a normal classroom setting is usually not considered as noisy, there would have been typical classroom noise, such as a certain level of noise coming from outside and some noise that the students inside the classroom generate when 'moving chairs, scraping feet, coughing, leafing through papers, and rattling writing utensils' (Klatte et al., 2010, p. 660), as well as some degree of sound reverberation with the audio equipment used for administering the task in the classroom. If the participants' performance was affected by such an environment in any way, the KHSs were more likely to have been affected by it than their NS controls, thus scoring lower on the given task.

5.3.2 KHSs' change in phoneme distinction

The analysis of the participants' per cent correct scores by year level within each speaker group in each gender showed that their mean score generally increased by year level in KHSs as well as in KNSs in each gender. This was tested for statistical significance, but the test results revealed that most of the mean score differences between two different year levels within a speaker group in a gender were not statistically significant. Only the difference between Year 1 and some higher-year levels in KHSs in both genders and that between Year 6 and some lower-year levels in male KNSs were statistically significant.

⁵⁰ The findings from research on speech perception in adverse acoustic conditions such as with noise or reverberation have shown that the ability to recognise speech in noisy conditions deteriorate greatly, children are more affected under such conditions than adults (e.g., Johnson CE, 2000; Klatte et al., 2010; Neuman & Hochberg, 1983; Stuart, 2005; Talarico et al., 2007) and non-NSs (i.e., L2 speakers in L2 speech perception) are more affected than NSs (e.g., Crandell & Smaldino, 1996; Florentine, 1985; Mayo et al., 1997; Nábelek & Donahue, 1984; Rogers et al., 2006). In particular, the study by von Hapsburg and Bahng (2009) demonstrated the effect of noise on L1 speech perception in adult L2 learners with the results that noisy conditions affected those with higher L2 proficiency more than those with lower L2 proficiency, indicating that adult L2 learners experience more difficulty processing L1 in noise as their L2 proficiency increases.

The results of the statistical tests, together with the overall tendency of a mean score increase by year level, leave the question about a possible change in the perception of phonemic contrast in Korean among KHSs over primary school years with two contrasting answers. As most of the mean score differences between the year levels turned out to be statistically non-significant not only in KHSs but also in KNSs in each gender,⁵¹ the results can be interpreted as that the perception of phonemic contrasts in Korean does not change significantly over primary school period in both speaker groups. However, the opposite hypothesis, that their perception of phonemic contrasts changes over the period, can also be true because a statistically non-significant result does not verify the null hypothesis in question. If the latter is the case, their perception is more likely to improve (rather than deteriorating) by year level, given the tendency to increase by year level in both speaker groups.

Possibly no significant change in KHSs' phoneme distinction over primary school years

According to the literature on speech sound perception and production in child L1 acquisition, the perception of phonemic contrasts in Korean is likely to have been fully developed by the lowest year level in the participants of this study, especially in the KNSs. Babies, who are born with sensitivity to all phonetic distinctions that exist in human languages (Byers-Heinlein & Fennell, 2013), become insensitive to non-native phonetic contrasts as early as in the second half of their first year of life and maintain only the contrasts relevant to their native language (Werker et al., 2012). This loss of sensitivity to non-native phonetic contrasts and maintenance of native language contrasts is viewed as a development in L1 phonetics and phonology. Apparently, this development takes place very early in life and provides infants and toddlers with the basis for processing the TL input to learn the words and grammar of the language. Thus, it is assumed that one's perception of phonemic contrasts in his or her native language is in place from very early on.

The general observation that monolingual children master speech sound production of their native language by the time they start school leads to the assumption that they have native-level perception by that time. By age six, monolingual children

⁵¹ Given the statistical results, the null hypothesis cannot be rejected. The null hypothesis of the statistical tests was that in the underlying population exists no difference between the speakers of Korean at different year levels in their abilities to perceive phonemic contrasts in Korean, whereas the alternative hypothesis maintained an existence of the differences between the speakers at different year levels.

appear to pronounce most speech sounds in their native language accurately; for instance, 90% of the six-year-old monolingual English-speaking children pronounced all English consonants accurately except for /θ/ and /ð/ (Dodd et al., 2003). Vowels are known to be mastered even earlier than consonants (Donegan, 2012). Since correct speech perception usually presumes correct speech production in normally developing children, monolingual children who can pronounce almost all speech sounds in their native language accurately (i.e., distinguished clearly from other sounds in the language) by the onset of schooling should be able to perceive all phonemic contrasts in their native language accurately as well. Concerning the speech sound production in Korean-speaking children, monolinguals are expected to ‘fully acquire their vowels before the age of 3’ (Lee SAS & Iverson, 2012, p. 1451), and six-year-olds were observed to produce Korean consonants with 97% accuracy (Kim MJ & Pae, 2005; Kim YT, 1996). Accordingly, KNSs are highly likely to have mastered Korean speech sounds in production and perception at the outset of primary school years, and hence have full command of making correct distinctions between similar phonemes in Korean from the lowest primary school year level.

Such an assumption of KNSs’ full command of phoneme distinction in Korean by the time of schooling, however, raises a question about the observed performance of the KNSs in this study. If the KNS participants had mastered Korean speech sounds and consequently were fully capable of correctly perceiving the phonemic contrasts given in the task, even those in Year 1 should have received a perfect score. Contrary to this, many KNS participants, even those in Year 6, did not attain full marks, and those in a lower-year level scored even lower. Under the assumption of KNSs’ mastery of speech sound perception in Korean by the time of schooling, such imperfect performance of many KNSs in Year 6 and even lower performance of those in a lower-year level cannot be due to their lack of competence in perceiving phonemic contrasts in Korean. Instead, their less-than-perfect performance should reflect some other skills exercised in the task or be simply due to some performance-related errors (e.g., lack of attention or making a mistake in marking) to which younger children than older children are usually more susceptible.

Following this account, the observed trend of a mean score increase by year level in both speaker groups in this study may be attributed to the other skills required for completing the task, such as literacy skills and short-term memory. Reading skills and short-term memory, which includes phonological working memory, are expected to

improve over primary school years (but certainly not in the way that they increase suddenly by a significant degree between specific year levels). Thus, it is likely that the participants in a lower-year level were not as good as those in a higher-year level at holding the auditory information of a test stimulus in their short-term memory, reading each of the given answer choices (i.e., transferring the visually presented phonological information of a non-word into its auditory representation in their mind) and comparing the two if they are the same. These less-developed skills in reading and/or phonological working memory of the participants in a lower-year level than those in a higher-year level must have been realised as a slightly lower level of performance of the given task, irrespective of their speaker group.

The above-described account of a potential influence of task-related factors such as literacy skills and short-term memory for the observed trend of better performance at a higher-year level also explains the statistically significant differences found between Year 1 and some higher-year levels in KHSs. In particular, the participants' literacy skills in Korean seem to have affected their performance of the task. As described in the previous section, the KHSs' mean score increased greatly between Years 1 and 2 in girls and between Years 2 and 3 in boys. The most likely cause of such sudden improvement in their performance is their reading skills having reached the competent level for the given task so that they could perform on the task without being affected much by the skills, hence the observed pattern of mean score increase. The statistical test results revealed that the mean score at Year 1 was statistically significantly lower than that at all other year levels in female KHSs and at Year 6 in male KHSs. More mean score differences between the year levels turned out to be statistically significant in the girls possibly due to relatively small within-group variances. Nevertheless, the observed mean score increase and within-group performance variations are most likely to have been derived from their reading skills in Korean.

Among the KNSs, the trend of mean score increase was also evident, but the poorer performance at a lower-year level than a higher-year level was less prominent, as the mean score differences between the adjacent year levels were generally small. Nevertheless, the difference between Year 6 and some lower-year levels in male KNSs was statistically significant, which can be explained by the same account of the difference in the literacy skills between the year levels. The statistical test result has probably derived

from the consistently superb performance of those in Year 6, who could employ some effective strategies, taking advantage of their highly developed reading skills.

A small possibility of a change in KHSs' phoneme distinction over primary school years

Although the statistically non-significant mean score differences found between most of the year levels compared in KNSs as well as KHSs in this study were likely to mean no significant improvement would occur in their perception of phonemic contrasts in Korean over primary school years, the statistical test results do not nullify the possibility that one's speech sound perception develops further through to late childhood. In fact, studies that tested phoneme discrimination among children for various research questions observed that older children generally performed better than younger children (e.g., Cheung et al., 2010; Morgan, 1984). These results indicate that children's perception of phonemic contrasts in their native language may improve as they grow older.

The assumption of further development of speech sound perception can be supported by the explanation of how early attuning of speech perception occurs in infants and young children. According to Kuhl's (2000) review of relevant research, infants initially have the universal perceptual space as they show perceptual biases, but they soon exhibit language-specific mapping of the perceptual space; this means that they have formed a language-specific filter that alters the dimensions of speech sounds as they have changed their acoustic space to differentiate sound categories. More importantly, forming such a language-specific filter involves a neural commitment to the phonemic contrasts or categorisations in that language (Kuhl, 2000). This commitment is likely to be reinforced as infants and young children gain experience in the language; this leads to the prediction that older children with more language experience are better at perceiving phonemic contrasts in the language than younger children.

Indeed, studies have shown that adults were much better than children and older children were better than younger children at distinguishing between speech sounds when acoustic cues were reduced (e.g., Ohde & Haley, 1997; Ohde et al., 1996; Ohde et al., 1995). Moreover, the findings of some studies suggested that a developmental change in phoneme categorisation may occur until late childhood (e.g., Nitttrouer & Miller, 1997; Walley & Flege, 1999). In Hazan and Barrett's (2000) study, for example, children aged six to 12 were different from their adult controls in terms of the boundaries where they categorise a continuum of sounds into two distinct phonemes; this suggests that children

may perceive some sounds as a different phoneme from how their adult counterparts perceive the sounds. Given the above, it is possible that one's phoneme distinction, which has been established by the early attuning to his or her native speech sounds, develops further through to late childhood with their continuous exposure to the language. However, even if the perception of phonemic contrasts in Korean differed between the participants in different school year levels within a given speaker group, it is not clear by which degree (e.g., in the mean score) the difference would have been realised in the current study.

No regressive change in phoneme distinction over primary school years even in KHSs in this study

Lastly, it should be noted that a regressive trend of performance by year level was not observed in KHS in this study. If adult KHSs' less-than-native performance of phoneme discrimination tasks observed in some previous studies resulted from the attrition of their sensitivity to some phonemic contrasts in the HL or restructuring of their HL phonological representation due to the interaction between their HL and the majority language of the wider community (e.g., Ahn et al., 2017; Lee-Ellis, 2012), those with more experience in the societal majority language may have undergone such change to a greater degree. Hence, there would be a higher likelihood of having a less-than-native speech perception in their HL. According to Lee-Ellis (2012), language dominance plays a more critical role in maintaining native-level phonological competence in the TL than early exposure to the TL. Hence, English-speaking adult KHSs who speak English as their dominant language show native-level phonological competence in English but less-than-native competence in Korean. Among the KHSs in this study, those in a higher-year level must have had more experience in English accumulated with more years of schooling in the English-immersion setting in general than those in a lower-year level. If attrition or restructuring were to occur with their acquisition of English and the subsequent change of language dominance from Korean to English, the KHSs in a higher-year level were more likely to have undergone such change than those in a lower-year level. Thus, those in a higher-year level should have performed more divergently from their KNS peers, possibly scoring lower than those in a lower-year level. However, such a regressive pattern was not observed in the KHSs' performance in this study. Future studies should investigate if, under what conditions, how fast and to what extent such attrition or restructuring occurs in KHSs or HSs in general.

5.3.3 KHSs' difficulty with particular phonemic contrasts

The analysis of the participants' accuracy rates on test items within and between the participant subgroups indicated that the accuracy was lower on some test items than others. The analysis of the between-speaker-group accuracy differences by test item also informed that the difference was relatively large for some test items at a given year level in a gender. However, no items showed a relatively large difference across the year levels and genders. The further analysis of the participants' accuracy on test items by the sound property of the target phonemes revealed that both KHSs and KNSs were slightly less accurate with the items for testing a distinction between similar vowels than those for testing a distinction between similar consonants as well as that they were least accurate with the items for testing a distinction between the alveolar affricates among the five consonant sets compared.

Lower accuracy on specific test items across the participant subgroups

Comparing the participants' accuracy on individual test items across the participant subgroups showed that the participants in most subgroups were comparatively less accurate with the test items *so.e.kwu*, *kay.ye.to*, *to.ay.ci* and *po.wi.sa*. Importantly, not only KHSs but also KNSs were comparatively consistently less accurate with these test items. This suggests that both speaker groups had more difficulty with perceiving the phonemic contrasts tested with those items. The greater difficulty with those items across the speaker groups seems to have been chiefly derived from the vowel in the first syllable interfering with the perception of the target vowel in the second syllable.

For instance, in *so.e.kwu* (*a* and *o*), the target vowel *e* (/ʌ/, i.e., the back-mid-unrounded vowel) in the second syllable is preceded by another vowel, *o* (/o/, i.e., the back-mid-rounded vowel), which is acoustically very similar to the target vowel; this may have imposed relatively greater difficulty to the participants in distinguishing the target vowel *e* from the alternative *o*, in particular. Similarly, in *kay.ye.to* (*ya* and *e*), many participants seem to have not perceived the glide /j/ in the target diphthong *ye* (/jʌ/) well enough to distinguish *ye* (/jʌ/) from the alternative *e* (/ʌ/), especially because the glide /j/ followed the front-mid-unrounded vowel *ay* (/E/) of the first syllable. The participants could not detect the sound change from /E/ of the first syllable to /j/ at the beginning of the second syllable (i.e., the target phoneme) very well because of the similarity between /E/ and /j/ in the acoustic quality, as well as the short duration of /j/ in nature before /ʌ/ within the target diphthong. In *po.wi.sa* (*i* and *ui*), some participants may have misheard

the target vowel *wi* (/wi/) as the alternative *i* (/i/) because the target vowel in the second syllable immediately followed the vowel *o* (/o/) of the first syllable. Due to the acoustic similarity between *o* and the glide /w/ in the target phoneme *wi* pronounced adjacently, some participants may have had difficulty distinguishing *wi* from the alternative *i*.

Lack of evidence for a consistent difficulty with some phonemic contrasts in the given task

The analysis of the between-speaker-group accuracy differences on test items across the year levels and genders showed that a relatively large accuracy difference for an item observed at a particular year level in a gender was more often not found to be ‘relatively’ large at another year level in the gender or at the same or another year level in the other gender. In other words, the evidence for a consistent difficulty with a particular phonemic contrast in the KHS participants compared to the NS controls is somewhat lacking in this study. This result may be interpreted as supporting the previously explained assumption that the observed lower level of performance of KHSs than their KNS counterparts on the task in this study is not necessarily due to their less-developed perception of phonemic contrasts in Korean. This is because even when KHSs are assumed to have less-developed speech sound perception in Korean, it is more likely to be selective than applicable to all phonemic contrasts in Korean, as observed in some previous studies (e.g., Ahn et al., 2017).

However, the result that a consistently greater degree of difficulty with a specific item was not found in this study does not necessarily mean that they will be able to perceive all phonemic contrasts in Korean equally well. The result could have been derived from the phoneme discrimination task in this study being not sensitive enough to detect such contrast. Due to the limited number of test items included, two different but related phonemic contrasts were tested by one test item in the task in this study; for instance, the target stimulus *pwu.to.li* tested the contrast between *p* (/p/) and *pp* (/p̚/) and that between *p* (/p/) and *ph* (/p^h/) with the three answer choices. Some of the contrasts were tested only once with only one of the paired phonemes presented as the target phoneme; for example, for the contrast between *wi* (/wi/) and *i* (/i/), only *wi* was tested as the target phoneme in *po.wi.sa*, but the same contrast was not tested with *i* given as the target phoneme. Even when the contrast in question was tested twice with each phoneme given as the target phoneme (e.g., the contrast between *p* and *pp* was tested with *pwu.to.li* as well as with *ppe.mwu.ni*), each test stimulus was tested only once. Due to this minimal

amount of testing for each phonemic contrast, it would have been difficult for a constant difficulty with a specific phonemic contrast to be revealed.

For the same reason, some observations made in this study, such as the especially low accuracy on *ssay.o.ki* (*s* and *c*) observed in KHSs at the lower-year levels, should be interpreted with caution. In fact, the pronunciation of the fricatives *s* (/s/) and *ss* (/ʃ/) appears to be the last to be mastered in Korean-speaking monolingual children (e.g., Ha S et al., 2019; Kim MJ & Pae, 2005; Kim M et al., 2017; Kim YT, 1996). It was also observed that adult English-speaking KHSs were more likely to perceive the contrast between the fricatives less well than their NS controls compared to some other contrasts (Ahn et al., 2017). Based on these research findings, the low accuracy on *ssay.o.ki* observed among female KHSs in Year 1 and male KHSs in Years 1 and 2 may be interpreted as a possible indication of delayed acquisition of the fricatives or restructuring of their phonological representation. However, it could have simply been a happenstance since the KHSs' accuracy on *sa.ho.cay* (*ss* and *cc*), which tested the same contrast between *s* and *ss* but with *s* as the target phoneme, was quite high (above or around 90%) at the lower-year levels. A future study that tests a contrast in question with multiple tokens and numerous frequencies should further investigate the possibility of KHSs' less-developed perception of specific phonemic contrasts.

Lower accuracy on items for vocalic contrasts possibly influenced by the design of test stimuli

The accuracy on the test items for a distinction between similar vowels was lower than that on the items for a distinction between similar consonants in both speaker groups. Based on the general observation on child L1 speech perception and production that vowels emerge earlier and are mastered before consonants (e.g., Donegan, 2012; Stoel-Gammon & Herrington, 1990), the lower accuracy on the test items for a vocalic contrast than that on the test items for a consonantal contrast observed in this study could have been due to the position of the target phoneme in a test stimulus. The items testing for a distinction between similar vowels had their target vowel placed in the second syllable; in comparison, the items testing for a distinction between similar consonants had their target consonant at the beginning of the stimulus (i.e., the onset of the first syllable). This could have made it easier to accurately perceive a target consonant than a target vowel, as the word-initial position is often perceived to be salient. Moreover, as the target vowel was pronounced immediately after another vowel (i.e., the vowel of the first syllable) in

a given test stimulus, the first vowel might have hindered the perception of the target vowel in the second syllable.

Little accuracy difference between items for different consonant sets

Lastly, the results of the comparison of the accuracy on the test items for a consonantal contrast by the consonant set showed that in both speaker groups in both genders—except for slight deviations observed in male KHSs—the adjusted mean accuracy on the test items for a distinction between a set of consonants was the highest for the alveolar stops (*t*, *tt* and *th* [i.e., /t/, /t̚/ and /tʰ/, respectively]) and the alveolar fricatives (*s* and *ss* [i.e., /s/ and /s̚/, respectively]), followed by the velar stops (*k*, *kk* and *kh* [i.e. /k/, /k̚/ and /kʰ/, respectively]) and the bilabial stops (*p*, *pp* and *ph* [i.e., /p/, /p̚/ and /ph/, respectively]), and the lowest for the alveolar affricates (*c*, *cc* and *ch* [i.e., /t͡s/, /t͡s̚/ and /t͡sʰ/, respectively]). Concerning the lowest mean accuracy observed for the alveolar affricates (*c*, *cc* and *ch*), one may hypothesise that this result was derived from the relatively late mastery of the affricates as it was widely observed in Korean-speaking children's production (e.g., Ha S et al., 2019; Kim MJ & Pae, 2005; Kim M et al., 2017; Kim YT, 1996). However, such an assumption, which is based on the order of the mastery of Korean consonant pronunciation, is proven incorrect by the highest accuracy being observed on the items for a distinction between the alveolar fricatives (*s* and *ss*) since it contrasts to the idea of the fricative's late acquisition.

In addition, the results did not correspond to the pattern observed in Cheon and Lee's (2013) study in which the participants (i.e., KNSs, English-speaking KHSs and L2 learners of Korean) were most accurate with the bilabial stops followed by the velar stops and then the alveolar stops in their perception. Considering the generally small differences in accuracy between the consonant sets observed in this study and Cheon and Lee (2013), the observed differences may not be regarded as evidence for the relative perceptual difficulty of the target phonemes by their place and manner of articulation. Moreover, because of the minimal tokens and frequencies of the items for testing a phonemic contrast in the given task, one should interpret the observed pattern of the accuracy rates with caution. A future study with multiple tokens and numerous frequencies should scrutinise if KHSs (whether in comparison to KNSs) show differentials in their perception of different consonantal contrasts by the place and/or manner of articulation of the target phonemes.

5.4 Summary

In respect to the linguistic abilities in Korean of KHSs in primary school years in Australia regarding the sound system, their speech sound perception compared to their gender- and school-year-level-matched KNSs was examined with a phoneme discrimination task with non-words (i.e., Task 1) in this study. In this chapter, the design of the phoneme discrimination task was described, the performance of KHSs and the NS controls on the task was analysed based on the research questions of the study, and finally, possible interpretations of the results were provided.

With respect to the question of KHSs' difference from the NS controls regarding their perception of various phonemic contrasts in Korean, the analysis of their performance showed that the KHSs scored lower than their KNS counterparts across the year levels and genders. However, the performance differences between the speaker groups at many of the year levels in each gender did not reach statistical significance, making it difficult to claim that KHSs have a less-developed perception of phonemic contrasts in Korean. Conversely, where the between-speaker-group difference reached statistical significance (i.e., at Years 1 and 2 in both genders and Year 6 in boys), it was more likely to have resulted from the gap between the speaker groups in their reading skills in Korean required for completing the task. Taken together, the results did not corroborate the KHSs' statistically significantly lower level of HL speech sound perception observed in some previous studies that suggested the possibility of an erosion of early established phonetic or phonological competence in the HL among HSs despite their continuous exposure to the TL. Nevertheless, the generally lower level of performance among the KHSs than their NS controls observed in this study, together with the statistical test results, did not invalidate the possibility that the KHSs perceive phonemic contrasts in Korean less well than KNSs.

Regarding the question of a developmental change in the KHSs' phoneme distinction in Korean over primary school years, their performance of the task was analysed by the school year level in comparison to the performance of their NS controls. The analysis showed that both KHSs and KNSs in a higher-year level tended to score higher than those in a lower-year level, but when tested for statistical significance, most of the performance differences between the year levels compared in each speaker group in a gender turned out to be non-significant. Since the better performance observed at a higher-year level than a lower-year level was not supported by statistical significance, it

is difficult to claim that those in a higher-year level make distinctions between similar sounds in Korean better than those in a lower-year level. These results may be interpreted as being in line with the assumption that one's perception of phonemic contrasts in his or her native language is established very early in life, phoneme distinction in the language reaches its full attainment at least by the time of schooling and perception does not improve considerably over primary school years. In contrast, the statistically significantly poorer performance of the KHSs in Year 1 compared to those in some higher-year levels and the statistically significant better performance of KNSs in Year 6 than those in some lower-year levels were more likely to be derived from the difference in literacy skills in Korean between the paired year levels. Nevertheless, the statistically non-significant results do not necessarily imply that no performance improvement would be made between the year levels in the underlying population. Therefore, the possibility remains that one's perception of phonemic contrasts in his or her early exposed language may develop further with the continuous TL experience throughout primary school years, as indicated by some studies.

Lastly, regarding the relative difficulty in perceiving some phonemic contrasts among KHSs compared to their NS controls, the analysis of the accuracy on individual test items did not find an item for which the between-speaker-group accuracy difference was consistently large across the year levels and genders. This may have been due to the small number of test items included in the given task, as it tested various phonemic contrasts with minimal tokens and frequencies. Although the analysis identified some test items with which the participants across the speaker groups, year levels and genders were comparatively less accurate than others, this result seems to have been caused by the specific construction of each target stimulus. In cases of the test items for a distinction between similar vowels, the target vowel was placed in the second syllable immediately after the vowel of the first syllable. This may have made the items for a distinction between similar vowels more difficult to perceive accurately than the items for a distinction between similar consonants, as the vowel of the first syllable often interfered with distinguishing the target vowel from its alternatives.

Chapter 6 Development and Maintenance of Heritage Language Vocabulary*

Regarding lexical abilities in their HL, HSs are expected to diverge greatly from NSs of the language. Based on research findings on dual language vocabulary development in bilingual children, as well as on lexical abilities of adult HSs, it is assumed that, on average, HSs have a smaller vocabulary in their HL and are slower to process their HL vocabulary compared to NSs of the language. In addition, HSs' vocabulary in their HL is usually viewed as confined to the words and expressions frequently used in their homes or local ethnolinguistic community due to the limited contexts of their HL acquisition. Given a lack of research on HL vocabulary development during primary school years in KHSs growing up in Australia, those in primary school years were assessed for their receptive vocabulary in Korean with a picture selection task (i.e., Task 2) in this study. This chapter illustrates the design and administration of the task, presents its results and then discusses the findings with their implications on the KHSs' HL vocabulary development and maintenance for the primary school period in the Australian context. (This chapter addresses the research questions (1), (2), (3) and (5) presented in 4.2 regarding vocabulary.)

6.1 Task design

An average HS is generally assumed to have less-than-native lexical abilities in his or her HL based on previous research findings (as reviewed in section 3.3.2.1). The size of his or her vocabulary in the HL will be smaller than that of an average NS of the language who is functionally monolingual, and the HS will be slower to access and retrieve words in the HL than the NS. Based on such findings, it is highly likely that Australian KHSs in primary school years have a smaller vocabulary in Korean compared to their NS peers in South Korea and their vocabulary development is delayed. However, no study has directly investigated their vocabulary development in the HL to verify this.

* The results of preliminary analyses of Task 2 were presented at the Australian Symposium of Korean Communities, Bilingual Practices and Cultural Identities, Adelaide, Australia (2019, November).

To this end, this study attempted to examine KHSs receptive lexical knowledge in Korean compared to their school-year-level-matched KNSs in South Korea.

To assess the KHSs' as well as the KNSs' lexical knowledge in Korean in comprehension, a picture selection task was designed, in which they were asked to select the picture that best described the meaning of the word in question. The picture selection task in this study adapted the Receptive Vocabulary Test (REVT-R) from the Receptive and Expressive Vocabulary Test (REVT) (Kim Y-T et al., 2009b). REVT is a standardised test developed to measure a KNS's vocabulary against his or her age-appropriate norm for the ages two to 16; it is normed on the results of over 5,000 KNSs, representative of the South Korean population in terms of age and region.⁵² As its name implies, REVT is composed of two separate subtests, REVT-R, which measures one's vocabulary in comprehension with a word-picture matching task, and Expressive Vocabulary Test (REVT-E), which measures one's vocabulary in production with a picture-naming task.⁵³ This study adapted REVT-R from REVT to measure the participants' receptive lexical knowledge in Korean not only because REVT can provide reliable standards for measuring vocabulary development of a speaker of Korean but also because it is most widely used in the research related to Korean-speaking children's vocabulary development.

REVT-R has 185 items (i.e., words) in total, which include nouns (53%), verbs (37%), adjectives and adverbs (10%) (Kim Y-T et al., 2009a). Each item tests if the examinee knows the meaning of the target word. The test is administered in a face-to-face session during which the examinee is presented with four different pictures printed on the test booklet and asked to select the best-matching picture for the target word that the examiner presents orally. Different from the standard administration of REVT-R,⁵⁴ however, the picture selection task for receptive vocabulary in Korean in this study had

⁵² Approximately 6,800 participants were tested in the process of the test development, from the pilot studies to the final norm study. For more details of the development and norming process of the test, see Kim Y-T et al. (2009a).

⁵³ In REVT-R, a test taker is asked to choose the best picture for the meaning of a given word among four pictures shown to him or her. In REVT-E, a test taker is asked to name the word depicted in a picture shown to him or her.

⁵⁴ The test is normally administered one on one. The test usually starts with the test item recommended for the age of the examinee. Once the basal (i.e., the lowest item number at which the examinee correctly identifies six consecutive items) is established, the test continues until the ceiling (i.e., the highest item number that the examinee incorrectly identifies six out of eight consecutive items) is determined. The examinee's raw score is calculated by subtracting the basal and the number of items with an incorrect response from the ceiling (i.e., raw score = ceiling – basal – the number of incorrect items).

40 test items preselected for the participants so the task could be administered in their normal classroom setting.

In REVT-R, test items are arranged in order of increasing difficulty, and a KNS is expected to know a specific range of words in the test for his or her age; the test was developed and used based on this principle. Therefore, three different ranges of 40 consecutive test items in REVT-R—referred to as Set 1, Set 2 and Set 3 in the task in this study—were chosen for the participants divided into three groups by their school year level (i.e., Years 1 and 2; Years 3 and 4; and Years 5 and 6). The range of test items in REVT-R selected for each set was slightly lower than the range that KNSs at a given year level was anticipated to know. This was to avoid a possible floor effect in the KHS participants, based on delayed HL lexical development observed in bilingual children (e.g., Oller & Eilers, 2002). The range of items selected for each set was as follows (for the list of the test items in REVT-R adopted for the task, see Appendix 5):

Set 1 for Year 1 and 2: Items 41–84 (exclusion: 49, 50, 53 and 62)

Set 2 for Year 3 and 4: Items 61–102 (exclusion: 62 and 99)

Set 3 for Year 5 and 6: Items 81–121 (exclusion: 99)

With the design of the task that measures the participants' vocabulary with three different sets, the following predictions were laid out: on the assumption that the participants'—especially the KNSs'—vocabulary develops by school year level, those in a higher-year level will perform better than those in a lower-year level when tested with the same set; and those tested with a more difficult set (difficulty: Set 1 < Set 2 < Set 3) comprising a higher range of test items in REVT-R may not necessarily score higher than those tested with an easier set because of the levelling effect of more difficult items.

As indicated above, some test items in REVT-R were excluded from the task because they were considered too culture-specific for the KHS participants to know without much in-country experience in South Korea. The items were *chel.pong* 'chin-up/pull-up bar' (REVT-R item no. 49), *kwung.kwel* 'royal palace' (REVT-R item no. 50), *man.kwuk.ki* 'flags of all nations' (REVT-R item no. 62) and *ki.ma.cen* 'Korean cavalry battle' (REVT-R item no. 99). It was assumed that KNSs are familiar with these words from their formal schooling experience in South Korea: chin-up bars are commonly installed in schoolyards; schools have annual sports day on which the schoolyard is decorated with flags of all nations, and the Korean cavalry battle is one of the games that

boys in an upper-year level often play on the sports day; and some schools take their students to royal palaces for an excursion. In contrast, it was unlikely that KHSs have encountered these words in their HL input at home or in their local Korean community. In addition, the item *cip.pay.wen* ('mailperson', REVT-R item no. 53) was also excluded because it has been replaced with other words such as *wu.chey.pwu* (post man) or *thayk.pay.ki.sa* ('delivery person') and is no longer widely used in South Korea.

To administer the task in a classroom setting, the pictures as the answer options for each item were printed and included in the test booklet prepared for the entire test in this study.⁵⁵ The target words were pre-recorded and presented auditorily to the participants. (See section 4.3.2.2 for more detail on the preparation of the test booklet and the auditory stimuli.) In the task, the participants were asked to listen to the target word for each item, which was played twice with a three-second interval and choose its corresponding picture. They had 10 seconds to choose and mark their answer until they heard a ding-dong sound prompting them to move to the next item. Once all tasks for the study (i.e., Tasks 1–5) were completed, the participants' booklets were collected, and their answers were transcribed and analysed for the results.

6.2 Results

The answers of a total of 742 participants—232 KHSs (126 girls and 106 boys) and 510 KNSs (254 girls and 256 boys)—were analysed for the results of Task 2, the picture selection task for receptive vocabulary in Korean, excluding some participants' results.⁵⁶ Each participant's raw score on the task was calculated by counting the number of items with the correct answer out of the 40 test items; the raw score was converted into a percentage and denoted as his or her per cent correct score on the task. This per cent correct score was analysed for the results of the task. With the individual participants'

⁵⁵ Two test items were printed in one page in the appropriate section of the test booklet. Accordingly, each picture was resized to 6.3 cm × 4.1 cm from its original size 10.8 cm × 7.1 cm in REVT-R.

⁵⁶ The participants who did not complete the task due to their lateness or absence for the task session were excluded from the analysis. The participants who exhibited a sign of ill performance were also excluded such as not answering or selecting multiple answers for more than four test items among the first five items (over 10% of the task) were also excluded as they were regarded to have not paid enough attention to the task or not fully understood how to complete the task. Consequently, the following participants were excluded from the analysis: five female KHSs (three in Year 2, one in Year 5 and one in Year 6), six male KHSs (one in Year 1, one in Year 2, one in Year 3, two in Year 4 and one in Year 6), one female KNS (in Year 2) and four male KNSs (two in Year 1, one in Year 2 and one in Year 4).

scores, the mean score of each participant subgroup, divided by gender, school year level and speaker group, was computed. (The mean scores of participant subgroups are presented in Table 6.1.)

An overview of the mean scores by gender, year level and speaker group indicated the following trends: boys performed slightly less well than the girls of the same speaker group and year level; within a speaker group in a gender, the participants in a lower-year level tended to score lower than those in a higher-year level if tested with the same test set; and KHSs scored considerably lower than their KNS peers at all year levels in each gender.

Table 6.1 *Numbers, mean scores and standard deviations of scores of KHSs and KNSs in Years 1–6 in girls and boys*

Gender	Year level	KHS			KNS		
		<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Female	1	24	48.0	12.0	36	79.9	9.6
	2	20	63.0	18.5	49	88.7	7.3
	3	30	41.3	15.4	41	79.9	13.0
	4	20	37.0	16.8	45	87.7	8.1
	5	13	36.0	8.6	41	83.8	11.8
	6	19	53.0	18.3	42	87.3	10.7
	Total	126	46.6 ^a	17.7 ^a	254	84.8 ^a	10.7 ^a
Male	1	21	47.3	15.9	35	76.3	12.8
	2	16	53.1	14.9	38	87.6	8.5
	3	27	38.0	10.5	46	81.0	8.6
	4	15	35.0	8.0	47	85.1	7.9
	5	10	36.3	16.3	48	81.9	12.5
	6	17	44.7	16.8	42	86.8	9.0
	Total	106	42.6 ^a	14.9 ^a	256	83.2 ^a	10.6 ^a

^aTotal means and total standard deviations shown here are pooled means and pooled standard deviations.

6.2.1 Comparison between speaker groups—KHSs' differences from their KNS peers in receptive vocabulary

Comparing the mean scores between the speaker groups at each year level in each gender showed that KHSs scored far lower than their KNS counterparts on the task. On average, KHSs scored approximately half of what their same-gender KNS peers scored. In girls, the adjusted mean score of KHSs—corrected for the imbalance in the participant number between the year levels in the speaker group in the gender—was 46.4, while that of KNSs was 84.6. In boys, the adjusted mean score of KHSs was 42.4 compared to that of their KNS peers at 83.1 (cf. the pooled mean scores presented in Table 6.1).

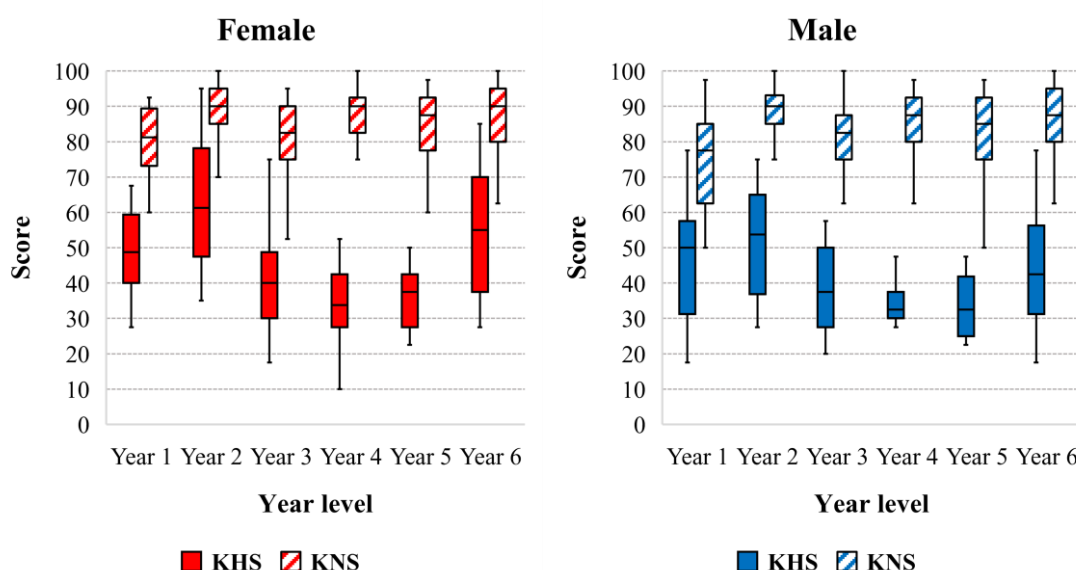
At every year level, KHSs scored markedly lower than their KNS counterparts, displaying a large mean score difference. At Years 1 and 2, where the participants were tested with Set 1, KHSs chose the correct answer for only about half of the test items, on average. In contrast, their same-gender KNS peers chose the correct answer for more than three-quarters of the items. For instance, at Year 1, the KHSs' mean score was 48.0 in girls and 47.3 in boys, compared to that of KNSs in the respective genders at 79.9 and 76.3.

At Years 3 and 4 tested with Set 2, the differences between the speaker groups in the mean score were even larger in both genders because the KHSs scored even lower than those in Years 1 and 2, whereas their KNS counterparts maintained a similar level of performance from the lower-year levels to the middle-year levels. At Year 4, for instance, the KHSs' mean score was 37.0 in girls and 35.0 in boys, while their KNS counterparts' mean score was 87.7 and 85.1 in the respective genders; the mean score differences between the KHSs and KNSs in both genders exceeded 50 at this year level.

The much lower mean scores of KHSs than their KNS counterparts observed at the middle-year levels continued to Year 5, where the participants were tested with Set 3. At this year level, KHSs scored below 40, on average, in both genders, while their KNS counterparts scored more than 80. At Year 6, where the participants were also tested with Set 3, the large between-speaker-group differences seen at Year 5 decreased modestly in both genders because the performance of Year 6 KHSs increased slightly. Although the mean score difference between the speaker groups fluctuated by year level, the analysis clearly showed that KHSs scored remarkably lower than their KNS counterparts across the year levels and genders.

The standard deviations of the participants' scores were quite large in both speaker groups, as shown in Table 6.1. This shows that the participants' performance of the task varied greatly not only among KHSs but also among KNSs, indicating a large variation in receptive vocabulary even in the NSs. Nevertheless, the standard deviations were generally larger in the KHS subgroups than the KNS subgroups, implying an even larger within-group variation in the KHSs. The ranges of the participants' scores appeared relatively comparable between the speaker groups as KNSs' scores were also dispersed quite widely, as shown by the boxplots in Figure 6.1.

Figure 6.1 *Boxplots of scores of KHSs and KNSs in Years 1–6 in girls and boys*



Independent-samples t-tests were conducted to test the statistical significance of the mean score difference between KHSs and KNSs at each year level and in each gender. Since equal variances across the speaker groups were not assumed at each year level in each gender, Welch t-tests were employed. Although the Shapiro–Wilk test of normality indicated that the assumption of normal distribution was not met in many subgroups, the Welch t-tests were run, relying on their robustness to deviations from normality. Outliers were present, but there was no extreme outlier in each subgroup. Because the 12 t-tests run simultaneously (2 genders \times 6 year levels), the alpha level was set at .004 by dividing the conventional alpha level of .05 by 12, based on the Bonferroni correction. The result of the Welch t-test for the mean score difference between the speaker groups at each year level in each gender is shown in Table 6.2.

Table 6.2 Results of Welch *t*-tests for between-speaker-group differences at Years 1–6 in girls and boys

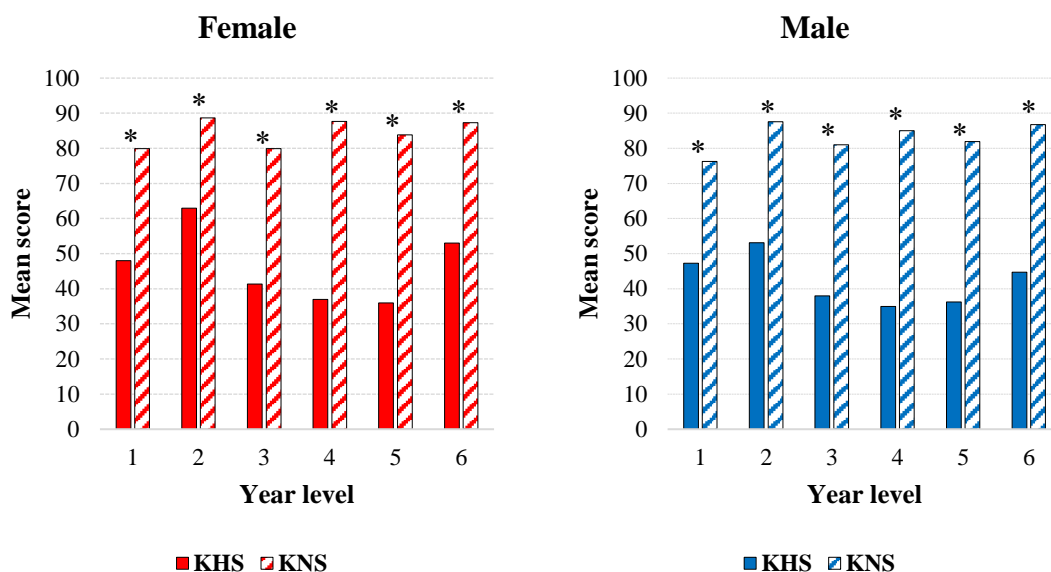
Gender	Year level	Mean difference	<i>t</i>	<i>df</i>	<i>p</i>	99.6% CI	
						Lower	Upper
Female	1	–31.9	–10.912	41.961	0.000*	–40.8	–23.0
	2	–25.7	–6.022	21.454	0.000*	–39.4	–11.9
	3	–38.6	–11.149	56.263	0.000*	–49.0	–28.2
	4	–50.7	–12.823	22.980	0.000*	–63.3	–38.0
	5	–47.9	–15.900	27.835	0.000*	–57.3	–38.4
	6	–34.2	–7.581	23.721	0.000*	–48.6	–19.8
Male	1	–29.0	–7.077	35.429	0.000*	–41.7	–16.4
	2	–34.4	–8.651	19.261	0.000*	–47.4	–21.4
	3	–43.1	–17.984	46.376	0.000*	–50.3	–35.8
	4	–50.1	–21.117	23.372	0.000*	–57.6	–42.5
	5	–45.7	–8.349	11.279	0.000*	–65.4	–26.0
	6	–42.1	–9.787	19.882	0.000*	–56.1	–28.1

Note. A statistically significant *p*-value is marked with an asterisk (*).

The results of the Welch *t*-tests showed that the difference in the mean score between KHSs and KNSs was statistically significant at every year level in each gender. The mean score difference between the speaker groups (difference = mean score of KHSs – mean score of KNSs) ranged from –50.7 (at Year 4) to –25.7 (at Year 2) in girls and from –50.1 (at Year 4) to –29.2 (at Year 1) in boys. Such large differences were all found statistically significant with the probability value of .000. The statistically significantly lower mean score of KHSs than their KNS counterparts across the year levels and genders clearly indicate that they have a smaller receptive vocabulary in Korean than the NS controls. The bar charts in

Figure 6.2 show the mean score of KHSs and KNSs at each year level in each gender, highlighting the large mean score difference between the speaker groups.

Figure 6.2 *Comparison of mean scores between KHSs and KNSs at Years 1–6 in girls and boys*



Note. A statistically significant difference between the speaker groups at a year level in a gender is marked with an asterisk (*).

6.2.2 *Comparison between school year levels—KHSs’ change in receptive vocabulary*

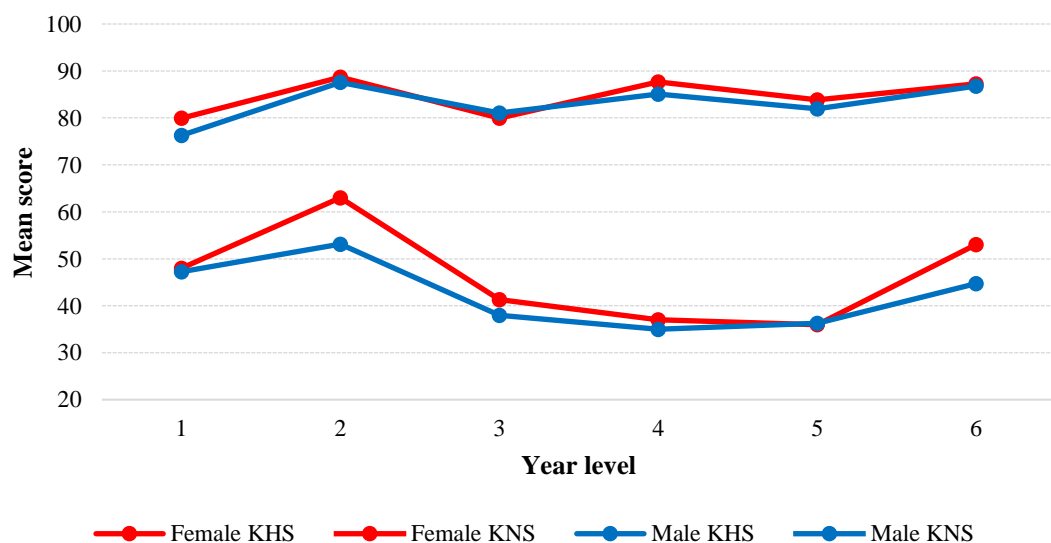
The mean score change by school year level was examined in each speaker group in each gender to investigate KHSs’ lexical development by year level compared to the NS controls. At the outset of the task design, it was not expected that the participants’ mean score would increase linearly by year level because they were tested with three different sets. Where tested with the same set (e.g., Years 1 and 2 tested with Set 1), the participants in the higher-year level were expected to score higher than those in the lower-year level. Where tested with different sets (e.g., Year 2 with Set 1 and Year 3 with Set 2), it was predicted that those in the higher-year level may not necessarily score higher than those in the lower-year level because the set for the higher-year-level participants included more difficult items. Overall, these predictions were met in both speaker groups.

In KNS subgroups, in each gender, the mean score oscillated as the year level went up, as Figure 6.3 shows. This was because the expected increases of the mean score between the year levels, based on the assumption of vocabulary development by year level, were interpolated by a mean score fall, which resulted from the levelling effect of

more difficult test items included in a higher test set. Where tested with the same set, the participants in the higher-year level performed better than those in the lower-year level. The mean score thus appeared to increase between Years 1 and 2, between Years 3 and 4 and between Years 5 and 6, respectively. However, between the year levels tested with different sets, such as between Years 2 and 3 or between Years 4 and 5, the mean score fell. This mean score fall was a consequence of the task design that the participants in the higher-year level were tested with a more difficult set. In other words, the observed decrease between Years 2 and 3 and between Years 4 and 5 was not a reflection of a decline in the participants' receptive vocabulary in Korean but simply of the task design.

Compared to the oscillating pattern of the mean score change by year level in the KNSs, the KHSs exhibited a slightly different pattern. Their mean score increased between Year 1 and 2 and between Year 5 and 6 in both genders, as in their KNS counterparts. Between Years 3 and 4, however, the mean score fell slightly, showing the opposite trend of an expected rise. In addition, the increases observed between Years 1 and 2 and Years 5 and 6 were much larger in girls than in boys, contrary to little gender difference observed among KNSs in that regard. Moreover, the anticipated fall between Years 2 and 3 based on the task design occurred in a somewhat greater degree, exhibiting a steeper slope between the year levels in each gender, as shown in Figure 6.3. Between Years 4 and 5, the mean score fell slightly among the girls as expected, but a minimal rise was observed among the boys.

Figure 6.3 *Change of mean scores by year level in KHSs and KNSs in girls and boys*



A developmental change in the participants' receptive vocabulary in Korean could not be examined linearly by year level because the task design with three different sets precluded such analysis. Only the mean scores of the paired year levels—tested with the same set—could be compared directly. In each speaker group in each gender, the mean score differences between the paired year levels were tested for statistical significance with Welch t-tests. As multiple t-tests were run, the alpha level was adjusted to .004 by dividing the conventional alpha level of .05 by the number of the tests, 12 (2 genders \times 2 speaker groups \times 3 pairs of year levels), following the Bonferroni correction. (The results of the Welch t-tests are presented in Table 6.3.)

Table 6.3 *Results of Welch t-tests for mean score differences between the paired year levels in KHSs and KNSs in girls and boys*

Gender	Speaker group	Paired year levels	Mean difference	<i>t</i>	<i>df</i>	<i>p</i>	99.6% CI	
							Lower	Upper
Female	KHS	1 & 2	−15.0	−3.119	31.438	0.004*	−29.9	−0.1
		3 & 4	4.3	0.923	38.217	0.362	−10.0	18.7
		5 & 6	−17.1	−3.533	27.183	0.001*	−32.3	−1.9
	KNS	1 & 2	−8.7	−4.571	62.605	0.000*	−14.5	−3.0
		3 & 4	−7.7	−3.270	65.610	0.002*	−14.8	−0.7
		5 & 6	−3.4	−1.381	79.743	0.171	−10.8	3.9
Male	KHS	1 & 2	−5.9	−1.149	33.453	0.259	−21.6	9.9
		3 & 4	3.0	1.022	35.944	0.313	−6.0	11.9
		5 & 6	−8.5	−1.286	19.413	0.214	−29.9	13.0
	KNS	1 & 2	−11.3	−4.382	58.406	0.000*	−19.0	−3.6
		3 & 4	−4.0	−2.339	89.934	0.022	−9.1	1.1
		5 & 6	−4.9	−2.135	85.233	0.036	−11.6	1.9

Note. A statistically significant p-value is marked with an asterisk (*).

The statistical tests presented slightly different results for each speaker group in each gender. In girls, in KHSs, the mean score difference between Years 1 and 2, $M = -15.0$, $t(31.438) = -3.119$, $p = .004$ and that between Years 5 and 6, $M = -17.1$, $t(27.183) = -3.533$, $p = .001$, were statistically significant. In female KNSs, the difference between Years 1 and 2, $M = -8.7$, $t(62.605) = -4.571$, $p = .000$, and that

between Year 3 and 4, $M = -7.7$, $t(65.610) = -3.270$, $p = .002$, were statistically significant. Conversely, in boys, no mean score difference was found statistically significant in KHSs; in KNSs, only the difference between Years 1 and 2, $M = -11.3$, $t(58.406) = -4.382$, $p = .000$, was found statistically significant with the set alpha level.

The mean score differences between the speaker groups were inspected by year level to complement the limited comparisons allowed only between the paired year levels within a speaker group in a gender. In girls, the between-speaker-group difference of -31.9 at Year 1 decreased slightly to -25.7 at Year 2; it verged to -38.6 at Year 3 and widened further to -50.7 at Year 4; to Year 5, it maintained a similar level of difference (-47.9), but the difference decreased considerably to -34.2 at Year 6. In boys, the between-speaker-group difference of -29.0 at Year 1 increased continuously through to Year 4 (-50.1), but the difference shrank by a small degree at Year 5 (-45.7) and decreased further to -42.1 at Year 6.

6.2.2.1 Comparison between test items—KHSs' difficulty with particular vocabulary

6.2.2.1.1 Analysis of accuracy by test item

To examine if KHSs compared to their KNS counterparts show a particularly low acquisition level for some Korean words tested in the task, their accuracy on the test items was analysed. In each subgroup, the participants' accuracy rate on individual test items—that is, the percentage of the participants who chose the correct answer for the item in question in the subgroup—was calculated, and the subgroups' accuracy rates were compared between the speaker groups at each year level in each gender. (Each subgroup's accuracy rates and the accuracy differences between the speaker groups at each year level in each gender were plotted in the bar charts presented in Appendix 6.) The results of the comparison confirmed that KHSs were considerably less accurate than their KNS counterparts on most items. This was an expected result based on the KHSs' much lower mean score on the task than that of their KNS counterparts across the year levels and genders, as described in section 6.2.1.

The accuracy difference between the speaker groups at a year level in a gender differed significantly between the test items. For instance, at Year 4 in boys, the difference in the accuracy rate between the speaker groups (difference = accuracy rate of KHSs – accuracy rate of KNSs) for *ey.we.ssa.ta* 'surround/encircle' was -94 ; none of the KHSs knew the meaning of the word, whereas most of the KNSs knew it. On the contrary, the

difference for *chayk.sang* ‘desk’ was six because the KHSs’ accuracy rate was slightly higher than that of the KNSs. However, it was clear that the KHSs’ accuracy on most test items was markedly lower than that of their KNS counterparts at a year level in a gender.

More importantly, at a given year level in a gender, the difference in the accuracy rate between the speaker groups appeared relatively large on some items. The test items that showed a relatively large between-speaker-group difference at Years 1 to 6 in each gender are listed in Table 6.4. A relatively large difference was defined as a difference that was equal to or below the first quartile when rank-ordered from smallest to largest.

Table 6.4 Test items with a ‘relatively’ large between-speaker-group difference in the accuracy rate at Years 1–6 in girls and boys (with the accuracy rate difference shown in parentheses)

Test Set	Year level	Gender	
		Female	Male
1	1	<i>sey.myen.tay</i> ‘wash basin’ (–81)	<i>el.lwuk</i> ‘stain’ (–62)
		<i>hyep.tong.ha.ta</i> ‘cooperate’ (–80)	<i>oy.thwu</i> ‘overcoat’ (–58)
		<i>han.kwen</i> ‘one volume’ (–60)	<i>hyep.tong.ha.ta</i> ‘cooperate’ (–58)
		<i>pe.tu.na.mwu</i> ‘willow tree’ (–56)	<i>hay.an</i> ‘seashore’ (–56)
		<i>oy.thwu</i> ‘overcoat’ (–51)	<i>ssu.ta.tum.ta</i> ‘stroke/pet’ (–54)
		<i>hay.an</i> ‘seashore’ (–51)	<i>chey.on.kyey</i> ‘clinical thermometer’ (–45)
		<i>twung.ci</i> ‘nest’ (–50)	<i>yes.po.ta</i> ‘peep into’ (–44)
		<i>el.lwuk</i> ‘stain’ (–50)	<i>sey.myen.tay</i> ‘wash basin’ (–42)
		<i>ssu.ta.tum.ta</i> ‘stroke/pet’ (–46)	<i>pe.tu.na.mwu</i> ‘willow tree’ (–42)
		<i>ceng.yuk.cem</i> ‘butcher’s shop’ (–46)	<i>tho.lon.ha.ta</i> ‘discuss’ (–40)
	2	<i>hyep.tong.ha.ta</i> ‘cooperate’ (–65)	<i>hay.an</i> ‘seashore’ (–78)
		<i>twung.ci</i> ‘nest’ (–53)	<i>ssu.ta.tum.ta</i> ‘stroke/pet’ (–64)
		<i>hay.an</i> ‘seashore’ (–50)	<i>kye.lwu.ta</i> ‘compete’ (–64)
		<i>pwu.chwuk.ha.ta</i> ‘help somebody by holding his or her arms’ (–46)	<i>yes.po.ta</i> ‘peep into’ (–64)
		<i>yes.po.ta</i> ‘peep into’ (–45)	<i>sik.lyo.phwum</i> ‘groceries’ (–61)
		<i>ceng.yuk.cem</i> ‘butcher’s shop’ (–44)	<i>hyep.tong.ha.ta</i> ‘cooperate’ (–60)
		<i>el.lwuk</i> ‘stain’ (–44)	<i>hwak.tay.ha.ta</i> ‘enlarge’ (–57)
		<i>hwak.tay.ha.ta</i> ‘enlarge’ (–43)	<i>chey.on.kyey</i> ‘clinical thermometer’ (–56)
			<i>sey.myen.tay</i> ‘wash basin’ (–56)

2	3	<p><u>ssu.ta.tum.ta</u> ‘stroke/pet’ (–40)</p> <p><u>oy.thwu</u> ‘overcoat’ (–40)</p> <p><u>tho.lon.ha.ta</u> ‘discuss’ (–40)</p>	<p><u>ceng.yuk.cem</u> ‘butcher’s shop’ (–54)</p>
		<p><u>pwu.chwuk.ha.ta</u> ‘help somebody by holding his or her arms’ (–78)</p> <p><u>hay.an</u> ‘seashore’ (–72)</p> <p><u>sik.lyo.phwum</u> ‘groceries’ (–70)</p> <p><u>pi.sek</u> ‘stone monument’ (–68)</p> <p><u>ceng.yuk.cem</u> ‘butcher’s shop’ (–65)</p> <p><u>chwu.swu.ha.ta</u> ‘harvest’ (–63)</p> <p><u>co.myeng</u> ‘lighting’ (–60)</p> <p><u>chel.ke.ha.ta</u> ‘demolish’ (–57)</p> <p><u>hwak.tay.ha.ta</u> ‘enlarge’ (–56)</p> <p><u>sey.myen.tay</u> ‘wash basin’ (–52)</p>	<p><u>ceng.yuk.cem</u> ‘butcher’s shop’ (–81)</p> <p><u>hay.an</u> ‘seashore’ (–81)</p> <p><u>chwu.swu.ha.ta</u> ‘harvest’ (–73)</p> <p><u>chim.mol.ha.ta</u> ‘sink’ (–66)</p> <p><u>san.man.ha.ta</u> ‘be messy’ (–60)</p> <p><u>el.lwuk</u> ‘stain’ (–59)</p> <p><u>sik.lyo.phwum</u> ‘groceries’ (–59)</p> <p><u>pwu.chwuk.ha.ta</u> ‘help somebody by holding his or her arms’ (–58)</p> <p><u>pi.sek</u> ‘stone monument’ (–57)</p> <p><u>ka.chwuk</u> ‘livestock’ (–57)</p>
		<p><u>pi.sek</u> ‘stone monument’ (–88)</p> <p><u>ca.may</u> ‘sisters’ (–83)</p> <p><u>chel.ke.ha.ta</u> ‘demolish’ (–83)</p> <p><u>hyep.tong.ha.ta</u> ‘cooperate’ (–80)</p> <p><u>sel.kyey.sa</u> ‘designer/architect’ (–75)</p> <p><u>sey.myen.tay</u> ‘wash basin’ (–74)</p> <p><u>sik.lyo.phwum</u> ‘groceries’ (–74)</p> <p><u>kak.to.ki</u> ‘protractor’ (–71)</p> <p><u>hay.an</u> ‘seashore’ (–68)</p> <p><u>tho.lon.ha.ta</u> ‘discuss’ (–68)</p>	<p><u>ey.we.ssa.ta</u> ‘surround’ (–94)</p> <p><u>pi.sek</u> ‘stone monument’ (–91)</p> <p><u>sik.lyo.phwum</u> ‘groceries’ (–89)</p> <p><u>chwu.swu.ha.ta</u> ‘harvest’ (–87)</p> <p><u>ka.chwuk</u> ‘livestock’ (–84)</p> <p><u>kak.to.ki</u> ‘protractor’ (–81)</p> <p><u>hyep.tong.ha.ta</u> ‘cooperate’ (–78)</p> <p><u>sel.kyey.sa</u> ‘designer/architect’ (–76)</p> <p><u>chim.mol.ha.ta</u> ‘sink’ (–76)</p> <p><u>pwu.chwuk.ha.ta</u> ‘help somebody by holding his or her arms’ (–74)</p>
3	5	<p><u>pi.sek</u> ‘stone monument’ (–83)</p> <p><u>chim.mol.ha.ta</u> ‘sink’ (–78)</p> <p><u>si.wi.ha.ta</u> ‘protest’ (–78)</p> <p><u>so.um</u> ‘noise’ (–78)</p> <p><u>si.si.tek.ke.li.ta</u> ‘chat and giggle’ (–75)</p> <p><u>san.man.ha.ta</u> ‘be messy’ (–72)</p> <p><u>pwu.hwa.ha.ta</u> ‘hatch’ (–70)</p>	<p><u>pi.sek</u> ‘stone monument’ (–88)</p> <p><u>sa.yuk.ha.ta</u> ‘breed/keep’ (–77)</p> <p><u>san.ho</u> ‘coral’ (–70)</p> <p><u>co.myeng</u> ‘lighting’ (–69)</p> <p><u>sel.kyey.sa</u> ‘designer/architect’ (–66)</p> <p><u>pang.chwung.mang</u> ‘flyscreen’ (–66)</p> <p><u>yuk.kwun</u> ‘the army’ (–66)</p> <p><u>kak.to.ki</u> ‘protractor’ (–64)</p>

	<i>tay.ye.ses</i> ‘five or six’ (–70) <i>sa.yuk.ha.ta</i> ‘breed/keep’ (–70) <u><i>cep.cong.ha.ta</i></u> ‘inoculate’ (–67)	<u><i>so.um</i></u> ‘noise’ (–61) <i>ttam.saym</i> ‘sweat gland’ (–59)
6	<i>ka.chwuk</i> ‘livestock’ (–82) <i>mo.pal</i> ‘hair’ (–75) <i>chwu.swu.ha.ta</i> ‘harvest’ (–74) <u><i>pi.sek</i></u> ‘stone monument’ (–61) <u><i>si.wi.ha.ta</i></u> ‘protest’ (–58) <i>cang.chak.ha.ta</i> ‘mount/install’ (–56) <i>co.myeng</i> ‘lighting’ (–51) <i>chim.wul.ha.ta</i> ‘be depressed’ (–51) <u><i>chim.mol.ha.ta</i></u> ‘sink’ (–46) <u><i>cep.cong.ha.ta</i></u> ‘inoculate’ (–46) <i>hwu.kak</i> ‘olfactory sense’ (–46) <i>san.ho</i> ‘coral’ (–46)	<u><i>co.myeng</i></u> ‘lighting’ (–84) <u><i>so.um</i></u> ‘noise’ (–77) <i>chwu.swu.ha.ta</i> ‘harvest’ (–69) <i>kye.nwu.ta</i> ‘target/aim’ (–69) <u><i>sa.yuk.ha.ta</i></u> ‘breed/keep’ (–66) <u><i>yuk.kwun</i></u> ‘the army’ (–65) <i>ka.chwuk</i> ‘livestock’ (–60) <u><i>pi.sek</i></u> ‘stone monument’ (–59) <i>ey.we.ssa.ta</i> ‘surround’ (–58) <i>hay.pwu.ha.ta</i> ‘anatomise’ (–53) <i>phok.wu</i> ‘torrential rain’ (–53)

As Table 6.4 shows, the items that showed a relatively large between-speaker-group difference at a year level in a gender were similar between the adjacent year levels and between the genders. First, at each year level, many of the listed items overlapped between the genders. (The items found in both genders at a given year level are presented in bold in Table 6.4.) For instance, at Year 1, *sey.myen.tay* ‘washstand’, *hyep.tong.ha.ta* ‘cooperate’, *pe.tu.na.mwu* ‘willow tree’, *oy.thwu* ‘overcoat’, *hay.an* ‘seashore’, *el.lwuk* ‘stain’ and *ssu.ta.tum.ta* ‘pet/stroke’ were listed in both genders. This shows that the Year 1 KHSs were less accurate than their KNS counterparts on these items, and across the genders, their degree of being less accurate was relatively great on those items compared to the others.

Where tested with the same set, some items showed a large between-speaker-group difference across the paired year levels. (These items are underlined in Table 6.4.) For instance, among the items that showed a relatively large difference at Year 1 in girls, *hyep.tong.ha.ta* ‘cooperate’, *oy.thwu* ‘overcoat’, *hay.an* ‘seashore’, *twung.ci* ‘nest’, *el.lwuk* ‘stain’, *ssu.ta.tum.ta* ‘pet/stroke’ and *ceng.yuk.cem* ‘butcher’s shop’ continued to show a relatively large difference at Year 2. This shows that the KHSs across the paired

year levels were less accurate than their KNS counterparts on these items by a relatively great degree.

In comparison, some items appeared at the higher-year level, as the item's between-speaker-group difference at the lower-year level was not relatively large. Such an addition often resulted from an accuracy rate increase made between the year levels in the KNSs. For instance, in girls, both KHSs and KNSs had a low accuracy on *hwak.tay.ha.ta* 'enlarge' and *pwu.chwuk.ha.ta* 'help someone by holding his or her arms' at Year 1. Hence, the between-speaker-group differences for these items were not very large. At Year 2, however, the accuracy rate increased greatly in the KNSs, whereas it stayed at a similar level in the KHSs. This resulted in the items' between-speaker-group differences emerging at Year 2 as being relatively large.

Where tested with different sets, some of the test items that overlapped between the compared sets continued to show a relatively large between-speaker-group difference. For instance, in girls, *hay.an* 'seashore', *pwu.chwuk.ha.ta* 'help someone by holding his or her arms', *ceng.yuk.cem* 'butcher's shop' and *hwak.tay.ha.ta* 'enlarge' continuously showed a relatively large difference at Years 2 and 3. These items are those on which the KHSs across the compared year levels were less accurate than their KNS counterparts by a relatively great degree. Conversely, among the items that were only included in the higher set, some items also displayed a relatively large difference. Thus, they appeared as if they were added at the higher-year level in the list. These items simply reflect those that imply a relatively low level of acquisition in KHSs compared to KNSs at the year level in the gender.

6.2.2.2 Further analysis of accuracy by lexical property

The participants' accuracy on individual test items was further analysed by the item number in REVT-R, word frequency, word formation/origin and word class. This was to examine if the KHSs' level of acquisition of the words tested in the task was related to such properties of the Korean lexis.

6.2.2.2.1 Accuracy by REVT-R item number

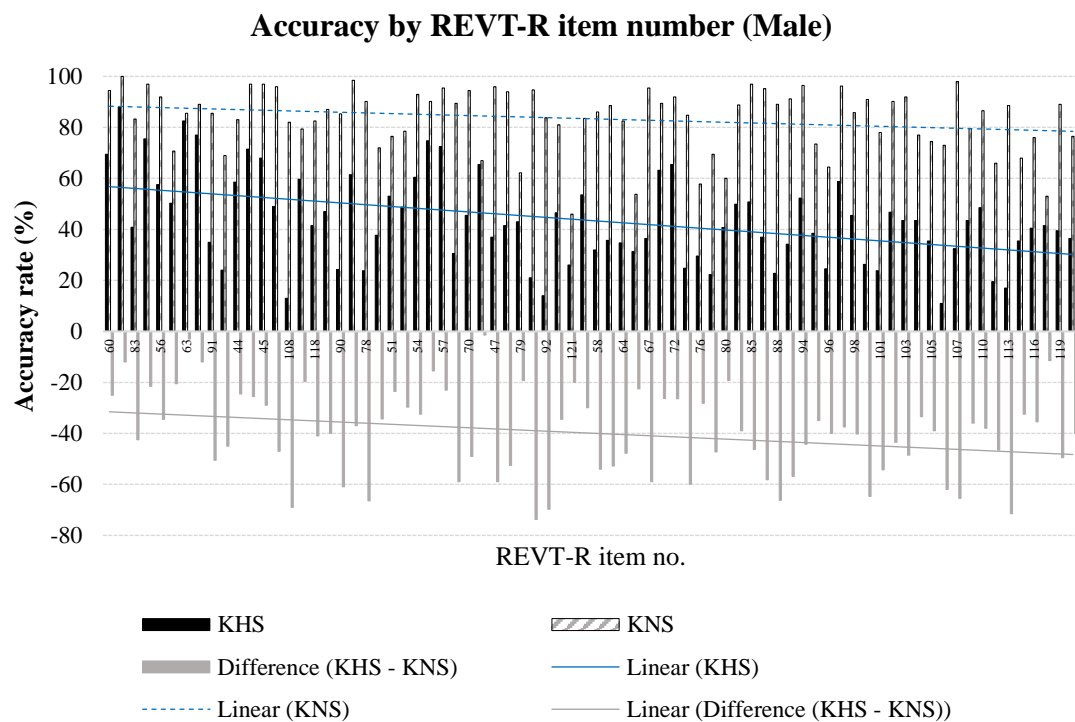
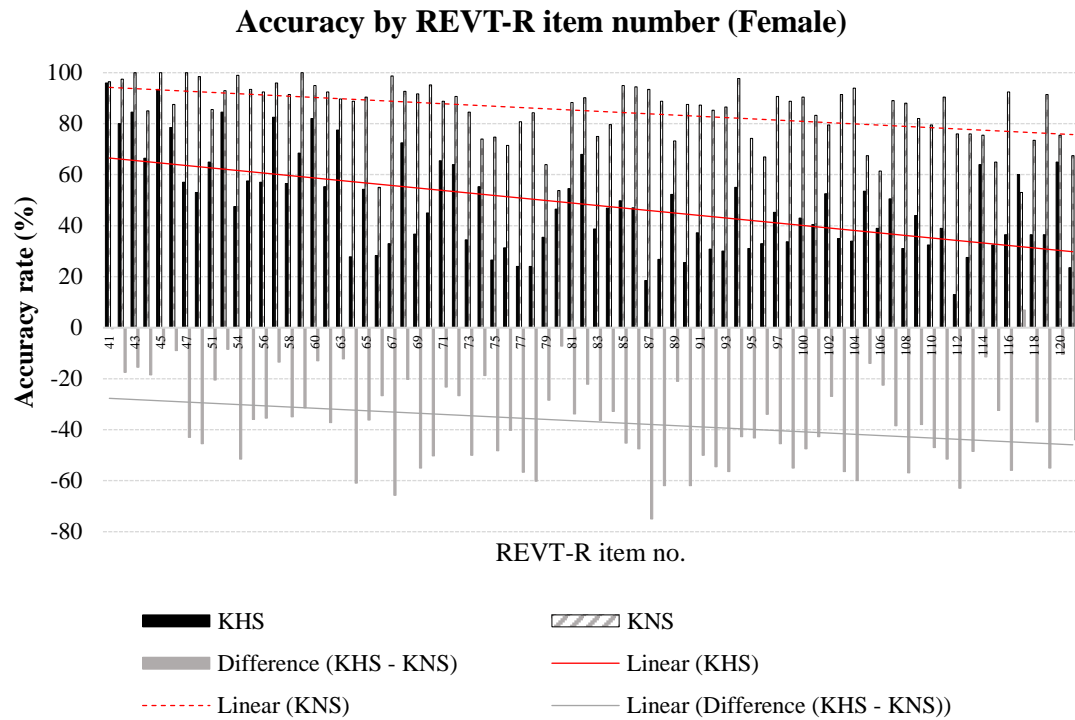
First, the participants' accuracy on test items was analysed by REVT-R item number. In REVT-R, the difficulty of test items increases as the test proceeds; in other words, more challenging words are tested later than easier words and thus assigned a higher item number. The analysis of the participants' accuracy on the test items by REVT-R item number showed that the test items with a higher REVT-R item number tended to

have lower accuracy than those with a lower number. This result can be interpreted as that the participants' accuracy decreased as the item difficulty increased.

The adjusted mean accuracy rate of KHSs and KNSs in each gender was calculated for each test item.⁵⁷ The calculated accuracy rates were plotted in bar charts as presented in Figure 6.4, in which the test items are ordered by their REVT-R item number (from lowest to highest). In both KHSs and KNSs in both genders, the items with a low REVT-R item number, especially on the far left in the charts, tended to have a higher accuracy rate than those with a high item number placed on the right side of the charts. This indicates that the participants in both speaker groups were generally more accurate with easier items than more difficult ones in the given task.

⁵⁷ The adjusted mean accuracy rate of KHSs and KNSs in each gender on a test item is the average of the accuracy rates of all participant subgroups within a speaker group in a gender, who were tested for that item. For instance, the test items from 41 to 60 in REVT-R were only included in Set 1 and thus tested only among the participants in Year 1 and 2. Thus, the adjusted mean accuracy rate of KHSs and KNSs in each gender for an item between 41 and 60 in REVT-R was calculated by computing the average of the accuracy rates of Years 1 and 2 participants in a given speaker group in a gender.

Figure 6.4 *Adjusted mean accuracy rates of KHSs and KNSs in girls and boys on individual test items ordered by REVT-R item number*

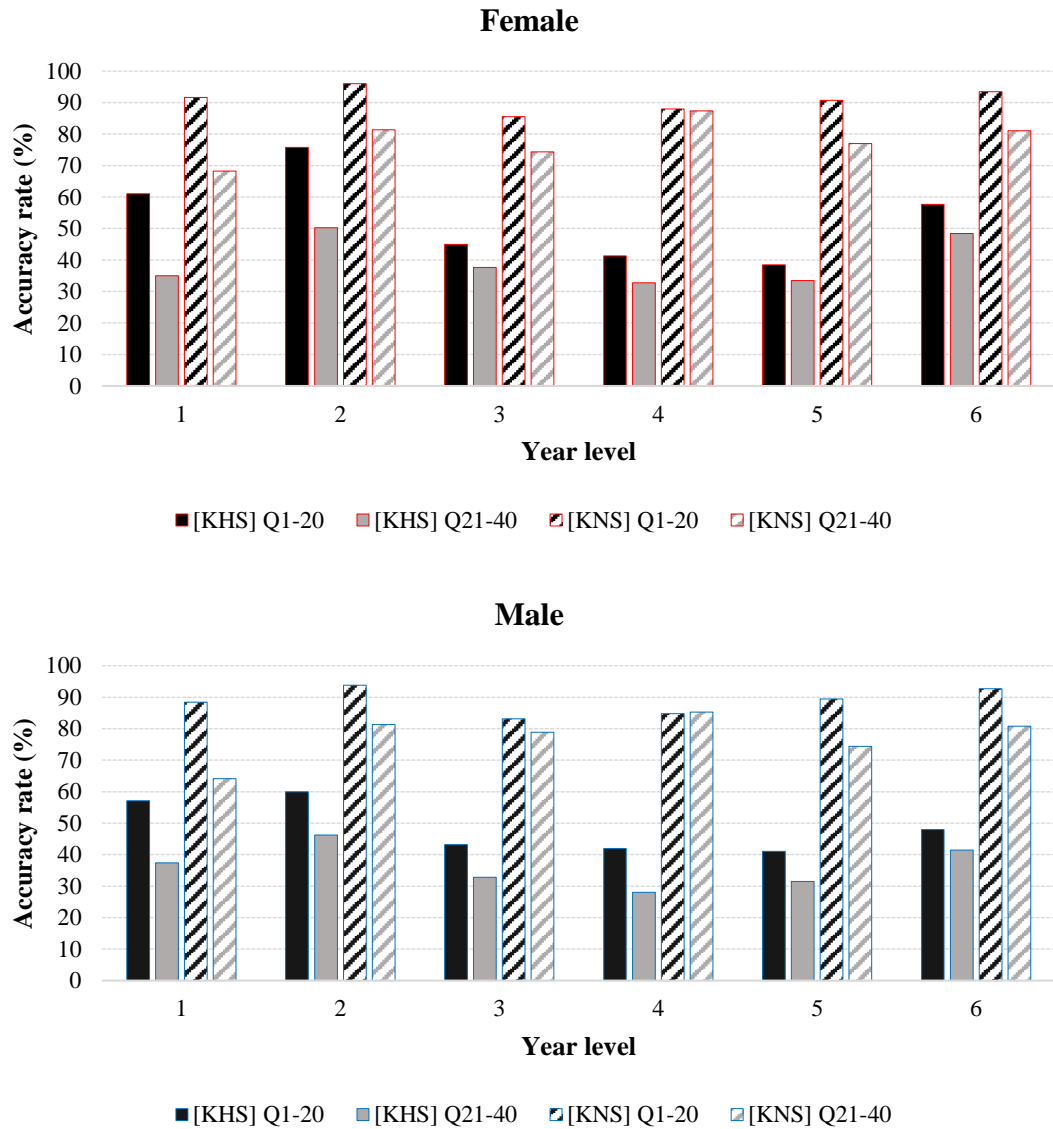


However, the decrease in the accuracy rate by the ascending REVT-R item number did not appear linear; instead, it appeared to fluctuate wildly as the REVT-R item number goes up. This can also be observed in each subgroup's accuracy rates on the test items presented in Appendix 6. In some subgroups, the decrease was not very pronounced. Nevertheless, an overall trend of accuracy decrease by REVT-R item number was discernible in both speaker groups in both genders, as the fitted lines (i.e., the line of best fit) in Figure 6.4 showed such a trend. This result was essentially in line with the principle of the development and application of REVT-R that the test items are ordered by difficulty.

Further, the between-speaker-group differences in the accuracy rate tended to be smaller for the items with a low REVT-R item number than those with a high number. In Figure 6.4, the grey bars (in negative numbers) that represent the between-speaker-group differences for the test items are generally shorter on the left than on the right. This indicates that KHS tended to have a greater difference from their NS controls on more challenging items than easier ones. This trend was also supported by the fitted lines for the between-speaker-group differences and the steeper slope of the fitted lines for the accuracy rates of the KHSs than KNSs.

The overall tendency of a higher accuracy on more straightforward items than on more complicated ones became more apparent when the mean accuracy of the first half of the items (Question 1 to 20) in each set was compared with that of the second half (Question 21 to 40) in each participant subgroup. This is because the first half of the items must be easier than the second half, on average, according to the principle of REVT-R. The mean accuracy rate of the first half and that of the second half calculated in each participant subgroup were plotted in bar charts shown in Figure 6.5. A higher mean accuracy for the first half than the second half was evident in almost all subgroups. However, it was noted that the mean accuracy difference between the first and second half of the items was not very prominent at the middle-year levels in KNSs, especially at Year 4.

Figure 6.5 Comparison of mean accuracy rates between the first and second half of the test items in KHSs and KNSs in Years 1–6 in girls and boys



6.2.2.2.2 Accuracy by word frequency

The participants' accuracy on the test items was analysed by the target word's frequency in the semantically tagged corpus (9,071,036 *ecels* \approx words⁵⁸) of the modern written Korean corpus of the Korean national corpus.⁵⁹ Although the spoken corpus of

⁵⁸ *ecel* is a word-counting unit based on spacing that Korean linguists use most often when counting words in a Korean corpus.

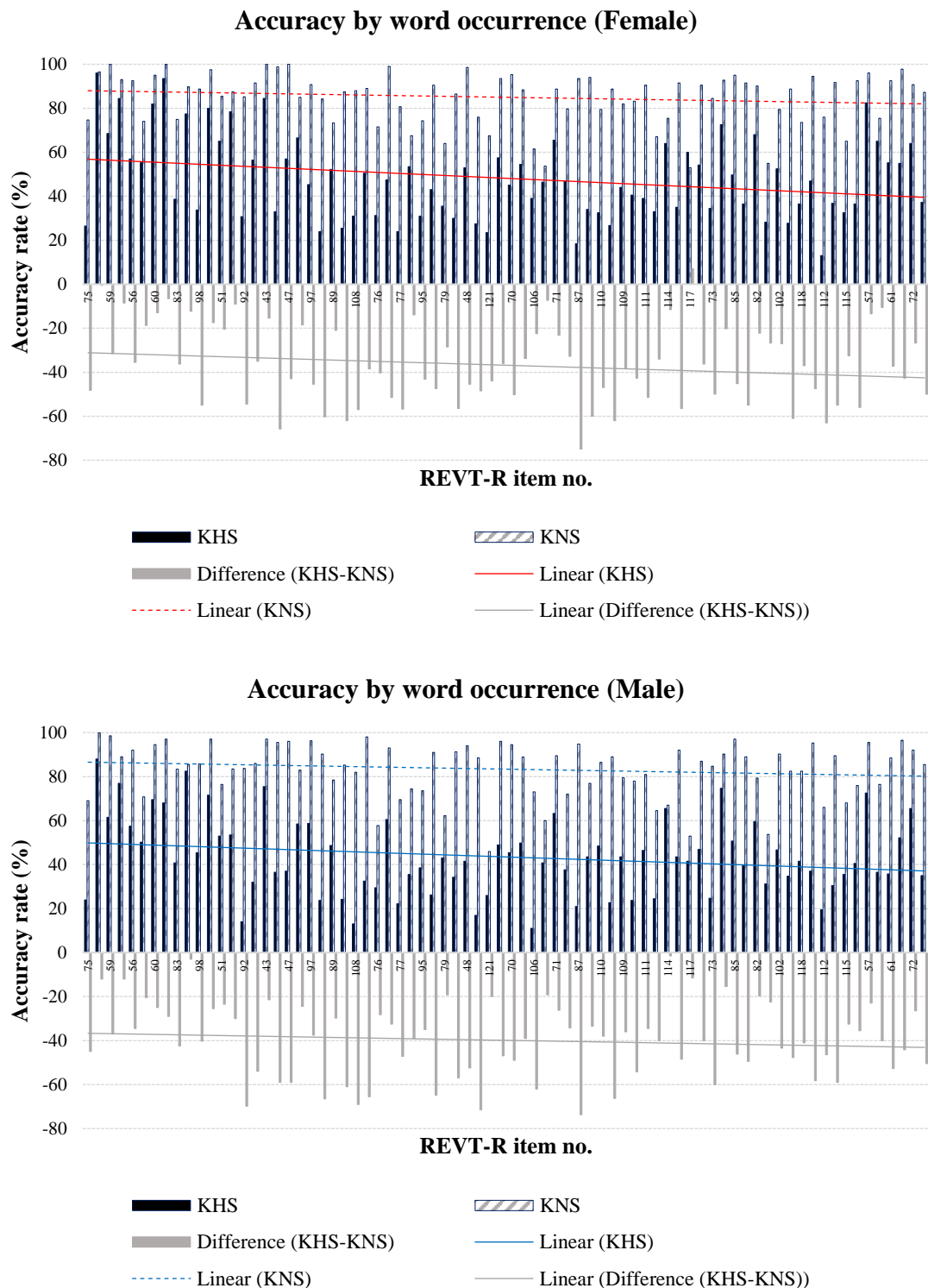
⁵⁹ The Korean national corpus is the largest Korean corpus open to the public at present. It is more often referred to as Sejong corpus because it was developed under the 21st Century Sejong Project (1998–2007) by the National Institute of Korean Language funded by the Korean government. The corpus consists of over 200 million *ecels* of a collection of corpora of modern Korean as well as special corpora including

the Korean national corpus may better represent the Korean language input that the KHS participants receive based on the nature of their HL acquisition, that corpus was not readily available for a word-frequency analysis because it was not semantically tagged. The occurrences of the target words in the primary school textbooks within the grammatically tagged corpus was also analysed (see Appendix 7). Still, many of the words tested in the task showed no occurrence in the textbooks. Therefore, their frequency in the textbooks was considered unsuitable for the analysis of the word-frequency effect on the participants' performance of the task. Each test item's occurrence in the semantically tagged corpus was counted using the analysis software, Hanmaru (version 2.0). Their occurrences ranged from 0 for *kak.to.ki* 'protractor' to 2,187 for *hwak.tay.ha.ta* 'enlarge'. (See Appendix 7 for each test item's occurrence in the semantically tagged corpus).

The adjusted mean accuracy rates of KHSs and KNSs in each gender on the test items, shown previously in Figure 6.4, were re-ordered by the item's occurrence in the corpus (from highest to lowest) and presented in Figure 6.6. In KHSs, many of the test items that frequently occur in the corpus—thus placed on the far left on the bar chart—appear to have comparatively high accuracy. However, apart from the KHSs' generally high accuracy on the test items with a comparatively high frequency in the corpus, it was somewhat difficult to claim a decreasing trend regarding the relationship between the participants' accuracy on the test items in the task and the items' occurrences in the corpus. Especially in KNSs, the fitted lines representing the overall trend of the mean accuracy change were quite flat in both genders. In KHSs, the fitted lines showed a downwards slope in both genders, but this was more likely to stem from the high accuracy rates on the items with a comparatively high occurrence in the corpus placed on the far left in the bar charts.

corpus of transcribed colloquial discourse, historical corpus, corpus of international Korean (written in North Korea or overseas) as well as parallel corpus.

Figure 6.6 *Adjusted mean accuracy rates of KHSs and KNSs in girls and boys on individual test items ordered by their occurrence in the Korean national corpus*

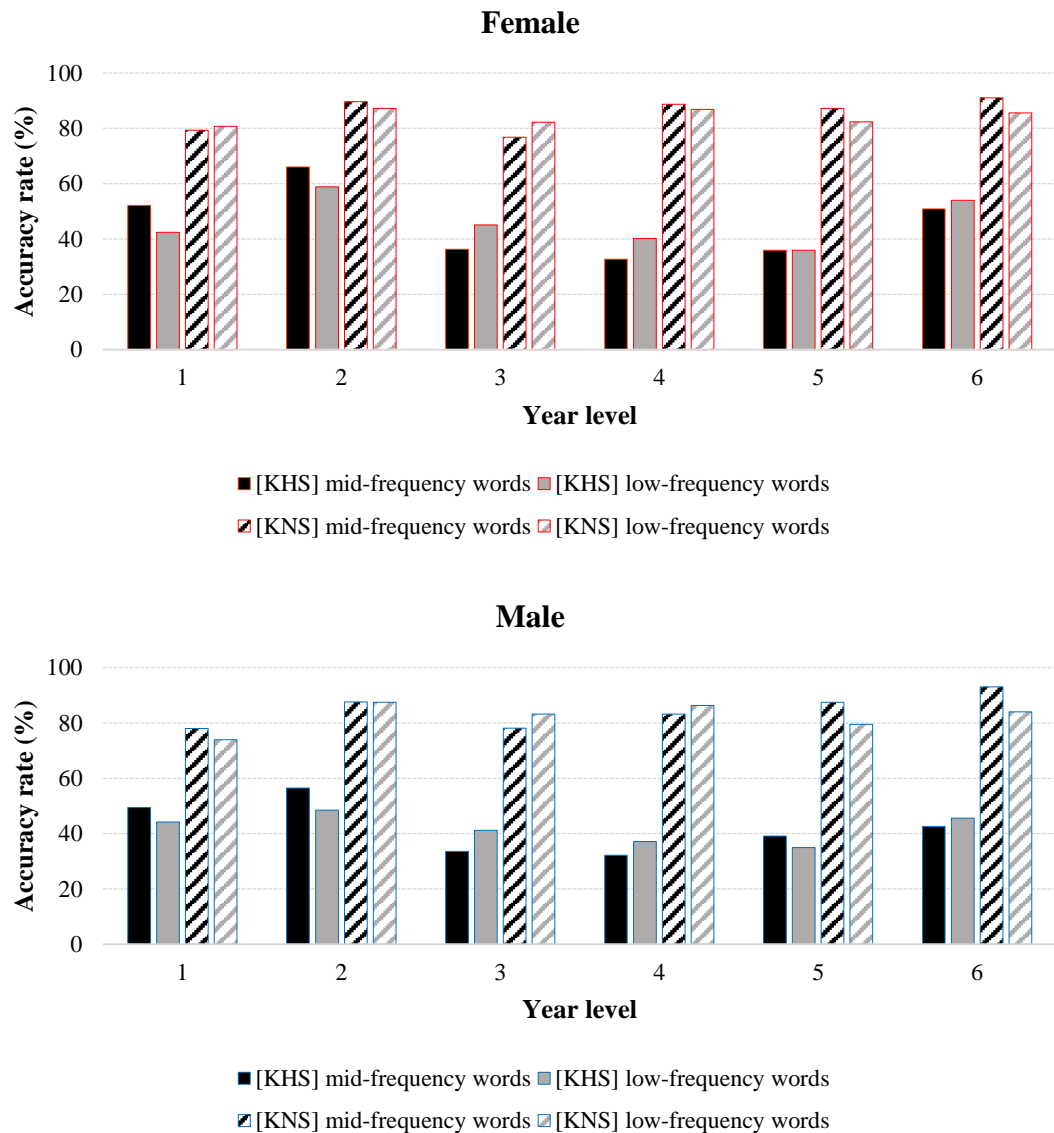


To scrutinise the results of the visual inspection that indicated a very weak relationship between the test items' word frequency in the corpus and the participants'

accuracy the target words in the given task, the participants' mean accuracy rates of the test items were compared between low-frequency and mid-frequency words. Low-frequency words are typically defined as having fewer than 5 fpm (i.e., frequency per million words), while high-frequency words have more than 100 fpm (Brysbaert et al., 2018). Among the 76 words tested in the given task, no word was identified as a high-frequency word (i.e., a word with an occurrence over 2,066 in the semantically tagged written corpus of 20,662,012 morphemes), except for *hwak.tay.ha.ta* 'enlarge'. Conversely, 42 words were identified as a low-frequency word (i.e., a word with an occurrence up to 103). Therefore, the target words in a given test set were divided into low-frequency words and mid-frequency words (i.e., words with an occurrence over 103). Each participant subgroup's mean accuracy rate on the items of the respective frequency groups was calculated and plotted in the bar chart, as shown in Figure 6.7.

In KNSs, the participants' mean accuracy rate on the mid-frequency words was higher than that of the low-frequency words in most subgroups. However, the accuracy differences between the mid-frequency and low-frequency words were not very large in general. In some subgroups at the lower- and middle-year levels, the opposite trend was observed. In KHS, in contrast, the trend of a higher mean accuracy on the mid-frequency words was not predominant except for at the lower-year levels. At the middle- and upper-year levels, the KHSs were more accurate with the low-frequency words than the mid-frequency words. These results confirm that the participants' accuracy on the test items was not strongly related to the items' frequency in the analysed corpus, not only in the KNSs but also in the KHSs. The results also support that the downwards slope of the fitted lines for the KHSs' accuracy rates in Figure 6.6 was mostly derived from the higher accuracy on the items that had a comparatively high frequency in the analysed corpus and thus were positioned on the far left in the charts.

Figure 6.7 Comparison of mean accuracy rates between mid-frequency words and low-frequency words in KHSs and KNSs in Years 1–6 in girls and boys

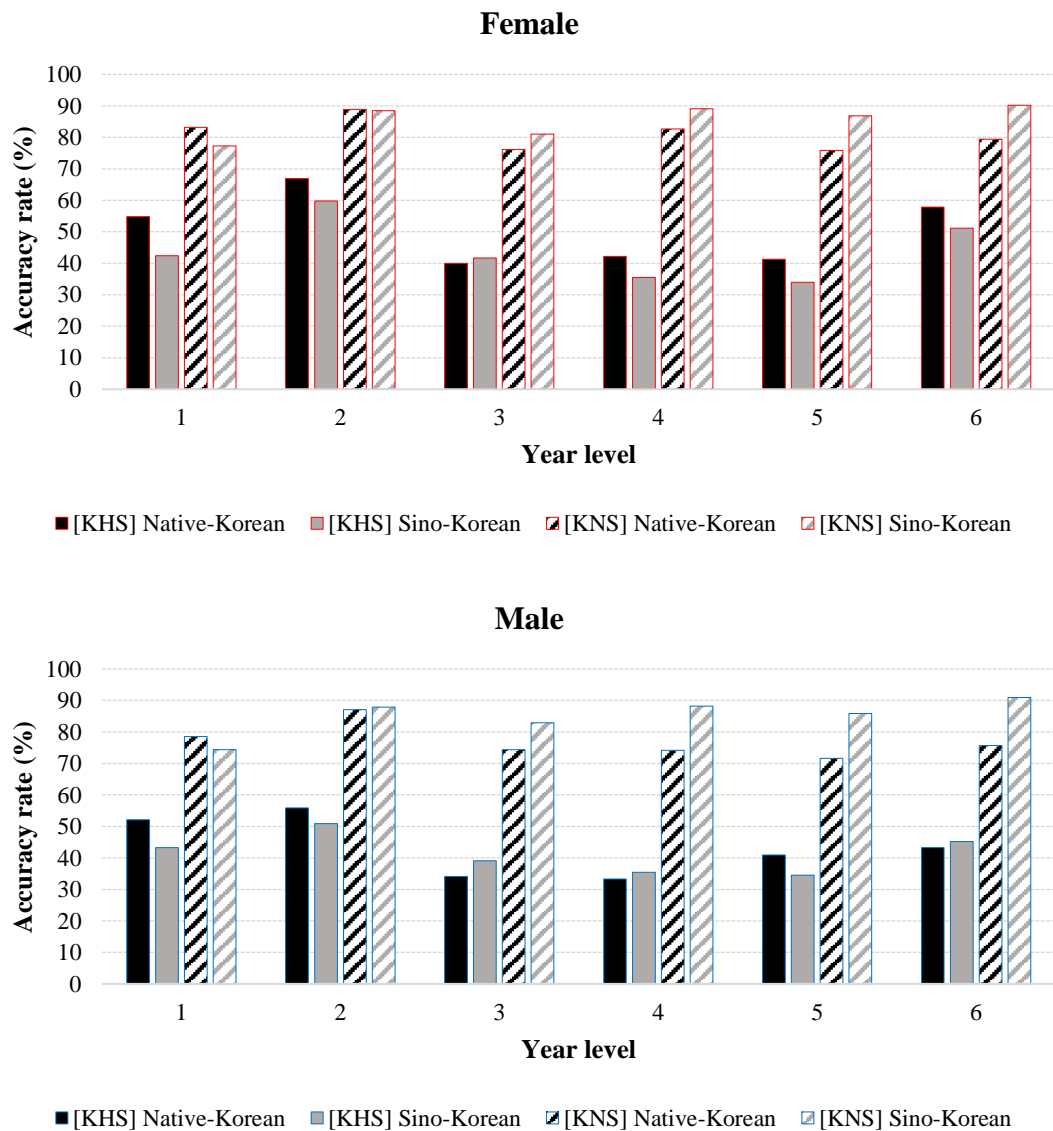


6.2.2.2.3 Accuracy by word formation/origin (native-Korean vs Sino-Korean)

The participants' accuracy on the test items was compared between native Korean and Sino-Korean words tested in the task as the word formation/origin is an important property of the Korean lexicon. As Figure 6.8 shows, KNSs were more accurate with the native Korean words than the Sino-Korean words tested in the task at the lower-year levels. However, the opposite trend was predominant at the middle- and upper-year levels. Like their KNS counterparts, KHSs were more accurate with native Korean words than Sino-Korean words at the lower-year levels. However, at the middle- and upper-year levels, many of the KHS subgroups, especially in girls, maintained the trend of a higher

accuracy on native Korean words than Sino-Korean words, contrary to the pattern observed in their KNS peers. In contrast, male KHSs in most of the middle- and upper-year levels had a higher mean accuracy on Sino-Korean words than native Korean words like their KNS counterparts. Still, the accuracy differences between the Sino-Korean and native Korean words were much smaller (fewer than 5%) compared to the NS controls.

Figure 6.8 Comparison of mean accuracy rates between Native-Korean and Sino-Korean words in KHSs and KNSs in Years 1–6 in girls and boys

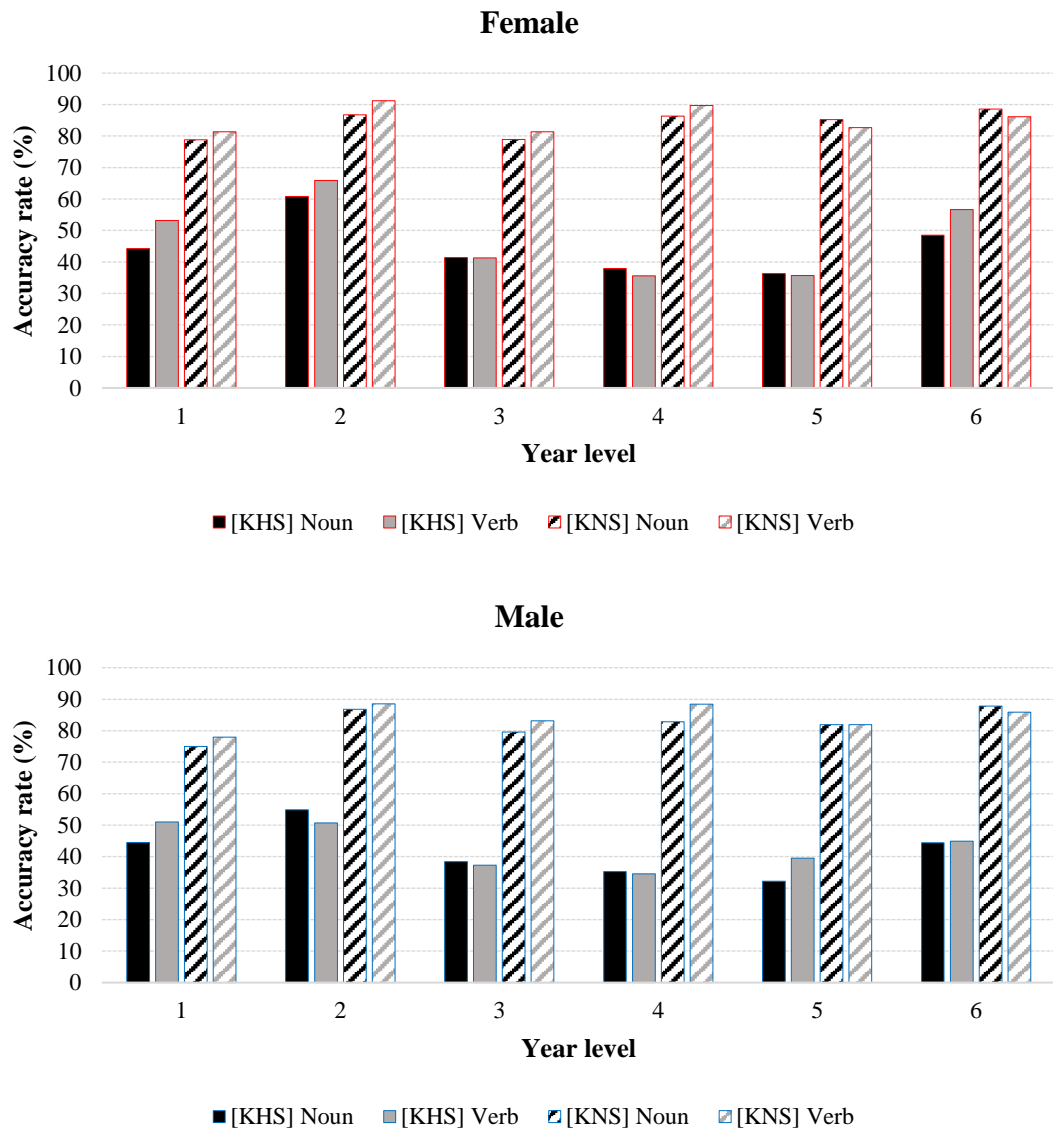


6.2.2.2.4 Accuracy by word class (nouns vs. verbs)

Lastly, the participants' accuracy on the test items was analysed by word class, namely between nouns and verbs.⁶⁰ As Figure 6.9 shows, KNSs were more accurate with verbs than nouns at the lower- and middle-year levels, but they were slightly more accurate with nouns than verbs at the upper-year levels. In comparison, KHSs showed an overall higher accuracy on verbs than nouns at the lower- and upper-year levels, but at the middle-year levels, the opposite trend held true even though the accuracy differences between the nouns and verbs were minimal. Overall, in both speaker groups, no consistent trend regarding the test items' word class and the participants' accuracy was observed across the year levels and genders. In most participant subgroups, the accuracy difference between the nouns and the verbs in the task was rather small and not statistically significant.

⁶⁰ Among the 76 words tested in the task, *ka.tuk.ha.ta* 'be full', *wi.kup.ha.ta* 'be urgent', *num.lum.ha.ta* 'be dashing/manly', *san.man.ha.ta* 'be messy/distracted' and *chim.wul.ha.ta* 'be depressed/gloomy' were classified as adjectives by the REVT developers, following the classifications in Standard Korean Language Dictionary by the National Institute of Korean Language. However, for the purpose of the analysis in this study, these adjectives were categorised into as verbs, following the common description of the Korean language that introduces adjectives as a type of verbs such as 'descriptive verbs' or 'description verbs' or as predicates such as 'descriptive predicates', 'adjective predicates' or 'adjectival predicates'.

Figure 6.9 *Comparison of mean accuracy rates between nouns and verbs in KHSs and KNSs in Years 1–6 in girls and boys*



6.3 Discussion

6.3.1 *KHSs' differences from their KNS peers in receptive vocabulary*

The analysis of the participants' mean scores on the task showed that KHSs scored remarkably lower than did KNSs across the year levels and genders, demonstrating a large difference to their KNS counterparts at every year level in each gender. Tested for statistical significance, every difference between the speaker groups was found statistically significant.

KHSs' less-than-native lexical knowledge in Korean—Replication of previous findings

The remarkably lower level of performance of KHSs than that of their KNS counterparts across the year levels and genders shows that, on average, KHSs knew far fewer words tested in the task than their same-gender KNS peers. This suggests that KHSs will not know as many words and expressions in the Korean lexis beyond those included in the task as the NS controls. The statistical significance found for every between-speaker-group difference indicates that such performance difference between KHSs and KNSs is highly likely to be replicated in another sample of the underlying population. Taken together, these results suggest that KHSs are likely to have a less-developed receptive vocabulary in Korean than their school-year-level-appropriate NS norms. This corroborates previous research findings that uniformly point to adult HSs' limited lexical abilities in their HL, suggesting the HSs' relatively large deviation from the native norms in the linguistic domain of lexis as reviewed in section 3.3.2.1.

The significantly lower level of performance of KHSs than their KNS counterparts found in this study is also consistent with the results observed in previous studies on bilingual vocabulary development in school-age HSs of other languages.⁶¹ Tested with standardised tests such as Peabody Picture Vocabulary Test (PPVT), school-age HSs of various languages in different countries have shown shortfalls in their receptive and productive lexical knowledge in their HL compared to their age-appropriate native norms. For instance, assessed cross-sectionally at the Kindergarten, 2nd and 5th grade, HSs of Spanish in Miami scored lower than their age-appropriate native norms on a battery of tests assessing their vocabulary in Spanish (Oller & Eilers, 2002); on the adapted version of PPVT for Spanish receptive vocabulary in particular, the HSs scored far lower than the Spanish native norms.⁶² In an earlier study, HSs of Turkish in the Netherlands were also observed to know fewer words in a productive Turkish vocabulary

⁶¹ In studies related to language acquisition of HSs—whether the study is concerned with the acquisition/learning of the speakers' HL, the majority language of the society or both languages, non-adult HSs are rarely referred to as HSs. Instead, they are referred to as bilingual children, and their bilingual profiles such as the languages paired, the country/city in which they reside or the education program that they attend are specified, e.g., German–Turkish primary school children (from Turkish-speaking homes) in Germany as in Montanari et al.'s (2019) study or French–English bilingual children attending an international state schools in France as in Cohen's (2016) study.

⁶² It should be noted that the HSs' lower mean scores compared to their native norms were not explicitly presented in the study results as the research question was centred on the relationship between language outcomes in various measures and some input-related factors (i.e., language spoken at home, school program and socioeconomic status) in the children.

test and use fewer types of content words in their spontaneous speech in Turkish than their age-matched NSs in Turkey when the comparisons were made for those of age five and seven (Verhoeven & Boeschoten, 1986). Recently, HSs of Persian (aged six to 18) living in New Zealand were also observed to have a lower level of lexical knowledge in Persian in comprehension and production than their age-matched NS controls (Gharibi & Boers, 2017). Such inferior performance of school-age HSs than their age-appropriate native norms on the measures of their HL vocabulary clearly shows that they generally know fewer words in their HL than their age-matched NSs of the language. The same result found in this study with primary-school-age KHSs in Australia adds to the literature attesting to HSs' less-developed lexical knowledge in their HL than NSs of the language during primary school years.

Less-than-native lexical knowledge in the HL due to less experience

HSs' less-than-native lexical knowledge in the HL during school years corroborated in this study, as well as in other studies, are closely associated with their exposure to and use of their HL as pointed out repeatedly in the relevant research (e.g., Gharibi & Boers, 2017; Oller & Eilers, 2002). On average, HSs are exposed to their HL for less time and use it to a lesser degree than NSs of the language, who are presumably monolingual. Learning two languages (i.e., their HL and the majority language of the wider community) and possibly more, HSs must divide their language experience into two (at least). As a result, they are exposed to and use each of their two languages less than NSs of the respective languages as less-than-monolingual exposure is usually assumed for bilinguals' single language (e.g., Hoff et al., 2014; Unsworth, 2016). Although a great variability also exists in the quantity and quality of language experience among NSs (Hart & Risley, 1995),⁶³ HSs, when compared collectively to NSs, will have less-than-native experience in either of their two languages on the assumption that the total language experience that HSs gain in the combination of their two languages equals what NSs experience in their only language. This leads to the conclusion that HSs as a group will always be at a disadvantage to NSs in learning their HL vocabulary due to their less-than-native TL experience imposed by their bilingualism.

The logic behind the assumption that less-than-native experience in the HL places HSs under an unfavourable condition in achieving native-level HL lexical knowledge

⁶³ For instance, in the 42 monolingual families observed in the study, utterances produced per hour differed greatly between the families, ranging from ca. 200 to ca. 700 (Hart & Risley, 1995, p. 291).

comes from the proposition that vocabulary learning is highly dependent on language experience.⁶⁴ Among many properties of language experience, the quantity of TL experience has been demonstrated to influence the lexical development in the TL in children learning their L1 (e.g., Hoff, 2003; Huttenlocher et al., 1991) as well as in adults learning their L2 (e.g., Kida, 2010; Rott, 1999).⁶⁵ The evidence for the correlation between the amount of TL experience and the acquisition rate for TL vocabulary, especially in child L1 acquisition, is not trivial; some of the researchers explaining language acquisition from the nativist standpoint—which posit a rather limited role of input for grammar acquisition—hypothesise that vocabulary is learned primarily by domain-general cognitive learning abilities (e.g., Bloom, 2000; Pinker, 1999) which is different from domain-specific acquisition mechanism that is believed to drive the acquisition of grammar.

The premise that vocabulary development is reliant on language experience is also supported by the declarative/procedural model (Ullman, 2001, 2004, 2007), a neurolinguistic account of language learning. According to the theory, vocabulary learning depends on the declarative memory system (i.e., the memory of facts and events) rather than the procedural memory system (e.g., implicit control of motor and cognitive skills and habits). It is declarative memory that underlies ‘the learning, storage, and use of all idiosyncratic knowledge in language’, hence those of lexical knowledge, not only in child L1 acquisition but also in adult L2 learning (Ullman, 2015). Multiple exposures to a word are not necessary for its learning because a word can be learned by a single exposure (Ullman, 2015).

However, language learners probably need to encounter a word more than once in their input, especially in a natural acquisition setting, to infer its correct meaning (e.g., the initially supposed meaning may be refined and expanded by multiple encounters (Aitchison, 1987)) as well as to learn its other grammatical and collocational properties

⁶⁴ Although it is relevant to HL vocabulary learning, it is beyond the scope of this study to discuss how a language learner (i.e., a child or an adult) learns words in terms of the learning mechanism or process, whether whole or some aspects of the learning capacities involved in vocabulary learning are specific to language learning or whether what underpins vocabulary learning is the same across ages within the learner (e.g., early childhood, middle-childhood or adulthood) or across the types of language learning (e.g., child L1 acquisition or adult L2 learning).

⁶⁵ There is no doubt that the quality of TL experience also plays an important role in learning vocabulary in many ways such as making a new word presented more salient to the language learner or making him or her interested or motivated to pay more attention to the word. However, it is difficult to measure the sole effect of the quality of TL experience on the TL lexical development—and TL competence in general—because the quality is very often comingled with the quantity of TL experience.

such as word class, count/mass noun, grammatical gender or application of a regular morphological rule (e.g., the plural form of ‘child’ is not ‘childs’ but ‘children’). Accordingly, the frequency of a word occurring in the TL input (probably in the TL output as well) will have a significant impact on the entrenchment of the word’s form-meaning mapping in the learner’s mental lexicon and on the ease of access to and retrieval of the word in comprehension and production.⁶⁶ This relation, known as the ‘word-frequency effect’, means that high-frequency words are known to more people and processed faster than low-frequency words. This has been widely demonstrated in studies in psychology and psycholinguistics. (For a review of the relevant literature, see Brysbaert et al., 2011; Brysbaert et al., 2018)

Undoubtedly, HSs hear and use words and expressions in their HL less frequently than NSs of the language primarily due to the partition of their total language experience. All other things being equal (e.g., TL quality and the learning capacity), such a relatively low input frequency of HL words in their total language experience should limit the acquisition and retention of the words, as well as their processing. As a result, HSs are likely to know fewer words in their HL compared to NS of the language and show an inferior performance of measures of their lexical abilities in the HL than the NSs, like in this study.

Moreover, some words and expressions may never appear in the HL input that HSs receive because of the ‘distributed characteristic’ of their dual language acquisition (Oller & Eilers, 2002; Oller et al., 2007). According to this theory, bilinguals use their two languages in different contexts; they use one language in specific contexts and use the other language in other contexts, although these can overlap. Therefore, their vocabulary is often distributed over their two languages, closely tied to the contexts in which each language is used. For instance, as many HSs receive formal education only in the societal majority language, they will know academic terms mainly in that language but not in their HL; on the contrary, if they participate in religious activities in their local ethnolinguistic community, they will know the terms related to their religious practice in the HL but may not necessarily know the terms’ translation-equivalents in the majority language. On the one hand, HSs’ vocabulary distributed over their two languages as such

⁶⁶ The duration of each time that the learner pays attention to a given word may also be relevant to the success of its learning, but the time span will be generally difficult to measure in the real language acquisition environment.

is evidence that HSs know fewer words in their HL compared to NSs of the languages. Conversely, such distributed characteristic of HSs' dual language acquisition, which leads to their vocabulary being distributed over their two languages, indicates that they are provided with fewer opportunities to learn the vocabulary in their HL compared to the NSs, not only in terms of the frequency of input of words but also in terms of the variety of words. This explains to a certain extent why HSs are less likely to attain native-level lexical knowledge in their HL.

The ascription of HSs' less-than-native lexical knowledge in their HL to the inherent properties of their bilingualism may be supported even more strongly if one assumes the size of 'total vocabulary' (Pearson et al., 1993)—that is, the sum of all words that a multilingual speaker knows in each of his or her languages—is the same between HSs and NSs. Although studies that have compared total vocabulary between monolingual and bilingual children have reported contradicting results—for example, smaller total vocabulary in bilinguals than in monolinguals (e.g., Rescorla & Achenbach, 2002) in contrast to similar or even larger total vocabulary in bilinguals (e.g., Hoff et al., 2012; Junker & Stockman, 2002; Pearson et al., 1993),⁶⁷ the size of HSs' vocabulary in at least one of their two languages is highly likely to be smaller than that of NSs unless their total vocabulary is twice the size of the NSs' single language vocabulary. More drastically put, if the size of total vocabulary of an average HS equals that of an average NS, it is inevitable that the HS's vocabulary in each of his or her two languages is smaller than that of the NS.⁶⁸ In this respect, the HSs' less-than-native lexical knowledge found in this study, as well as in others, can be seen as an inescapable consequence of their bilingualism because an average HS is ordained to achieve less-than-native lexical

⁶⁷ For instance, Rescorla and Achenbach (2002) reported children from bilingual homes knew fewer words in the sum of the vocabularies in their two languages than those from monolingual homes, although the credibility of the study results may be questioned regarding how the researchers measured the vocabularies in the bilingual children's two languages (e.g., Patterson, 2004). On the contrary, Junker and Stockman (2002) reported that German–English bilingual children ($N = 10$), most of whom living in the US (eight children in the US and the rest in Germany), had a much larger size of 'total vocabulary' than either English- or German-speaking monolingual children and their 'total conceptual vocabulary' (Pearson et al., 1993) was comparable to the monolinguals.

⁶⁸ Several studies observed differences in lexical knowledge between bilinguals and monolinguals when the comparisons were made for the bilinguals' single language. For instance, in Hoff et al.'s (2012) study on Spanish–English bilingual infants and toddlers from high socioeconomic status families in the US, the total number of words that the bilingual children knew in Spanish and English together was similar to the number of words that their age-matched monolingual English-speaking children knew in English alone. When the number of words only in English was compared between the bilinguals and monolinguals, however, the bilinguals apparently knew fewer words than the monolinguals; in Spanish, the bilinguals knew even fewer words than the words they knew in English.

knowledge in each of their two languages or at least in one of his or her two languages unless his or her total vocabulary is twice as large as the total vocabulary of an average NS.⁶⁹

6.3.2 KHSs' change in receptive vocabulary

The change in receptive vocabulary in Korean of KHSs over primary school years has been examined by comparing their performance of the given task by school year level. Their performance of the task, however, could not be examined linearly because of the limitation imposed by the task design that the participants were tested with three different sets, only the paired year levels tested with the same set (i.e., Years 1 and 2; Years 3 and 4; and Years 5 and 6) could be compared directly. To complement the limited comparisons allowed between different year levels, the between-speaker-group differences were examined by year level. This enabled KHSs' vocabulary development in Korean over primary school years to be investigated in terms of the change in their divergence from the NS norms.

KNSs' lexical development by school year level

The analysis of the participants' mean scores by year level showed that the KNS controls performed on the task following the predictions laid out by the task design. When tested with the same set, the KNSs in the higher-year level performed better than did their paired lower-year-level KNSs (i.e., mean accuracy rates: Year 1 < Year 2; Year 3 < Year 4; Year 5 < Year 6); when tested with different sets, the mean score of the KNSs in the higher-year level turned out to be lower than that of the KNSs in one year level below who were tested with an easier set (i.e., mean accuracy rates: Year 2 > Year 3; Year 4 > Year 5). Accordingly, the mean score of KNSs in each gender repeated a rise and fall as the year level went up, presenting an oscillating pattern.

The statistical significance tests of the mean score differences between the paired year levels in KNSs in each gender showed that the difference between Years 1 and 2 and that between Years 3 and 4 in girls were statistically significant, as well as the difference between Years 1 and 2 in boys. This indicates that both female and male KNSs in Year 2 and female KNSs in Year 4 in the underlying population are highly likely to score higher than their paired lower-year-level KNSs of the same gender if given the same task. Since

⁶⁹ As the KHSs' vocabulary knowledge in English was not measured in this study, the results of this study are difficult to interpret in relation to the effect of their combined vocabulary knowledge (i.e., Korean vocabulary + English vocabulary).

the better performance of the task implies a better receptive vocabulary in Korean, these results suggest that receptive lexical knowledge in Korean develops between those year levels in the given genders among KNSs.

On the contrary, with the conservative alpha level (i.e., $p < .004$), the mean score difference between Years 5 and 6 in female KNSs, as well as the difference between Years 3 and 4 and that between Years 5 and 6 in male KNSs, was not found statistically significant. One of the possible interpretations of these results is that receptive vocabulary in Korean does not improve significantly between those year levels in the given gender in the underlying KNS population, and thus, no significant difference was found. However, given the estimate that school-age children learn several new thousand words every year (e.g., Miller & Gildea, 1987; Nagy & Scott, 2000), the more likely interpretation of the results is that the observed non-significance was due to the performance differences between the paired year levels in this study being not large enough to infer the actual differences that exist in the underlying population.

The small mean accuracy differences between those paired year levels are highly likely to have arisen from the task design. The KNSs were tested with a slightly lower range of test items in REVT-R for their age to prevent a possible floor effect in their KHS counterparts. Accordingly, the selected ranges were pitched more propitiously for the lower-year-level KNSs because more difficult test items—less likely to be known to them—were not included in their task set, so they could perform as well as their paired higher-year-level KNSs. At the same time, the KNSs in the higher-year level could not demonstrate their more developed receptive vocabulary in Korean with the given task set because the selected range pre-set a limit on its upper end. This must have functioned as a ceiling effect in the task, resulting in only small performance differences between the paired year levels in KNSs, especially in those of middle- and upper-year levels, hence no statistical significance.

KHSs' lexical development by school year level

The KHSs' performance showed a slightly different pattern of change by year level from their NS controls. In both genders, KHSs in Year 2 performed better than those in Year 1, and those in Year 6 performed better than those in Year 5, presenting the same trend observed in their KNS counterparts. However, the mean score of Year 4 KHSs was lower than that of Year 3 KHSs in both genders. Since this mean score decrease in each gender bore no statistical significance, it could have been due to sampling or measurement

errors and thus may not be replicated in another study. However, the other interpretation of a statistically non-significant result is also possible—that is, the decrease between Years 3 and 4 in each gender was not large enough to yield statistical significance given the participants' performance variations. In the latter case, the lower level of performance at Year 4 than Year 3 in both genders is important because it could indicate stagnation or attrition in KHSs' vocabulary development in Korean between the year levels. (This will be discussed further later in this section.)

Although the KHSs' mean score rose between Years 1 and 2 and between Years 5 and 6 in both genders, the statistical significance tests of the increases presented different results between the genders. In boys, the performance increases between Years 1 and 2 and between Years 5 and 6 were not statistically significant. The possible ceiling effect derived from the task design—that is, the explanation given for the statistically non-significant increases between the paired year levels for the middle- and upper-year levels in the KNS controls—cannot explain the non-significant increases observed between Years 1 and 2 and between Years 5 and 6 in male KHSs because their mean accuracy rarely exceeded 50%. Thus, the observed increases between those year levels in male KHSs should be interpreted as either sampling or measurement errors or the degree of the increases not being large enough to yield a statistical significance given their within-group variance.

In female KHSs, on the contrary, the mean score increase between Years 1 and 2 and between Years 5 and 6 was statistically significant. This means that female KHSs in Years 2 and 6 are likely to perform better than those one year level below on the same task in another study. These results, suggesting a high probability of vocabulary development occurs between those year levels in female KHSs, are difficult to interpret because the results contrast not only with the likelihood of no significant growth occurring between the same paired year levels in their male peers (as indicated by the statistically non-significant results discussed above) but also with the decreases observed between Years 3 and 4 in both genders.

However, the statistically non-significant increases (as well as the decreases) between the paired year levels observed in KHSs does not rule out the possibility of an increase (or a decrease) in performance between the year levels in the underlying population. In other words, it is possible that in the underlying KHS population, those in the higher-year level perform better (or less well) than their paired lower-year-level KHSs

on the task like in this study, although the degree of increase (or decrease) is likely to be very small. This is because the statistically non-significant performance increases (or decreases) in the KHSs do not reject the possibility of small vocabulary growth (or attrition) between the year levels.

In fact, some studies have indicated a possible growth in HL vocabulary among HSs over school years. In the aforementioned study by Jia et al. (2014) on bilingual lexical development among KHSs and HSs of Chinese (aged 5–18) in the US, the HSs' productive vocabulary in their HL showed an increasing tendency by age group, although the increases between two adjacent age groups were very small and only the performance difference between the youngest (five to seven) and oldest age group (17–18) was found statistically significant,⁷⁰ underlining a clear contrast to the significant differences observed between most age groups for their English vocabulary. Similarly, in her study of lexical development in Korean among KHSs (aged four to five) in the US, Lee J (2014) also reported an increase in their scores on REVT (both REVT-R and REVT-E) measured one year apart, despite the observed increases being very small. Similar results indicating small vocabulary development by age or school year level were observed in other studies (e.g., Oller & Eilers, 2002; Verhoeven & Boeschoten, 1986). Study results showing somewhat better performance of older children than younger children suggest that HSs' vocabulary in their HL continues to grow over school years even if the gain they make each year will be far smaller than that produced by their NS controls.

Based on the previous study results indicating the possibility of a non-significant but small and continuous growth in HL vocabulary over school years, even the statistically non-significant performance increase between Years 1 and 2 and that between Years 5 and 6 among male KHSs may be interpreted as a reflection of genuine growth in their Korean vocabulary between the year levels. In fact, it is unreasonable to assume that KHSs growing up in Australia do not learn any new words in Korean despite their continued exposure to the language at home, as well as the Korean language instruction that some of them receive in Korean community schools. The number of new words they learn each year from their limited Korean language experience will not match the number of new words learned by their NS controls. Nevertheless, KHSs will continue to learn new vocabulary in Korean from their continued exposure to the language.

⁷⁰ In their study, the HSs' receptive vocabulary in their HL was not measured due to unavailability of adapted versions of PPVT in Chinese as well as Korean.

The KHSs' exposure to Korean never fully ceases even after they start formal schooling in the English-immersion environment, even though it will be reduced heavily in terms of quantity. At home, they will continue listening to their parents talking to them in Korean, often overhearing conversations in Korean between their parents or other KNSs and occasionally watching Korean TV programs and videos. Further, some of them attend Korean language classes for two to three hours on the weekend. Given these opportunities to encounter new words and expressions in their Korean input, they should learn new Korean words, either incidentally or explicitly (e.g., by explanations provided by the KNS source of input, such as their parents or ethnic school teachers).

Possible attrition in HL vocabulary

Since the possibility of small vocabulary growth in Korean between the paired year levels was cited as a possible interpretation of the statistically non-significant mean score increases observed among the KHSs, the same interpretation must be applied to the statistically non-significant decreases observed between Years 3 and 4. Indeed, KHSs may forget some words in their HL that they have learned if the words do not occur in their HL input (and/or output) for some time; consequently, they may know fewer words in the HL than what they used to know beforehand. As attrition in lexical knowledge has been widely documented, bilinguals in various languages in contact situations for L1 among adult immigrants with prolonged exposure to L2 (e.g., Yagmur et al., 1999), international adoptees (e.g., Gindis, 2008; Isurin, 2000), as well as for L2 in adult L2 learners (e.g., Weltens & Grendel, 1993) and returnees (e.g., Yoshitomi, 1999), there is a high chance of vocabulary attrition to occur in the HL of KHSs in Australia. However, with the nature of their lexical development examined in this study—that is, the participants' receptive vocabulary in Korean was measured not longitudinally but cross-sectionally, it is difficult to claim that the observed decreases in the mean accuracy rate between the year levels reflect actual attrition that occurred in the KHS's Korean vocabulary. Nevertheless, such a possibility cannot be ruled out completely, and the decrease can be interpreted as pointing at least to stagnation in their Korean vocabulary growth.

A more important thing to note regarding the performance of the KHSs of middle-year levels is that the gap between KHSs and their NS peers became much larger. The between-group differences in the mean score are well over –40 at the middle-year levels through to Year 5. Considering that the selected ranges of test items were lower than that

appropriate for their age in the case of KNSs, the differences between the speaker groups in receptive vocabulary in Korean might have been even larger. The between-speaker-group differences that widened from Year 3 to Year 5 highlight that KHSs do not keep up with their initial gap in receptive Korean vocabulary from their NS norms. This is an expected result based on the estimates made by some researchers and educators that NSs learn several thousand new words every year throughout their school years (e.g., Miller & Gildea, 1987; Nagy & Scott, 2000). While their KNS controls learn several thousands of new words each school year, KHSs also learn a similar number of words each year. However, the majority will be English words, and only a small portion will be Korean words. Therefore, the KHSs' gap from their school-year-level-appropriate NS norms in Korean vocabulary will widen incrementally; it becomes much more substantial at the middle-year levels where the number of new words to learn increases considerably as their study of school subjects broadens and deepens.

6.3.3 KHSs' difficulty with particular vocabulary

6.3.3.1 Accuracy by test item—KHSs' relatively low accuracy on particular test items

The analysis of the participants' accuracy rates on individual test items revealed that the participants' accuracy differed by test item in each subgroup. This shows that a speaker group in a year level in a gender knew the words tested in the task to a varying degree, implying a differing acquisition level of the test items. The comparison of the accuracy rates between KHSs and KNSs at each year level in each gender also showed that the between-speaker-group difference at a year level in a gender differed by test item, and it was comparatively large for some items. The list of the test items with a relatively large between-speaker-group difference presented the words that KHSs in a given year level in a gender exhibited a relatively large gap to their KNS counterparts in the acquisition level. The comparison of the test items with a relatively large between-speaker-group difference between the genders and the year levels revealed that many of the items overlapped between the genders and between the adjacent year levels. Presumably, the level of acquisition of those words is consistently low among KHSs compared to the NS controls.

Regarding the test items for which KHSs in a year level in a gender showed a relatively large gap to the NS controls in the acquisition level, the underlying reasons are

not discussed individually here because such a discussion would be exhausting rather than informative. Instead, a reason uniformly applicable to the items is sought, as they are the examples of the Korean vocabulary that are far less likely to be acquired by KHSs in a particular year level in a gender compared to the NS controls. An obvious reason for the items' low acquisition level among KHSs is their low level of occurrence in the KHSs' Korean language input. The words may not have occurred frequently enough (or be salient enough) in the KHSs' Korean language input, while their year-level-matched KNSs had plenty of opportunities to learn the words with a frequent occurrence.

One of the apparent causes of this occurrence discrepancy between KHSs and KNSs for some vocabulary is the KHSs' lack of formal schooling in Korean. The school education in South Korea follows its national school curriculum, so KNSs who receive school education are expected to learn certain words by a particular year level. For instance, KNSs are supposed to know *kak.to.ki* 'protractor' by the end of Year 4 because at that year level, they learn about angles and measure an angle using a protractor in mathematics. In a similar vein, KNSs are expected to know *tho.lon.ha.da* 'discuss' and *hyep.tong.ha.ta* 'cooperate' from the lower primary school year levels. A discussion is not only a learning component in Korean (as a school subject) but also one of the frequently used learning activities by which a learning objective is achieved in many subjects. Learning to cooperate with others is one of the critical objectives in primary school education in general. Contrary to KNSs who learn such words from their formal schooling in common, many KHSs may never encounter these words in their Korean input in their bilingual environment, given the absence of Korean-medium formal education. This difference between the speaker groups must have resulted in a relatively large gap in the acquisition level for some words.

Moreover, a presumably large gap in the Korean language experience between KHSs and KNSs beyond that derived from the absence of formal schooling in Korean must have also contributed to the relatively large difference in the acquisition level for some words. Although formal education is a primary source of learning new vocabulary for most KNSs in primary school years, they continue to learn new words and expressions through their daily life outside school, just like they have been doing before they entered school. At home, which is still the most important place for primary school children in general, KNSs interact with their family members throughout their daily routine, do homework, read books, watch television or videos, browse on the web (more common

for those in the higher-year levels) and play every day. After school and during school vacations, many KNSs have private or small-group lessons for the key school subjects and learn to play music or sports. In addition, they do some leisure activities on weekends and in school holidays (e.g., travelling, visiting places like museums, zoos or historic sites, or going to the cinema, theatre or exhibitions) and visit relatives and friends. These daily activities at home, as well as extracurricular or leisure activities outside school, provide KNSs with a further opportunity to learn new vocabulary in Korean.

On the contrary, KHSs carry out the activities from which they can learn new vocabulary besides their formal schooling much more often in English than in Korean. More dramatically put, when KNSs do their homework, read books, watch television or play at home in Korean, KHSs do the same activities (mostly) in English. As a result, KHSs miss out on the opportunity to be exposed to the vocabulary that their KNS peers encounter in the learning, playing and living activities outside the school. This must have contributed to the KHSs' low level of acquisition of some words compared to their KNS controls, as reflected in the results of this study. For instance, about half of the KHSs in the lower-year levels in this study did not know the word *kye.lwu.ta* 'compete' or *yet.po.ta* 'peep into' in the task; on the contrary, most of their KNS peers knew the words because they frequently appear in children's stories or TV programs for kids in Korean. This shows that the amount and type of Korean language input that KHSs are provided with in their bilingual environment in Australia can affect the acquisition of certain words in Korean, shaping their Korean vocabulary.

6.3.3.2 Accuracy by lexical property

6.3.3.2.1 Accuracy by REVT-R item number

The analysis of the participants' accuracy on the test items by the REVT-R item number in each subgroup and each speaker group in a gender showed that the accuracy by and large decreased as the item's REVT-R item number ascended. This indicates that the participants' performance of the task was in accordance with the principle of REVT-R's design that test items are ordered by increasing difficulty. The difficulty of each item in REVT-R should have been determined by the target word's likelihood of being known to KNSs of a particular age; this likelihood must have been based on the word's expected AoA in KNSs, reflecting the word's frequency in their age-appropriate input. According to the REVT instruction booklet, the test developers first arranged test items based on previous studies related to vocabulary development of KNSs and basic vocabulary in

Korean, and they adjusted the order of the items through a couple of pre-tests as well as the norming test (Kim Y-T et al., 2009a).⁷¹ Therefore, the difficulty of test items increases as REVT-R proceeds, so the higher is the number of the test item, the less likely is the item known to younger KNSs.

However, the item accuracy in REVT-R is not supposed to decrease in a strictly linear fashion. As the REVT-R's norming test results show, the item accuracy of a given age group does not decrease linearly but declines rather gradually with some fluctuations. For instance, of the test developers' norming sample of eight-year-olds, the accuracy rates of the items from 51 to 60 were 93, 97, 94, 90, 91, 93, 97, 95, 82 and 88%. Those of the next 10 items were 74, 72, 92, 86, 80, 71, 83, 89, 93 and 83%. Similar to the results of the REVT-R norming test, the participants' accuracy on the items in this study fluctuated wildly. Nevertheless, an overall tendency of accuracy decrease by REVT-R item number was observed, and it was confirmed by visual inspections and the lines of best fit. This means that both KNSs and KHSs generally performed better on the words with lower REVT-R item numbers—which are supposedly easier and thus are tested earlier in REVT-R—than those with higher numbers.

Under the assumption that the order of test items in REVT-R correctly reflects their approximate level of difficulty based on their likelihood of being known to KNSs estimated by their predicted AoA, the results of this study can be interpreted that the participants—regardless of the speaker group—were more likely to know words that are supposedly learned earlier than later. When more radically examined, comparing the mean accuracy of the first half of the items with the second half in each participant subgroup showed that both speaker groups were more accurate with the first half of the items than the second half. This confirmed that the participants knew the words with lower REVT-R item numbers better than those with higher item numbers.

6.3.3.2.2 Accuracy by word frequency

In the analysis of the participants' accuracy on the test items by the word frequency in the semantically tagged corpus from the modern written Korean corpus of

⁷¹ The test developers first started with over 500 words as potential test items for REVT-R, based on previous research related to Korean children's vocabulary development and the basic vocabulary of the Korean language. After a couple of pre-tests, they narrowed down the word list to about 200, and they finalised the 185 words for the test after the norming test. Based on each item's accuracy rate as well as calculated level of difficulty and discrimination index from the norming test, they adjusted the order of the items.

the Korean national corpus, no clear relationship was found between the participants' accuracy on the test items and the items' frequency in the corpus. This finding was further confirmed by the results of the comparison of the mean accuracy rates between the mid-frequency and low-frequency words in each participant subgroup. This was a rather unexpected finding because it did not corroborate the previous research findings that largely pointed to the word-frequency effect on the level of acquisition as well as access/retrieval of words (e.g., Balota et al., 2007; Forster & Chambers, 1973; Monsell et al., 1989; Rubenstein et al., 1970; Scarborough et al., 1977). In fact, this frequency effect has been observed in HS's lexical processing as well; for example, in Blasingame's (2018) study, adult HSs of Spanish in the US reacted faster to high-frequency words than to low-frequency words in the lexical decision task. Contrary to the expectation based on previous research findings, a relationship between the word frequency in the analysed corpus and the accuracy in the given task was not strong in both KHSs and KNSs in this study.

The most likely reason for this result is that the semantically tagged corpus used for the test items' frequency analysis was not the correct sample of the texts representing the Korean language input of the participants—not even for the KNSs who are primary school children.⁷² As the importance of the validation of frequency measures has been emphasised by many researchers (e.g., Brysbaert & New, 2009; Keuleers et al., 2010; Van Heuven et al., 2014), it is critical to select the right corpus for the frequency estimates of the group of speakers in question. At least for the written language of the KNS participants, primary school textbooks in South Korea (all of which are government-regulated), learning support materials such as student workbooks for self-study (mostly privately published) and children's literature may have better served the sampling of the Korean language to which primary-school-age KNSs are exposed. A future study should further investigate the relationship between the frequency and acquisition of HL vocabulary in KHSs with a valid frequency measure.

⁷² Similarly, in Jee's (2018) study on the relationship between HL proficiency and factors related to language acquisition in adult KHSs in Australia, the difference in accuracy between high-frequency words and low-frequency words in the vocabulary test was quite small in all subgroups of the KHSs. The same reason that accounts for the result of this study may explain her result; the Korean corpus data used in her study did not represent the Korean language input that the KHSs received in their bilingual environment.

6.3.3.2.3 Accuracy by word formation/origin (native-Korean vs Sino-Korean)

The analysis of the participants' accuracy on native Korean and Sino-Korean words showed that KHSs performed differently from their KNS counterparts, especially at the middle- and upper-year levels. At the lower-year levels, KNSs were more accurate with the native Korean words than the Sino-Korean words, but the accuracy difference between them almost vanished by Year 2. At the middle- and upper-year levels, the trend was reversed as they were far more accurate with the Sino-Korean words than the native Korean words, though it could have been influenced by the ratio between them as the number of Sino-Korean words included in the test sets for the middle- and upper-year levels was much higher than that of native Korean words. In contrast, KHSs did not follow the performance pattern observed in their KNS counterparts, especially at the middle- and upper-year levels. The accuracy differences between native Korean and Sino-Korean words were fairly small in boys, and the reversed trend was observed in girls.

The much higher proportion of Sino-Korean words in the test sets that tested middle- and upper-year-level participants, in fact, reflect the increase of written-language-oriented words as well as technical terms, which are more often Sino-Korean words than native Korean words in Korean lexis. According to Beck et al. (1987), an educated adult's vocabulary can be categorised into three tiers: tier one words are the most basic words frequently used in everyday conversation such that learned from a very early age; tier two words are those widely used across subject areas in the written language but rarely encountered in the spoken language; and tier three words are those very infrequently used and more limited to a specific subject, often called technical terms. With the start of schooling, children encounter more words belonging to tier two or tier three, and this tendency will accelerate as the year level goes up. In Korean, words and expressions classified as tier two or tier three words are more likely to be Sino-Korean words than native Korean words.⁷³

Moreover, from middle primary school year levels, not only academically oriented vocabulary across the subject areas but also the subject-specific vocabulary

⁷³ In fact, a large proportion of Korean vocabulary is Sino-Korean words; Korean linguistics estimate them to be more than half of the Korean lexicon, e.g., 52% (Song JJ, 2006), 60% (Sohn, 2001) and 60–70% (Min, 2004). This is not only because of the long history of Chinese influence on the Korean peninsula in all possible areas, instigating the diglossia among Korean aristocrats and scholars in the past but also because of the productivity of Chinese characters to coin a new word by combining two to four characters based on their ideographic (Sohn, 2001). Because of the productivity of Chinese characters for word coinage and long scholarly and literary tradition of writing in Chinese, the words used in formal occasions as well as in more professional and academic discussions are more often Sino-Korean words.

increases drastically with the introduction of more subjects such as science and social sciences at Year 3, following the Korean national school curriculum.⁷⁴ Min (2004) analysis of Sino-Korean words in all Korean primary school textbooks (under the 7th Korean national school curriculum) demonstrates this very well. The number of Sino-Korean words found in all textbooks of each year level was as follows: 856 at Year 1; 1,294 at Year 2; 3,238 at Year 3; 4,753 at Year 4; 5,942 at Year 5; and 8,169 at Year 6. The number of Sino-Korean words jumps at the middle-year level, and at Year 6, it almost doubles from that of Year 4. This demonstrates that from the middle primary school year levels, KNSs learn much more words and expressions than before, with more subjects taught at school, accompanying longer school hours. It also shows that the proportion of Sino-Korean words in the KNSs' expanding vocabulary becomes much higher with the increasing depth of knowledge taught in each subject area.

Because of the much smaller number of native Korean words included in the test sets for the middle- and upper-year-level participants, however, the KNSs' better performance of the Sino-Korean words than on the native Korean words at those year levels should not be taken at face value. Their performance pattern should be only regarded as representing the NS norms for the given year levels with the given task. Thus, the results should be interpreted as that the KNSs have been developing their Korean vocabulary well, meeting the expectation for learning more sophisticated and academically oriented words based on their school curriculum learning.

Thus, the KHSs' performance of the task at the middle- and upper-year levels that showed little difference between the native Korean and Sino-Korean words (in the case of boys) or even larger gaps from their year-level-appropriate NS norms for Sino-Korean words than native Korean words (in the case of girls) should be viewed as showing that the KHSs have difficulties in keeping up with their school-year-level-appropriate NS norms more with Sino-Korean words than native Korean words possibly due to the absence of Korean-medium schooling. The results underline that KHSs growing up in Australia will have a great challenge staying abreast of the vocabulary expansion of their NS peers, especially for Sino-Korean words, which increase by a significant degree from the middle primary school year levels as more subjects are introduced and the level of knowledge covered in each subject area starts to deepen and become more complex.

⁷⁴ The higher proportion of Sino-Korean words in the sets that tested those in the middle and higher-year levels reflect this change.

6.3.3.2.4 Accuracy by word class (nouns vs verbs)

Comparing the participants' accuracy rates between nouns and verbs in each subgroup did not show any consistent trend regarding the relationship between the test item's word class and its acquisition level. There has been a long debate over the hypothesis of noun bias in early vocabulary development—that is, children learn nouns faster (i.e., earlier and/or more easily) than verbs. The observation that, in general, the vocabulary of young children has more nouns than verbs made some researchers postulate that early vocabulary development is also facilitated by pre-existing learning mechanisms (whether specific to language learning or not) such as whole-object constraint (e.g., Dockrell & Campbell, 1986; Macnamara, 1982; Markman & Wachtel, 1988) or taxonomic constraint (e.g., Baldwin, 1989; Landau et al., 1988; Markman & Hutchinson, 1984). According to Gentner (1982, p. 301), who first proposed the noun bias hypothesis, 'the category corresponding to nouns is, at its core, conceptually simpler or more basic than those corresponding to verbs and other predicates' (p. 301).

However, the hypothesis of noun bias has been challenged by the studies showing that in some languages, like Korean, Japanese or Chinese, the early vocabulary list was predominated by verbs than nouns (e.g., Choi S & Gopnik, 1995; Fernald & Morikawa, 1993; Tardif, 1996; Tardif et al., 1999). It was argued that in those languages, the language utterances directed to a child tend to have more verbs than nouns and verbs are presented more salient as they come in the final position in the sentence, especially in Korean and Japanese. Although these findings also have been disputed by some studies showing contradictory results (e.g., Au et al., 1994; Imai et al., 2006), the findings that refute the noun bias hypothesis indicated the possibility of input effect on vocabulary learning or more specifically semantic learning, which could be taken as evidence supporting the argument that language shapes cognition (e.g., Gopnik & Choi, 1990).

Concerning the noun bias hypothesis, the results of this study neither supported nor refuted the hypothesis, as the comparison of the participants' accuracy between nouns and verbs did not show any consistent pattern across the year levels and genders, not only in KHSs but also in KNSs. In KNSs, the accuracy on verbs tended to be slightly higher than that of nouns at the lower- and middle-year levels, but the trend was reversed at the upper-year levels. Further, the differences between the word classes were very small overall, indicating that the observed trend is likely to have resulted from the ratio of the

nouns and verbs included in each test set, possibly influenced by a particularly high (or low) accuracy of some items.

In fact, it is not clear whether the noun bias—or the opposite claimed for languages like Korean—persists in vocabulary development beyond early childhood, as studies rarely investigate this question because it is almost impossible to measure not only one's vocabulary but also his or her language input after the preschool age. Although a study by Ludington (2013) found some results supporting the noun bias hypothesis in adult L2 learners of Hebrew at the beginner level, it is difficult to take it as evidence for the noun bias persisting through to adulthood for L1. This noun bias is not likely to exist beyond learning concrete nouns in early childhood. School-age children will have a more developed cognitive ability to understand abstract concepts when learning new vocabulary. Moreover, the match between a word's conceptual category and its word class (e.g., names of entities are more often lexicalised as nouns, while actions or changes of state as verbs) are not always a clear cut as in many words (e.g., phenomenon, cause, effect or change).

6.4 Summary

The lexical knowledge in the HL of Australian KHSs in primary school years was examined in this study by testing their receptive vocabulary in Korean in comparison to their school-year-level-matched KNSs with a picture selection task. Comparing their task performance of the given task with that of the NS controls showed that they had a much lower level of receptive vocabulary in Korean than their year-level-matched KNSs across the year levels and genders, replicating findings of previous studies. This shortfall in the HL lexical knowledge among the KHSs in this study as well as among HSs in other studies may be seen as the inescapable result of their less-than-native experience in the language since vocabulary learning is closely tied to language experience based on its nature (i.e., how vocabulary is learned). It seems inevitable for HSs, who are bilingual, to have less experience than NSs in each of their two languages because their total language experience must be divided into two. For KHSs growing up in Australia, it appears difficult to receive as much experience in Korean as their KNS peers because English–Korean bilingual school programs are not readily available. Without formal education delivered in Korean, the KHSs' exposure to and use of Korean is limited chiefly

to their homes. This results in a massive difference in the TL experience between KHSs growing up in Australia and their KNS peers in South Korea in both its amount and quality, leading to a large gap in their lexical knowledge.

However, native-level competence even in vocabulary may be achieved with less-than-native TL experience, as some studies have indicated that bilingual children with 40–60% of their total language exposure in one of their languages demonstrated native-level lexical knowledge in that language. Thus, the much lower receptive vocabulary in Korean observed among the KHSs compared to the NS controls in this study must indicate that the KHSs are exposed to and use Korean to a far lesser degree than the minimum requirement for attaining native-level receptive lexical knowledge. This implies that Korean immigrant families would need to invest much more effort than their current level of practice in providing their children with a rich and stimulating environment for learning HL vocabulary if they wish for their children to keep up with their age-appropriate level of lexical knowledge in Korean. However, based on the model of the factors influencing minority language maintenance in immigrant contexts where little use of a minority language in the wider society eventually affects its use among its speakers by influencing the speakers' perception and attitudes towards it and its maintenance, this will be an extremely challenging task for immigrant families to tackle if no support from the formal education system, such as majority-language–HL bilingual education programs, is provided.

Comparing the KHSs' performance of the task between the paired year levels showed that their performance improved between Years 1 and 2 and between Years 5 and 6 in both genders, even though the performance improvements in boys were statistically non-significant. Since even the statistically non-significant results do not rule out the possibility that KHSs' performance improves between those year levels, it was concluded that KHSs may continue to learn new words and expressions in Korean with their continuous exposure to the language at home and in their local Korean community (e.g., religious institutions and Korean community schools) over their primary school years. Simultaneously, however, the decrease in their performance observed between Years 3 and 4 in both genders was alarming because it may signify stagnation or even attrition in their HL lexical knowledge at the middle primary school year levels.

However, if the KHSs' performance decreases between the middle-year levels are taken as a genuine representation of stagnation or attrition of their vocabulary

development, their performance increases observed between Years 5 and 6 in both genders in this study seems odd. One way to understand this is to suppose that the observed increase resulted from a sampling error caused by the Year 6 KHS participants selected for this study happening to have a high proficiency. In fact, HS are notorious for their reluctance and refusal to attend ethnic schools, and this tendency is assumed to be much stronger among older and less-proficient speakers. Thus, KHSs with high proficiency in Korean are more likely to continue attending Korean community schools through to the upper-year levels than those with low proficiency. Following this supposition, the Year 6 KHSs who participated in this study may have happened to be those with relatively high proficiency in Korean. This could have led to the observed performance increases between Years 5 and 6.

Although the performance difference between the genders on the given task was not analysed statistically—as gender difference was not a research question of this study—slightly better performance was observed among girls than their male peers in KHSs, while the performance difference between the genders was not very prominent in the NS controls. Possible reasons for the observed gender difference in the HL lexical knowledge were discussed in relation to the female advantage in learning vocabulary in general, as well as gender differences in HL maintenance. Future studies should further investigate the gender difference in HL development and maintenance and its effect on HSs' lexical abilities in the HL.

The analysis of the participants' accuracy on individual test items revealed that KHSs in comparison to the NS controls showed a comparatively low level of acquisition for some words tested in the task. The list of the test items with a relatively large between-speaker-group difference at each year level in each gender exemplified such words. The list also highlighted the words that KHSs showed a much lower level of acquisition than their KNS counterparts across the genders and the adjacent year levels. As a possible reason for the words' relatively low level of acquisition, their comparatively infrequent occurrences in the KHSs' input were discussed. Put differently, those words are the exemplar of the words that occur much less frequently in the KHSs' Korean input in their bilingual acquisition environment.

The participants' accuracy on individual test items was further analysed by REVT-R item number, word frequency, word formation/origin and word class. While the participants' accuracy on test items showed an overall decrease by the REVT-R item

number, as expected based on the principle of REVT-R, their accuracy did not show a strong relationship with the word frequency in the analysed corpus, even among the NS controls. This was highly likely due to the lack of representativeness of the selected corpus for the Korean language input that not only the KHSs but also the KNSs in primary school years receive. The analysis of the participants' accuracy on native Korean words versus Sino-Korean words in the task indicated that the KHSs in the middle- and upper-year levels had difficulties keeping up with the increase of Sino-Korean words to learn due to their lack of formal schooling in Korean. However, the comparison of the accuracy between nouns and verbs did not show any consistent relationship in either speaker group.

Chapter 7 Development and Maintenance of Heritage Language Grammar*

A growing body of literature in the study of HLs has indicated that HSs have non-native (i.e., different from native norms) abilities in respect to various aspects of HL grammar and the degree of their non-native-ness varies between linguistic domains as well as between linguistic aspects within a domain. Constituting a substantial part of the literature, studies conducted on English-speaking KHSs uncovered some of the aspects in Korean grammar in which the KHSs diverge from the native norms in their linguistic knowledge and use. Although their findings started to reveal linguistic aspects vulnerable to non-native acquisition in KHL under a Korean–English-in-contact condition, more research on such linguistic aspects is essential to advance our understanding of the overall architecture of KHL. Moreover, the developmental pathways of different linguistic aspects of KHL grammar in such cross-linguistic bilingualism before adulthood are barely known. Thus, it is imperative to investigate the linguistic aspects in Korean in which English-speaking KHSs diverge from the native norms, as well as the development and maintenance of such aspects prior to adulthood. To this end, KHSs in Australia in primary school years were tested for their knowledge and use of various linguistic aspects in Korean grammar with three different tasks (i.e., Tasks 3, 4 and 5). This chapter describes the designs of the tasks, presents their results and provides interpretations and implications of the results in relation to the development and maintenance of KHL grammar under a Korean–English-in-contact condition over primary school years. (This chapter addresses the research questions (1), (2), (3) and (5) presented in 4.2 regarding grammar.)

7.1 Task design

The study of HLs has centred around the description of linguistic profiles of HSs and has been eager to uncover their differences from their NS controls in the linguistic

* The results of preliminary analyses of Task 5 were presented at the International Circle of Korean Linguistics Conference, Melbourne, Australia (2019, July). The results of preliminary analyses of Task 4 were presented at the 11th Biennial Korean Studies Association of Australasia Conference, Perth, Australia (2019, December).

knowledge and use of HL grammar. Its findings have thus far indicated that with respect to numerous linguistic aspects, HSs have abilities different from those of the NSs and the degree of the difference differs between linguistic aspects. The findings also indicated that such aspects in HL grammar can vary by the pair of the languages in contact (e.g., Korean–English compared to Korean–Japanese). Contributing to the findings in the field of research, studies that have examined English-speaking adult KHSs identified some linguistic aspects in Korean grammar that the KHSs show a divergence from the native norms, as reviewed in section 3.4.3. Undoubtedly, their findings started to inform which aspects of Korean grammar are likely to be not attained to the native level in English-speaking KHSs. Nevertheless, more information on the linguistic aspects in Korean that are susceptible to non-native attainment under a Korean–English-in-contact setting is necessary for better understanding the acquisition of KHL. Moreover, it has been hardly studied how the knowledge and use of the linguistic aspect in question develop and are maintained in the KHSs before they reach adulthood. Thus, this study investigated the level of the linguistic abilities regarding various aspects of Korean grammar that KHSs in Australia in primary school years have attained and retained compared to their school-year-level-matched KNSs in South Korea.

To examine their command of various linguistic aspects in Korean grammar, three tasks were devised: Task 3, a picture selection task for the comprehension of sentences of various syntactic structures and semantic features; Task 4, a Grammaticality Judgement (GJ) task for the linguistic knowledge of four specific aspects; and Task 5, a picture selection task for the comprehension of passive sentences in comparison to active sentences.

7.1.1 Task 3—A picture selection task for multiple syntactic and semantic aspects

Task 3 was a picture selection task designed to examine the research participants' comprehension of simple or complex sentences in Korean that contain various syntactic structures and semantic features. This task adapted the Syntax/Semantics Comprehension Test (SSCT), which is the sixth subtest of the Language Scale for School-aged Children (LSSC) (Lee Y et al., 2015). LSSC is a standardised test developed to assess the lexical/semantic, grammatical and pragmatic competence in Korean of KNSs of primary school age with 11 subtests. Among these subtests, the SSCT examines the children's

comprehension of simple sentences and complex sentences composed of various syntactic structures and semantic features.

In a standard administration of the SSCT, the examinee is presented with four different pictures and asked to select the best matching one for the sentence that the examiner presents orally, such as *Khu.le.pha.su.lo em.ma.to ku.lim.ul ku.lin.ta*. ‘The mother, too, draws with crayons.’ The SSCT consists of 35 items that are tested in order of increasing difficulty. Task 3 in this study excluded five items that have a relatively low discrimination power according to the norming test results from the test development;⁷⁵ this was to avoid the duration of the whole test of the study (i.e., Tasks 1–5) being too long. (See Appendix 8 for the list of sentences in the SSCT that were included in Task 3 and their target features.)

To administer the task in a classroom setting, the pictures for the answer choices were printed and included in the test booklet, and the target sentences were pre-recorded. In the task, the research participants were asked to choose the picture that corresponds to the sentence that they hear for each test item. The target sentence for each item was played only once following the standard administration of the SSCT; the participants were given 10 seconds to choose their answers before moving to the next item.

7.1.2 Task 4—A GJ task for four different linguistic aspects

Task 4 was designed to test the participants’ linguistic knowledge of four different aspects in Korean grammar that English-speaking KHSs may have difficulties with developing to the native level. The aspects were verb conjugation, passive construction, Negative Polarity Items (NPIs) and the use of the verbs *o-* ‘to come’ and *ka-* ‘to go’. The task adopted a GJ test in which the participants were asked to judge the well-formedness of the sentence that contains one of the four target aspects. A GJ test has been widely used not only in adult L2 learning but also in child L1 acquisition as a psychometric measure of the language learner’s knowledge of the linguistic feature in question. The GJ task in this study consisted of 60 items: 20 items for verb conjugation, 20 items for passive construction, 10 items for NPIs and another 10 items for the verbs *o-* and *ka-*.

Twenty items in Task 4 were designed to test the participants’ morphophonemic knowledge of verb conjugation in Korean. Non-mastery of verb conjugation in Korean has been previously observed among English-speaking adult KHSs (e.g., Choi H-W,

⁷⁵ The items 1, 9, 12, 18, 24 in the SSCT were excluded from Task 3 in this study.

2003); their conjugation appeared regularised or simplified (e.g., *tut.ko* ‘to listen and’—the conjugation of the verb *tut-* ‘to listen’ with the conjunctive/clausal connective *-ko* ‘and’—was often realised as *tul.e.ko* or *tul.u.ko* in the KHSs’ Korean speech) probably due to their more frequent exposure to the verb endings in the intimate (e.g., Verb + *-a/-e*) or polite (e.g., Verb + *-a.yo/-e.yo*) speech style (Choi, 2003). For the task, five groups of irregular verbs were chosen, considering the morphophonemic rules for verb conjugation in Korean.⁷⁶ For each verb group, two verbs were selected that the KNSs and KHS participants were expected to know well based on the early acquisition and high frequency of use in Korean as follows:

l-irregular verbs: *pul-* (to blow) and *kil-* (to be long)

u-irregular verbs: *ssu-* (to write) and *khu-* (to be large/tall)

lu-irregular verbs: *ca.lu-* (to cut) and *ta.lu-* (to be different)

p-irregular: *kwup-* (to grill/bake) and *chwup-* (to be cold)

t-irregular: *ket-* (to walk) and *tut-* (to listen).⁷⁷

Each verb was combined with two of the four different conjunctors, *-(u)ni.kka*, *-(u)myen*, *-ko*, *-a.se/-e.se*, to form 20 different sentences. Among these 20 sentences, 10 were ungrammatical because they had an incorrectly conjugated verb form as in *An.kyeng.ul sse.myen* ($\sqrt{ssu.myen}$) *cak.un.kul.ssi.to cal po.ye.yo*. ‘If wearing glasses, one can see even small letters well.’ (The sentences made up for testing the verb conjugation in Task 4 are listed in Appendix 9.)

⁷⁶ Irregular verbs that do not follow regular conjugation rules but have their own patterns. For instance, the final consonant *t* in the verb stem *tut-* (to listen), which is a *t*-irregular verb, stays intact when followed by *-ko* or *-(u)n.tey/nun.tey* (e.g., *tu \underline{t} .ko*, *tu \underline{t} .nun.tey*), but it changes to *l* when followed by *-(u)ni.kka*, or *-e/a* (e.g., *tu \underline{l} .u.ni.kka*, *tu \underline{l} .e*).

⁷⁷ It should be noted that in some dialects, some of these verbs have different forms or pronunciations; for instance, the verb *kil-* ‘to be long’ of the standard Korean is pronounced as *cil-* in Gyeongsang and Jeolla dialects. It should be also noted that the categorisation of regular and irregular verbs differs between dialects. For instance, in Gyeongsang dialect, *p*-irregular verbs follow regular conjugation rules; when *chwup-* ‘to be cold’ is followed by *-e/a*, the final sound of the verb stem *p* stays intact (i.e., *chwup-e*, hence regular conjugation) in the dialect whereas it changed to /w/ in the standard Korean (i.e., *chwuw-e*, hence irregular conjugation). Moreover, even in the standard Korean, NSs do not always use the correctly conjugated verb form of an irregular verb, especially in colloquial speech. For *lu*-irregular verbs, for example, it is commonly observed that NSs utter *tal.lu.ko* for *ta.lu.ko* (i.e., the correctly conjugated form for the verb *ta.lu-* ‘to be different’ when it is followed by *-ko*). This may have been derived from applying the verb’s irregular conjugation rule of omitting *u* and doubling *l* of the verb stem when the verb is followed by *-e/a* (i.e., *tal.la* not *ta.lu.e*).

Another 20 items in Task 4 were to test the participants' morphosyntactic knowledge of passive voice constructions in Korean. A relative difficulty with understanding and processing passive sentences in Korean among English-speaking adult KHSs has been reported previously (e.g., Lee S-Y & Jeong, 2014). Moreover, a delay in acquiring the passive in Korean was observed in Korean–Chinese bilingual children who were ethnic Koreans living in China (Lee K-O & Lee, 2007). Accordingly, KHSs in Australia in their primary school years may also have difficulties with passive constructions in Korean. Thus, Task 4 in this study tested the participants' morphosyntactic knowledge of the morphological passives—whose passivisation is carried out by suffixation of *-i/hi/li/ki*—with 20 sentences.⁷⁸ Half of the sentences were ungrammatical as their passive verb form was replaced by the active form as in *Na.nun mo.ki.han.they cal mwul.e.yo* (*√mwul.lye.yo*). 'I get bitten by mosquitoes a lot.' (The list of the sentences for testing the passives in Task 4 is Appendix 10.)

Ten items in Task 4 were to test the participants' semantic–syntactic knowledge of NPIs in Korean such as *-pakk.ey* 'except for' or *a.mu.to* 'anyone', which must be licensed by a negator. It has been previously observed that English-speaking adult KHSs were less accurate with rejecting a complex Korean sentence with an NPI in which the NPI was not licensed by a negator within the same clause, such as *Na.nun [swu.ci.ka a.mwu.to coh.a.han.ta.ko] sayng.kak.ha.ci ahn.a.yo*. 'I do **not** think [that Suzi likes anyone].' which is ungrammatical in Korean but grammatical in English (Kim S-J, 2015). Ten simple or complex sentences were made up to test the participants' knowledge of the NPIs in Korean; five of them were ungrammatical. (The list of the sentences is in Appendix 11.)

Another 10 items in Task 4 were to test the participants' semantic–pragmatic knowledge regarding the use of the Korean verbs *o-* 'to come' and *ka-* 'to go'. The realisation of the deictic motion verbs *o-* and *ka-* in Korean does not correspond to that of their translation-equivalents in English. The use of the two verbs between the two languages is similar in that both *o-* and *come* represent the movement towards the referent

⁷⁸ Korean has different types of passive constructions and Korean linguists differ from one to another in referring to them. For instance, Sohn (2013) categorises the different types of passive sentences into 'suffixal', 'lexical' and 'phrasal'. This study follows the classification of passives by Yeon (2015) who explains that Korean has two types of passives, 'morphological' and 'analytical' passives. The 'morphological' passives refer to those passivised by adding one of the four suffixes *-i/hi/li/ki* after the verb stem.

point, and both *ka-* and *go* represent the movement away from the reference point. However, how the reference point is decided in relation to the direction of the movement of the agent, as well as the locations of the speaker and addressee and the timing of the movement and the speech act, differs between the two languages (Kuno, 1987; Nakazawa, 1990). Therefore, when called in for dinner by a person in the kitchen, an English speaker in another room will say, *Ok, I'm coming*. whereas a Korean speaker will say *Ney, ka.yo*. 'Ok, I'm going.' As difficulties in learning the complex pragmatics of these motion verbs in their L2 have been observed among Korean-L1 learners of English (e.g., Park GS, 2002) as well as among English-L1 learners of Korean (e.g., Cho, 2005; Park E-J, 2015), it is expected that English-speaking KHSs may show non-native use of the verbs *o-* and *ka-* in Korean. Ten items were prepared for testing the use of the verbs; different from the other test items in Task 4, these were short conversations between two people. The utterance by the first speaker provided the pragmatic information relevant for the conversation, and the other person's answer contained the target sentence as below:

Speaker A: *Ci.kum way sin.pal.ul sin.e?* 'Why are you putting your shoes on now?'

E.ti na.ka.lye.ko? 'Are you going out to somewhere?'

Speaker B: *Ney, nol.i.the.ey ka.yo*. 'Yes, I'm going to the playground.'

Ce.nyek mek.ki cen.kka.ci tul.e.kal.key.yo ($\sqrt{tul.e.ql.key.yo}$) 'I'm going (\sqrt{coming}) back by dinner'.

Among the 10 items prepared, half of them were ungrammatical. (The list of the conversations for using the verbs *o-* and *ka-* is in Appendix 12.)

The 60 items prepared for testing the participants' linguistic knowledge of the four target aspects in Korean were placed in a random order in the task. For each test item, the participants were asked to choose between 'correct (O)' and 'wrong (X)' printed on the test booklet after listening to the target sentence.⁷⁹ Like in the other tasks, the target sentences were provided only aurally, but each stimulus was played twice to compensate for the possible lack of attention and limited short-term memory capacity of the participants. The participants were given 10 seconds to choose their answers for each item.

⁷⁹ The word 'grammatical' or 'ungrammatical' was not used in the instruction of the task because the participants were not expected to know the meaning of such word. Nevertheless, primary school children—or even younger children—know intuitively that an ungrammatical sentence is not right and can even correct the sentence such that GJ tasks as well as correction tasks have been frequently used in L1 acquisition studies.

7.1.3 Task 5—A picture selection task for the passive

Task 5 was designed to test the participants' understanding of passive sentences in Korean—precisely speaking, their ability to understand the thematic relations (i.e., the agent and patient of the action) in morphological passives—with a picture selection task. The task assessed the comprehension of three different types of passive sentences in comparison to two types of active sentences as follows:

passive sentences in the canonical word order: NP-Nom, NP-*han.they* and Verb

passive sentences in a scrambled word order: NP-*han.they*, NP-Nom and Verb

passive sentences without the *hanthey*-phrase: NP-Nom and Verb

active sentences in the canonical word order: NP-Nom, NP-Acc and Verb

active sentences in a scrambled word order: NP-Acc, NP-Nom and Verb

Twenty sentences were made up from the four action verbs, *an-* 'to hug', *cap-* 'to catch', *cha-* 'to kick' and *mil-* 'to push'. For each verb, the above five types of sentences were created for the target action that takes place between a pair of animals (i.e., a dog and a cat; a monkey and a koala; a lion and a tiger; and a giraffe and an elephant) so that the agent and patient are semantically reversible. (The list of the sentences created for Task 5 is in Appendix 13.)

For each sentence, four different pictures were prepared for its answer choices: one matching the thematic relations of the action of the target sentence (e.g., X hugs Y) regardless of the voice, another with the reversed thematic relations (e.g., Y hugs X) and the two others for an irrelevant action (e.g., X kicks Y and Y kicks X). (The examples of the pictures prepared for a target sentence in Task 5 can be found in Appendix 14.) The test sentences were placed in random order. For each test item, the participants were asked to choose the matching picture for the sentence they heard. Each sentence was played only once, and the participants were given 10 seconds to choose their answers.

7.2 Results

For each of the three tasks (i.e., Tasks 3, 4 and 5), the participants' answers were analysed, excluding the results of some participants who either missed the task or showed

a sign of ill performance.⁸⁰ Each participant's per cent correct score was calculated from his or her raw score on each task, and this was analysed for the results of the tasks. With the scores of individual participants, the mean score of each participant subgroup—divided by gender, school year level and speaker group—was calculated. The mean scores of the subgroups for each task are presented in Table 7.1.

The preliminary analysis of the participants' performance of the three tasks exhibited the same overall trends observed with Task 1 (i.e., phoneme discrimination task) and Task 2 (i.e., receptive vocabulary task) reported in the previous chapters. In general, girls scored slightly higher than their male peers of the same speaker group. Within a speaker group in a gender, the participants in a higher-year level tended to score higher than those in a lower-year level. KHSs scored lower than their NS peers of the same gender. In the following subsections, the performance of the participants on each task is analysed in detail, following the key research questions of the study.

Table 7.1 *Numbers, mean scores and standard deviations of scores of KHSs and KNSs in Years 1–6 in girls and boys on Tasks 3, 4 and 5*

Task	Gender	Year level	KHS			KNS		
			N	M	SD	N	M	SD
Task 3	Female	1	24	81.5	10.7	36	89.2	6.2
		2	22	86.7	8.8	50	89.5	6.4
		3	30	87.3	6.3	41	91.9	4.5
		4	20	84.5	8.5	45	92.5	4.2
		5	14	88.3	6.0	41	93.1	5.6
		6	20	91.7	6.7	42	93.6	3.4
		Total	130	86.5 ^a	8.5 ^a	255	91.6 ^a	5.4 ^a
	Male	1	20	76.8	15.4	34	84.3	7.7

⁸⁰ The participants who missed the task due to their absence from the whole or some part of the test session were excluded from the analysis of each task's results. For each task, the participants who did not answer 10% or more of the test items (i.e., three or more items in Task 3, six or more in Task 4 and two or more in Task 5) were also excluded from its analysis. As a result, the following number of participants were excluded from the analysis of each task: Task 3—four KHSs (two boys in Year 1, one girl in Year 2 and one boy in Year 3) and three KNSs (one girl and two boys in Year 1); Task 4—11 KHSs (two girls and two boys in Year 1, one girl and one boy in Year 2, three boys in Year 3 and one girl and one boy in Year 4) and eight KNSs (three girls and three boys in Year 1, and one girl and one boy in Year 4); and Task 5—four KHSs (one girl in Year 1, two boys in Year 3 and one boy in Year 4) and one KNS (one boy in Year 4).

		2	17	76.7	9.0	39	88.5	7.2
		3	27	82.1	10.7	46	90.7	6.1
		4	17	88.8	6.0	48	91.4	4.8
		5	10	87.7	7.4	48	91.8	5.6
		6	18	89.1	7.8	42	93.0	4.3
		Total	109	83.0 ^a	11.3 ^a	257	90.2 ^a	6.5 ^a
Task 4	Female	1	22	63.6	11.2	34	79.6	9.8
		2	22	71.7	11.2	50	82.3	7.1
		3	30	69.7	12.4	41	86.0	8.0
		4	19	68.9	11.5	44	87.1	5.5
		5	14	69.8	14.1	41	90.3	4.3
		6	20	78.6	11.7	42	90.2	5.0
		Total	127	70.3 ^a	12.5 ^a	252	86.0 ^a	7.7 ^a
	Male	1	20	61.0	11.0	33	75.8	11.7
		2	16	59.9	10.0	39	81.2	9.5
		3	25	64.4	12.3	46	83.8	6.7
		4	16	64.4	11.1	47	84.9	4.5
		5	10	67.3	15.4	48	87.8	7.3
		6	18	73.1	14.0	42	88.5	6.8
		Total	105	64.8 ^a	12.7 ^a	255	84.1 ^a	8.7 ^a
Task 5	Female	1	24	60.4	15.5	37	74.6	13.8
		2	22	62.5	13.6	50	77.7	15.2
		3	30	68.0	17.1	41	81.0	13.2
		4	20	67.8	15.3	45	85.6	11.1
		5	14	73.9	13.8	41	89.4	11.2
		6	20	70.5	15.1	42	87.6	12.2
		Total	130	66.7 ^a	15.6 ^a	256	82.7 ^a	13.8 ^a
	Male	1	22	51.8	14.3	36	71.8	15.5
		2	17	46.2	15.9	39	75.1	13.4
		3	26	59.6	16.2	46	80.4	12.4
		4	16	53.8	15.5	47	83.6	11.8
		5	10	63.0	19.6	48	82.1	14.4
		6	18	67.2	16.3	42	87.7	13.2

	Total	109	56.7 ^a	17.1 ^a	258	80.5 ^a	14.2 ^a
--	-------	-----	-------------------	-------------------	-----	-------------------	-------------------

^aTotal means and total standard deviations shown here are pooled means and pooled standard deviations.

7.2.1 Comparison between speaker groups—KHSs’ differences from their KNS peers in grammatical abilities

7.2.1.1 Comparison of performance between speaker groups

On all three tasks, KHSs performed less well than KNSs as they scored lower than their KNS counterparts at every year level in a gender. However, the degree of their performance difference to the NS controls differed between the tasks. The difference between the speaker groups was smaller in Task 3 than in Tasks 4 and 5.

7.2.1.1.1 Task 3—A picture selection task for multiple syntactic and semantic aspects

In general, not only KNSs but also KHSs performed well on Task 3 since most subgroups had a mean score over 80. Despite the generally high level of performance of both speaker groups on the task, it was clear that KHSs scored lower than their gender- and year-level-matched KNSs across the year levels and genders, as Table 7.1 shows. Accordingly, the adjusted mean score of KHSs in each gender—corrected for the imbalance in the number of participants between year levels in the speaker group in the gender—was lower than that of their KNS counterparts. In girls, the adjusted mean score of KHSs was 86.7, while that of KNSs was 91.6; in boys, that of KHSs was 83.5 compared to that of KNSs being 90.0.

However, the performance difference between KHSs and KNSs in Task 3 was generally not very large. The difference between the speaker groups in the mean score (mean score difference = mean score of KHSs – mean score of their KNS counterparts) was fewer than –10 at most of the year levels. In girls, the between-speaker-group difference ranged from –1.9 (at Year 2) to –8.0 (at Year 4). It was fewer than –5 at Years 2, 3, 5 and 6 and even fewer than –3 (i.e., a difference smaller than a test item) at Years 2 and 6. In boys, the difference tended to be slightly larger than in girls since it ranged from –2.6 (at Year 4) to –11.9 (at Year 2). It was quite large in the lower half of the year levels and particularly large at Year 2. In comparison, in the upper half of the year levels, it was generally smaller (fewer than –5) as the KHSs’ mean scores were more comparable to those of their KNS counterparts.

7.2.1.1.2 Task 4—A GJ task for four different linguistic aspects

On Task 4, KHSs also scored lower than their KNS counterparts at every year level in each gender, like Task 3. However, their performance difference to the NS controls in Task 4 was much larger than that in Task 3. At most year levels in a gender, the mean score difference between the speaker groups was larger than -15 , and it even exceeded -20 at some year levels. Notably, the difference between the speaker groups was relatively small at Year 2 (-10.6) and Year 6 (-11.6) in girls because the female KHSs in those year levels performed comparatively well on the task, like on Task 3. However, the between-speaker-group difference at the other year levels in the same gender was close to or even larger than -15 . The difference was especially large at Years 4 and 5, not only in boys but also in girls, because the KHSs' mean score did not increase as much as that of their KNS counterparts did; it was -18.2 at Year 4 and -20.6 at Year 5 in girls and -20.5 at both year levels in boys. Additionally, the difference was also very large at Year 2 in boys (-21.3). Given such large performance differences between the speaker groups, the average performance of KHSs in each gender was much lower than that of their KNS counterparts. This was reflected in their adjusted mean scores; in girls, the adjusted mean score of the KHSs was 70.4, compared to that of their NS controls being 85.9, and in boys, it was 65.0 in KHSs and 83.7 in KNSs.

It was noteworthy that both speaker groups performed less well on Task 4 than they did on Task 3. For example, the adjusted mean score of the NS controls in Task 4 was 85.9 in girls and 83.7 in boys, compared to that in Task 3 being 91.6 and 90.0 in the respective genders. In the cases of KHSs, their performance difference between the two tasks was even larger; their adjusted mean score in Task 4 was 70.4 in girls and 65.0 in boys, while that in Task 3 was 86.7 in girls and 83.5 in boys. The KHSs' much poorer performance of Task 4 than on Task 3 was reflected well in their larger differences to the NS controls in Task 4 than in Task 3, as described above.

7.2.1.1.3 Task 5—A picture selection task for the passive

The trend of a lower performance of KHSs than their KNS counterparts across the year levels and genders was also observed in Task 5. The mean score differences between the speaker groups in the task were also quite large. In girls, the between-speaker-group difference ranged from -13.0 (at Year 3) to -17.8 (at Year 4) and was larger than -15 at most year levels. In boys, the difference was even larger as it was close to or larger than -20 at all year levels; the difference almost reached -30 at Years 2 and 4. Reflecting such

far poorer performance of KHSs than their KNS counterparts, the average performance of KHSs in each gender was much lower than that of the NS controls; the adjusted mean score was 67.2 in female KHSs and 56.9 in male KHSs, while it was 82.6 in female KNSs and 80.1 in male KNSs.

The adjusted mean scores between the three tasks showed that both speaker groups performed even less well on Task 5 than on Task 4. In KHSs, the adjusted mean score on Task 5 was 67.2 in girls and 56.9 in boys, compared to that on Task 4 at 70.4 and 65.0 in the respective genders. In the NS controls, that on Task 5 was 82.6 in girls and 80.1 in boys, compared to 85.9 and 83.7 in the respective genders on Task 4. The between-speaker-group difference was similar between the two tasks in girls, but in boys, the difference was larger in Task 5 than in Task 4.

In all three tasks, the standard deviations of the scores were larger in KHSs than in their KNS counterparts, indicating greater performance variations among KHSs than among KNSs. When compared between the tasks, the standard deviations were largest in Task 5, followed by Task 4, and smallest in Task 3. For instance, in Task 5, the adjusted standard deviation of KHSs was 15.1 in girls and 16.3 in boys, compared to that in Task 4 being 12.0 and 12.3 and that in Task 3 at 7.8 and 9.4 in the respective genders (cf. the pooled standard deviations shown in Table 7.1).

7.2.1.2 Statistical significance of performance difference between speaker groups

For each task, the observed lower mean score of KHSs than KNSs at each year level in each gender was tested for statistical significance by an independent-samples t-test. As the assumption of equal variances between the speaker groups was violated at many of the year levels in a gender, Welch t-tests were conducted. Although the assumption of normal distribution was not met in many subgroups according to the results of Shapiro–Wilk test of normality, Welch t-tests were run because they are robust to a violation of that assumption. Outliers were present, and extreme outliers in each subgroup were excluded from the t-tests. To reduce the risk of family wise error in each task, the alpha level for each t-test was set at .004 by dividing the conventional alpha level of .05 by 12, the number of the t-tests run simultaneously (2 genders \times 6 year levels) for each task. The results of the Welch t-tests for the mean score differences between the speaker groups are presented in Table 7.2 for each task. (The numbers, mean scores and standard deviations of the scores of each participant subgroup were recalculated after removing extreme outliers for each task.)

Table 7.2 Results of Welch *t*-tests for between-speaker-group differences at Years 1–6 in girls and boys for Tasks 3, 4 and 5

Task 3										
Gender	Year level	KHS		KNS		Mean difference = $M_h - M_n$				
		<i>N</i>	<i>M_h</i>	<i>N</i>	<i>M_n</i>	<i>M</i>	<i>t</i>	<i>p</i>	99.6% CI	
			(<i>SD</i>)		(<i>SD</i>)				Lower	Upper
Female	1	24	81.5 (10.7)	36	89.2 (6.2)	−7.6	−3.152 (33.448)	0.003*	−15.1	−0.1
	2	21	88.3 (4.8)	50	89.5 (6.4)	−1.2	−0.879 (49.586)	0.383	−5.4	3.0
	3	30	87.3 (6.3)	41	91.9 (4.5)	−4.5	−3.356 (49.272)	0.002*	−8.6	−0.5
	4	20	84.5 (8.5)	45	92.5 (4.2)	−8.0	−4.026 (23.168)	0.001*	−14.4	−1.7
	5	14	88.3 (6.0)	39	94.1 (3.1)	−5.8	−3.460 (15.606)	0.003*	−11.4	−0.1
	6	20	91.7 (6.7)	42	93.6 (3.4)	−1.9	−1.198 (23.780)	0.243	−7.0	3.2
Male	1	20	76.8 (15.4)	34	84.3 (7.7)	−7.5	−2.030 (24.666)	0.053	−19.2	4.2
	2	17	76.7 (9.0)	39	88.5 (7.2)	−11.9	−4.828 (25.303)	0.000*	−19.7	−4.1
	3	27	82.1 (10.7)	43	91.8 (4.7)	−9.7	−4.435 (32.470)	0.000*	−16.4	−2.9
	4	10	90.3 (1.1)	48	91.4 (4.8)	−1.1	−1.372 (55.700)	0.176	−3.4	1.3
	5	10	87.7 (7.4)	48	91.8 (5.6)	−4.1	−1.675 (11.281)	0.121	−13.0	4.8
	6	18	89.1 (7.8)	42	93.0 (4.3)	−3.9	−2.013 (21.497)	0.057	−10.3	2.4

Task 4										
Gender	Year level	KHS		KNS		Mean difference = $M_h - M_n$				
		<i>N</i>	<i>M_h</i>	<i>N</i>	<i>M_n</i>	<i>M</i>	<i>t</i>	<i>p</i>	99.6% CI	
			(<i>SD</i>)		(<i>SD</i>)				Lower	Upper
Female	1	22	63.6 (11.2)	34	79.6 (9.8)	−16.0	−5.511 (40.736)	0.000*	−24.9	−7.2
	2	22	71.7 (11.2)	50	82.3 (7.1)	−10.6	−4.104 (28.619)	0.000*	−18.7	−2.5

	3	30	69.7 (12.4)	39	87.2 (6.1)	-17.5	-7.062 (39.719)	0.000*	-25.0	-9.9
	4	19	68.9 (11.5)	44	87.1 (5.5)	-18.2	-6.562 (21.644)	0.000*	-27.2	-9.3
	5	14	69.8 (14.1)	41	90.3 (4.3)	-20.6	-5.370 (13.821)	0.000*	-33.8	-7.4
	6	20	78.6 (11.7)	41	90.7 (4.0)	-12.1	-4.508 (21.157)	0.000*	-20.8	-3.4
Male	1	20	61.0 (11.0)	33	75.8 (11.7)	-14.8	-4.646 (42.292)	0.000*	-24.5	-5.1
	2	16	59.9 (10.0)	39	81.2 (9.5)	-21.3	-7.284 (26.578)	0.000*	-30.5	-12.1
	3	25	64.4 (12.3)	46	83.8 (6.7)	-19.4	-7.332 (31.824)	0.000*	-27.7	-11.2
	4	16	64.4 (11.1)	47	84.9 (4.5)	-20.5	-7.167 (16.735)	0.000*	-30.0	-11.0
	5	10	67.3 (15.4)	48	87.8 (7.3)	-20.5	-4.121 (9.861)	0.002*	-39.0	-1.9
	6	18	73.1 (14.0)	42	88.5 (6.8)	-15.3	-4.427 (20.465)	0.000*	-26.6	-4.1

Task 5

Gender	Year level	KHS		KNS		Mean difference = $M_h - M_n$				
		N	M_h (SD)	N	M_n (SD)	M	t (df)	p	99.6% CI	
Female	1	24	60.4 (15.5)	37	74.6 (13.8)	-14.2	-3.652 (45.113)	0.001*	-26.0	-2.4
	2	22	62.5 (13.6)	50	77.7 (15.2)	-15.2	-4.207 (44.704)	0.000*	-26.2	-4.2
	3	30	68.0 (17.1)	41	81.0 (13.2)	-13.0	-3.465 (52.671)	0.001*	-24.2	-1.7
	4	20	67.8 (15.3)	45	85.6 (11.1)	-17.8	-4.671 (28.275)	0.000*	-29.8	-5.9
	5	14	73.9 (13.8)	41	89.4 (11.2)	-15.5	-3.799 (19.224)	0.001*	-28.8	-2.2
	6	20	70.5 (15.1)	42	87.6 (12.2)	-17.1	-4.423 (31.232)	0.000*	-29.1	-5.1
Male	1	22	51.8 (14.3)	36	71.8 (15.5)	-20.0	-5.008 (47.405)	0.000*	-32.1	-7.9
	2	17	46.2 (15.9)	39	75.1 (13.4)	-29.0	-6.578 (26.349)	0.000*	-42.8	-15.1
	3	26	59.6 (16.2)	46	80.4 (12.4)	-20.8	-5.682 (41.843)	0.000*	-32.0	-9.7

4	16	53.8 (15.5)	47	83.6 (11.8)	-29.9 (21.175)	-7.029	0.000*	-43.6	-16.1
5	10	63.0 (19.6)	48	82.1 (14.4)	-19.1 (11.097)	-2.919	0.014	-42.7	4.6
6	18	67.2 (16.3)	42	87.7 (13.2)	-20.5 (26.979)	-4.723	0.000*	-34.2	-6.8

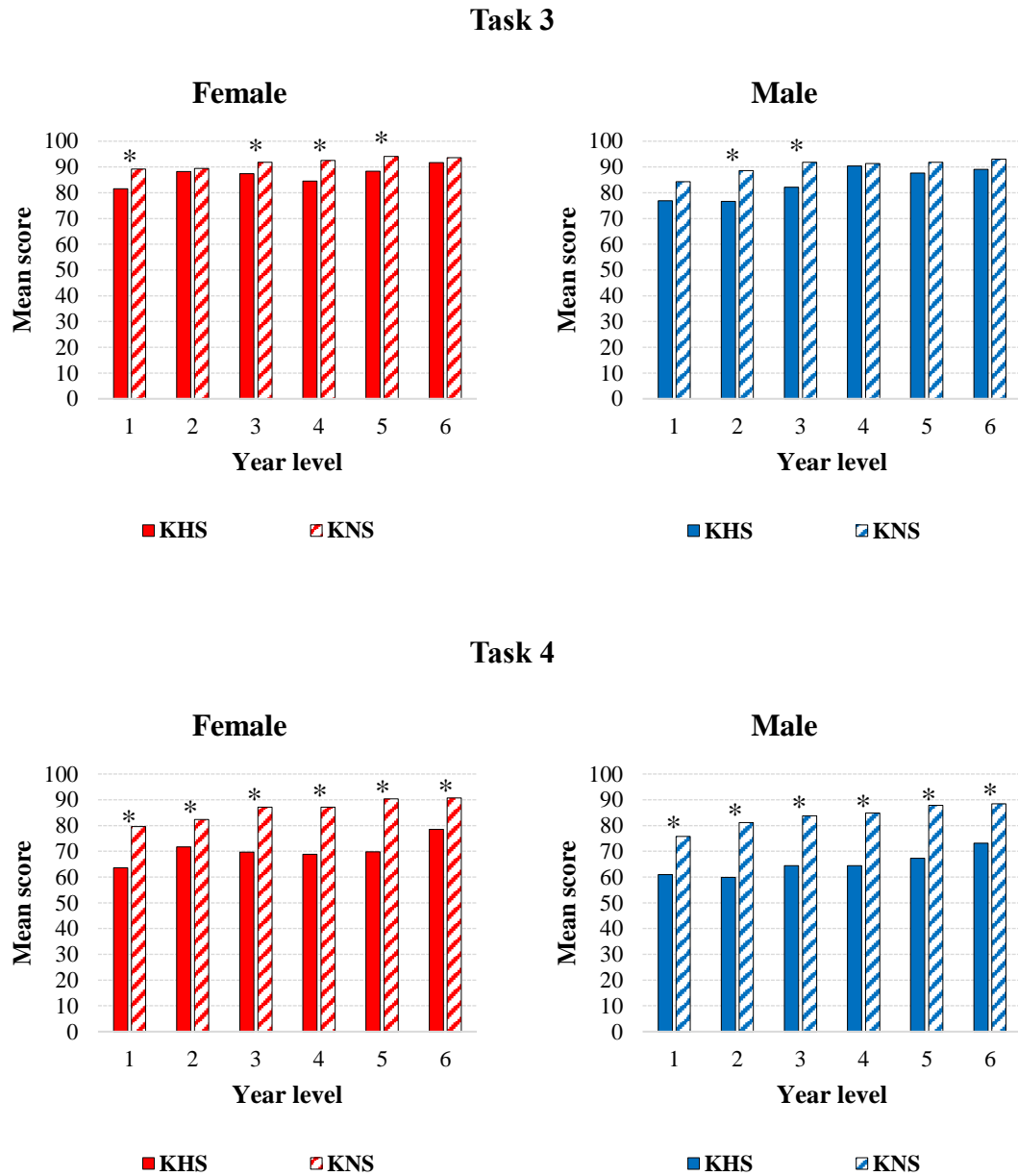
Note. A statistically significant p-value is marked with an asterisk (*).

The results of the statistical significance tests differed from one task to another. Because the between-speaker-group difference tended to be small in Task 3, it did not reach statistical significance at many year levels in a gender. In girls, the between-speaker-group difference of -7.6 at Year 1, -4.5 at Year 3, -8.0 at Year 4 and -5.8 at Year 5 was statistically significant, whereas the small difference (fewer than -3) at Years 2 and 6 was not statistically significant. In boys, only the difference of -11.9 at Year 2 and that of -9.7 at Year 3 were statistically significant.

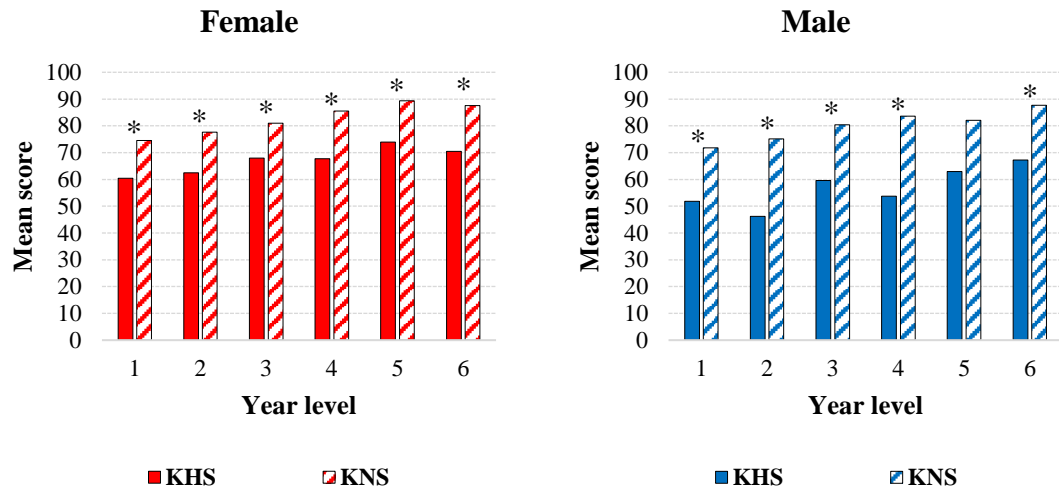
In comparison, in the latter two tasks, the between-speaker-group difference was found statistically significant at almost all year levels in a gender as the differences were generally large. In Task 4, the much lower mean score of KHSs than their KNS counterparts turned out to be statistically significant at every year level in each gender, with most p-values being .000. In Task 5, the between-speaker-group difference also reached statistical significance at all year levels in both genders, except for Year 5 in boys. Although the mean score difference between the speaker groups at Year 5 in boys was quite large, $M = -19.1$, $t(11.097) = -2.919$, $p = .015$, it was not statistically significant with the conservative alpha level. (The mean scores of the participant subgroups are plotted in bar charts for each task in Figure 7.1.)

In sum, in all three tasks, KHSs performed less well than their gender- and year-level-matched KNSs, although the degree of their performance difference to the NS controls differed between the tasks. The observed lower performance of KHSs than their KNS counterparts on each task was tested for statistical significance. The statistical test results informed that the lower performance of KHSs than their KNS counterparts reached statistical significance at almost all year levels in both genders in Task 4 and in Task 5. In Task 3, in contrast, the performance difference between the speaker groups did not reach statistical significance at many of the year levels in each gender.

Figure 7.1 Comparison of mean scores between KHSs and KNSs at Years 1–6 in girls and boys for Tasks 3, 4 and 5 (excluding extreme outliers)



Task 5



Note. A statistically significant difference between the speaker groups at a year level in a gender is marked with an asterisk (*).

7.2.2 Comparison between year levels—KHSs' change in grammatical abilities

7.2.2.1 Comparison of performance between school year levels

In all three tasks, the participants' mean score generally increased by year level within each speaker group in each gender. In other words, the participants in a higher-year level usually scored higher than those in a lower-year level of the same speaker group and gender. Because the three tasks differed from one another not only in the task format and difficulty but also in the linguistic feature and the total number of test items, the degree of the mean score change by year level varied between the tasks. In each task, the two speaker groups differed from each other in the degree of mean score change by year level, as well as the locus of a relatively large mean score change.

7.2.2.1.1 Task 3—A picture selection task for multiple syntactic and semantic aspects

In Task 3, in both speaker groups, the mean score of the participants rose as the year level went up, although it fell between some year levels in KHSs. In the NS controls, the mean score increased consistently by year level in each gender; it rose steadily from 89.2 at Year 1 to 93.6 at Year 6 in girls and from 84.3 at Year 1 to 93.0 at Year 6 in boys. As KNSs performed quite well on the task from the lowest year level, the mean score difference between the lowest and highest year level in a gender was not very large, and their mean score exceeded 90 at Year 2 in girls and at Year 3 in boys. Accordingly, in each gender, the mean score increase between adjacent year levels was very small.

In KHSs, the mean score also increased generally by year level in each gender. In girls, their mean score constantly increased from 81.5 at Year 1 to 91.7 at Year 6, except for the fall between Year 3 ($M = 87.3$) and Year 4 ($M = 84.5$). In boys, the mean score also increased from 76.8 at Year 1 to 89.1 at Year 6 although it decreased marginally between Year 1 ($M = 76.8$) and Year 2 ($M = 76.7$) and between Year 4 ($M = 88.8$) and Year 5 ($M = 87.7$). Like in the NS controls, in KHSs, the mean score increase between adjacent year levels was not very large as they performed quite well on the task from Year 1.

7.2.2.1.2 Task 4—A GJ task for four different linguistic aspects

In Task 4, an overall tendency of mean score increase by year level was observed in both speaker groups. However, a closer inspection of the increase by year level showed a slightly different pattern in each speaker group. In KNSs, the mean score increased moderately between the lower-, middle- and upper-year levels. In girls, the mean score of 79.6 at Year 1 rose to 82.3 at Year 2, made a leap to 86.0 at Year 3 and then increased slightly to 87.1 at Year 4, and it made another jump to 90.3 at Year 5 but fell slightly to 90.2 at Year 6. Similarly, in boys, the mean score of 75.8 at Year 1, which was quite low compared to that of their female peers, jumped to 81.2 at Year 2, made a small leap to 83.8 at Year 3 and rose slightly to 84.9 at Year 4, and it made another small jump to 87.8 at Year 5 and went up slightly to 88.5 at Year 6.

Compared to the NS controls, KHSs in each gender showed a stagnant increase at the middle-year levels through to the start of the upper-year levels, although a moderate increase between the lower- and middle-year levels was observed, and a relatively large increase between the two upper-year levels was noted. At the lower-year levels, their mean score made a remarkable spring between Year 1 ($M = 63.6$) and Year 2 ($M = 71.6$) in girls, whereas it fell unexpectedly between the same year levels in boys ($M = 61.0$ at Year 1 and $M = 59.9$ at Year 2). At the middle-year levels, the KHSs' mean score stagnated through to Year 5 (e.g., in girls, $M = 69.7$ at Year 3, $M = 68.9$ at Year 4, and $M = 69.8$ at Year 5). However, the mean score jumped by a great degree between the two upper-year levels in both genders; the mean score increase between them was extraordinary in girls (i.e., $M = 69.8$ at Year 5 and $M = 78.6$ at Year 6).

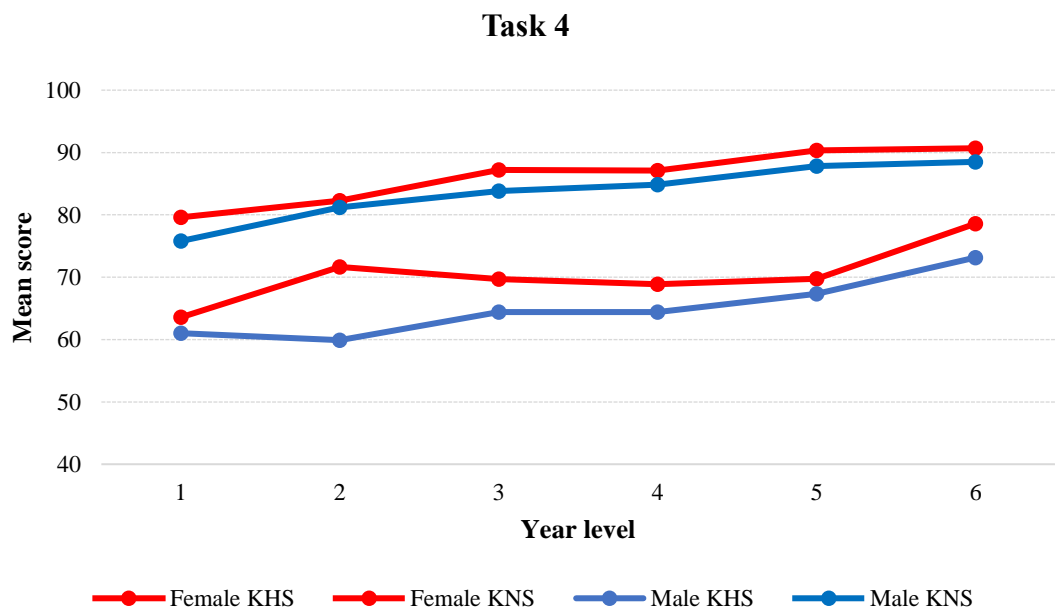
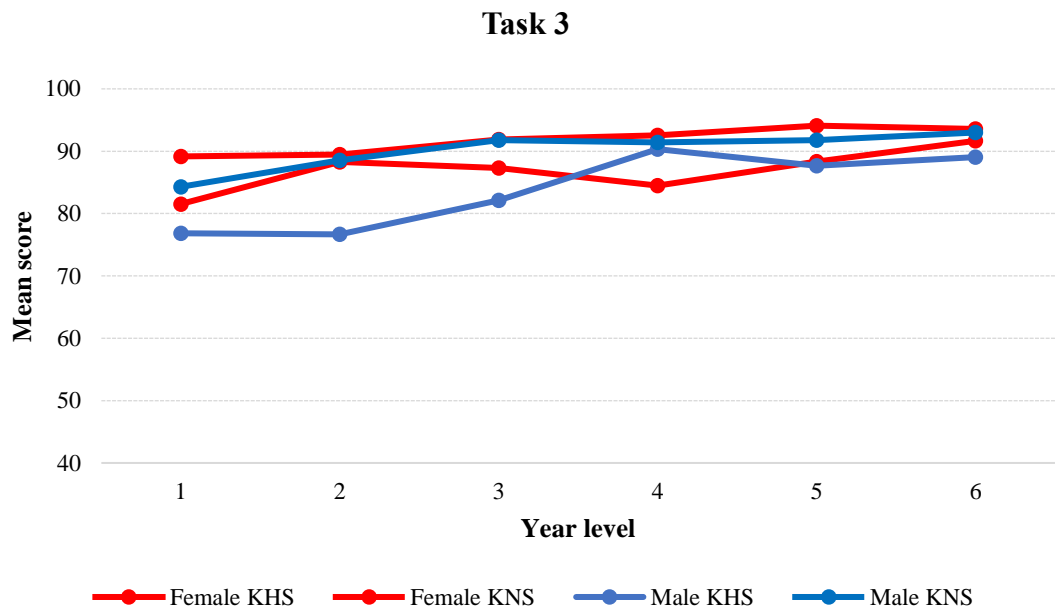
7.2.2.1.3 Task 5—A picture selection task for the passive

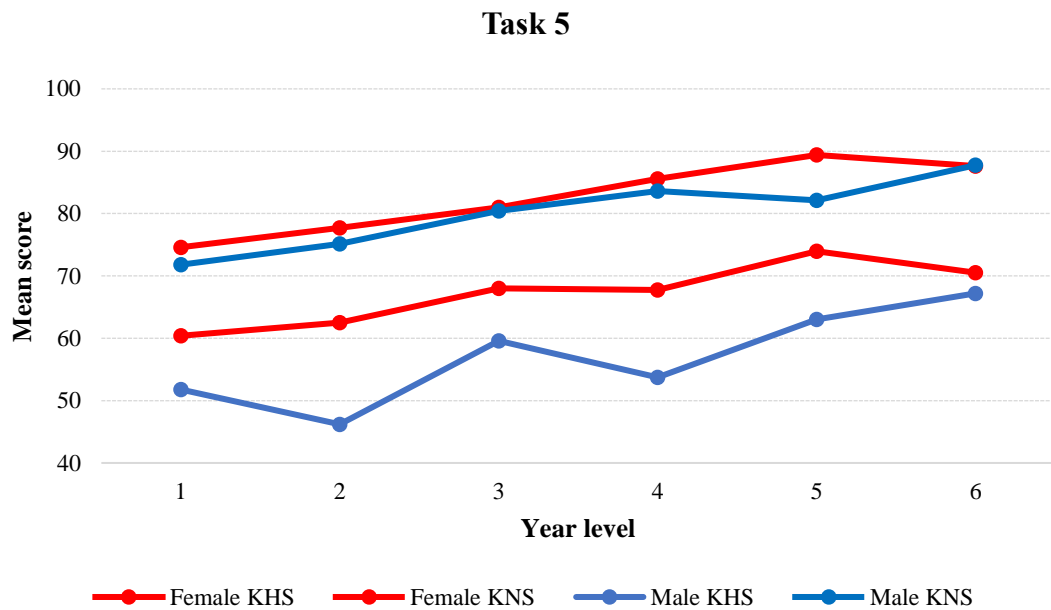
In Task 5, the trend of better performance of the participants in a higher-year level than those in a lower-year level was also evident in both speaker groups. In KNSs, the

mean score increased from 74.6 at Year 1 to 87.6 at Year 6 in girls and from 71.8 at Year 1 to 87.7 at Year 6 in boys, although it fell slightly between Year 5 ($M = 89.4$) and Year 6 ($M = 87.6$) in girls and between Year 4 ($M = 83.6$) and Year 5 ($M = 82.1$) in boys. It was notable that in girls the mean score exceeded 85 at Year 4 and had stagnant progress thenceforth and in boys it also showed fluctuations from Year 3 to Year 5 although by and large it increased.

In KHSs, the mean score also tended to increase by year level in each gender, but it showed more fluctuations than in KNSs as the mean score fell between some year levels. In girls, their mean score generally increased by year level, from 60.4 at Year 1 to 70.5 at Year 6, although it fell slightly between Year 3 ($M = 68.0$) and Year 4 ($M = 67.8$) and between Year 5 ($M = 73.9$) and Year 6 ($M = 70.5$). In boys, their mean score fluctuated even more: the mean score of 51.8 at Year 1 fell to 46.2 at Year 2 but jumped to 59.6 at Year 3; it went down again to 53.8 at Year 4 but rose once again to 63.0 at Year 5 and increased further to 67.2 at Year 6. Despite the observed fluctuations, it could be concluded that the KHSs in the upper-year levels generally performed better than those in the middle-year levels who, in turn, performed better than those in the lower-year levels.

Figure 7.2 *Change of mean scores by year level in KHSs and KNSs in girls and boys for Tasks 3, 4 and 5*





7.2.2.2 Statistical significance of performance difference between year levels

In each task, the mean score differences between year levels within each speaker group in each gender were tested for statistical significance. For each task, the statistical significance of the mean score differences between two different year levels within a speaker group in a gender was tested by pairwise t-tests with the Bonferroni correction applied. Welch t-tests were run because equal variances between the year levels were not assumed. The extreme outliers excluded from the statistical tests for the mean score differences between the speaker groups (as reported in section 7.2.1.2.) were also removed from the pairwise Welch t-tests. As four pairwise Welch t-tests (2 genders \times 2 speaker groups) were run simultaneously for each task, the alpha level for each pairwise Welch t-tests was set at .0125 by dividing the conventional alpha level .05 by 4.

Table 7.3 Results of pairwise Welch t-tests for mean score differences between year levels in KHSs and KNSs in girls and boys for Tasks 3, 4 and 5

Task 3			
Gender	Speaker group	Year level (j)	Mean difference ($i - j$)
			Year level (i)

			1	2	3	4	5	6
Female	KHS	1						
		2	−6.7					
		3	−5.8	0.9				
		4	−3.0	3.8	2.8			
		5	−6.8	−0.1	−1.0	−3.8		
		6	−10.1*	−3.4	−4.3	−7.2	−3.3	
	KNS	1						
		2	−0.3					
		3	−2.7	−2.4				
		4	−3.4	−3.1	−0.6			
		5	−4.9*	−4.6*	−2.2	−1.6		
		6	−4.4*	−4.1*	−1.7	−1.1	0.5	
Male	KHS	1						
		2	0.2					
		3	−5.3	−5.4				
		4	−13.5	−13.7*	−8.2*			
		5	−10.8	−11.0	−5.6	2.7		
		6	−12.2	−12.4*	−7.0*	1.3	−1.4	
	KNS	1						
		2	−4.2					
		3	−7.5*	−3.2				
		4	−7.1*	−2.8	0.4			
		5	−7.5*	−3.3	0.0	−0.4		
		6	−8.7*	−4.5	−1.2	−1.6	−1.2	

Task 4

Gender	Speaker group	Year level (<i>j</i>)	Mean difference (<i>i</i> − <i>j</i>)					
			Year level (<i>i</i>)					
			1	2	3	4	5	6
Female	KHS	1						
		2	−8.1					
		3	−6.2	1.9				
		4	−5.3	2.8	0.9			

		5	−6.2	1.9	0.0	−0.9	
		6	−15.0*	−6.9	−8.9	−9.7	−8.8
	KNS	1					
		2	−2.7				
		3	−7.6*	−4.9*			
		4	−7.5*	−4.8*	0.1		
		5	−10.7*	−8.0*	−3.1	−3.2	
		6	−11.1*	−8.4*	−3.5	−3.6*	−0.4
Male	KHS	1					
		2	1.1				
		3	−3.4	−4.5			
		4	−3.4	−4.5	0.0		
		5	−6.3	−7.4	−2.9	−3.0	
		6	−12.1	−13.3	−8.7	−8.8	−5.8
	KHS	1					
		2	−5.4				
		3	−8.0	−2.6			
		4	−9.1*	−3.7	−1.0		
		5	−12.0*	−6.6*	−4.0	−3.0	
		6	−12.7*	−7.3*	−4.7	−3.6	−0.7

Task 5

Gender	Speaker group	Year level (<i>i</i>)	Mean difference (<i>i</i> − <i>j</i>)					
			Year level (<i>j</i>)					
			1	2	3	4	5	6
Female	KHS	1						
		2	−2.1					
		3	−7.6	−5.5				
		4	−7.3	−5.3	0.3			
		5	−13.5	−11.4	−5.9	−6.2		
		6	−10.1	−8.0	−2.5	−2.8	3.4	
	KNS	1						
		2	−3.1					
		3	−6.4	−3.3				

		4	-11.0*	-7.9	-4.6		
		5	-14.8*	-11.7*	-8.4	-3.8	
		6	-13.0*	-9.9*	-6.6	-2.1	1.8
Male	KHS	1					
		2	5.6				
		3	-7.8	-13.4			
		4	-1.9	-7.6	5.9		
		5	-11.2	-16.8	-3.4	-9.3	
		6	-15.4	-21.0*	-7.6	-13.5	-4.2
	KNS	1					
		2	-3.3				
		3	-8.6	-5.3			
		4	-11.8*	-8.5	-3.2		
		5	-10.3	-7.0	-1.6	1.5	
		6	-15.9*	-12.6*	-7.3	-4.1	-5.7

Note. A statistically significant mean score difference is marked with an asterisk (*).

In Task 3, although most of the mean score differences between two different year levels compared to one another were statistically non-significant in both speaker groups, some differences were statistically significant, and fewer differences were significant in KHSs than in the NS controls. In KNSs, in girls, the higher mean score of the participants in one of the upper-year levels compared to those in one of the lower-year levels was statistically significant: the mean score at Year 6, as well as that at Year 5, was statistically significantly higher than the mean score at Years 1 and 2, respectively. In male KNSs, the mean score of the participants in Years 3, 4, 5 and 6, respectively, was statistically significantly higher than that of those in Year 1. Conversely, in KHSs, in girls, only the mean score at Year 6 was found to be statistically significantly higher than that at Year 1; in boys, the mean score at Year 6, as well as that at Year 4 (i.e., the highest among all year levels after removing extreme outliers), was statistically significantly higher than that at Years 1 and 2, respectively.

For Task 4, the statistical test results differed between the speaker groups more greatly. In KNSs, many of the mean score differences between one of the lower-year levels and some higher-year levels were statistically significant. In female KNSs, the

mean score at Years 3, 4, 5 and 6, respectively, turned out to be statistically significantly higher than that of at Year 1, as well as that at Year 2; in addition, the mean score at Year 6 was also statistically significantly higher than that at Year 4. Similarly, in male KNSs, the mean score at Year 6, as well as at Year 5, was statistically significantly higher than that at Years 1 and 2, respectively. The mean score at Year 4 was also significantly higher than that at Year 1. By contrast, in KHSs, all mean score differences between two different year levels were statistically non-significant, except for that between Years 1 and 6 in girls.

Like in Task 4, in Task 5, many of the mean score differences between one of the lower-year levels and some higher-year levels were statistically significant in KNSs, whereas most of the differences were non-significant in KHSs. In female KNSs, the mean score at Years 4, 5 and 6, respectively, was statistically significantly higher than that at Year 1; the mean score at each of Years 5 and 6 was also statistically significantly higher than that at Year 2. In male KNSs, the mean score at Year 6 was statistically significantly higher than that at Year 1 as well as that at Year 2, and the mean score at Year 4 was also statistically significantly higher than that at Year 1. On the contrary, in KHSs, only the mean score difference between Year 6 (i.e., the highest) and Year 2 (i.e., the lowest) was found statistically significantly in boys. No mean score difference was found statistically significant in girls.

7.2.3 Comparison between test items—KHSs' difficulty with particular grammatical aspects

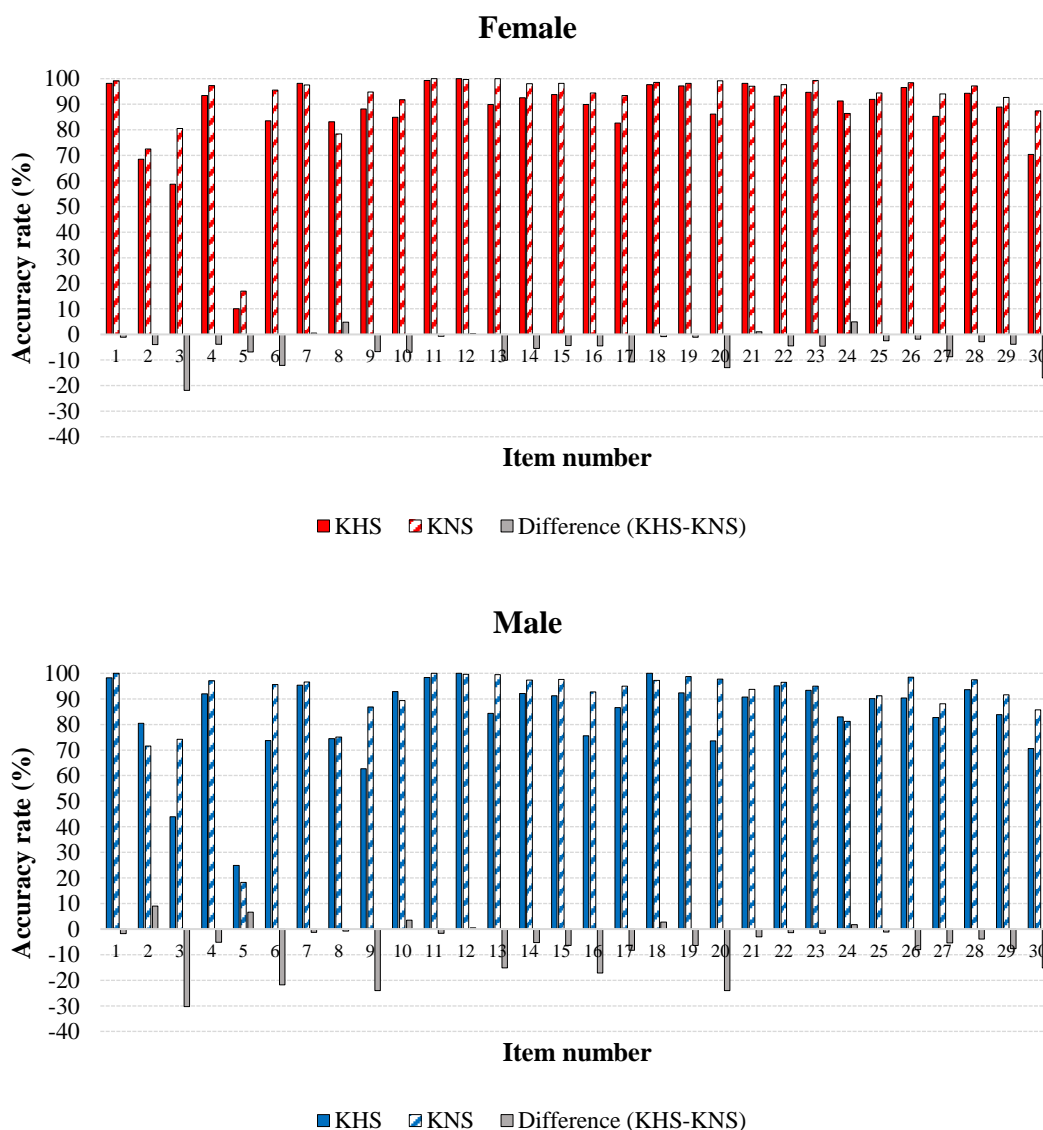
To examine the KHSs' linguistic abilities regarding specific linguistic aspects tested in the tasks in comparison to their NS controls, the participants' performance of individual test items as well as on the test items for specific features were analysed for each task. Given the overall trend of a lower performance of KHSs than KNSs, KHSs performed far less well than the NS controls on some test items compared to other items or the test items for some linguistic aspects compared to those for other linguistic aspects as elaborated in the following subsections.

7.2.3.1 Task 3—A picture selection task for multiple syntactic and semantic aspects

For Task 3, the participants' accuracy on individual test items was analysed because each item tested a different syntactic structure or semantic feature. In each participant subgroup, the accuracy rate for each test item was calculated by computing

the percentage of the participants with the correct answer. For individual test items, the calculated accuracy rates of KHSs and KNSs at each year level in each gender, as well as their accuracy rate difference between the speaker groups at each year level in each gender, were plotted in bar charts and presented in Appendix 15. With these accuracy rates of the subgroups, the adjusted mean accuracy rate of each speaker group in each gender—corrected for the imbalance in the participant number between year levels in the speaker group in the gender—was computed for each test item and compared between the speaker groups, as Figure 7.3 shows.

Figure 7.3 *Adjusted mean accuracy rates of KHSs and KNSs in girls and boys on individual test items in Task 3*



The comparison of the participants' accuracy on individual test items showed that both speaker groups had a relatively low accuracy rate (i.e., below or around 80%) on certain test items. The accuracy rate on Item 5 was particularly low; for instance, it was below 20 even in the NS controls in both genders. This extremely low accuracy on Item 5 in both speaker groups in each gender was due to the ambiguity that arose from the oral presentation of the target sentence. Its target sentence *Sang.a.ka tong.sayng.ey.key cong.i.pay.lul man.tul.e cwu.ko iss.ta* can easily be interpreted as 'Sanga is making a paper ship for her little brother' especially without a noticeable pause between *man.tul.e* 'to make and' and *cwu.ko iss.ta* 'is giving'. To deliver the intended meaning of the sentence—that is, 'Sanga has made a paper ship and is giving (it) to her little brother'—without a dispute, the sentence should be either rearranged as in *Sang.a.ka cong.i.pay.lul man.tul.e tong.sayng.ey.key cwu.ko iss.ta* or keep the full form the conjunctor *-a.se/e.se* 'and' (i.e., *man.tul.e.se* instead of *man.tul.e*) so that the examinee can parse between *man.tul.e* and *cwu.ko* in the sentence as intended.

The accuracy rate on Items 2, 3 and 8 was also relatively low compared to the other items. In the case of Item 2, *Khu.ley.pha.su.lo em.ma.to ku.lim.ul ku.lin.ta* 'The mother, too, is drawing with crayons', some participants in both speaker groups seemed to have not paid enough attention to the special particle *-to* 'also/too' in *em.ma.to* 'the mother, too' or the small differences between the given pictures as the answer options; in the picture intended as the correct answer, both the mother and the child are drawing, but some participants chose the picture in which only the mother is drawing. For Item 8, *Ca.tong.cha.ka pay.po.ta te khe.ko kong.i ka.cang khe.ta* 'The car is bigger than the ship, and the ball is the biggest', both speaker groups seemed to have had difficulty with comparing the size of the three different objects in the short time given to choose the matching picture. For Item 3, *Khe.ta.lan ko.yang.i.ka cak.un kang.a.ci.ey.key cap.hyess.ta* 'The big cat was caught by the small puppy', both speaker groups seem to have found it difficult to find the right picture for the different sizes of the animals in addition to figuring out the thematic roles of the animals in the given passive sentence.

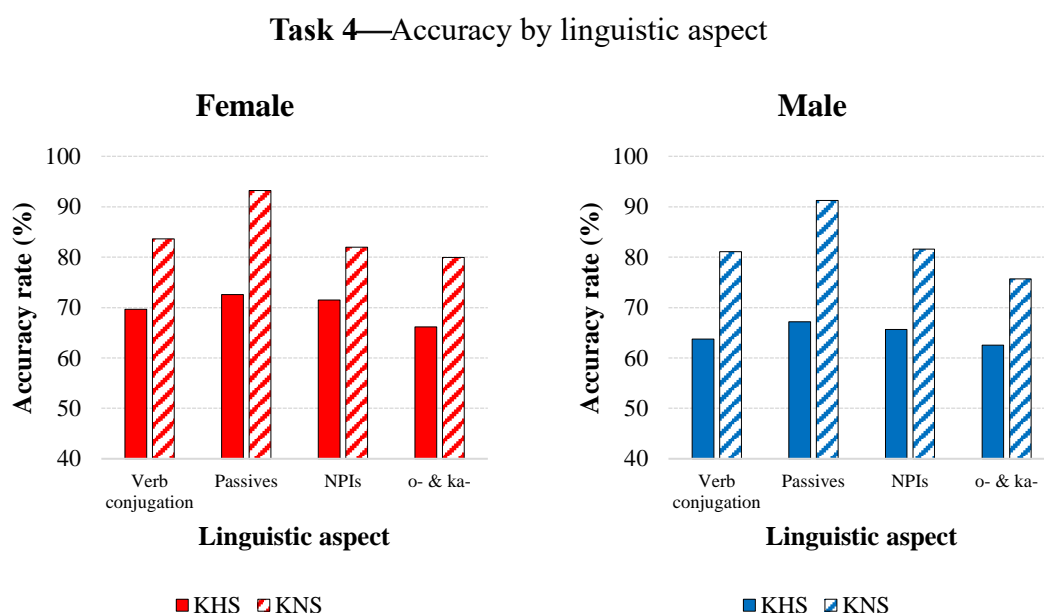
As not only KNSs but also KHSs performed well on Task 3, the performance difference between the speaker groups was generally small, and accordingly, for individual test items, the between-speaker-group accuracy difference was not very large. For most test items, the between-speaker-group difference was fewer than -10%, as shown in Figure 7.3. Nevertheless, the accuracy difference appeared relatively large on

some items than others. In other words, given the general observation that the KHSs' accuracy was lower than that of the KNS counterparts on most test items, their gap to the NS controls was relatively large on some items compared to the others. The accuracy difference between the speaker groups was larger than -10% on Items 3, 6, 13, 17, 20 and 30 in girls and on Items 3, 6, 9, 13, 16, 20 and 30 in boys. On some of these items, the difference even exceeded -20%, indicating a particularly lower accuracy among KHSs compared to the NS controls; they were Item 3 in girls and Items 3, 6, 9 and 20 in boys.

7.2.3.2 Task 4—A GJ task for four different linguistic aspects

For Task 4, in which four different linguistic aspects (i.e., the verb conjugation, the passives, the NPIs and the verbs *o-* and *ga-*) were tested, the adjusted mean accuracy rate of KHSs and KNSs in each gender was calculated for each target feature and then compared between the speaker groups, first. As the bar chart in Figure 7.4 shows, in both speaker groups, the accuracy was the highest for the passives and the lowest for the verbs *o-* and *ka-*. In KHSs, the difference in the participants' accuracy between the tasks was not very large. In female KHSs, the adjusted mean accuracy rate for the test items was 70 for the verb conjugation, 73 for the passives, 72 for the NPIs and 66 for the verbs *o-* and *ka-*; in male KHSs, it was 64 for the verb conjugation, 67 for the passive, 66 for the NPIs and 63 for the verbs *o-* and *ka-*. In contrast, KNSs showed an especially high accuracy on the passives (i.e., 93 in girls and 91 in boys). Their adjusted mean accuracy rate on the other linguistic aspects was relatively low; it was 84 in girls and 81 in boys for the verb conjugation, 82 in both genders for the NPIs and 80 and 76 in the respective genders for the verbs *o-* and *ka-*. Because of the KNSs' much higher accuracy on the passives, the accuracy difference between the speaker groups was relatively large for the passives in both genders, compared to the other features.

Figure 7.4 *Adjusted mean accuracy rates of KHSs and KNSs in girls and boys on test items by linguistic feature tested in Task 4*

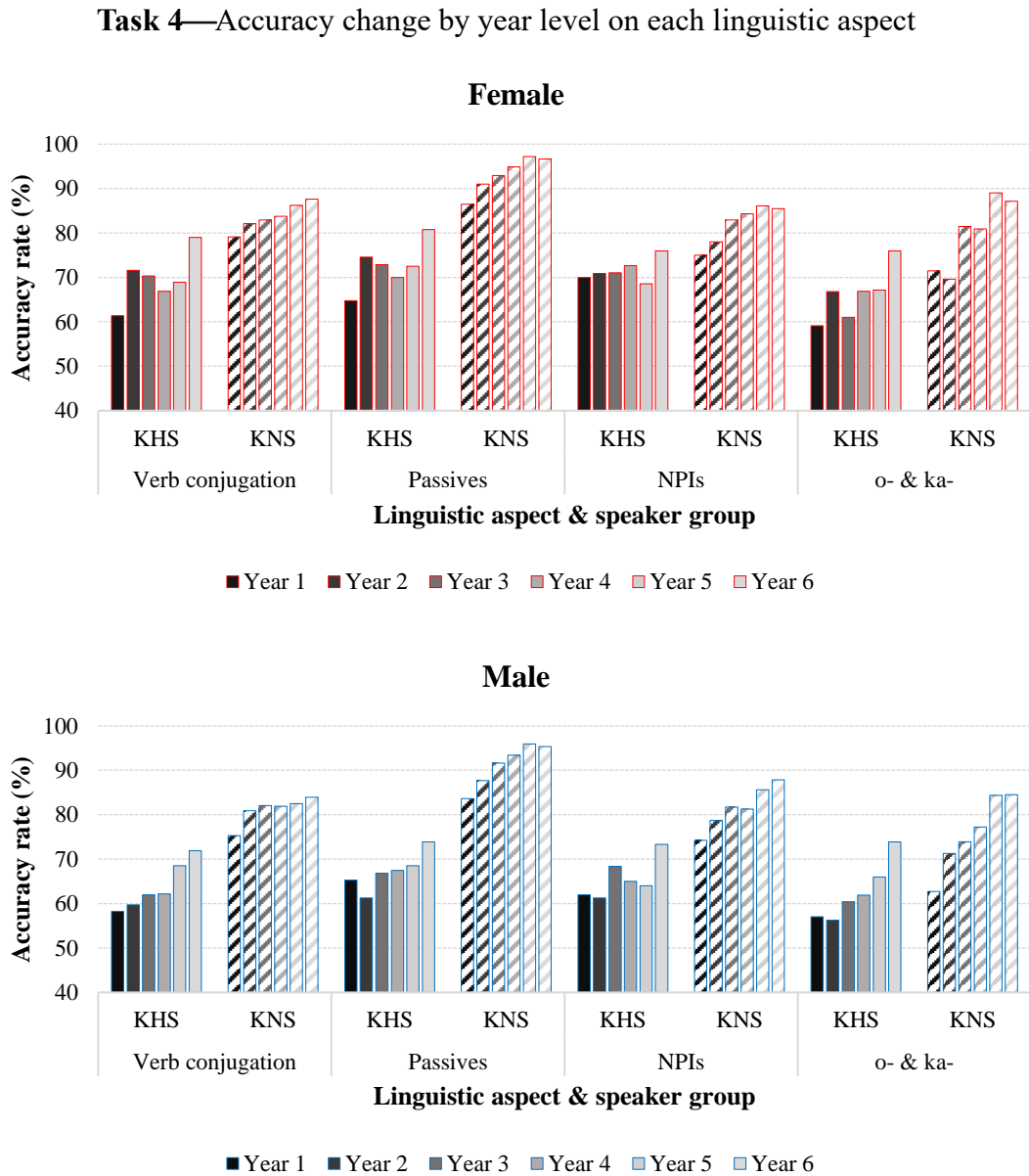


The participants' accuracy on the test items for each linguistic aspect was further analysed by school year level within each speaker group in each gender to examine the developmental pattern in KHSs in comparison to the NS controls. As Figure 7.5 shows, the mean accuracy rate change by school year level exhibited slightly different patterns between the speaker groups and the linguistic features. In the NS controls, in each gender, all linguistic features showed a relatively consistent increase in the accuracy by year level. Concerning the verb conjugation, the KNSs' mean accuracy rate went over 80 at Year 2 in both genders and increased further through to Year 6, although the increase between Years 3 and 5 in boys appeared stagnant. Regarding the passives, their mean accuracy was over 90 at the middle-year levels and went up further to over 95 at the upper-year levels in both genders. Their mean accuracy for NPIs started around 75 at Year 1, went over 80 at the middle-year levels and rose further to over 85 at the upper-year levels in both genders. Their accuracy on the verbs *o-* and *ka-* were much lower at the lower-year levels, around 70 or even lower, but it rose to over 85 at the upper-year levels in both genders.

Contrary to the relatively consistent accuracy increase by year level observed in the NS controls on all four linguistic aspects, in KHSs, the accuracy change by year level showed higher fluctuations, and when the especially higher mean accuracy of those in

Year 6 in both genders was disregarded, it was difficult to claim that their accuracy on the features increased by year level. On the test items for the verb conjugation, the KHSs' accuracy was quite low at Year 1, slightly over 60 in girls but below 60 in boys; it was higher in the middle- and upper-year levels but barely exceeded 70 in both genders, except for at some year levels with extraordinary performance (e.g., Years 2 and 6 in girls). Regarding the passives, the KHSs' accuracy mainly stayed between 70 and 75 in girls and 65 and 70 in boys, apart from the unusually high accuracy at Year 6 in both genders. On the test items for the NPIs, the girls had an accuracy over 70 at most year levels, but their accuracy rate mostly stagnated by year level when Year 6 was excluded; the boys' accuracy appeared to have increased slightly between the lower- and middle-year levels but primarily stayed below 65. Conversely, the KHSs' accuracy on the test items for the use of the verbs *o-* and *ka-* showed an increasing tendency by year levels; nevertheless, it rarely exceeded 70 in both genders, except for Year 6 with exceptionally high accuracy.

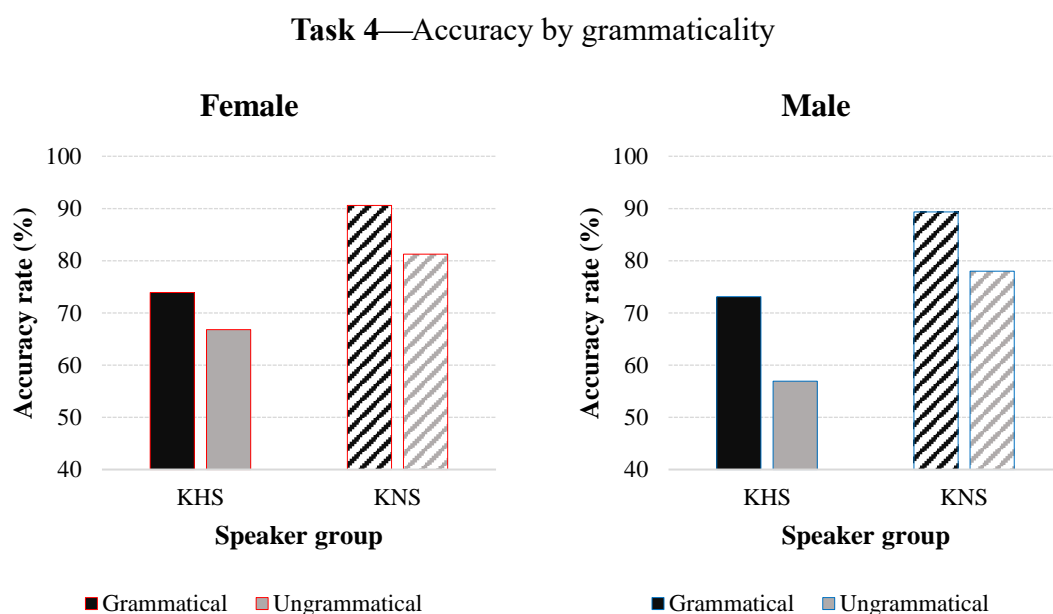
Figure 7.5 *Change of mean accuracy rates by year level in KHSs and KNSs in girls and boys on linguistic aspects tested in Task 4*



The participants' accuracy on the test items in Task 4 was also analysed by the grammaticality of the target sentences. As Figure 7.6 shows, in both speaker groups, the participant' accuracy on grammatical sentences was higher than their accuracy on ungrammatical sentences. In other words, both KHSs and KNSs were more accurate with accepting grammatical sentences as correct than identifying ungrammatical sentences as incorrect. In the NS controls, the accuracy rate difference between the grammatical and ungrammatical sentences was around 10: in girls, the adjusted mean accuracy rate on the

grammatical sentences was 91, compared to 81 on the ungrammatical sentences; in boys, it was 89 on the grammatical sentences and 78 on the ungrammatical sentences. In comparison, in KHSs, the boys showed a much larger difference in the accuracy by grammaticality (i.e., 73 on the grammatical sentences and 57 on the ungrammatical sentences) than their female peers and their NS controls. In female KHSs, their accuracy difference between the grammatical and ungrammatical sentences was relatively small: their adjusted mean accuracy rate was 74 on the grammatical items and 67 on the ungrammatical items.

Figure 7.6 *Comparison of adjusted mean accuracy rates between grammatical and ungrammatical test items in KHSs and KNSs in girls and boys for Task 4*



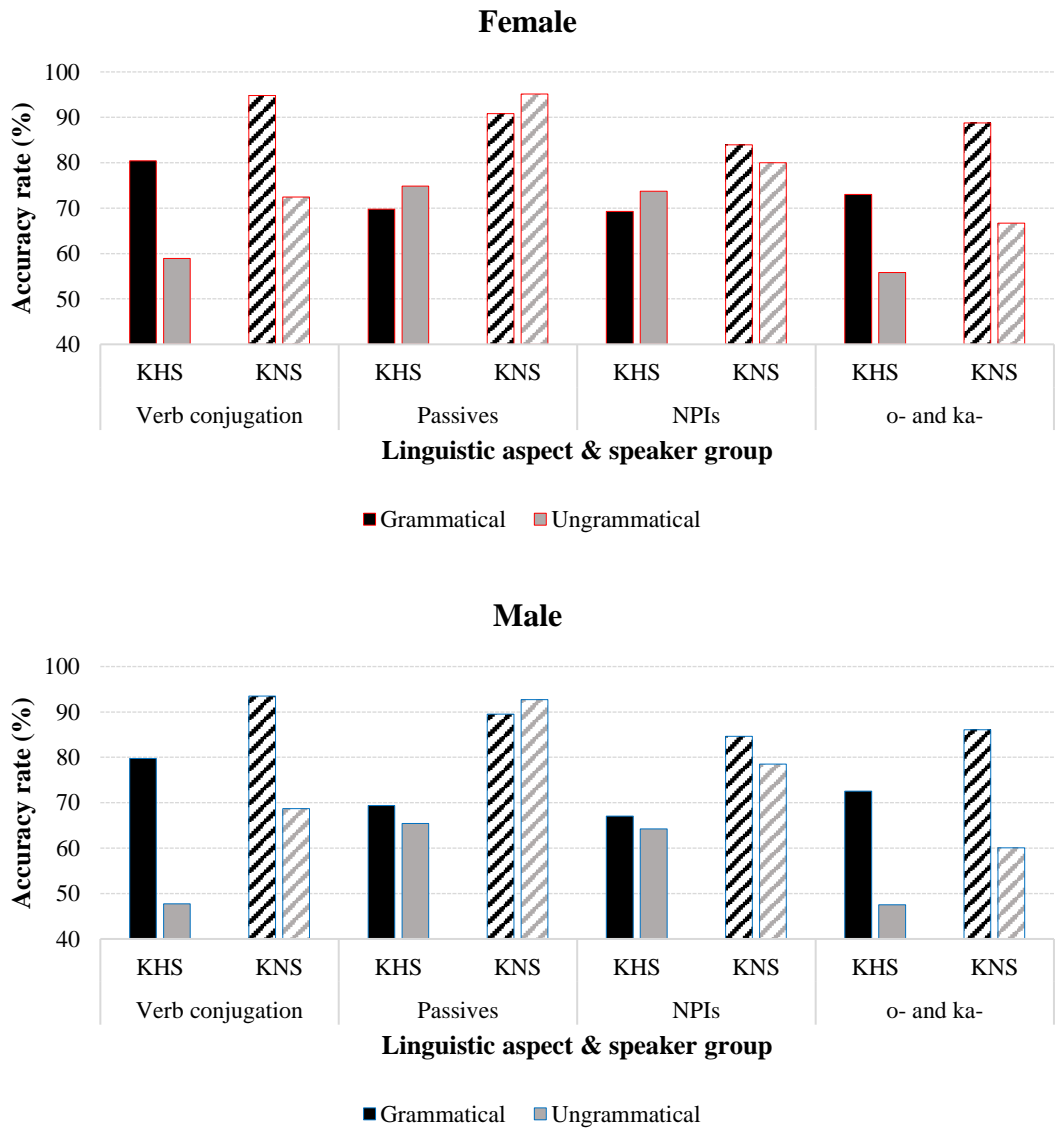
The accuracy on the test items by grammaticality was further analysed by the linguistic aspect tested in the task, as shown in Figure 7.7. For most of the linguistic aspects, the above-described pattern of higher accuracy on the grammatical items than the ungrammatical items held true. Interestingly, however, for the passive, the participants tended to be slightly more accurate with identifying ungrammatical items than accepting grammatical items. This was observed among KNSs in both genders as well as among female KHSs. Male KHSs continued to be more accurate with the grammatical items than the ungrammatical ones for the passive. Notably, with the test items for the NPIs, female KHSs were more accurate with the ungrammatical items than

the grammatical items, contrasting not only to their male KHS peers but also to the NS controls.

Having compared the participants' accuracy by grammaticality between the linguistic aspects, it was noted that the accuracy difference between the grammatical and ungrammatical items was quite large for the verb conjugation and the use of the verbs *o-* and *ka-*. For instance, for the verb conjugation, KNSs in both genders and female KHSs were approximately 20% less accurate with the ungrammatical sentences than the grammatical sentences; in male KHSs, the difference was even larger because they were more than 30% less accurate on the ungrammatical items than on the grammatical items.

Figure 7.7 Comparison of adjusted mean accuracy rates between grammatical and ungrammatical items for linguistic aspects tested in Task 4 in KHSs and KNSs in girls and boys

Task 4 – Accuracy by grammaticality on each linguistic aspect



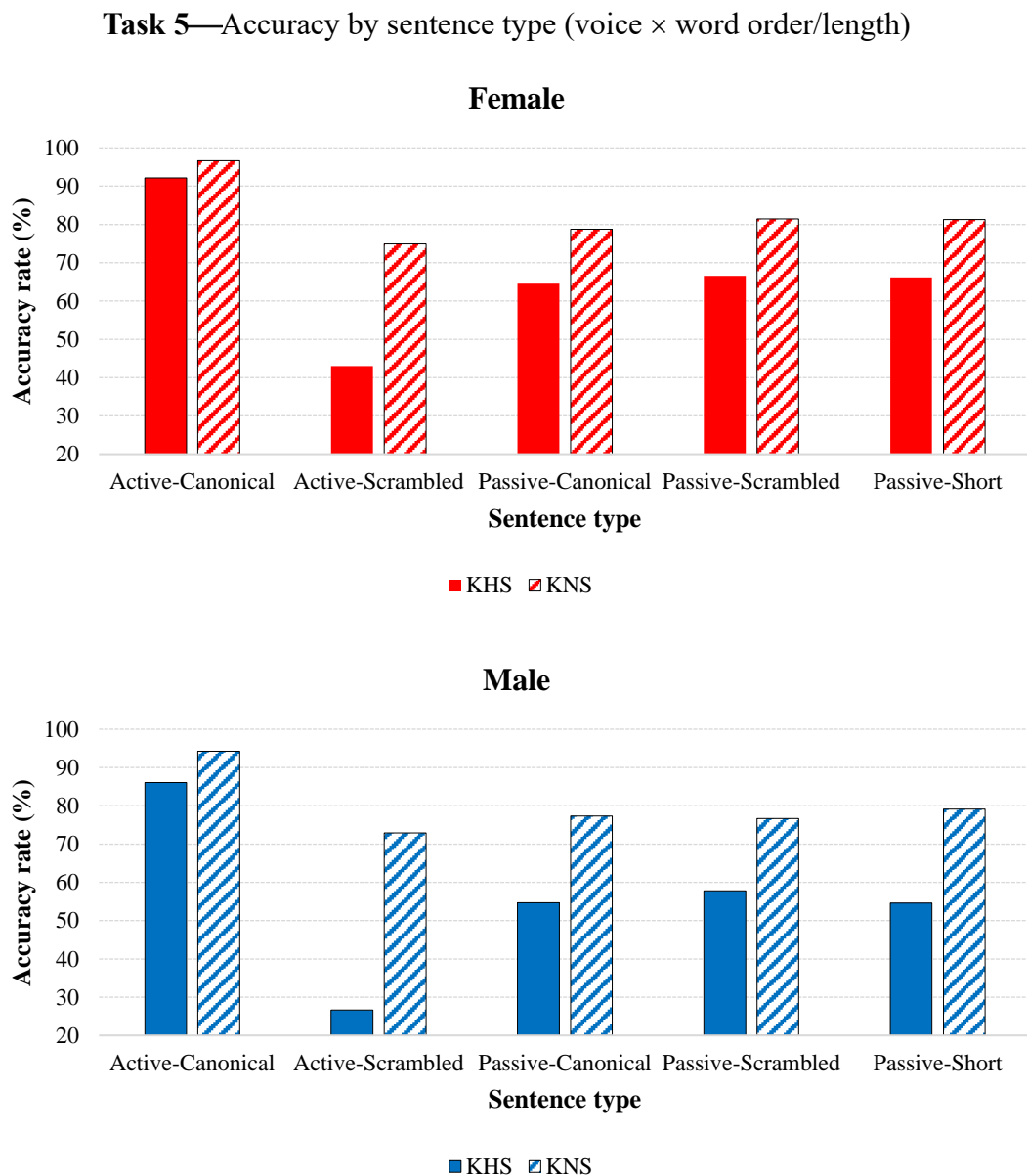
7.2.3.3 Task 5—A picture selection task for the passive

The participants' accuracy on the test items in Task 5 was analysed by sentence type as there were five different types of sentences tested—namely, active sentences in the canonical word order, active sentences in the scrambled word order, passive sentences in the canonical word order, passive sentences in the scrambled word order and passive sentences without the *han.they*-phrase. For each sentence type, the adjusted mean

accuracy rate of each speaker group in each gender was calculated and then compared between the speaker groups. As can be seen in the bar charts in Figure 7.8, both speaker groups in each gender were highly accurate with the active sentences in the canonical word order. The adjusted mean accuracy rate was 97 in girls and 94 in boys in the NS controls, and it was 92 and 86 in the respective genders in KHSs. Compared to the canonical active sentences, not only KHSs but also KNSs in each gender showed a lower accuracy on the canonical sentences, indicating that the participants across the speaker groups had more difficulty with understanding passive sentences than active sentences. Moreover, the accuracy difference between the speaker groups was much larger for the canonical passive sentences than the canonical active sentences; the female KHSs' adjusted mean accuracy rate on the canonical passive sentences was 65 compared to that of their KNS counterparts being 79, and the male KHSs' accuracy was 55 compared to 77 of their NS controls.

Comparing the participants' accuracy between the two types of active sentences by word order (i.e., canonical versus scrambled) showed that both speaker groups were far less accurate on the scrambled sentences than on the canonical sentences. Notably, KHSs in both genders were markedly less accurate with the scrambled sentences than the canonical sentences in the active voice (i.e., 43% in girls and 27% in boys). On the contrary, the scrambled word order seems to have helped the KHSs and their NS peers a little with understanding the passive sentences in the scrambled word order as their accuracy rates on the scrambled passive sentences turned out to be slightly higher than the canonical passive sentences. In addition, the participants' accuracy on the short passive sentences without the by-phrase appeared as high as that on the other passive sentences. Overall, the participants' accuracy on the three types of passive sentences was similar across the speaker groups and genders.

Figure 7.8 *Comparison of adjusted mean accuracy rates by sentence type in Task 5 in KHSs and KNSs in girls and boys*



7.3 Discussion

7.3.1 KHSs' differences from their KNS peers in grammatical abilities

The comparison of the per cent correct scores between the speaker groups at each year level in each gender on Tasks 3, 4 and 5 showed that on all three tasks, KHSs performed less well than their KNS counterparts across the year levels and genders. However, the degree of the performance difference between KHSs and the NS controls

differed by task. The difference between the speaker groups was much larger in Tasks 4 and 5 than in Task 3. Tested for statistical significance, the between-speaker-group difference did not reach statistical significance at many year levels in a gender in Task 3. In contrast, it was statistically significant at almost all year levels in each gender in Tasks 4 and 5.

7.3.1.1 Task 3—Relatively small difference in basic syntax and semantics

In Task 3, although KHSs performed less well than their KNS counterparts across the year levels and genders, their gap to the NS controls was not very large in general. The performance difference between the speaker groups, measured in the per cent correct score, was mostly below -10 , and it was even fewer than -5 at many year levels in each gender. The statistical significance tests for the observed differences informed that the performance of KHSs was not reliably lower than that of their KNS counterparts at Years 2 and 6 in girls and at Years 1, 4, 5 and 6 in boys. Given the generally small between-speaker-group differences and the non-significant statistical test results found at many year levels in each gender, it is difficult to claim that KHSs in Australia in primary school years do not understand simple or complex sentences such as those tested in Task 3 as well as the KNSs of the same (gender and) school year level do. In contrast, because of the persistence of lower performance of KHSs than their KNS counterparts, as well as statistical significance found at many year levels in each gender, it cannot be asserted either that the KHSs can understand such sentences in Korean to their (gender- and) school-year-level-appropriate native level. Nevertheless, the descriptive statistics and statistical test results indicate a high likelihood that Australian KHSs in primary school years will perform less well than their KNS counterparts if given the same task.

However, careful thought must be given to the question of what the observed degree of performance difference between KHSs and the NS controls in Task 3 means in terms of the KHSs' HL abilities. It should be noted that in the given task, the performance difference between the speaker groups was generally small, even where the difference reached statistical significance, it was mostly fewer than -10 . Thus, in the underlying population, the performance gap between the speaker groups may not be so large even if KHSs perform less well than their KNS counterparts. In other words, KHSs may understand sentences such as those tested in the task quite well—that is, to a level close to (though, not necessarily the same as) their school-year-level-appropriate native norms. On average, they may understand at least eight out of 10 such sentences correctly when

their KNS peers understand nine out of 10, given their adjusted mean per cent correct scores on the task (86.7 in girls and 83.5 in boys among KHSs; 91.6 in girls and 90.0 in boys in KNSs).

Adapted from the SSCT of the LSSC, Task 3 in this study tested the participants' comprehension of simple sentences and complex sentences in Korean for various syntactic structures and semantic features. It examined whether the participants could correctly understand the information coded by specific linguistic aspects in syntax or semantics, such as passive or causative constructions, relative clauses, clausal connectives, case particles, delimiters or adverbs. The linguistic aspects tested in the task are considered very basic because most of them develop early in L1 acquisition of Korean and are taught mainly at the beginner or lower intermediate level in L2 instruction. The influence of the prior lexical knowledge in Korean on the task performance is expected to be minimal even in KHSs,⁸¹ so the performance of the participants on the task should have primarily (if not solely) reflected their understanding of the target sentences made up for the syntactic or semantic aspects in question.

Thus, the generally good performance of KHSs and their small performance gap to the NS controls indicate that they did not find it much more difficult to understand the sentences tested in the task than did their KNS counterparts. Put differently, KHSs understood the gist of the tested sentences to a level quite close to that of their KNS counterparts. As the syntactic structures and semantic features tested in the task exemplify the linguistic aspects that comprise core grammar of Korean that governs phrases and sentences, the small performance gap between KHSs and the NS controls suggests that KHSs have acquired core grammar of their HL in the domain of syntax and semantics generally well, close to their school-year-level-appropriate native norms.

Born to a Korean immigrant family, KHSs in Australia learn Korean from birth at home. Although their onset of bilingualism (i.e., their acquisition of English) differs from individual to individual (any time between birth and their start of formal schooling), they are more often predominantly exposed to Korean until they start Kindergarten, the first year of primary school education in New South Wales in Australia. Especially in the cases of KHSs who participated in this study, the language of communication at home is highly

⁸¹ The test sentences are made up of words and expressions that are supposed to be learned early or used frequently in primary school children's immediate environments, and the pictures provided as answer choices could assist the participants to work out the meaning of any unknown vocabulary in a target sentence.

likely to have been Korean because most of them have both parents being KNSs. (See 8.2.1 for relevant information). There may have been KHSs who were predominantly exposed to English because they attended English-speaking childcare centres for four or five days a week for the whole day (e.g., from 8 a.m. to 6 p.m.) before primary school because both of their parents worked full time or their parents had spoken to them mostly in English at home despite being a KNS. However, the proportion of such KHSs should have been very small because among the South Korea-born population in Australia, only 16.6% of the couple families have both parents or couples working full time (ABS, 2017), and the percentage of full-time-working parents will be even lower for the families with children, especially for those with preschool-age children.⁸² In addition, if some parents spoke to their children mostly in English at home despite being KNSs, it is highly unlikely that they send their children to a Korean community school to learn Korean. Given their family constellation and attendance to a Korean community school as such, most of the KHS participants in this study are presumed to have been predominantly exposed to Korean (or similarly to both Korean and English, at most) until they started Kindergarten around age five. Their dominant exposure to Korean (or at least balanced exposure to Korean and English) before formal schooling must have allowed them to acquire the basic syntactic structures and semantic features in Korean that their KNS peers have acquired in the monolingual environment by then.

Some may question whether KHSs should have differed from their age-matched KNSs in acquiring Korean even during preschool years because many of them are bilingual (possibly having started to learn English early), and differences may exist between monolingual and bilingual acquisition. However, even bilingual children who learn two languages simultaneously from birth are supposed to ‘proceed through the same developmental phases as the respective monolinguals, and they are able to attain native competence in each of their languages’ (Meisel, 2009, p. 5). Moreover, among the two languages of bilingual children, the stronger language develops ‘indistinguishably from that of monolingual children of the same language background’ (Döpke, 2000, p. 2). In other words, unless KHSs were predominantly exposed to English, they should have acquired core grammar of Korean similarly to their KNS peers during preschool years. Accordingly, KHSs in this study and many KHSs in Australia, who have been learning

⁸² Among the families of the South Korean-born population, 53% were couple families with children, 35.2% were couple families without children, and 9.8% were one parent families (ABS, 2017).

Korean since birth and exposed to the language at least for half of their dual language experience, must have acquired core grammar of Korean to a level comparable to their age-appropriate native norms at least until they started formal schooling. This must have enabled them to perform generally well on Task 3, even to a level quite comparable to (but not necessarily the same as) that of their KNS peers at many year levels.

7.3.1.2 Task 4—Large difference in linguistic aspects mastered late

In Task 4, the performance of KHSs was far lower than that of their KNSs counterparts at each year level in each gender, and such large performance difference between the speaker groups (i.e., mostly over -15 and often more than -20 as measured in the per cent correct score) reached statistical significance at every year level in both genders. The much lower performance of KHSs in judging the well-formedness of a sentence that contains one of the four linguistic aspects, the verb conjugation, passives, NPIs and use of the verbs *o-* and *ka-* in Korean, indicates that they have far less-developed linguistic knowledge of the aspects compared to their (gender- and) school-year-level-matched KNSs. Confirmed by statistical tests, the results suggest that KHSs in Australia in primary school years have not attained those aspects to their (gender- and) school-year-level-appropriate native norms.

The reliably lower performance of KHSs than that of the NS controls across the year levels and genders on Task 4, suggesting a lower level of attainment of the four linguistic aspects by KHSs compared to their KNS peers at a given primary school year level, is in line with findings of HL research. As reviewed in Chapter 3, adult HSs of various languages have been observed to have non-native linguistic competence regarding some (but certainly not all) linguistic aspects of their HL grammar. The results of Task 4 in this study may serve as a partial explanation or evidence for such findings in that KHSs in this study showed a shortfall in their linguistic knowledge of some grammatical aspects in their HL already in primary school years.

In fact, a lower level of attainment of some grammatical aspects in the HL by HSs compared to NSs during school years has been observed in studies that examined the development of the home language (i.e., the HL) in bilingual children growing up in immigrant contexts (i.e., child HSs). Using a variety of measurement tools (e.g., standardised tests, experimental tasks, storytelling/retelling tasks or collecting spontaneous speech), studies assessed the HL of school-age HSs for various grammatical aspects; they usually found that HSs often fall behind their age- or school-year-level-

appropriate native norms on measures of their linguistic knowledge or use of the HL grammar examined. For instance, as a part of the Miami project (Oller & Eilers, 2002), Gathercole (2002b, 2002c) examined gender agreement and that-trace effect in Spanish among HS of Spanish in the second and fifth grade with a GJ task followed by a correction task. She found that for both features, the HSs performed less well than their school-year-level-matched NSs of Spanish on the GJ task and the correction task. She interpreted the results as an indication of a protracted development of gender agreement and that-trace effect in Spanish among the HSs. Similar results have been also observed in other studies conducted on school-age HSs of various languages (e.g., Austin et al., 2013; Cuza & Pérez-Tattam, 2016; Flores et al., 2017; Meir, 2018).⁸³ The reliably lower performance of KHSs on the GJ task regarding the verb conjugation, passives, NPIs and use of the verbs *o-* and *ka-* in Korean than that of their NS peers observed in this study adds to the literature suggesting a lower level of attainment of some grammatical aspects in HLs in school years.

The KHSs' less-than-native attainment of the four linguistic aspects in Korean observed in this study is likely to have resulted from their lower level of exposure to and use of the language compared to their NS peers raised monolingually in Korea. Their lower level of attainment of the linguistic aspects denotes that their acquisition of the aspects has been delayed—due to slower progress—or has regressed—due to a loss of the knowledge that was previously acquired. Although it is not possible to clarify if their level of attainment was a result of a delay, attrition or both, this delay or attrition must have been derived from their lower level of HL experience as researchers have speculated so (e.g., Gathercole & Thomas, 2009; Oller & Eilers, 2002; Unsworth, 2013).

By the time of this study, even KHS in Year 1 had had almost two years of schooling in the English-immersion environment since their entry into Kindergarten. This means the KHSs with the least possible experience in English had had nearly two years

⁸³ In particular, numerous studies were conducted on school-age HSs of Spanish in the US. They reported a lower level of attainment of particular linguistic features in Spanish in the HSs compared to their NS controls, especially in morphology and syntax, e.g., gender assignment and agreement and the noun-adjective word order (Cuza & Pérez-Tattam, 2016), gender agreement (Montrul & Potowski, 2007), overt morphological marking of direct objects (Montrul & Sánchez-Walker, 2013), aspects in past tense (Cuza & Miller, 2015), subject and verb inversion in interrogative sentences (Cuza, 2016), interrogative sentences and NPIs (Austin et al., 2013). Similar results indicating a possible delay in the development of particular HL aspects in school years have been observed among HSs of other languages in other continents, e.g., HSs of Turkish in the Netherland (Verhoeven & Boeschoten, 1986), HSs of Portuguese in Germany (Flores et al., 2017) or HSs of Russian in Israel (Meir, 2018).

of less-than-native experience in Korean when they were tested. Moreover, in Australia, it is quite common for children to attend a preschool for two or three days a week for at least one year before they enter Kindergarten.⁸⁴ Accordingly, the KHSs who had the shortest possible exposure to and use of English (i.e., those in Year 1) by the time of testing may have had less-than-native Korean language experience for nearly three years. This reduced exposure to and use of Korean since their entry into primary school or possibly from their attendance at preschool should have influenced their acquisition of some linguistic aspects in Korean, such as those tested in Task 4, causing a delay or even attrition.

Some study findings suggest that the acquisition of some linguistic aspects can be delayed or even undergo attrition in HSs, especially if their acquisition of the aspects has not reached its presumable end state before their HL input is reduced considerably (e.g., Anderson, 1999). (More discussion of this follows in 9.2.3.2.) Then, it is possible that in KHSs in primary school years, the attainment of the four aspects tested by Task 4 in this study has been delayed or reduced since they started learning English more extensively in the English-immersion setting such as in school. As the tested linguistic aspects are assumed to be mastered relatively late by monolingual Korean-speaking children (see section 0 for further discussion), the aspects are highly likely to be subject to slower development and attrition in the HL acquisition of KHSs in primary school years. In short, the much lower performance of KHSs than that of the NS controls on Task 4 observed in this study must have arisen from their lower level of attainment of the linguistic aspects tested; this, in turn, is highly likely to have resulted from their reduced exposure to and use of Korean after they started having more extensive exposure to and use of English.⁸⁵

7.3.1.3 Task 5—Large difference in comprehension of passive sentences

The comparison of the performance of Task 5 between the speaker groups showed that KHSs performed far less well than their KNS counterparts across the year levels and genders (with their mean per cent correct score being ca. 15 lower in girls and ca. 20

⁸⁴ According to the Australian Institute of Health and Welfare, nearly 90% of children in Australia attend preschool for the year before school (AIHW, 2020).

⁸⁵ However, it should be noted that these results could have also reflected their less-developed metalinguistic awareness in the HL, as Benmamoun et al. (2013) note. If this was the case, the results of Task 4 do not necessarily imply that KHSs will not understand the information in a sentence coded by one of the features as well as the NS controls do. Despite the limitations of their implication, the results clearly show that KHSs have lower abilities in judging the well-formedness of a sentence regarding those four linguistic aspects in Korean than the NS controls and their gap to the NS controls are likely to be large.

lower in boys than their KNS counterparts). Tested for statistical significance, the performance of KHSs was statistically significantly lower than that of their NS counterparts at all year levels in each gender, except for Year 5 in boys. Male Year 5 KHSs performed considerably less well than their KNS counterparts, just like those in the other year levels in the gender, so their mean score difference to the NS controls was very large (i.e., -19.1). Nevertheless, this performance difference did not reach statistical significance; this is likely due to the KHSs' large within-group performance difference ($SD = 19.6$) and small participant number ($N = 10$).

The results of the descriptive statistics of Task 5, showing lower performance of KHSs than their KNS counterparts across the year levels and genders, indicate that they did not understand the passive sentences and active sentences in Korean tested in the task as well as the NS controls did. More precisely speaking, the results indicate that they were not as good as the NS controls in figuring out the thematic relations of the noun phrases in a given passive or active sentence (e.g., the agent and the patient of the action, in respect to who did what to whom). Confirmed by statistical tests, this lower performance of KHSs than their KNS counterparts on the task suggests that KHSs in Australia in primary schools can understand passive sentences and active sentences in Korean less well than the (gender- and) school-year-level-matched KNSs.

The detailed analyses of the participant performance of Task 5 by sentence type (presented in 2.3.3.) revealed that the lower performance of KHSs was owing to their poorer understanding of passive sentences as well as of active sentences in the scrambled word order, the object–subject–verb (OSV) order. Their accuracy on active sentences in the canonical word order, the subject–object–verb (SOV) order, was not only very high (92% in girls and 86% in boys) but also quite close to that of the NS controls (97% and 94% in the respective genders). In contrast, they were far less accurate than their KNS counterparts on all three types of passive sentences tested. Moreover, they showed an extremely low accuracy on the scrambled active sentences (43% in girls and 27% in boys), far lower than that of the NS controls (75% and 73% in the respective genders). This indicates that KHSs in this study had much more difficulty with understanding the thematic relations of the noun phrases in a sentence if the sentence was in the passive voice or if it is presented in a non-canonical order when in the active voice.

However, it should be noted that the relatively poor performance of passive sentences and OSV sentences compared to canonical active sentences was also observed

among the NS controls. This means that not only for KHSs but also for KNSs, it was harder to determine the thematic relations of the noun phrases of an action if the action was described in the passive voice or if the noun phrases appeared in an order other than the prevalent SOV order in the active voice. Nevertheless, this relatively greater difficulty with passive sentences and OSV sentences compared to SOV sentences appears to have been much greater in KHSs than in KNSs.

One of the possible reasons for this greater degree of difficulty with passive sentences and OSV sentences that KHSs show compared to the NS controls may be the KHSs' lower level of sensitivity to functional morphology in Korean. Some studies have indicated that the lower performance of HSs compared to their NS controls regarding certain HL aspects resulted from their less-developed abilities in inflectional morphology. For instance, in her study of the comprehension of relative clauses in Russian in adult HS of Russian in the US, Polinsky (2011b) observed that the HSs did not comprehend object-gap relative clauses as well as their NS controls; the HSs tended to interpret object-gap relative clauses as a subject-gap relative clause. Polinsky attributed the observed frequent misunderstanding of object-gap relative clauses in the HSs to their negligence of inflectional morphology, such as case. Earlier, O'Grady et al. (2001) examined the understanding of relative clauses in Korean in adult KHSs enrolled in a tertiary-level Korean course in the US compared to adult L2 learners of Korean. The researchers observed not only that the KHSs were not very different from the L2 learners in understanding subject-gap relative clauses (e.g., [____ *nam.ca.lul po.nun*] *ye.ca* 'the woman who sees the man') and object-gap relative clauses (e.g., [*nam.ca.ka* ____ *po.nun*] *ye.ca* 'the woman who the man sees') but also that both groups were far less accurate with object-gap relative clauses (below 50%) than subject-gap relative clauses (below 80%). The researchers interpreted the results as that the HSs are not significantly different from the L2 learners in their ability to utilise the morphosyntactic cues, the case-marking particles that are essential for understanding relative clauses in Korean correctly.⁸⁶ Based

⁸⁶ However, it should be noted that in an extended replication study by Lee T (2016) on the relative clause comprehension, adult HSs performed generally better than L2 learners. In addition, the subject-object asymmetry was not statistically significant despite showing the same trend. The researcher also found an effect of animacy and topicality of the head noun as well as proficiency effect. She explained that the misidentification of the head noun in a relative clause was possibly due to the influence of English, the participants' dominant language, and such misinterpretation was more pronounced among the L2 learners than the HSs as well as among the lower proficiency participants than the participants at more advanced levels.

on such findings from previous studies, it is assumed that KHSs in this study did not take note of morphosyntactic cues in Korean, such as case particles and verbal inflections that encode the grammatical relations of sentence constituents, as well as did their KNS counterparts. This must have led KHSs compared to the NS controls to have greater difficulty with construing the thematic relations of the noun phrases in a passive sentence as well as in an OSV sentence.

The assumption that KHSs in this study did not make as much use of the morphosyntactic cues as their KNS counterparts did is supported strongly by their markedly low accuracy on OSV sentences. They tended to interpret the grammatical relations of an OSV sentence as reversed—that is, they frequently understood the first noun phrase marked with an object-marking particle *ul/lul* (i.e., the object) as the subject and the second noun phrase marked with a subject-marking particle *i/ka* (i.e., the subject) as the object of the active sentence. This demonstrates that they did not note the case-marking particle of each noun phrase very well; instead, they interpreted the grammatical relations of the noun phrases based on the order of the phrases as if the sentence was in the canonical order.

A lower level of utilisation of case-marking particles in Korean has been previously reported in some studies that investigated the acquisition of case in Korean in English-speaking child KHSs in the US. (e.g., Kim K et al., 2012; Kim K et al., 2018; Song M et al., 1997). Song M et al. (1997) first observed that KHSs living in Hawaii (aged three to eight and aged seven to 14 in the follow-up remedial study) understood OSV sentences in Korean far less well than monolingual Korean-speaking children (aged two to eight) even when the context of a target sentence was provided. The researchers interpreted the results as a sign that KHSs do not use case particles to the extent that their NS controls do.⁸⁷ Later, Kim K et al. (2018) replicated and extended the study by manipulating the comprehension tasks with acoustic salience or felicitous contexts, as well as by adding production tasks. The researchers observed that English-speaking child KHSs (aged eight to 14) failed to understand OSV sentences correctly but used case particles correctly in production. The researchers argued that the KHSs acquired the knowledge of case in Korean but had difficulty with processing it on-line in comprehension. Although the possible gap between the acquired knowledge of case in

⁸⁷ With a follow-up study, the researchers demonstrated that this lower level of use of or sensitivity to case particles can be remedied by instructions.

Korean and its processing should be examined further, the findings of their study clearly show that KHSs have difficulties with understanding OSV sentences in Korean, and this is likely due to their processing difficulty with case morphology in Korean.

Thus, the similar results found in this study must have, at least partly, been derived from the relatively greater difficulty of KHSs with processing functional morphemes in Korean in comprehension. If KHSs in this study found it relatively difficult to process case-marking particles attached to noun phrases in on-line comprehension, it is also likely that they had difficulties with perceiving and decoding the verb inflection as well. To understand a target sentence in the given task correctly, the participants must take note of the inflection of the verb placed at its end, in addition to the case-marking particle attached to each noun. In the passive sentences tested in the task, the verbs were suffixed by one of the four passivising suffixes *-i/hi/li/ki-* (e.g., the passive form of the verb *cha-* ‘to kick’ is *cha.i-*), followed by the past tense/aspect marking *-ass/ess-* and the polite speech style ending *-ayo/eyo*. Since the difference between the active form and the passive form of a target verb was quite subtle (e.g., the passive form *cha.yess.e.yo* in comparison to the active form *chass.e.yo*), KHSs may have had greater difficulty with perceiving and decoding the verb conjugation correctly, besides the case-marking particles, than the NS controls had. It is possible that the KHSs’ reliably poorer understanding of passive sentences as well as OSV sentences observed in this study resulted from their lower level of acquisition of the linguistic knowledge of relevant linguistic aspects such as passive constructions (as indicated by the results of Task 4 in this study), case particles or verb conjugation. However, if the findings of the study by Kim K et al. (2018) hold true for the KHSs in this study, its results must have also been derived from their lower abilities in processing functional morphology in Korean.

7.3.2 KHSs’ change in grammatical abilities

The analysis of the participant performance of each of the three tasks by school year level within each speaker group in each gender showed that on all three tasks, the participants in a higher-year level generally performed better than their lower-year-level counterparts, indicating a potential performance improvement by school year level in a speaker group in a gender. The analysis also showed that in each speaker group, the degree by which its performance changed between year levels and the year levels between which its performance changed relatively considerably, varied between the tasks. More importantly, on each task, KHSs differed from the NS controls in the degree of

performance change, as well as in the locus of a greater performance change. Tested for statistical significance, far fewer performance differences between the different year levels compared within a speaker group in a gender found significant in KHSs than in KNSs across the tasks.

7.3.2.1 Task 3—Maintenance of basic syntax and semantics

The analysis of the participant performance of Task 3 by school year level that not only in KNSs but also in KHSs, participants in a higher-year level generally performed better than those in a lower-year level. In other words, in both speaker groups, the performance tended to increase as the school year level ascended. In KNSs, the performance increase between adjacent year levels was generally small because the participants performed quite well on the task from Year 1. Compared to the NS controls, KHSs showed a slightly larger degree of performance change between year levels, including a decrease between some year levels, but their performance also increased largely by year level.

Tested for statistical significance, however, most of the performance differences between the year levels compared within a speaker group in a gender turned out to be statistically non-significant. In the NS controls, in girls, KNSs in one of the upper-year levels performed statistically significantly better than those in one of the lower-year levels; in boys, those in one of the middle- and upper-year levels performed statistically significantly better than those in Year 1. Conversely, in KHSs, only the performance of Year 6 turned out to be statistically significantly higher than that of Year 1 in girls; in boys, the performance of Year 6 was statistically significantly higher than that of Year 2, as well as than that of Year 3. Although the performance of Year 4 in male KHSs was also found statistically significantly higher than that of Years 2 and 3, respectively, this may have arisen from the removal of extreme outliers ($N = 7$) in the subgroup for the statistical tests, which resulted in the highest mean score among all year levels ($M = 90.3$, changed from 88.8) and an extremely small standard deviation ($SD = 1.1$).

In KHSs, because most of the performance differences between the compared year levels turned out to be statistically non-significant, it is difficult to assert that in the underlying population, KHSs in a higher-year level will perform better than those in a lower-year level. However, since the non-significant results do not negate the possibility of better performance at a higher-year level than at a lower-year level, it is still possible that KHSs in a higher-year level perform better than their lower-year-level counterparts

on the same task. This possibility can be supported by the overall trend of a performance increase by school year level observed in the speaker group.

In fact, the performance differences between year levels were larger in KHSs than in the NS controls. Nevertheless, fewer between-year-level performance differences were statistically significant in KHSs than in the NS controls. This could have arisen from the generally larger standard deviations in KHSs compared to the NS controls, which indicate larger within-group variations. In other words, even though the performance differences between year levels were generally larger in KHSs than in the NS controls, the differences in KHSs were not large enough to reach statistical significance, given their even larger within-group variations. It is thus possible that the observed tendency of better performance at a higher-year level than at a lower-year level in KHSs in this study reflects a genuine effect that exists in the underlying population.

Notably, even in the NS controls, most of the between-year-level differences turned out to be statistically non-significant even though the task adapted the SSCT, a standardised test for assessing the development of syntax and semantics in primary-school-age KNSs. Therefore, the results of the NS controls in Task 3 in this study should be interpreted carefully, in conjunction with the results of the norming test of the SSCT. According to the report of the norming test results (Lee Y et al., 2015), the mean score of the norming samples increased from 84.7 at Year 1 to 88.3 at Year 2, 92.4 at Year 3, 94.1 at Year 4, 95.9 at Year 5 and 96.6 at Year 6.⁸⁸ The developers also report that the mean score of Years 4, 5 and 6, respectively, was statistically significantly higher than that of Year 2, which in turn was statistically significantly higher than that of Year 1; the mean score of Year 5, as well as that of Year 6, was also statistically significantly higher than that of Years 3 and 4, respectively. The comparison of the performance of the NS controls on Task 3 in this study with the SSCT norming test results shows that the performance differences between year levels were somewhat smaller in this study than in the norming test, as well as that fewer between-year-level differences were statistically significant in this study compared to the norming test; in particular, no performance difference between a middle-year level and an upper-year level was found significant in this study. These differences in the performance of KNSs between Task 3 in this study and the norming

⁸⁸ The per cent correct scores presented here converted from the mean raw scores that the test developers reported: 29.66 at Year 1, 30.90 at Year 2, 32.33 at Year 3, 32.94 at Year 4, 33.55 at Year 5 and 33.80 at Year 6 out of 35, which is the maximum score (i.e., the total number of test items).

test may have arisen from the exclusion of five test items (i.e., 30 items tested in Task 3), the smaller number of participants, the separate analysis for girls and boys or the task administration in the classroom in this study.

Based on the principles of the development and application of the SSCT, the understanding of the sentences tested in Task 3 should improve by school year level, at least in the NS controls. Accordingly, the performance increases observed between year levels in the NS controls in this study should be considered genuine even though they were realised to a somewhat smaller extent and were not found statistically significant between as many year levels as in the norming test results. Following this interpretation, the performance of the NS controls on Task 3 in this study that exhibited a greater degree of increase between year levels may be considered as reflecting actual performance increases that happen in the underlying population.

However, the relatively superb performance of KHSs in Year 6 in both genders and male Year 4 KHSs, along with their statistically significant results, should be interpreted with caution. This is because their high level of performance could have resulted from a sampling error. Especially in the case of KHSs in Year 6, there may have been had a higher proportion of highly proficient speakers or higher proficiency in Korean than those in the underlying population, judging from their unusually high performance across the tasks in this study. When the relatively superb performance of Year 6 KHSs is regarded as a sampling error, one may question the interpretation provided above for the observed trend of a performance increase by school year level in KHSs. However, even excluding those in Year 6, their performance in each gender increased by year level. The overall trend of their performance change by year level did not point to a decrease. This hardly suggests that KHSs in a higher-year level will perform less well than their lower-year-level counterparts if given the same task. The unlikelihood of a performance decline by school year level in KHSs, in turn, denotes that they will, at least, maintain the generally high level of comprehension of the sentences made of basic syntactic structures and semantic features in Korean over primary school years. This can be interpreted to suggest that they will retain the linguistic abilities in basic syntax and semantics that they had acquired before formal schooling quite well over their primary school years.

7.3.2.2 Task 4—Stagnant development of linguistic aspects mastered late

The analysis of the participant performance of Task 4 by school year level showed that the performance of KHSs stagnated at the middle-year levels through to the upper-

year levels, although a great improvement was observed between the two lower-year levels in girls and between the two upper-year levels in both genders. This contrasted quite sharply to the relatively consistent performance increase in the NS controls, which exhibited a slightly larger degree of increase between the lower-, middle- and upper-year levels. The results of the statistical tests for the between-year-level differences in KHSs were also quite different from the results of those in KNSs. In the NS controls, the performance difference between a lower-year level and an upper-year level and even between a lower-year level and a middle-year level turned out to be statistically significant. On the contrary, in KHSs, no performance difference between different year levels was found statistically significant, except for that between Years 1 and 6 in girls.

Given the performance of KHSs on Task 4, which was not reliably better at a higher-year level than at a lower-year level, as well as showing an equivocal trend of improvement, it is difficult to conclude that their grammaticality judgements regarding the four linguistic aspects tested by the task (i.e., the verb conjugation, passives, NPIs and use of the verbs *o-* and *ka-*) improve as their year level goes up in primary school years. Especially if the unusually high performance of female KHSs in Year 2 and KHSs in Year 6 in both genders is regarded as a sampling error, a stagnation in their performance change by school year level becomes more evident. Consequently, it becomes much more difficult to claim that there will be a performance improvement in KHSs over primary school years. Moreover, even if one ascribes their statistical test results (i.e., non-significant for almost all between-year-level differences) to the observed differences being not large enough for their within-group variations, the descriptive statistics hardly point to an overall performance increase by school year level in the speaker group. Taken together, the results of the statistical tests and the descriptive statistics of KHSs suggest that their grammaticality judgements regarding the four aspects in Korean may not necessarily improve over primary school years. This further suggests that in KHSs in Australia, the linguistic knowledge of those features in Korean may not necessarily develop over the primary school period.

Similar results indicating no clear sign of development of some linguistic aspects in the HL over school years have been observed in some studies. For instance, in her study of the development of Spanish and English among HSs of Spanish attending a primary school with a bilingual program in the US, Merino (1983) found no strong evidence for a performance increase by school year level (from Kindergarten to Grade 4) on the tasks

assessing their acquisition of various morphosyntactic features in Spanish (e.g., number, gender, word order, relative clauses and conditional clauses). Other studies also reported minimal differences or fluctuations between age groups on measures of the HL abilities regarding certain linguistic aspects in school-age HSs (e.g., Flores et al., 2017; Nic Fhlannchadha & Hickey, 2017; Unsworth, 2013). Although these results could have been a by-product of a cross-sectional examination, they could indicate that some linguistic aspects in the HL do not necessarily develop naturally as HSs grow older.

The results of Task 4 in this study and those of the previous studies showing no clear sign of development of certain linguistic aspects in the HL over school years denote that in HL acquisition, some linguistic aspects do not develop significantly after preschool years. In the case of the four linguistic aspects tested by Task 4 in this study, their low chance of developing greatly over primary school years in KHSs in Australia arises from the combination of their timing of acquisition in L1 acquisition and the condition of reduced Korean input in the KHSs especially after the onset of formal schooling around the age of five. Quite simply, this is because, in HSs (or bilinguals in general), the acquisition of a linguistic aspect will not progress if the relevant input undergoes a considerable reduction before that aspect is acquired fully, as briefly mentioned in section 7.3.1.2.

As indicated by the performance of the NS controls on the given task, in L1 acquisition of Korean, the four linguistic aspects examined do not fully develop by the time KNSs enter primary school (at Year 1 in South Korea) at age six (or at seven).⁸⁹ For instance, regarding the verb conjugation, monolingual Korean-speaking children have been observed to produce non-target forms up until seven (e.g., Baek, 2011; Lee P-y & Im, 2004). In the study by Baek (2011), the six-year-olds (i.e., the oldest children examined in the study) were still making errors that seemed to have resulted from incompetence in reconstructing the verb stem, and over 20% of the children were still producing errors caused by inserting the epenthesis vowel *u* erroneously after the verb stem (e.g., *mek.u.nun* instead of *mek.nun* for *mek-nun* ‘eat’-modifier). These study results indicate that many KNSs do not master the morphophonemic rules for verb conjugation in Korean by seven. In fact, the morphophonemic rules for verb conjugation in Korean

⁸⁹ However, some children enter primary school at seven. In general, children enter primary school at the age of six given that each academic year start at the beginning of March. With some changes made in the relevant regulations, those children born in January or February start primary school at the age of seven since 2009.

are quite complex; children must learn not only the rules that involve a calculation of the phonetic conditions of the verb stem and the constituent attached to the stem (e.g., connectives, suffixes/markers or sentence endings) but also numerous exceptions of the rules. Above all, they must be able to extract the verb stem from its inflected forms. This must be why the verb conjugation in Korean is not readily mastered within preschool years, even in KNSs.

In the case of passives in Korean, although monolingual Korean-speaking children produce passive sentences quite early, it seems to take beyond preschool years to achieve adult-level linguistic abilities in various passive constructions in Korean. According to Lee I-S (1977), passive sentences appear already in the utterances of two-year-old monolingual Korean-speaking children, but still around four, they produce passive sentences with low accuracy (only 30–40%). Between five and six, they produce passive sentences more frequently than before, and only between seven and nine does the acquisition of passive seem to stabilise (Lee I-S (1977)). In the study by Park E-J et al. (2016),⁹⁰ the seven-year-old KNSs with both parents Korean showed an average accuracy of around 80% in the comprehension and production task,⁹¹ and the eight-year-olds' accuracy was still below 90%. In the nine-year-olds, the accuracy was over 95%, both in comprehension and production. Ha EJ (1999) also observed similar results in her study. The results of these studies support the observation of Lee I-S (1977) in that the acquisition of passives seems to be near mastery around nine. However, Jeong H (2015) has observed that even at 12, the children did not perform to the level of their adult controls on a grammaticality acceptability test. Nevertheless, taken together, such findings clearly indicate that in KNSs, the acquisition of passives during preschool years is far from being complete.

With respect to NPIs, KNSs may learn the simple syntactic rule that an NPI must be accompanied by a negator within preschool years. Kim J-B (1995) claimed that Korean-speaking children may not readily produce sentences with an NPI until six. However, in her elicitation task for sentences with an NPI either as the subject (e.g., *a.mu.to* 'anyone') or as the object (e.g., *a.mu.ket.to* 'anything'), Song MS (2004) found

⁹⁰ This was a study of the comprehension and production of passive sentences as well as causative sentences in children from couples with a bicultural marriage in South Korea (e.g., with a Korean father and a mother from another country).

⁹¹ The seven-year-olds understood 14 out of the 17 sentences tested correctly and produced 13.6 out of 17 sentences correctly, on average.

that monolingual Korean-speaking children aged three to six were fully capable of producing sentences that contain an NPI not only as the subject but also as the object (with an accuracy well over 90%). However, in a similar elicitation task conducted by Kim B (2018), the production rates of the target-like sentences with an NPI by children aged four to six appeared much lower than those in the study by Song MS (2004); even in the six-year-olds, the production rates were below 85%, with that for the sentences with an NPI as the subject being even lower than 80%. This shows that KNSs may not master even the simple syntactic rule for NPIs that an NPI must be accompanied by a negator by age six.

Further, the more complex syntactic rule that an NPI must be licensed locally in a complex sentence in Korean may take even longer for children to learn. No study has investigated the acquisition of syntactic rules regarding NPIs beyond preschool years in KNSs or the development of the more complex syntactic rule to date (to this researcher's knowledge). Thus, it is unknown when KNSs master the complex rule for NPIs in Korean. As more complex syntactic aspects are acquired relatively late (Berman, 2004; Chomsky, 1969), it seems reasonable to suppose that more complex syntactic rules regarding NPIs in Korean, such as the local licensing rule, are mastered much later. The findings of the study by Kim S-J (2012) that among adult KHSs in the US, even those who started learning English between seven and 10 showed non-native knowledge of the complex syntactic rule also suggest that the acquisition of more complex rules for NPIs is generally not completed in preschool years.

In relation to the mutually exclusive use of the deictic motion verbs *o-* and *ka-*, no study has thus far investigated its acquisition in monolingual Korean-speaking children.⁹² As the use of the verbs in Korean requires a complex calculation of relevant information, such as the direction of the movement of the agent to or from the referent point, the location of the agent as well as of the speaker and addressee and the timing of the movement and speech act, it is difficult to presume that KNSs master such complex calculation in preschool years. It might take up to nine years for KNSs to master the use of the verbs *o-* and *ka-* as it is the case for monolingual English-speaking children with

⁹² Although Jeon (2013) observed that the five-year-old monolinguals used both *o-* and *ka-* very frequently in their utterances, she did not analyse the grammaticality or appropriateness of the use of the verbs in the children's utterances.

the verbs ‘come’ and ‘go’ (as well as ‘bring’ and ‘take’), as reported by Clark and Garnica (1974).

As elaborated above, in KNSs, the four linguistic aspects tested by Task 4 do not seem to fully develop in preschool years but continue to develop further through primary school years. This indicates that the four linguistic aspects are not fully developed in KHSs in Australia when they start their formal schooling (at Kindergarten) around the age of five. Thus, one of the apparent reasons for the stagnant development of the aspects during primary school years observed in KHSs in this study must be their reduced Korean language experience during the period. While they attend school, their exposure to and use of Korean are reduced considerably (much more than before if they had already started learning English by attending childcare centres or preschools for a few days a week); accordingly, in KHSs, the acquisition of the aspects cannot proceed in the same speed (as well as way) as it does in their NS peers.

After KHSs enter primary school, it is almost impossible for them to have language input and use of Korean equivalent to what their KNS peers receive in the monolingual environment, not only in quantity but also in quality. As KHSs receive formal schooling in the immersion setting, they become more proficient in English. However, this gain in English proficiency leads to a change in the use of their two languages, allowing less and less time for Korean language exposure and use. They may end up receiving only the minimal input in Korean, with which they barely manage to maintain the previously acquired knowledge of the four aspects.

7.3.2.3 Task 5—Maintenance of comprehension of passive sentences

The analysis of the participant performance of Task 5 by school year level showed that not only in KNSs but also in KHSs, the participants in a higher-year level tended to perform better than their lower-year-level counterparts. Although the performance of KHSs fluctuated more wildly between year levels than that of the NS controls, it was evident that in each gender, KHSs in the upper-year levels generally performed better than those in the middle-year levels who, in turn, generally performed better than those in the lower-year levels. However, the statistical test results revealed that in KHSs, all between-year-level differences in each gender, except for that between Year 2 (i.e., the lowest) and Year 6 (i.e., the highest) in boys, did not reach statistical significance. In contrast, in the NS controls, the difference between a lower-year level and an upper-year level in each gender and that between Years 1 and 4 in girls did so.

Since the generally better performance at a higher-year level observed in KHSs was not verified statistically, it is difficult to conclude that their understanding of passive sentences and active sentences in Korean improves over primary school years. Nevertheless, even with the statistically non-significant test results, a performance improvement over the period is still one of the possible realities for the underlying population of KHSs in Australia. Although the non-significant results also left the possibility open for no change or a decrease by year level, the general trend of performance increase observed in KHSs hardly suggests attrition in the understanding of passive sentences and active sentences in Korean over primary school years in KHSs.

Providing a reference for the interpretation of the results of KHSs on the task, the NS controls showed a performance increase by school year level. This indicates that in KNSs, the understanding of passive sentences and active sentences develops over primary school years. In fact, in L1 acquisition of Korean, the comprehension of passive sentences and active sentences in the OSV word order is supposed to improve further through primary school years, as preschool children appear to be far from its mastery. For instance, in the study by Lee K-O and Lee (2008) of the acquisition of the morphological passives in Korean in children aged four to seven, the comprehension of passive sentences and active sentences (tested only in the canonical word order) was much lower in younger children than in older children. In the oldest age group, the comprehension accuracy of the passive sentences with some verbs was still below 90%. It was even lower than 80% for those with ‘activity’ verbs. Similarly, in the study by Ha EJ (1999), the correct comprehension and production of passive sentences was only 46% and 31%, respectively, in the four-year-olds and 75% and 58% in the five-year-olds, the comprehension accuracy (but not the production accuracy) exceeded 90% only in the nine-year-olds. In the study by Park E-J et al. (2016), the comprehension and production accuracy of passive sentences likewise was over 90% only in the nine-year-olds. These results indicate that in KNSs, the understanding of passive sentences improves significantly even after preschool years, nearing the mastery level only around the middle primary school years.⁹³

⁹³ in Task 5 in this study, however, the comprehension accuracies of KNSs on passive sentences were still mostly below 90% even at the upper-year levels. Such a relatively low level of performance in Task 5 compared to the previous studies must have been derived from the higher level of task difficulty of Task 5 in this study. In other words, Task 5 was much harder than the comprehension tasks in the previous studies. For instance, the participants in this study had to choose the right answer among four pictures provided (not from two pictures as in the study by Lee K-O and Lee (2008)) and the task was not administered one to one in this study. Most notably, it was a timed task in this study (i.e., having to choose their answer within a set amount of time).

The comprehension of OSV sentences is also expected to improve beyond preschool years in KNSs. According to Yi (2000), monolingual Korean-speaking children acquire subject-marking particles by 30 months and object-marking particles by 42 months. This, however, does not mean that older children can readily use the linguistic knowledge of case-marking particles in comprehension. In Chung GN's (1994) study, the correct understanding of OSV sentences in Korean in children aged 3;7–3;10 or 4;1–4;6 was still below 80%. Notably, in their study of the acquisition of case and word order in Korean, Kim S et al. (1995) observed that the monolingual Korean-speaking children aged eight understood only two out of four OSV sentences correctly (i.e., 50% accuracy) although their understanding of the sentences improved substantially when a context for the target sentence was provided.

The above-mentioned results of previous studies clearly show that even in KNSs, the understanding of passive sentences and OSV sentences does not reach its full capacity in preschool years and improves further through primary school years. The performance of the NS controls on Task 5 in this study are consistent with the previous studies in that at the lower-year levels (where the children are six or seven years old), their correct understanding of passive sentences was below 80% in both genders, and their understanding of OSV sentences was even lower. With respect to the development of the understanding of passive sentences and OSV sentences over primary school years, the performance of the NS controls showed an increasing trend by year level. Moreover, the statistically significant performance differences, at least, between a lower-year level and an upper-year level observed in the NS controls indicate that those in an upper-year level understand the tested sentences better than those in a lower-year level, suggesting an improvement in their understanding of passive sentences and active sentences over primary school years.

Given the results of the previous studies as well as of this study indicating that the understanding of passive sentences and OSV sentences develops further through primary school years in KNSs, it is apparent that it does not yet reach its full capacity by age five, around which KHSs in Australia start their formal schooling. If KHSs start learning English even before formal schooling (which is very common), they may not be able to understand passive sentences and active sentences as well as their age-matched KNSs even at the start of schooling, due to reduced Korean input up to that time point. Nevertheless, with respect to the question of its further development over primary school

years, the results of KHSs on Task 5 in this study indicate that their understanding of passive sentences and active sentences will, at least, be maintained over primary school years. Based on the observed overall trend of performance increase in KHSs, it is even possible that their understanding of the sentences improves as the year level goes up during primary school years, despite the statistically non-significant results.

In section 3.1.3, the consistently lower level of understanding of passive sentences and OSV sentences of KHSs compared to their KNS counterparts observed in this study was speculated to be due to their lower ability to take note of and decode morphosyntactic cues such as case-marking particles and verb inflections in on-line comprehension. In other words, the KHSs' less-than-native understanding of passive sentences and OSV sentences in Korean observed in this study was assumed to have resulted from their difficulty with processing inflectional morphology but not necessarily from their lower level of acquisition of the relevant morphosyntactic knowledge as Kim K et al. (2018) claim. Following this assumption, the general trend of performance improvement by school year level observed in KHSs can be interpreted as that their use of the morphosyntactic cues in Korean in comprehension may improve over primary school years or that it is, at least, maintained over that period.

7.3.3 KHSs' relative difficulty with particular linguistic aspects

The analysis of the accuracy on individual test items, as well as the comparison of the accuracy by the linguistic aspect examined in the task, revealed that on certain test items or for certain linguistic aspects, the accuracy difference between KHSs and the NS controls was relatively large compared to other items or other linguistic aspects. Given the accuracy of KHSs on individual test items usually being lower than that of their KNS counterparts, the relatively large accuracy gap observed with certain test items indicate that the KHSs' level of linguistic knowledge or use of the linguistic aspects tested by those items is particularly low among the linguistic aspects examined. The test items with a relatively large between-speaker-group gap present the possible linguistic aspects in Korean that KHSs in Australia are likely to show a greater difference to the native norms in linguistic knowledge and use.

7.3.3.1 Task 3—Particular syntactic structures or semantic pictures

The analysis of the participants' accuracy on individual test items in Task 3 revealed that on some test items, not only KHSs but also KNSs were relatively less

accurate. As explained in section 7.2.3.1, the commonly low accuracy on the items observed across the speaker groups seems to have arisen mainly from the item construction, such as the formation of the target sentence and its oral presentation, as well as the pictures provided as the answer choices. More importantly, on certain test items, the accuracy difference between the speaker groups was relatively large compared to other items, despite the generally small between-speaker-group difference in the task because of the relatively good performance of KHSs. The test items 3, 6, 13, 20 and 30 showed a between-speaker-group difference over -10% in both genders; for Item 3, the difference even exceeded -20% not only in boys but also in girls.

For some of these items, one of the possible causes of the observed large between-speaker-group difference—which reflects the gap between the KHSs’ and their NS controls in linguistic knowledge and use of the linguistic aspects tested—is the relatively late acquisition of linguistic aspects and the KHSs’ reduced Korean language input and use after the start of formal schooling. Although most of the syntactic structures and semantic features tested in Task 3 develop early in L1 acquisition of Korean, not all of them develop fully within preschool years. As explained in detail in sections 7.3.2.2 and 7.3.2.3, for instance, the comprehension of passive sentences in Korean—which was tested by Item 3 in the given task (as well as in Tasks 4 and 5)—improves further through primary school years in KNSs. As the comprehension of passive sentences continues to improve beyond preschool years in L1 acquisition of Korean, KHSs in this study who start their formal schooling around five may not have been able to develop the passives in Korean or their understanding of passive sentences in Korean to the level of their KNS peers, given their Korean language input considerably reduced by their regular school attendance.

Besides such relatively late acquisition and considerable reduction of Korean language input and use in KHSs, a greater processing difficulty in Korean that KHSs seem to be burdened with compared to their KNS peers—possibly due to their bilingualism that implies less Korean language experience and cross-linguistic influences from English, or simply due to their lower proficiency in Korean—may have hindered them from understanding the target sentence correctly in some of those test items. If the lower level of understanding of passive sentences in Task 5 observed in KHSs was due to their greater difficulty in processing inflectional morphology in Korean (as argued in section 7.3.1.3), the same effect must have affected Item 3 in Task 3, as the item also

tested the comprehension of a passive sentence. Moreover, in Item 3, the task of determining the thematic relations of the noun phrases was further confounded by the size variable of the noun phrases (i.e., ‘a big cat’ and ‘a small dog’), so the processing load for the sentence must have been greater than that for the simpler sentence without the size variable (i.e., ‘a cat’ and ‘a dog’), along with identifying the matching picture among the given options (which also had the pair of ‘a small cat’ and ‘a big dog’). Similarly, with Item 30, KHSs may have had greater difficulty with understanding the relative clause (i.e., *oy.n.ccok.u.lo kwu.pwu.le.cye iss.nun phyo.ci.phan* ‘a sign that is bent to the left’) in the target sentence than the NS controls, as attested in previous studies (e.g., Kim H-SH, 2005; O’Grady et al., 2001). In addition, the target sentence was one of the longest sentences tested in the task. This must have added a greater burden on their memory capacity; this added processing load must have resulted in a greater performance gap between KHSs and the NS controls on the item.

The relatively large accuracy difference observed for Item 13—which tested the understanding of the conjunctor *-ta.ka* used to express a transition between actions or states—also seems to have been derived from the relatively late acquisition of that aspect. Lee Sam-hyung et al. (2003) reported monolingual Korean-speaking children producing the conjunctor *-ta.ka* between 30 and 35 months, but in an elicitation task by Seo and Lee (1999), the relative production rate of the conjunctor compared to other conjunctors was very low (i.e., below or around 2%) in children aged 4;6–4;11 and 5;6–5;11, and it was not produced at all in other age groups (between 2;00 and 5;11, divided by six-month-interval). This extremely low production rate of *-ta.ka* could have arisen from the design of the elicitation task in their study. However, if their results correctly reflected the relative production frequency of the conjunctor *-ta.ka* in the utterances of preschool-age KNSs, it can be concluded that *-ta.ka* is acquired relatively late in L1 acquisition. In addition, such a low production rate observed could have simply reflected its frequency in the children’s Korean language input. Nevertheless, both relatively late acquisition and a low input/use frequency of *-ta.ka* (which may be interrelated) could have delayed its acquisition in KHSs, leading them to fall far behind their KNS peers.

In comparison, in the case of Item 20—which tested the acquisition of the adverbial phrase *-(u)n chay(lo)* ‘being in the state’, the limited exposure to written Korean that KHSs in Australia may have caused the relatively large gap to the native norms in understanding the phrase. The target phrase *-(u)n chay(lo)* is more often used

in the written language than in the spoken language; in spoken Korean, the same meaning would/could be expressed using other constructions or expressions such as the conjunctor *-ko* ‘and’ and the adverb *ku.nyang* ‘just’. As KHSs in Australia lack written language experience in Korean due to their absence of formal schooling in the language, they may have encountered the target phrase far less often than their KNS peers and consequently acquired it to a much lower level than the NS controls, thus showing a lower level of understanding.

With Item 6, it is difficult to point out the exact reason for the KHSs’ much lower level of understanding of the target sentence that tested the temporal aspect that the adverb *mak* ‘just now’ adds to the action expressed the verb. It is unknown when this meaning of the adverb *mak* is learned by KNSs or how frequently the adverb is used for that meaning tested in that test item in the NS controls’ input. One may carefully posit that frequent uses of its homonyms (e.g., *mak* as the short form of *ma.kwu*, which means ‘randomly’, ‘recklessly’, ‘severely’, etc.) as well as frequent replacements of the word with another one (e.g., *pang.kum* ‘just now’) to express the same meaning in spoken Korean, which is the primary source of Korean language input in KHSs, may have attributed to the much lower level of acquisition of the aspect in KHSs in primary school years.

7.3.3.2 Task 4—Particular linguistic aspects

The detailed analyses of the participants’ performance of test items in Task 4 by linguistic aspect showed that KHSs performed far less well than the NS controls on all four aspects. Given this trend, in each speaker group, the accuracy on the test items differed between the linguistic aspects. Nevertheless, the speaker groups were similar in the order of being more accurate on the linguistic aspects tested; both speaker groups were most accurate on the test items for the passives and least accurate on the test items for the use of the verbs *o-* and *ka-*.

Although the accuracy on the test items was highest for the passives in both speaker groups, the accuracy of the NS controls on the items for the passives was notably higher than their accuracy on the items for the other aspects. Consequently, compared to the NS controls, KHSs appeared to be particularly less accurate on the passives among the four linguistic aspects tested. The NS controls’ accuracy on the test items for the passives was over 90%, at least from the middle-year levels, and such high accuracy on the passives was largely consistent with the findings of previous studies suggesting that

the acquisition of passives stabilises between seven and nine in monolingual Korean-speaking children (e.g., Ha EJ, 1999; Lee I-S, 1977; Park E-J et al., 2016). In addition, it supports the assumption that the NS controls' relatively low performance of passive sentences in Task 5 in this study compared to the previous study results was derived from its greater task difficulty, such as that it was a timed task and was administered in a classroom setting.

In comparison to the NS controls' performance of the passives in Task 4, suggesting that their acquisition of the passives approaches the mastery level around the middle primary school years, the KHSs' accuracy on the test items for the passives stayed around 70% (in girls) or lower (in boys) across the year levels. This lower performance of KHSs on the passives in the task may have arisen from the considerable reduction in their Korean language experience in the time frame that its acquisition occurs. KHSs in Australia start their formal schooling around five; thus, their Korean language experience is cut down considerably. However, in L1 acquisition of Korean, the passives develop greatly even after five, as previous study results indicated (e.g., Ha EJ, 1999; Lee K-O & Lee, 2008). Accordingly, in KHSs, the acquisition of the passives in Korean does not progress as much as it should after their start of formal schooling, whereas in the NS controls, the passives develop by a significant degree over the Kindergarten and lower primary school years. This must have led to a particularly large between-speaker group difference observed for the passives in this study.

Compared to the relatively large between-speaker-group difference observed for the passives in Task 4, the between-speaker-group difference in the other three linguistic aspects was similar (around -15% in girls and slightly larger in boys). Interestingly, the accuracy of the NS controls on the test items for the verb conjugation was just over 80%, even though they are hardly expected to make verb conjugation errors (i.e., signs of non-mastery) at the middle- and upper-year levels. The detailed analyses of their accuracy on the test items for the verb conjugation informed that their accuracy on the grammatical sentences was over 90%, but that on the ungrammatical sentences was far lower, around 70%. The verb conjugation errors made up for the task were quite subtle as the difference between the target form and the erroneous form was often only a difference of a vowel, for example, the erroneous form for the correct conjugation *ssu.myen* 'if wearing (glasses)' for the verb *ssu-* 'wear (glasses)' was *sse.myen*. This fine phonemic difference from the

target form seems to have been difficult to catch even for the NS controls because it was presented in a sentence, not in a single word.

The accuracy of the NS controls on the test items for the NPIs was also just over 80%. This seems to have arisen from the composition of the target sentences that four of the 10 sentences tested were complex sentences (i.e., the other six were simple sentences). Following the assumption that KNSs do not learn complex syntactic rules for NPIs in Korean in preschool years (as explained in section 7.3.2.2), the NS controls' accuracy on the test items for the NPIs increased by school year level. Their accuracy exceeded 85% at the upper-year levels but was still below 90%. This indicates that complex syntactic rules for NPIs may not be mastered even by late primary school years. Future research should investigate the acquisition of complex syntactic rules for NPIs in KNSs to provide a reference for its acquisition in KHSs.

The accuracy was lowest on the items for testing the use of the verbs *o-* and *ka-* not only in KHSs but also in the NS controls. This was probably because the mutually exclusive use of the two verbs requires a complex calculation of the basic semantics of the verbs and the pragmatic information of the context and is thus mastered relatively late. In the NS controls, their performance of the items for the use of the verbs indeed increased by school year level. This suggests that the linguistic knowledge on the use of the verbs develops over primary school years in KNSs.

The accuracy on the test items by grammaticality demonstrated that both speaker groups were more accurate with grammatical sentences than ungrammatical sentences. These results are in line with the results of previous studies that used a GJ task to measure linguistic knowledge of certain linguistic aspects in monolingual children (e.g., Hakes, 1980; Sutter & Johnson, 1990) as well as in bilingual children (Bialystok, 1986; Gathercole, 2002b, 2002c). In general, it is harder to identify ungrammatical sentences than grammatical sentences since ungrammatical sentences require greater levels of analysis and a substantial amount of control (Bialystok, 1986). Interestingly, on the test items for the passives, the accuracy on ungrammatical sentences was higher than that on grammatical sentences in the NS controls (in both genders) as well as in female KHSs, although male KHSs kept the common pattern of a higher accuracy on grammatical sentences. As the accuracy difference between the grammatical and ungrammatical sentences (regardless of the pattern) was around 5% in each speaker group in each gender, it could have arisen from a few grammatical sentences that the NS controls in both

genders and female KHSs tended to regard as ungrammatical on some other grounds than its passive construction. Conversely, on the NPIs, only female KHSs exhibited a higher accuracy on the ungrammatical sentences, while the NS controls and male KHSs continued to be more accurate with the grammatical sentences, following the usual pattern. As the accuracy difference of female KHSs between the grammatical and ungrammatical sentences was fewer than 5%, this abnormal pattern may be disregarded. However, it can be speculated with caution that female KHSs, as they seem to have generally higher linguistic abilities in Korean than their male peers, may have had heightened task sensitivity, overreacting to grammatical sentences.

7.3.3.3 Task 5—Passive sentences and OSV sentences

The detailed analyses of the accuracy on the test items by sentence type in Task 5 revealed that both KHSs and KNSs were better at understanding active sentences than passive sentences when the sentences had the canonical word order. This is consistent with previous studies showing that understanding passive sentences is generally more difficult than understanding active sentences (e.g., Caplan et al., 2007; Jeong H-G & Lee, 2014). A relatively greater difficulty with passive sentences might be because the passive voice is the marked voice in contrast to the active voice being the unmarked/default form (Jeong H-G & Lee, 2014). Although KHSs showed the same pattern of a higher accuracy on active sentences than passive sentences in the canonical order with KNSs, they were far less accurate than the NS controls on the passive sentences (with a between-speaker group difference of around –15% in girls and over –20% in boys) compared to the active sentences (with a between-speaker-group difference of fewer than –5% in girls and fewer than –10% in boys). This larger between-speaker-group difference in the passive sentences compared to the difference in the active sentences when the sentences are in the canonical word order implies that KHSs had great difficulty with understanding passive sentences than with understanding active sentences, whether due to their lower level of acquisition of the passives or greater processing difficulty (or possibly both).

As explained in section 7.3.1.3, the assumption that KHSs, compared to the NS controls, utilise morphosyntactic cues in a sentence to a lesser degree in on-line comprehension is strongly supported by their particularly poor performance of the active sentences in the OSV order. Their accuracy on the OSV sentences was far lower than that of the NS controls. It was below 50% not only in boys but also in girls, indicating that more than half of the time, they interpreted an OSV sentence as an SOV sentence. One

of the possible explanations for such a high level of misunderstanding of OSV sentences by English-speaking KHSs is their reliance on the word order cue for figuring out the grammatical relations (as well as the thematic relations) of the noun phrases in a sentence.

One may posit that English-speaking KHSs rely heavily on the word order cue to work out the grammatical relations of the noun phrases in a sentence because of cross-linguistic influences from English, which is often their dominant language. However, this assumption should be scrutinised in conjunction with their performance of the passive sentences as in this study. If KHSs in this study interpreted the first noun phrase as the subject (i.e., the agent) and the second one as the object (i.e., the patient) in a given sentence regardless of its voice (active or passive), simply following their order, their accuracy on the canonical passive sentences should have been much lower, and at the same time, their accuracy on the scrambled passive sentences should have been much higher than that observed in their actual performance in the task. Although their accuracy on the scrambled passive sentences (agent–patient–action) was, in fact, higher than that on the canonical passive sentences (patient–agent–action), the difference between them was minimal (i.e., fewer than 3%). Moreover, the same pattern of slightly better performance of the scrambled passive sentences was also observed in the NS controls (although only in girls) who should have no cross-linguistic influence.

Thus, the KHSs' significantly lower accuracy on the OSV sentences must have arisen from falling back on the default word order of the sentence structure upon failure to note the morphosyntactic cues. Although it is relatively free to move the sentence constituents before the verb in Korean (Sohn, 2013), most of the time, the subject comes before the object (Shin S, 2007). In spoken Korean, the primary source of the HL input and use in KHSs, case-marking particles and sentence constituents, including the subject, are frequently omitted. However, if the grammatical relations cannot be recovered easily from the context, function words or sentence constituents are rarely omitted. Moreover, if all noun phrases are realised without a case particle, they are much more likely to come in the default word order than in another order. Accordingly, when KHSs do not note the case particles, they may simply assume that the sentence is in the default word order—that is, the most frequent/likely order—and interpret the noun phrases accordingly.

However, such an assumption that KHSs turn to the default word order when having failed to take note of the morphosyntactic cues does not explain the KHSs' slightly higher accuracy on the scrambled passive sentences than on the canonical passive

sentences very well even though the difference was minimal. According to that assumption, their accuracy on the scrambled passive sentences should have been much lower as the sentences were not in the default order. Their slightly higher accuracy on the scrambled passive sentences than on the canonical passive sentences, as well as much higher accuracy on all three types of passive sentences compared to OSV sentences, then, should be explained by other factors than having recourse to the default word order. It can be speculated that the understanding of the passive sentences in the canonical order and in the scrambled order is facilitated by the particle *-han.they* that marks the agent of a passive sentence in the given task. As the particle *-han.they* has two syllables, as well as having an explosive *th*, it may have been relatively salient compared to the subject-marking particles (i.e., *-i/ka*) or the object particles (i.e., *-ul/lul*), so it may have been relatively easier for KHSs to note. In the scrambled passive sentences, the noun phrase marked by *-han.they* (i.e., the patient) comes first in the sentence. If a KHS noted this noun phrase placed at the beginning of the sentence, it could have been slightly easier for them to expect that the sentence will be a passive sentence and the first noun phrase will be the agent (in the absence of other grammatical or thematic relations that the noun phrase marked by *-han.they* could have delivered such as the goal or indirect object).

In comparison, in the canonical passive sentence, the *-han.they* phrase, which may have better helped KHSs with understanding a passive sentence, comes after another noun phrase (i.e., the noun phrase marked by *-i/ka*, which is the patient); they cannot know if the sentence will be an active sentence or a passive sentence at least until they listen to that noun phrase marked by *-han.they* (i.e., the agent); accordingly, they have slightly less time to decode the thematic relations and find the matching picture, thus performing less well on the canonical passive sentence than on the scrambled passive sentence, but only slightly. Conversely, with the short passive sentences—that is, without the *-han.they* phrase, KHSs did not have the facilitation of the particle *-han.they* with its phonetically more salient presentation, but this lack of help of the *-han.they* phrase may have been compensated by the shorter length of the sentence with fewer constituents to process, as Lee K-O and Lee (2008) explains for their study results showing the same pattern. Therefore, the KHSs' understanding of the short passive sentences could have been at a similar level with that of the longer passive sentences. Such assumptions seem plausible to explain the observed patterns of the KHSs' performance of the different types of sentences tested in the given task. Nevertheless, future studies should confirm the

assumptions with more finely grained research tools that test more of the possible combinations of relevant variables (voice, word order, sentence length, phonetic salience of different particles etc.).

7.4 Summary

The linguistic abilities in the HL grammar of KHSs in Australia in primary school years were examined by three different tasks in comparison to their (gender- and) school-year-level-matched KNSs in this study. Their understanding of simple and complex sentences composed of various syntactic structures and semantic features was tested by a picture selection task (Task 3); their linguistic knowledge of the verb conjugation, the morphological passives, the NPIs and the use of the verbs *o-* and *ka-* was measured by a GJ task (Task 4); and their understanding of passive sentences compared to active sentences was tested by another picture selection task (Task 5). The results of the three tasks were analysed and discussed following the research questions of the study.

With respect to the question of the divergence of KHSs from the native norms in their linguistic abilities in HL grammar, the comparison of their performance with that of their KNSs counterparts showed that KHSs performed less well than KNSs across the year levels and gender on all three tasks, indicating that Australian KHSs in primary school years generally have a lower level of linguistic abilities in Korean grammar than their school-year-level-appropriate native norms. However, their gap to the native norms appeared different between the three tasks as the tasks examined not only different aspects of their linguistic abilities (i.e., knowledge or use) but also different features of their HL grammar. In the picture selection task for testing the comprehension of various syntactic structures and semantic features (i.e., Task 3), their performance gap to the native norms was relatively small, whereas in the other two tasks (i.e., Tasks 4 and 5), the gap was considerably large.

The descriptive statistics of Task 3 indicated the possibility that KHSs in primary school years in Australia understand sentences comprised of basic syntactic structures and semantic features in Korean less well than KNS of the same school year level. However, the results of the statistical tests were inconclusive since the observed lower performance of KHSs than KNSs did not reach statistical significance at many year levels. Given the inconclusive results, the discussion of their interpretation was focused mainly on the small performance difference of KHSs to the NS controls because this indicates

that the KHSs have attained basic syntactic structures and semantic features in Korean to a level close to (but not necessarily the same as) their school-year-level-appropriate native norms.

In comparison, in Tasks 4 and 5, not only the descriptive statistics but also the statistical test results demonstrated KHSs' much lower performance than that of KNS across the year levels and genders. The results of Tasks 4 and 5 showed that KHSs have a much lower level of linguistic knowledge or use of the linguistic aspects tested in the tasks than their KNS peers. In the case of Task 4, their shortfall in the linguistic knowledge of the four linguistic aspects (i.e., verb conjugation, passives, NPIs and use of *o-* and *ka-*) compared to the native norms was interpreted to show a delay in development or possibly attrition. Assuming a predominant exposure to Korean during preschool years in many KHSs in Australia, this delay or attrition was assumed to have resulted from the considerable reduction of Korean language experience brought by their formal schooling, especially because the tested aspects are supposed to develop beyond preschool years. In the case of Task 5, their lower level of understanding of passive sentences and active sentences, especially OSV sentences, was speculated to have been derived mostly from their greater processing difficulty. Based on the findings of previous studies, the poorer understanding of KHSs was considered due to their lower abilities to take note of and decode morphosyntactic cues in Korean, such as case-marking particles and verb inflections. This greater processing difficulty that KHSs have compared to their KNS peers was assumed to have accrued from their less-than-native Korean language input and use since they started learning English.

Regarding the question of the development of the linguistic abilities in the HL grammar over primary school years in KHSs in Australia, the results of the three tasks indicated that overall, their linguistic abilities in the HL grammar are well maintained over the period, with the possibility of development open. In Task 3, their understanding of the tested sentences appeared to be generally better at a higher-year level than at a lower-year level, but this better understanding was mostly found statistically non-significant. These statistical test results were interpreted to mean that their understanding of sentences such as those tested in the task is maintained over primary school years because the overall trend of their performance change by year level did not point to a decrease.

In contrast, the knowledge of the four linguistic aspects in Korean tested by Task 4 did not seem to develop greatly over primary school years in KHSs in Australia, even though their acquisition was supposed to progress further through primary school years. While the NS controls showed a clear tendency of a performance increase by year level on the task, as well as a statistically significant increase at least between a lower-year level and an upper-year level, KHSs exhibited a performance change by year level, which was difficult to regard as an increase especially when the unusually good performance of Year 6 KHSs was considered a sampling error. Their performance showed a sign of stagnation at the middle-year levels through to the beginning of upper-year levels. This stagnant development was assumed to be due to their less-than-native exposure to and use of Korean since their start of formal schooling. As the four linguistic aspects in Korean are not supposed to fully develop by the time that KHSs start their formal schooling around age five, they need to receive a certain level of input to acquire them. They must not receive the level of Korean language input required for further attaining those aspects during primary school years, as indicated by the results of Task 4.

In comparison, the results of Task 5 indicated that the understanding of passive sentences and active sentences will be at least maintained over the primary school period in KHSs in Australia. These results implied that their abilities to use morphosyntactic cues in working out grammatical and thematic relations of sentence constituents will be at least maintained over primary school years, under the assumption that their less-than-native understanding of passive sentences and OSV sentences in Korean was derived from their processing difficulty with inflectional morphology in the language. Since their results contrast with the expectation that the more proficient English speaker they become, the less they use Korean and consequently the greater the processing difficulty in Korean they have, future studies should further investigate the relationship between language proficiency and processing difficulty in HSs, especially in children who undergo a change in their language proficiency, dominance as well as use. However, if their maintenance (or even improvement) of the understanding of passive sentences and OSV sentences truly reflects their upkeep of the abilities to use the morphosyntactic cues in Korean over primary school years, the results of Task 5 can be interpreted to suggest that their continuous exposure to Korean at home also facilitates their maintenance of linguistic abilities in processing inflectional morphology in the HL.

More detailed analyses of the performance of KHSs on individual test items in each task in comparison to that of their NS controls revealed that in Task 3, they had relatively greater difficulty with test items if the items tested a linguistic aspect that is mastered relatively late in L1 acquisition of Korean or is likely to occur relatively infrequently in their HL input. Their greater difficulty became more prominent when the processing load was increased by complicating the test item with extra variables or the length of the sentence. In Task 4, KHSs appeared far less accurate than the NS controls on the passives among the four linguistic aspects tested by the task. The comparatively large gap between KHSs and their NS controls with the passives was, in fact, due to the relatively superb performance of the NS controls on the passives in the task. In the L1 acquisition of Korean, the acquisition of the passives nears the mastery level around the middle primary school years, so the NS controls performed very well on tested items for the passives at least from the middle-year levels (or even earlier). In comparison, the performance of KHSs on the passives did not improve greatly over primary school years, thus appearing to fall especially far behind their NS controls. In Task 5, on OSV sentences, the accuracy of KHSs was particularly lower than that of the NS controls when compared across the sentence types. Their relatively better understanding of all three types of passive sentences than OSV sentences was assumed to be facilitated by phonetic salience of some components or the length of the sentence.

Chapter 8 Heritage Language Abilities and Heritage Language Experience

As previous studies conducted on adult HSs, as well as the results of this study (presented in Chapters 5, 6 and 7), indicate, HSs attain linguistic abilities in different linguistic areas and aspects in their HL to a different degree. However, it has been understudied how their linguistic abilities in one linguistic area relate to those in another. To this end, the relationship between the linguistic abilities in the HL in the three linguistic areas (i.e., the sound system, vocabulary and grammar) assessed in this study in KHSs in Australia in primary school years was examined. In addition, previous studies indicate that the outcomes of HL acquisition are closely related to the HL experience that individual HSs have in their life. However, how their HL experience relates to their linguistic abilities in the HL is still far from well understood. Thus, the relationship between the linguistic abilities in Korean attained and retained by the KHSs and their exposure to and use of Korean was examined in this study. Correlations between their linguistic abilities in Korean in the three linguistic areas (i.e., sound system, vocabulary and grammar) examined and presented in previous chapters and sociodemographic information that can affect their HL experience together with their level of HL exposure and use estimated by their parents were analysed. In this chapter, the results of the analyses are presented and discussed in relation to their HL development and maintenance. (This chapter addresses the research questions (4) and (6) presented in 4.2.)

8.1 Correlations among heritage language abilities in different linguistic areas

Before analysing the relationship between the KHS participants' linguistic abilities in Korean and their sociodemographic backgrounds as well as their amount of HL experience, the correlations between their linguistic abilities in Korean examined in the three linguistic areas (i.e., sound system, vocabulary and grammar) by the five different tasks (i.e., Task 1, a phoneme discrimination task; Task 2, a receptive vocabulary task; Task 3, a picture selection task for basic syntax and semantics; Task 4, a GJ task for the verb conjugation, passive, NPIs and use of the verbs *o-* and *ka-*; Task 5, a picture selection task for passive sentences) was inspected. Out of the task results of the 243

KHSs who participated in this study, the results of 214 KHSs (i.e., 36 in Year 1, 34 in Year 2, 54 in Year 3, 33 in Year 4, 22 in Year 5 and 35 in Year 6) whose results on every task were included in the analyses presented in Chapters 5, 6 and 7 were analysed for the correlation between the tasks. In other words, if a participant was excluded from the analysis of any of the five tasks, he or she was excluded from this correlational analysis. Pearson product-moment correlation coefficients were computed to assess the correlations among the five tasks in the participants' performance at each school year level. The results are presented in Table 8.1.

Table 8.1 *Correlations between tasks in performance of KHSs at Years 1–6*

Year level	Task	Task				
		1	2	3	4	5
1	1					
	2	.43**				
	3	.22	.52**			
	4	.47**	.62**	.42*		
	5	.27	.56**	.50**	.58**	
2	1					
	2	.50**				
	3	.67**	.66**			
	4	.65**	.74**	.73**		
	5	.43*	.45**	.71**	.58**	
3	1					
	2	.28*				
	3	.52**	.37**			
	4	.40**	.59**	.59**		
	5	.43**	.56**	.67**	.56**	
4	1					
	2	.07				
	3	.36*	.26			
	4	.42*	.29	.37*		
	5	.28	.52**	.18	.51**	
5	1					

	2	.15			
	3	-.01	.37		
	4	.53*	.55**	.30	
	5	.59**	.53*	.46*	.70**
6	1				
	2	.36*			
	3	.34*	.42*		
	4	.46**	.61**	.72**	
	5	.49**	.45**	.65**	.74**

Note. * Correlation is significant at the .05 level (2-tailed).

** Correlation is significant at the .01 level (2-tailed).

As Table 8.1 shows, at each year levels, the participants' performance of one task positively correlated with that of another (except for that of Task 1 with that of Task 3 at Year 5, $r(212) = -.01$, $p = .987$), with most correlations found statistically significant. This indicates that if a participant performed well on one task, he or she usually performed well on another task. However, the participants' performance of Task 1 correlated with that of another relatively weakly. In particular, at most year levels, the correlation coefficient of the participants' performance between Task 1 and Task 2 was relatively small compared to that between Task 1 and the other three tasks. Moreover, at many year levels, the correlation coefficient between Task 1 and Task 3 (e.g., at Years 1, 5 and 6), as well as that between Task 1 and Task 5 (e.g., at Years 1, 2 and 4), also appeared relatively small. This indicates that the tendency of performing well on the other tasks if performing well on Task 1 was not very strong. Thus, it suggests that the correlation between speech sound perception (tested by Task 1) and lexical knowledge (tested by Task 2) or that between speech sound perception and grammatical abilities (tested by Tasks 3, 4 and 5) was relatively weak compared to that between lexical knowledge and grammatical abilities or that among the grammatical abilities.

In comparison, the participants' performance of Task 2 showed relatively strong correlations with that of Tasks 3, 4 and 5 that tested the participants' linguistic abilities in Korean grammar. Especially, its correlation with that of Task 4 was strong at most year levels. This suggests that the higher lexical knowledge in Korean a KHS has, the higher grammatical abilities in the HL has he or she (and vice versa), and this relationship was especially strong for the HL grammar that continues to develop further through primary

school years such as the verb conjugation, passive, NPIs and use of the verbs *-o* and *ka-* in Korean (tested by Task 4). Moreover, the correlations among the three tasks for Korean grammar (i.e., Tasks 3, 4 and 5) was relatively strong, overall. In particular, the correlation between Task 4 and Task 5 was strong, with the correlation coefficient being over .50 across the year levels. This shows that the KHSs' linguistic abilities in HL grammar correlate highly between linguistic domains (e.g., morphology and syntax) or aspects (e.g., phenomena or features). Those who performed well on Task 4, showing a relatively higher level of attainment of the linguistic knowledge of the four linguistic aspects tested, tended to perform also well on Task 5, indicating that they have relatively better abilities in processing passive sentences and active sentences. Taken together, the correlations observed among the five tasks appeared to be stronger between the tasks that were supposedly more difficult than others (i.e., Tasks 2, 4 and 5). Put differently, the correlation between difficult tasks was relatively strong, compared to that between easy tasks or between an easy task and a difficult task. This may have been because the variation between individual KHSs could be better disclosed in more difficult tasks.

8.2 Heritage language experience and heritage language abilities

The level of attainment and retainment of linguistic abilities in the HL varies between linguistic areas, domains or aspects, as reviewed in 3.3.2.1. Moreover, there is great variation between individuals in linguistic abilities in the HL as indicated by previous research reviewed in 3.5.1, as well as by the results of this study (e.g., the larger standard deviations observed in the performance of the KHSs than the NS controls). These observations made in HL acquisition are closely related to HL experience that individual HSs have in their life. For instance, the great variation observed in the level of HL attainment (whether measured in terms of overall proficiency in the HL or in the linguistic knowledge or use of particular linguistic aspects in the HL) among HSs is assumed to arise from the differences in the amount of HL experience that individual speakers have (Montrul, 2012, 2016). The literature in the study of HLs, or the study of bilingual acquisition in general, indicates that the more exposure and use the language learner has in the TL (e.g., the HL), the higher proficiency (or competence) he or she achieves in that language (e.g., Hoff et al., 2012; Knightly et al., 2003; Oller & Eilers, 2002).

As reviewed in 3.5.1, previous studies conducted on adult HSs have shown that the results of HL acquisition can be influenced by their sociodemographic backgrounds related to their exposure to and use of the HL. Certain trends were observed in the level of HL attainment among HSs following their backgrounds—for instance, those who had arrived in the host country later had higher proficiency in the HL than those who had arrived earlier or were born in the host country as observed in Hakuta and D’Andrea’s (1992) study. Probably, a combination of different background variables such as parents’ L1, age of immigration or birth order creates an acquisition environment unique to individual HSs. Nevertheless, those who have the same demographic profiles acquire their HL in similar acquisition settings to a certain degree. Hence, these HSs—when compared as a group against other groups of HSs—attain their HL to a level different from that of the others. However, even assuming a close relationship between the level of HL attainment and the amount of HL experience, in what way different language background variables contribute to HL experience (especially the amount of HL input and use) or to what extent HL experience influences the level of HL attainment in HSs is still far from well understood. To this end, the relationship between linguistic abilities in the HL and various language background variables, as well as the amount of exposure to and use of the HL, was examined among KHSs in Australia in primary school years who participated in this study.

8.2.1 Participant backgrounds related to heritage language experience

Surveys were conducted among the parents of the KHS participants in this study to gather information relevant to their HL experience. The demographic information of the participants that can be related to their HL experience such as their country of birth, age of immigration, birth order, parents’ length of residence in Australia, parents’ proficiency in English, parents’ level of education and occupation was gathered.⁹⁴ In addition, more direct information on their level of HL experience such as the percentage of language input and use of Korean (relative to English, in their total language experience) when communicating with different interlocutors or simply measured in the total number

⁹⁴ Information on the number of other adults than parents (e.g., grandparents or relatives) living in the same household, as well as on the input and use of Korean with these adults, was also gathered. However, the number of such participants was very small. Only 3 participants of the 166 participants had grandparents or relatives living in the same household, so this question was also excluded from analyses.

of hours—even if it is only an estimate based on their parents’ observation,⁹⁵ length of attendance at Korean classes in Australian schools as well as in Korean community schools and number of visits to the parents’ home country (i.e. South Korea) was collected. Among the parents of the 214 KHSs whose task results were included in the correlational analysis between the five tasks (presented in the previous section), the parents of 166 participants (i.e., 31 participants in Year 1, 25 in Year 2, 36 in Year 3, 31 in Year 4, 17 in Year 5 and 26 in Year 6) participated in the survey.⁹⁶ Their answers of the survey questions were analysed, and the results are presented in Table 8.2, showing the mean of the measure of each question (e.g., years, weeks, scales or per cent) for participants in each year level.

Table 8.2 *Demographic information and level of Korean language exposure and use of KHS participants in Years 1–6*

Category	Variable	Year level						
		1	2	3	4	5	6	Total
Mother	Length of residence (years)	13.4	14.6	14.1	16.4	14.3	15.0	14.7
	Proficiency–Korean	4.8	4.6	4.9	4.8	4.8	4.7	4.8
	Proficiency–English	2.9	2.5	2.9	2.9	2.8	3.0	2.8
	Level of education	2.9	2.9	2.9	2.9	3.0	2.8	2.9
	Occupation	2.4	3.0	2.5	4.0	3.4	4.5	3.2
Father	Length of residence (years)	18.1	19.0	15.1	19.4	17.1	17.2	17.5
	Proficiency–Korean	4.8	4.5	4.9	4.7	4.8	4.7	4.7
	Proficiency–English	3.0	3.1	3.3	3.1	3.2	3.1	3.1
	Level of education	3.0	2.9	3.2	2.7	3.2	3.0	3.0
	Occupation	5.8	5.6	5.6	5.9	5.4	5.5	5.7
Siblings	Birth order	1.7	1.4	1.6	1.3	1.7	1.5	1.5

⁹⁵ In addition to their current level of Korean language exposure and use, information on their cumulative exposure and use of Korean was sought. However, the response rates to the relevant questions were very low. As a results, their background information regarding their cumulative amount of HL exposure and use was excluded from the analyses.

⁹⁶ Of the 247 KHSs participated in this study, the parents of 181 participants participated in the language background survey.

	Number of siblings	1.3	1.0	1.2	1.1	1.8	1.2	1.2
HL	Input from mother	91.6	90.7	85.8	83.5	87.1	90.1	87.8
exposure	Output to mother	88.3	75.5	80.4	68.9	77.4	79.1	78.3
and use by	Input from father	92.8	86.6	83.7	82.9	86.8	91.6	87.0
interlocutor	Output to father	88.8	77.1	79.8	69.8	78.9	77.1	78.7
(%)	Input from siblings	65.0	65.0	57.8	40.2	53.3	45.6	53.4
	Output to siblings	60.7	68.2	57.8	43.3	51.3	47.3	54.0
	Input from friends	46.4	41.0	25.0	30.9	18.7	26.4	31.6
	Output to friends	46.8	38.5	22.0	30.0	21.3	27.3	31.0
Total HL	Current level of input	43.2	39.3	33.0	27.5	30.0	24.7	32.8
exposure	in total							
and use	Current level of	42.7	37.3	32.3	27.7	27.7	20.3	31.4
(%)	output in total							
HL	Attendance of Korean	0.4	0.8	0.5	0.5	0.2	0.6	0.5
instruction	classes in Australian							
	schools (years)							
	Attendance of Korean	1.8	2.5	3.6	4.0	5.3	5.9	3.7
	community schools							
	(years)							
Visits to	Number of visits to	2.4	3.7	3.1	2.7	2.7	3.4	3.0
Korea	South Korea							
	Total length of stay	13.2	20.8	13.9	11.1	9.9	15.0	
	(weeks)							

Note the scales of the measurement.

- Proficiency–Korean/English: 1 ‘not at all’, 2 ‘not very well’, 3 ‘well’, 4 ‘very well’ and 5 ‘native speaker’
- Level of education: 1 ‘High school’, 2 ‘TAFE education’, 3 ‘Undergraduate degree’ and 4 ‘Postgraduate degree’
- Occupation category: 0 ‘Has not been in paid work in the last 12 months’, 1 ‘Labourer’, 2 ‘Machinery operator and driver’, 3 ‘Sales worker’, 4 ‘Clerical and administrative worker’, 5 ‘Community and personal service worker’, 6 ‘Technician and trades worker’, 7 ‘Professional’ and 8 ‘Manager’

The results of the surveys revealed the sociodemographic characteristics of the KHSs who participated in this study. The KHS participants in this study were born in Australia or had arrived in the country before the age of three as the study set out these eligibility criteria for participation in the study. The great majority of the 166 participants

was born in Australia: 147 participants were born in Australia while 18 participants were born in South Korea and one participant was born in New Zealand. Of those born outside Australia, seven participants arrived in the country when they were one year old and four arrived when two years old.

Given that the participants are in primary school age and most of them were born in Australia, their parents' length of the residence in Australia was relatively long. The mean length of the residence of the mothers was 14.7 years, and that of the fathers was even longer, being 17.5 years. Despite their long residence in Australia, their proficiency in English was not very high. The mean proficiency in English of the fathers was 3.1 in the five-point scale (e.g., 1 for 'do not speak English at all' and 5 for 'a native speaker of English'), and that of the mothers was even lower, being at 2.8. This may have been partly related to the employment status of the parents. However, it should be noted that English proficiency of the parents was self-evaluated proficiency so it may not reflect their actual proficiency in that language. The parents may have underestimated their English proficiency as observed in Korean immigrants in the US in Song J's (2010) study, reflecting their 'self-deprecation' (Park JS-Y, 2004) that they regard themselves as poor speakers of English. Out of the 115 mothers whose occupation was specified, 56 reported being a housewife, leading to a far lower mean for the scale of occupational classification than that of the fathers. Nevertheless, the level of education was similar between the mothers and fathers. Most mothers and fathers had a university degree. Some mothers and fathers had postgraduate education, but their numbers were small.

Many of the participants were the first child of the family. Out of the 135 participants whose birth order could be identified, 81 participants were a first-born and 41 were a second-born. Out of the 148 participants whose information on the number of siblings was provided, 24 were reported to have no sibling while 84 had one sibling, 26 had two siblings and 14 had more than two siblings. Visits to the home country of their parents were common among the participants. Few participants had never been to South Korea ($N = 9$) while some participants visited the country as many as 11 times. On average, the participants had visited South Korea three times.

The survey results showed certain patterns in the participants' HL exposure and use. It was noted that their percentage of input and use of Korean (out of their total language input and use) were higher in communication with their parents than with their siblings. When they speak to their mothers, for instance, they speak in Korean for 78.3%

of the time (i.e., 21.7% in English) on average, but when they speak to their siblings, they do so only for 54.0% of the time. This was consistent with the results of the studies by Shin S-C (2008b) and Ko S and Shin (2010) that reported a higher tendency to use Korean when communicating with parents than with siblings among KHSs in primary and secondary school years. Across the year levels, the participants' percentage of input and use of Korean in their communication with their mother or father was very high. For instance, on average, for 87.8% of the time, the mothers speak to the participants in Korean (i.e., only for 12.2% of the time in English). This suggests that parental use of HL is very high at least among the KHSs who participated in this study whether it reflects their parents' conscious effort to help their HL maintenance or was simply due to their parents' relatively low proficiency in English (i.e., being much more comfortable to speak Korean than English).

Compared to their communication with parents or siblings, the participants' input and use of Korean in communication with friends outside school was lower. However, it was not as low as expected based on previous research reporting that HSs barely use their HL even when communicating with friends who share the same HL (e.g., Oller & Eilers, 2002). On average, around 30% of their language input and output was in Korean when they communicate with friends outside school. The results indicate that many of the participants have friends with the Korean ethnolinguistic background who can speak Korean and they meet up with these friends often. Their input and use of Korean when they interact with friends appeared especially high at the lower-year levels compared to the middle- or upper-year levels. This, however, might be reflecting the general trend of their parents' socialising. This is because children's play outside school is organised and controlled by their parents still at the lower-year levels and their parents may socialise more often with Korean immigrant families than with families of other ethnolinguistic backgrounds. At the middle- and upper-year levels, the input and use of Korean in communication with friends outside schools were lower, possibly indicating less use of Korean even when communicating with friends who can speak Korean.

As both parents of the participants were KNSs, the rates of input and use of Korean in their communication with their mother or father were similar between the parents. For instance, it was reported that the mothers speak to the participants in Korean for 87.8% of the time on average and the fathers do so for 87.0% of the time. The input and use of Korean in communication with parents did not appear to change greatly across

the school year levels. This may be because the primary reason for communicating in Korean between the parents and their children is more often the parents' limited proficiency in English or preference to speak Korean. When the participants' input and use of Korean was compared with each other, the percentage of communicating in Korean was slightly lower in the use than the input. While the mothers speak to the participants in Korean for 87.8% of the time, the participants speak to their mothers in Korean for 78.3% of the time. This supports the above assumption that the use of Korean in communication with parents are based on the parents' bilingual proficiency. It also highlights that the KHSs who participated in this study communicate with their parents mostly in Korean.

8.2.2 Correlation between language backgrounds and heritage language abilities

Some of the variables collected in the surveys were excluded from the correlational analyses because they made little distinction between the participants. For instance, the number of participants born outside Australia was small (as mentioned in the previous section), so the age of immigration was excluded from the correlational analyses. Parents' proficiency in Korean was also excluded from the analyses because most of them reported being a KNS. Further, some parents rated their proficiency in Korean as 'speak Korean very well' instead of 'a native speaker of Korean' even if they indicated that they 'do not speak English very well' or have been living in Australia for less than 15 years, which strongly suggests that they are in fact KNSs. This seems to have arisen from their tendency to rate their language proficiency modestly. Moreover, the number of parents who 'do not speak Korean very well' (only one father) or 'speak Korean well' (only three mothers and six fathers) was very small. In addition, the length of attendance in a Korean community school mostly corresponded to their school year level because most of them started attending their Korean community school since Kindergarten. Therefore, these variables were excluded from the correlational analyses. Excluding them, the correlation between each variable and the participants' performance on each of the five tasks was calculated for each year level. The Pearson product-moment correlation coefficients computed are presented in Table 8.3.

Table 8.3 *Correlations between language backgrounds and performance of Tasks 1–5 of KHSs at Years 1–6*

Year level	Category	Variable	Task				
			1	2	3	4	5
1	Mother	Residence	–.58	.01	.06	.04	.19
		English	.22	.24	.24	–.00	.30
		Education	.18	–.07	–.33	–.01	.14
		Occupation	.00	–.05	–.11	.06	–.18
	Father	Residence	–.00	.08	.09	–.21	–.02
		English	.25	.34	.10	.02	.08
		Education	–.16	–.01	–.21	–.15	–.20
		Occupation	.44*	–.05	–.23	.11	–.27
	Sibling	Birth order	–.52*	–.30	–.31	–.10	–.20
		Number	–.54**	–.26	–.10	–.12	–.09
	HL experience	Mother-Input	–.01	.11	.36	.07	.17
		Mother-Output	.09	.36	.30	.18	.35
		Father-Input	.07	.10	.44*	.01	.22
		Father-Output	–.04	.23	.27	.07	.31
		Siblings-Input	.20	.06	.31	.31	.22
		Siblings-Output	.07	.05	.27	.36	.29
		Friends-Input	.04	.35	.56**	.40	.52*
		Friends-Output	–.03	.33	.54**	.41	.55*
		Input-Total	–.24	.11	.06	.15	.37
		Output-Total	–.32	.18	.08	.11	.32
	HL Instruction	Korean class	.17	.21	–.18	.20	–.03
	Visits to Korea	Number	–.08	–.13	–.13	–.10	–.04
		Total length	–.14	.15	.12	–.05	–.12
2	Mother	Residence	–.36	–.29	–.13	–.33	–.13
		English	.11	.12	.02	.23	–.00
		Education	–.16	–.20	–.06	.01	.00
		Occupation	–.08	.22	–.11	–.17	–.12
	Father	Residence	.03	–.12	–.25	–.20	–.11
		English	–.18	–.30	–.34	–.23	–.36
		Education	–.48*	–.36	–.53*	–.23	–.28
		Occupation	–.00	–.34	–.41	–.37	–.47*
	Sibling	Birth order	–.13	–.27	–.16	–.23	–.02
		Number	–.13	.06	–.06	.07	.25
	HL experience	Mother-Input	.27	.35	.46*	.25	.41
		Mother-Output	–.05	.07	.45*	.25	.55*

3	HL Instruction	Father-Input	.17	.32	.57*	.49*	.48*
		Father-Output	-.02	.15	.48*	.37	.56*
		Siblings-Input	.15	.85**	.68*	.59*	.36
		Siblings-Output	-.31	.61*	.38	.27	.13
		Friends-Input	-.15	.31	.21	-.01	.12
		Friends-Output	-.09	.31	.19	.03	.09
		Input-Total	-.07	.25	.10	.22	-.27
		Output-Total	.10	.37	.36	.39	.02
		Korean class	-.33	-.20	-.39	-.23	-.11
		Visits to Korea					
	Visits to Korea	Number	.26	.15	.10	.18	-.03
		Total length	.07	.21	.20	.43	.35
	Mother	Residence	-.17	.42	-.04	.22	.31
		English	.24	.38*	.21	.38*	.53*
		Education	.20	.10	-.01	.11	.09
		Occupation	.05	-.05	-.06	-.15	-.12
	Father	Residence	.10	.20	-.07	-.02	.11
		English	.12	.08	.27	.05	.36*
		Education	-.36*	.11	-.18	-.06	-.14
		Occupation	-.14	-.43*	-.02	-.16	-.38*
	Sibling	Birth order	.08	-.35*	-.05	-.26	-.22
		Number	-.09	.00	-.20	-.15	-.17
	HL experience	Mother-Input	.11	.38*	.54**	.40*	.45*
		Mother-Output	.21	.36*	.43*	.34	.42*
		Father-Input	.24	.49**	.57**	.58**	.53**
		Father-Output	.24	.47**	.50**	.50**	.50**
		Siblings-Input	.35	.29	.23	.43*	.47*
		Siblings-Output	.36	.39	.21	.50*	.48*
		Friends-Input	-.08	.16	.38*	.11	.20
		Friends-Output	.06	.32	.43*	.33	.28
		Input-Total	.42*	.21	.53**	.49*	.32
		Output-Total	.42	.31	.60**	.62**	.39
	HL Instruction	Korean class	-.39*	-.11	-.19	-.17	-.15
	Visits to Korea	Number	.03	-.13	-.03	-.02	-.27
		Total length	.12	-.08	-.09	.01	-.20
4	Mother	Residence	-.04	-.18	-.00	.29	.06
		English	-.29	-.04	-.26	.18	.17
		Education	.13	.08	.01	.40*	-.01
		Occupation	.13	-.13	.09	.03	.08
	Father	Residence	-.10	-.47	-.54	-.19	-.06

		English	-.09	-.14	-.14	.11	.07
		Education	.10	.20	.35	.50**	.24
		Occupation	.00	.14	.02	.32	.36
	Sibling	Birth order	.06	-.23	.27	-.37	-.15
		Number	.10	-.02	.33	.02	.31
	HL	Mother-Input	.19	.15	.18	-.06	-.01
	experience	Mother-Output	-.06	.18	.30	.05	.08
		Father-Input	-.03	.14	.05	-.02	-.01
		Father-Output	-.06	.09	.19	-.06	-.01
		Siblings-Input	.26	.17	.08	-.10	-.05
		Siblings-Output	.28	.36	.37	.12	.17
		Friends-Input	.08	.30	-.14	.07	.08
		Friends-Output	.06	.33	-.13	.08	.18
		Input-Total	.31	-.05	.29	-.14	.08
		Output-Total	.18	.07	.31	-.04	.04
	HL	Korean class	.22	-.04	.18	.01	-.12
	Instruction						
	Visits to	Number	-.16	.06	-.46	.11	.25
	Korea	Total length	-.04	-.01	-.18	.25	.15
5	Mother	Residence	.04	-.38	-.37	-.29	-.43
		English	.06	.31	.35	.10	.22
		Education	.18	.23	.30	-.13	-.12
		Occupation	.00	.05	-.29	-.23	-.13
	Father	Residence	-.59*	-.47	-.25	-.42	-.54
		English	.09	.23	.71**	.14	.21
		Education	.04	.23	.23	.09	.01
		Occupation	-.13	.12	-.22	-.21	-.52*
	Sibling	Birth order	.06	-.47	-.30	-.24	-.26
		Number	-.03	-.25	.20	-.11	.28
	HL	Mother-Input	-.20	.34	.09	.36	.05
	experience	Mother-Output	-.06	.42	.03	.54*	.23
		Father-Input	-.09	.51*	-.05	.52*	.27
		Father-Output	-.09	.44	-.03	.56*	.25
		Siblings-Input	-.29	.63*	.22	.64*	.02
		Siblings-Output	-.36	.61*	.11	.61*	.00
		Friends-Input	-.69**	.05	-.11	-.15	-.32
		Friends-Output	-.67**	-.05	-.06	-.30	-.39
		Input-Total	.09	.51	.33	.38	.25
		Output-Total	.03	.77*	.31	.65*	.17
	HL	Korean class	-.11	-.30	-.32	-.12	-.25
	Instruction						

	Visits to	Number	-.05	-.04	.06	.31	.29
	Korea	Total length	-.09	-.27	-.03	.10	.13
6	Mother	Residence	-.35	-.10	.39	-.16	-.39
		English	-.33	-.11	-.04	.07	.59
		Education	.07	-.41	.00	-.12	.06
		Occupation	-.26	-.59*	-.30	-.53	-.10
	Father	Residence	-.30	.42	.18	.09	-.53
		English	-.20	.06	.13	.08	-.21
		Education	-.26	-.06	-.06	.03	-.10
		Occupation	-.01	.03	.04	.37	.38
	Sibling	Birth order	.07	-.00	-.16	-.12	.09
		Number	.18	-.02	.28	.20	.26
	HL experience	Mother-Input	.47*	.34	.19	.43	.31
		Mother-Output	.09	.62**	.29	.54*	.46*
		Father-Input	.21	.21	-.10	.23	.10
		Father-Output	.11	.61**	.19	.53*	.48*
		Siblings-Input	.41	.53*	.36	.60**	.39
		Siblings-Output	.36	.57*	.29	.66*	.42
		Friends-Input	-.37	.32	-.02	.13	-.30
		Friends-Output	-.37	.32	-.04	.12	-.35
		Input-Total	.01	.17	.28	.39	-.02
		Output-Total	.25	.33	-.02	.34	.16
	HL Instruction	Korean class	.25	-.15	.06	.08	.31
	Visits to	Number	.11	.02	.40	.25	.01
	Korea	Total length	.22	.26	.40	.40	.22

Overall, most correlation coefficients computed were found statistically non-significant. Nevertheless, some trends were observed between some background variables and the participants' performance of the tasks. At many year levels, the length of residence in Australia of the participants' mothers and fathers correlated negatively with their performance of the tasks. English proficiency of mothers or fathers, however, did not show a consistent pattern of correlations. For instance, at some year levels, English proficiency of fathers showed a clear tendency of negative correlations across the tasks (e.g., at Year 2), but at other year levels, it was positively correlated with the participants' performance, or the direction of the correlations was inconsistent across the tasks. The correlation between the parents' level of education and the participants' performance was also largely inconsistent although their performance showed negative correlations with

their fathers' education at Year 1 and Year 2. Fathers' occupation also did not produce a consistent pattern of correlation across the year levels. In comparison, mothers' occupation correlated negatively with the participants performance at most year levels. This may be because the mothers who did not work provided their children with more opportunities to listen to and speak Korean while caring the children at home. Birth order of the participants also correlated negatively in general, possibly indicating the advantage of first-borns for their HL maintenance demonstrated in previous studies (e.g., Shin SJ, 2002).

Among the measures of the level of HL input and use of the participants, the percentage of their input and use of Korean in communication with siblings as well as with parents correlated positively with their performance of the tasks. In particular, at Years 2, 3 and 6, many of the correlations between their task performance and their percentage of input or output of Korean in communication with their mother, father or siblings reached statistical significance. In comparison, the participants' percentage of language input and use of Korean calculated by the percentage of the hours listening to and speaking the language did not show a very strong correlation with their performance of the tasks. This may have been because its variation among the participants in a year level was not very large, given that they spend the same amount of time at school, do similar number of extra-curricular activities and spend similar hours in Korean community schools as well as in local Korean religious institutions such as churches on weekends.

Interestingly, the number of years that the participants had Korean language classes in Australian schools did not always show a positive correlation with their performance. This could have been due to the small number of participants having had Korean lessons provided in regular schools. However, the negative correlations observed at some year levels should be further investigated in future studies because it may indicate little effect of having Korean lessons provided in regular schools among KHSs. This might be because in such lessons they usually learn basic Korean (e.g., alphabets, numbers, frequently used words for certain themes or greetings) with L2 learners who can barely carry out meaningful conversations in Korean after years of one- to two-hour weekly lessons. In addition, the correlations between the participants' performance of the tasks and the number of visits to South Korea, as well as the total lengths of stay (calculated by multiplying the average length of stay by the total number of visits), did

not show a consistent pattern. This may indicate that the effect of visiting the country where the HL is spoken as the majority language is short lived. It is also possible that since most of the KHS participants in this study have both parents speaking Korean, the immersion environment that they experience while visiting South Korea for a few weeks is not very different from being at home in Australia. This is because they are likely to spend most of their time in Korea on visiting relatives or doing some sightseeing.

Overall, neither the demographic information nor the measures of HL input and use showed consistent and strong correlations with the participants' performance of the five tasks. This may have been because most participants in this study have both parents speaking Korean and the great majority of the parents are indeed KNSs who presumably came to Australia in adulthood, so the use of Korean at home may have been quite similar between families. Moreover, the measures of the level of HL input and use of the participants were only estimates made by their parents rather than the precise measure of the reality. Given that the variation among the participants for each variable was generally small, how accurately the parents' estimate reflected the reality is questionable. Nevertheless, the language background variables and the parents' measure of HL input and use of the participants have shown some correlations with their performance of the tasks that indicates their level of attainment of linguistic abilities in Korean. Future studies should further investigate the relationship between language backgrounds and HL attainment in KHSs in Australia by measuring the variables more precisely and including other factors that can affect their level of HL attainment such as language aptitude.

Chapter 9 Discussion

9.1 Summary of findings

The results of this study presented and discussed in previous chapters show linguistic abilities in Korean attained and retained by KHSs in Australia in primary school years. The findings provide theoretical implications for HL acquisition in HSs of various languages around the globe and practical implications particular for HL development and maintenance of KHSs in Australia, as well as those in other countries with similar sociolinguistic environments. The key findings of the study are summarised in the points below.

- (1) Regarding HL sound system, this study did not find sufficient evidence to conclude that KHSs in Australia in primary school years have developed the ability to perceive phonemic contrasts in Korean to a level lower than their school-year-level-appropriate native norms. With respect to the development and maintenance of the sound system, they appear to maintain their perception of phonemic contrasts in Korean well over primary school years because their phoneme distinctions did not regress.
- (2) In HL vocabulary, they appear to have developed their lexical knowledge in Korean to a far lower level than that of their school-year-level-matched KNSs. With respect to the development and maintenance of the vocabulary, the results of this study suggest that their difference to their native norms in the lexical knowledge widens over primary school years because they learn few words and expressions newly whereas their KNS peers continuously add a substantial amount of new vocabulary into their lexicon.
- (3) In HL grammar, they showed a varying degree of attainment of linguistic abilities by linguistic aspect compared to their school-year-level-appropriate native norms. They appear to have acquired basic syntactic structures and semantic features that develop early in L1 acquisition to a level comparable to that of the native norms; they exhibited a considerable delay in the acquisition of particular grammatical aspects that are mastered relatively late in L1 acquisition. They also have far lower command of understanding passive sentences and active sentences in a scrambled word order than the native

norms. With respect to the development and maintenance of HL grammar, they also exhibited differentials by linguistic aspect examined. Their linguistic abilities in basic syntax and semantics attained before the onset of schooling are maintained well over the primary school period; their acquisition of the linguistic aspects that continue to develop in primary school period do not seem to progress greatly over primary school years; their understanding of passive sentences is generally well maintained over the primary school period.

9.2 Theoretical implications and directions for future research

9.2.1 Development and maintenance of HL sound system

The results of this study did not provide enough evidence to conclude that Australian KHSs in primary school years can distinguish between similar phonemes in Korean less well than their school-year-level-appropriate native norms. Thus, the generally prevalent assumption that HSs possess native-like competence in perceiving speech sounds in their HL cannot be rejected. Although this assumption has been supported by empirical studies conducted on HSs (e.g., Chang, 2016; Oh et al., 2003), its theoretical basis can be found in the speech perception studies in child L1 acquisition, according to which the perception of speech sounds in one's native language develops very early. Studies on infants' speech perception showed that newborns are initially sensitive to a wide range of language-relevant distinctions (Byers-Heinlein & Fennell, 2013); this implies that they may be able to discriminate virtually all phonetic contrasts.⁹⁷ As infants gain experience in their native language, however, they soon learn which phonetic contrasts are meaningful in the language and which are not. They only maintain the contrasts relevant in their native language; their sensitivity to the other differences deteriorates drastically. They become insensitive to non-native phonetic contrasts within the first year of life (Werker et al., 2012).

Because of this early attuning of perception to the phonetic contrasts in the language that a person is exposed to early in life—that is, early loss of sensitivities to

⁹⁷ For instance, in the study of Eimas et al. (1971), one- to four-month-old infants have been shown to discriminate between the English voiced and voiceless bilabial stops /b/ and /p/ and along the same phonemic boundaries as adult English speakers. Werker et al. (1981) also showed that seven-month-old monolingual English infants could differentiate between the unvoiced unaspirated retroflex stop /ʈa/ and dental stop /ta/, as well as between the voiceless aspirated dental stop /tʰ/ and the breathy dental voiced stop /dʱ/.

non-native phonetic contrasts,⁹⁸ adult L2 learners have difficulties perceiving some L2 phonemic contrasts that are absent in their L1. Contrary to adult L2 learners, HSs are exposed to their HL from birth no matter whether they are simultaneous or successive bilinguals. They must have attuned their perception to the phonemic contrasts in their HL very early on and solidified it through their exposure to the language in early childhood. It is thus assumed that HSs have a native-like perception of speech sounds in their HL gifted from their early exposure to the language, and such native-like competence automatically grants them an advantage over adult L2 learners in learning or re-learning the language in adulthood.

The assumption of HSs' native-like perception of HL speech sounds has been further supported by language attrition studies in international adoptees. Bearing in mind the importance of the timing of TL exposure for native-like speech sound perception, studies on international adoptees investigated the role that continuity of TL exposure plays in the maintenance of early acquired linguistic competence. Some studies indicated that the sensitivity to L1 speech sounds can be completely lost if the speaker is cut off entirely from his or her L1 after adoption (e.g., Ventureyra et al., 2004). However, other studies have demonstrated that even after a complete cut-off from L1 exposure, the sensitivity to L1 phonemic contrasts remains somewhat latent and can be reactivated after some training, implying the strong resistance of early established phonetic or phonological competence to a loss (e.g., Bowers JS et al., 2009; Oh et al., 2010). Different from the extreme cases of international adoptees, however, HSs are exposed to their HL continuously from birth through to adulthood even if their contact with the HL undergoes a reduction with their acquisition of the societal majority language. Due to this continuous exposure to the HL in addition to the early exposure, it is even more strongly assumed that HSs have native-like competence in perceiving HL speech sounds.

Therefore, the results of this study that did not find enough evidence to support the opposite claim for HSs' less-than-native phoneme distinction may be interpreted to support the assumption of HSs' native-like phonetic and phonological abilities in their HL at least for perception. Nevertheless, it should be noted that across the year levels and genders KHSs in this study performed consistently less well than KNSs although the differences were not very large. This indicates that there remains a possibility that

⁹⁸ The attuning is also viewed as an instance of 'perceptual narrowing' in cognitive development (Byers-Heinlein & Fennell, 2013).

Australian KHSs in primary school years indeed perceive phonemic contrasts in Korean less well than their NS controls.

This possibility can find its support from some research findings, as reviewed in section 3.3.2.1. In Lee-Ellis's (2012) study, for instance, adult English-speaking KHSs could not distinguish between the fricatives *s* and *ss* as well as their NS controls on the AX task when tested with auditory stimuli recorded by multiple speakers;⁹⁹ on the sequence recall task with a speaker variety, the KHSs performed even far less well than their NS control. Similarly, Ahn et al. (2017) observed that KHSs were more likely to function outside the NSs' performance range on the sequence recall task when the tested phonemic contrasts were specific to Korean (i.e., between *t* and *tt* and even more between *s* and *ss*) than when the phonemic contrast was common to both Korean and English (i.e., between *n* and *l*).

More interestingly, the KHSs who had undergone a reduced contact with Korean at an earlier age were more likely to perform to a level below the native range than those who had experienced the reduction at a later age. The results indicate not only that the perception of HL speech sounds can erode or early established phonological representation in the HL can be restructured but also that the degree of the erosion or restructuring may vary depending on the age and the extent of the reduction. Findings that provide empirical evidence for HSs' less-than-native perception of some HL phonemic contrasts—though not all—make it difficult to reject the possibility that the KHSs in this study had lower abilities in distinguishing some of the similar phonemes tested and thus performed less well than their KNS counterparts despite their performance differences to the NS controls having not reached the statistical significance given the within-group variations.

In fact, it is possible that KHSs in primary school years in Australia have undergone or are undergoing desensitisation to or restructuring of some phonemic contrasts in Korean with their acquisition of English and subsequent change in their language dominance. The KHSs who participated in this study are early bilinguals born in Australia or who arrived in Australia before the age of three. According to the classification of Ahn et al.'s (2017) study, all KHSs in this study are likely to have experienced a reduced contact with Korean before three (to a varying degree) and thus

⁹⁹ It should be noted however, that the differences between the KHSs and the NS controls were not statistically significant when they were tested with auditory stimuli by a single speaker.

are subject to potential attrition of the sensitivity to some phonemic contrasts in Korean. The KHS participants in this study must have gained enough experience in English through their formal schooling in an English-immersion environment to become a competent speaker of English; by the time of participating in this study, even those in Year 1 had almost two years of English immersion since they entered primary school at Kindergarten level where the compulsory school education starts in New South Wales—and possibly more from their attendance at an English-medium preschool or childcare centre before entering primary school.¹⁰⁰ Deterioration of their sensitivity to some phonemic contrasts in Korean or restructuring of their Korean sound system may have been well underway due to cross-linguistic influence from English to Korean as English slowly takes over Korean in terms of use, proficiency and preference in KHSs with the formal schooling. This could have resulted in a less-than-native perception of some phonemic contrasts in Korean in KHSs, and hence the slightly lower level of performance of the given task across the year levels and genders.

Overall, the results of all analyses did not provide adequate support for the assumption that KHSs in primary school years in Australia have a lower perception of phonemic contrasts between similar sounds in Korean than their school-year-level-appropriate NS norms. These results may be interpreted as being in line with the research findings pointing to HSs' native-like phonetic or phonological competence, especially in the perception of HL speech sounds, based on their non-significantly different performance from their NS controls on various phoneme discrimination tasks. However, the possibility that HSs have a less-than-native perception of phonemic contrasts in their HL remains despite the lack of evidence to support it in this study. The statistically non-significant differences between the KHSs and their NS controls observed in this study could have resulted from the limitation of the given task in that it assessed the participants' perception of various phonemic contrasts in Korean with minimal tokens and frequencies rather than of a few contrasts with multiple tokens and numerous frequencies. Future studies with more demanding tasks (e.g., a sequence recall task with auditory stimuli with a speaker variety or phoneme discrimination when acoustic cues are reduced or in an adverse acoustic environment) may be able to disclose more fine-grained differences

¹⁰⁰ In Australia, primary and secondary education is 13 years long; the year level prior to Year 1—named differently in different states and territories, for instance, Kindergarten in New South Wales and Preparatory year in Victoria—is part of compulsory education.

between HSs and their NS controls, although careful thought should be given to some issues such as how native (or native-like) phonetic or phonological competence is defined, what a difference between HSs and their NS controls observed in their performance of specific tasks means and how meaningful such difference would be in their actual HL use as well as learning.

9.2.2 Development and maintenance of HL vocabulary

The results of this study showed that KHSs in Australia in primary school years have far lower receptive vocabulary in Korean compared to their school-year-level-matched KNSs. This must have been due to their less-than-native exposure to and use of Korean given their bilingualism as explained in 6.3.1. Interestingly, however, less-than-native TL experience in dual language acquisition does not always result in less-than-native TL abilities in each of the two languages, and this may hold true even for lexical abilities. Despite the strong correlation between TL experience and TL lexical abilities, the relationship between them does not appear directly proportional in bilingual acquisition. In fact, it is unclear how much experience in each language is required for bilinguals to achieve native-level lexical knowledge in the language (Pearson & Amaral, 2014). Some studies have shown that bilingual children with a certain level of exposure to one of their languages perform to the monolingual level in some measures of the language (e.g., Garcia et al., 2008; Thordardottir, 2011). For instance, Cattani et al. (2014) reported that bilingual toddlers in the UK are highly likely to perform to the level of their monolingual peers in the measures of English skills, including receptive and productive vocabulary, if they have received 60% or more exposure to English in their total language exposure.

There is no empirical evidence suggesting that the bilinguals' relative proportion of the total language experience in one of their two languages (e.g., 60% of the bilinguals' total language experience is in English, and the rest, 40%, is in Spanish) is equal to the same proportion in monolinguals' language experience (i.e., 60% of the language experience of monolingual English speakers).¹⁰¹ Nevertheless, such an equation would

¹⁰¹ In studies on bilingual acquisition, the language experience of a bilingual in each of his or her two languages is usually measured in the two languages' relative ratio or percentage. However, recent studies are increasingly attempting to measure bilinguals' language exposure to and use of each of the two languages as accurately as possible by constantly audio-recording individuals while awake with specific recording systems (e.g., LENA, developed by the Language ENvironment Analysis foundation, using a vest or a t-shirt with a digital recorder that can be worn by a research subject) (e.g. Orena et al., 2019; Orena

be valid hypothetically on the extension of the assumption that the total language experience between bilinguals and monolinguals should be the same. Thus, those study results may be interpreted as an indication that native-level knowledge in the lexical domain can be achieved with less-than-native experience in bilingual speakers. If this is true, the KHSs' far lower receptive vocabulary in Korean than their NS controls observed in this study—or HSs' less-than-native lexical knowledge in their HL in general—may not be justified so easily by their less-than-native experience in the language caused by their bilingualism.

It becomes much more obvious that HSs' less-than-native lexical knowledge in the HL cannot be rationalised by their less-than-native HL experience when their vocabulary development in their other language is considered (i.e., the majority language of the wider community). In fact, HSs seem to achieve native-level lexical knowledge in the majority language, despite their experience in that language also being less-than-native given their use of the HL at home. Although school-age HSs may initially lag behind their NS peers in the vocabulary of the societal majority language, they catch up with native norms eventually, as reported in numerous studies (e.g., Mahon & Crutchley, 2006; Schwartz M & Katzir, 2012; Uccelli & Páez, 2007). In their study of lexical development in English and the HL of school-age KHSs and HSs of Chinese in the US, Jia et al. (2014) observed that already around the age eight, about half of the HSs reached the 50th percentile of their age-appropriate native norms for English in PPVT. Golberg et al. (2008) also reported that young HSs of various languages in Canada met native norms in the receptive English vocabulary (also measured by PPVT) after about three years of exposure to English. These results demonstrate that HSs do not necessarily end up with less-than-native lexical knowledge in both of their two languages despite their possibly less-than-native experience in both languages.

If native-level TL experience is not a necessary condition for achieving native-level lexical knowledge in the TL as suggested by the above-mentioned study results, the considerably low receptive vocabulary in Korean observed among KHSs in this study may be an indication that they have exposure to and use of Korean far less than the minimum TL experience with which bilinguals can achieve native-level lexical knowledge in the TL. According to bilingual vocabulary development research in

et al., 2020). Nevertheless, no attempt has been made to compare bilinguals with monolinguals regarding their language exposure and use in absolute terms, to this researcher's knowledge.

English–French/French–English bilingual preschoolers (aged 4;6–5;0) in Montreal where neither of the two languages has a minority status, those who received 40–60% exposure to either language did not score very differently from their monolingual peers in receptive vocabulary in either language (Thordardottir, 2011). These study results, together with the others mentioned earlier, seem to suggest that HSs should have at least 40–60% of their total language experience in their HL to attain native-level lexical knowledge in that language. Due to the socio-political minority status of an HL in wider society (as opposed to the French-speaking part of Canada in the above-mentioned study), an even higher level of HL exposure may be required for HSs to achieve native-level lexical knowledge in their HL.¹⁰² However, since previous studies showing a minimum level of TL input and use required for the attainment of native-level TL vocabulary are conducted on preschool children whose language experience is assumed to be very different from that of school-age children, future studies should investigate if bilinguals can readily achieve native-level vocabulary in each of their two languages and how much TL experience is required for such achievement.

Gender differences were evident in the development and maintenance of HL vocabulary in KHSs in this study although they were also present on the measure of HL abilities in other linguistic areas. In particular, the girls exhibited a great improvement in their lexical knowledge in Korean between the lower-year levels and between the upper-year levels. Although more research is required to answer the question of gender differences in HL maintenance, one may carefully posit that such observation may have been derived from their better HL maintenance, possibly fostered by better vocabulary learning capacity. The assumption that females will be better than males at learning vocabulary is supported by the declarative/procedural model (Ullman, 2001), according to which females have a superior declarative memory system to males, on average, because of some biological traits such as a higher level of certain hormones. The hypothesis has also been supported empirically by some studies showing females' better performance of word learning experiments in children and adults (e.g., Kaushanskaya et al., 2013; Kaushanskaya et al., 2011),¹⁰³ as well as by studies reporting girls' initial lead

¹⁰² In the relevant previous studies, the language in question regarding the amount of TL exposure relative to total language exposure required for native-level lexical knowledge in the TL was a societal majority language in the speakers' society.

¹⁰³ It should be noted that phonological familiarity as well as referents familiarity of words also play a role for vocabulary learning in those studies.

in vocabulary development in early childhood (e.g., Bornstein et al., 2004; Fenson, 2007; Huttenlocher et al., 1991) that possibly lasts until early middle childhood (e.g., Rice & Hoffman, 2015). If girls are equipped with a better ability to learn and retain words for whatever reason, female KHSs may have an advantage in learning HL vocabulary over their male peers under the condition of limited exposure to the TL in quantity and quality, though the validity and the extent of such advantage should be verified in future research.

In addition to the possibility of having a generally better capacity for learning vocabulary that female KHSs might have taken advantage of when learning and retaining words in their HL, their tendency to keep a close relationship with their parents and other family members may have provided them with more opportunities to be exposed to and use words in their HL. Although the generalisability of the findings beyond the observed ethnolinguistic groups in the specific sociolinguistic contexts should be investigated further, some studies reported gender differences in HL use and proficiency in some ethnolinguistic groups in immigrant contexts. In the US, for instance, Portes and Schauffler (1994) found that girls tended to use their HL with their parents and family more than boys did among students in Grades 7 and 8 of various ethnolinguistic backgrounds in south Florida. In the nationwide survey on Latino young adults by Blair and Cobas (2006), significantly more females reported speaking Spanish as their primary language at home and having better Spanish comprehension skills than males. Studies conducted on Mexican immigrant families observed that daughters were more likely than sons to serve as the agents responsible for translating and organising the needs of their family especially when their parents had limited English language abilities (e.g., Valenzuela Jr, 1999; Vasquez et al., 1994).

In Australia, studies on community language maintenance based on census data showed that among second-generation immigrants (i.e., born in Australia to an overseas-born parent), the rate of language shift to English was lower among females than males in many ethnolinguistic communities (e.g., Clyne, 1991). In a small-scale research study conducted on second-generation German and Greek immigrants, females reported higher rates of HL use with family and friends and higher HL proficiency than males (Winter & Pauwels, 2005). An earlier study of bilingual acquisition in children from Russian immigrant families in Melbourne also showed better HL maintenance among girls than boys (Bodi, 1980). As the trend of better HL maintenance among females may not be universal across different ethnolinguistic communities (Pauwels, 2016), more HL use at

home among girls than boys is not guaranteed to hold true for KHSs in Australia. Given these research findings, the most likely causes of the differences between girls and boys in the development and maintenance of HL vocabulary observed in this study are the possible gender differences in their inherent ability to learn vocabulary and exposure to the HL based on their HL use patterns at home. Nevertheless, future studies should scrutinise this question further in KHSs in Australia with a careful research design.

9.2.3 Development and maintenance of HL grammar

9.2.3.1 Basic syntax and semantics

The results of this study indicated that KHSs in Australia in primary school years have a good command of core grammar of their HL in syntax and semantics. This is in line with the general description of linguistic profiles of adult HSs that can be found in the HL literature. As cited previously in Chapter 3, Benmamoun et al. (2010) claim that HSs retain the core structural properties of their HL generally well. Campbell and Rosenthal (2000) even estimate that HSs who come to tertiary-level foreign language classes to learn their HL have attained 80–90% of its grammatical rules. They further delineate that HSs ‘conform to the rules of a prestige dialect that allow for gender, number, and case distinctions, when required, as well as the production and recognition of syntactic structures that fall under rubrics such as interrogatives, passives, relative, adverbial, and adjectival clauses, conjunctions, pro-forms, and so forth’ (Campbell & Rosenthal, 2000, p. 167). This claim is supported, at least partly, by the results of the picture selection task for multiple syntactic and semantic aspects (i.e., Task 3) in that KHSs showed an average achievement of over 80% on the task at almost all year levels. Although the results do not guarantee that the KHS will maintain their current level of attainment of the core grammar until they reach adulthood, it is obvious that at least in primary school years, they have a good command of basic syntax and semantics in their HL for comprehension.

The relatively high level of attainment of basic syntactic structures and semantic features in the HL observed in primary-school-age KHSs in this study, as well as in adult HSs of various languages in general, seems to be related to early acquisition of such aspects in the L1 acquisition timetable and the dominant exposure to and use of the HL in the HSs until the onset of formal schooling. In (monolingual) L1 acquisition, around age five, children can understand, as well as produce, increasingly long and complex

sentences without an error, indicating that they have acquired most of the grammar of their native language by then. Although more complex grammatical aspects often take more time to master—even until late childhood (Berman, 2004), researchers generally agree that ‘the basic sentence-formation system is essentially in place by age four, if not earlier’ (O’Grady, 2000, p. 830).¹⁰⁴ Despite the question of what comprises core grammar of a language (in contrast to peripheral or more complex grammar), as well as a possible disagreement in the age at which children have core grammar of their native language in place, no researcher will refute the supposition that children learn most of basic syntactic structures and semantic features by age five, around which they start formal schooling in many countries, including Australia.

Moreover, the results of this study indicated that KHSs in Australia successfully retain their linguistic abilities in basic syntax and semantics in Korean over primary school years—even with the possibility of an improvement open. This confirms a strong resistance of those linguistic domains to attrition in HL acquisition, as has been consistently attested in the literature. In HL acquisition, the linguistic knowledge in core syntax is less susceptible to attrition than that in inflectional morphology or complex syntax (Benmamoun et al., 2013). It is not clear if such strong resilience of core grammar (especially in syntax) to attrition in HL acquisition is due to its early acquisition, possibly related to the nature or mechanisms of language acquisition (e.g., the acquisition of certain linguistic aspects may be a prerequisite for other aspects). Nevertheless, early mastery of linguistic knowledge of core grammar (i.e., not only attainment but also stabilisation) must have laid a foundation for its strong resistance to attrition in a reduced input condition such as that in HL acquisition.

More importantly, the strong resistance to attrition of the linguistic abilities in basic syntax and semantics in HL acquisition must be enhanced by continuous exposure to the HL that HSs have even after their other language (i.e., the societal majority language) takes over their HL in terms of the amount of language experience, as well as

¹⁰⁴ This consensus seems to be also related to the reasons that the acquisition of another language after certain L1 properties are in place is generally considered (child/early) L2 acquisition in contrast to bilingual L1 acquisition; some researchers set the cut-off age for bilingual L1 acquisition at age four (e.g. Genesee & Nicoladis, 2007; Meisel, 2009; Schwartz BD, 2003) or even lower at age three (e.g. McLaughlin, 1978). However, it must be noted that the criteria for distinguishing child L2 acquisition from bilingual first language acquisition more often stand on the ‘critical period’ (Lenneberg, 1967) or ‘sensitive period’ (Oyama, 1976) hypothesis and the ‘fundamental difference hypothesis’ (Bley-Vroman, 1990) in relation to the availability of or access to the same language learning capacity for L1 in the children’s L2 learning (e.g. Meisel, 2009).

proficiency and preference. In the case of KHSs in this study, they must have been continuously exposed to Korean at home even after they started formal schooling, given their family constellation and their attendance at a Korean community school. Even though their exposure to and use of Korean must have undergone a great deal of reduction since the start of schooling, they still hear and speak Korean every day at home as they communicate with their family members, especially with their parents. Despite being far more limited in its contexts (e.g., topic, mode, register or interlocutors), exposure to the HL at home provides the foundation for HSs to acquire the basic aspects of the language, as Benmamoun et al. (2010) explain. Everyday conversations in Korean at home that KHSs have with their family—whether they actively speak the language or simply listen to the others speaking it—contain basic syntactic structures and semantic features of the language. Thus, they provide the KHSs with constant opportunities to preserve (and learn) linguistic abilities in those aspects. This must have contributed to not only their acquisition of linguistic knowledge and use of basic syntax and semantics in Korean before schooling but also their maintenance of that linguistic knowledge and use over the years of schooling, especially for comprehension.

The abilities of KHSs to use the acquired linguistic knowledge of basic syntax and semantics in Korean in production may have deteriorated dramatically since schooling.¹⁰⁵ As their productive abilities in Korean were not examined in this study, however, the question of if their HL skills for production have undergone attrition over primary school years cannot be answered. Nevertheless, the results of this study indicate that their use of the linguistic knowledge of basic syntax and semantics in Korean is retained well, at least for comprehension, until the end of primary school years. This finding is also in line with the previous studies indicating that linguistic abilities for comprehension are more resilient to attrition than those for production (e.g., Lee S, 2019), even in the extreme condition of a complete stop of TL exposure as in international adoptees (e.g., Gindis, 2008). As the exposure to Korean is assumed to be well maintained in KHSs in Australia at the level of everyday conversations even after the takeover of English in language use,

¹⁰⁵ This happens so commonly that it was also depicted in the course of HL development and maintenance of the fictitious KHS created by Campbell and Rosenthal (2000), as cited in the section 3.2. As KHSs become more and more proficient in English with the progression of formal schooling in the English-immersion setting, English gradually takes over Korean in the language proficiency and preference as well. Consequently, they come to use Korean less and less often even at home such that they talk back in English when their family initiates the conversation in Korean. As a result of such change in the HL use, their productive abilities in Korean regress.

proficiency and preference—such as that their parents continue to talk to them in Korean even if they answer back in English, their receptive abilities in basic syntax and semantics in Korean acquired before schooling are expected to be retained well over primary school years. Nevertheless, future studies should investigate their productive abilities with basic syntax and semantics and scrutinise if the reduction in HL use affect their productive abilities in HL grammar even for basic linguistic aspects.

9.2.3.2 Linguistic aspects mastered late

The results of this study showed that KHSs in Australia in primary school years have far less-developed linguistic knowledge of some linguistic aspects that are mastered relatively late in L1 acquisition such as the verb conjugation, passives, NPIs and use of the verbs *o-* and *ka-* in Korean compared to their NS controls. It was explained in 7.3.1.2 that this lower level of attainment of such linguistic aspects has arisen from a slower development or possibly from an attrition. It was speculated that this slower progression or possible attrition has been derived from their less-than-native TL experience. In fact, possible effects of reduced exposure to the TL on the development of TL grammar in dual language acquisition have been widely observed among young bilingual children as they were often found to lag behind their age-matched monolinguals in one of their two languages, especially in their weaker language (e.g., Hoff et al., 2012).¹⁰⁶

More specifically, regarding particular linguistic aspects in one of their two languages, bilingual toddlers and preschoolers have been observed to have a lower level of achievement than their age-appropriate monolingual norms as indicated by higher rates and/or longer durations of producing non-target forms (i.e., errors) (e.g., Döpke, 1998; Gagarina et al., 2007; Paradis J & Navarro, 2003; Schwartz M et al., 2015).¹⁰⁷ Based on

¹⁰⁶ In this study, the researchers investigated lexical and grammatical development of the two languages in Spanish–English bilingual toddlers (age: 1;10–2;6) in the US. They found that the Spanish-dominant bilinguals and the balanced bilinguals were (statistically significantly) behind the English-dominant bilinguals, as well as the English-speaking monolinguals, on measures of grammatical complexity and Mean Length of Utterances (MLU) for English. On the same measures for Spanish, the English-dominant bilinguals and the balanced bilinguals fell behind their Spanish-dominant bilingual peers (Spanish-speaking monolinguals were not included in the study), indicating an input effect not only on vocabulary development but also on grammar development.

¹⁰⁷ For instance, in their study of verb inflection in Russian among Russian–Hebrew bilingual children in Israel aged between 3;5 and 5;0, Gagarina et al. (2007) found that the bilingual children produced errors that monolinguals of younger ages would make and some of their errors were different from those of monolinguals in that they seem to have resulted from cross-linguistic influences of Hebrew. A similar result was observed in the study by Paradis J and Navarro (2003) on subject realisation in Spanish based on CHILDES data as their research subject, one Spanish–English bilingual toddler (observed from 1;9 to 2;6) living in England produced a higher rate of overt subjects in Spanish than the monolingual controls,

observations that bilingual children show development patterns different from those of monolinguals regarding some linguistic aspects in one of their two languages, especially in their weaker language, Schlyter and her colleagues hypothesised that the grammatical development of the weaker language of bilingual children resembles that of adult L2 learning (e.g., Schlyter, 1993; Schlyter & Håkansson, 1994). This hypothesis has been refuted by many researchers who showed that the observed differences between bilinguals and monolinguals in the grammatical development are quantitative (e.g., slower development in bilinguals) rather than qualitative (e.g., Antonova-Ünlü & Wei, 2016; Bonnesen, 2009; Döpke, 2000; Meisel, 2007; Müller & Hulk, 2001; Müller & Kupisch, 2003).

Nevertheless, none of the researchers denies that there are or can be differences between bilinguals and monolinguals in the acquisition of some grammatical features, especially in the speed of acquisition, although the features more susceptible to a slower development appear selective. Even in monolingual L1 acquisition, some features are observed to develop and be mastered later than others (Berman, 2004; Chomsky, 1969), whether because of the predetermined acquisition timetable or input effect (or possibly both). If the acquisition of grammar is influenced by some properties of TL input that the language learner receives (e.g., amount or quality) in any way, some linguistic aspects will take longer to develop fully in bilinguals than in monolinguals because bilinguals receive TL input in each of their two languages less than what their monolingual peers receive (Gathercole, 2016; Hoff et al., 2014; Unsworth, 2015).

However, this assumption of possible effects of reduced TL input on the early development of TL grammar in bilinguals does not explain the KHSs' lower level of attainment of the four linguistic features observed in this study. This is because protracted development occurs more often in the weaker language than in the dominant or stronger language of the bilingual's two languages. In section 7.3.1.1, it was speculated that most of the KHS participants in this study had been predominantly exposed to Korean until they started formal schooling based on their family constellation. Thus, it was assumed that most of them were Korean-dominant bilinguals or at least balanced bilinguals but hardly English-dominant bilinguals before the onset of schooling. Thus, most of the KHS participants should have acquired the four linguistic aspects to a level comparable to that

although the researchers highlighted that this result may have been influenced by the parental input as well as cross-linguistic influences from English.

of their KNS peers until they entered school when it is almost impossible for them to be predominantly exposed to Korean because of long hours of school attendance and the intensity of English exposure and use at school. Put differently, the explanation of possible effects of reduced TL input on the early development of TL grammar put forward for the weaker language of bilinguals cannot be applied to the lower level of attainment of the tested linguistic features in Korean by KHSs in primary school years in this study because their dominant language before formal schooling is likely to have been Korean.

However, the possible effects of reduced input can still be a valid explanation for the KHSs' lower level of attainment of those aspects if the input effect observed with the weaker language in young bilinguals was simply reflecting that the children did not receive minimum TL input for native-like development of the linguistic aspect in question in their dual language acquisition. (More discussion of this follows below with respect to the 'critical mass' hypothesis.) Moreover, in bilinguals, their language dominance or relative amount of input of their two languages can change as they go through different stages of life. If a bilingual has not mastered the linguistic aspect in question in one of his or her two languages before the input of that language falls below the minimum level required for native-like development (under the assumption that such a minimum exists), he or she may show signs of less-than-native attainment of the aspect, resulting from slower development or attrition. Accordingly, it is possible that in KHSs, the acquisition of the four linguistic aspects was protracted or underwent attrition, especially if their acquisition of the aspects had not reached its presumable end state before their Korean input was reduced considerably.

An example of this delay or attrition has been reported by Anderson (1999) who studied gender agreement in Spanish in two Spanish–English bilinguals, Beatritz and her younger sister Victoria who immigrated to the US with their parents at age 3;6 and 1;6, respectively. Anderson examined their spontaneous speech during a play longitudinally for about two years (with one- or two-month intervals) from when they were 6;7 and 4;7, respectively. She found that Victoria made much more errors with gender agreement than her older sister, and her error rate varied more greatly than her older sister's. Interestingly, Victoria's error rates increased significantly towards the end of the study. Anderson speculated that the reduced frequency of input and productive use of the target feature caused the attrition observed with Victoria, as well as with Beatritz. More importantly, she assumed that the difference between the sisters in the degree of attrition may have

been derived from their difference in the AoA of English, which signifies the onset of reduced input in their HL. She explained that when the girls were exposed to English, the younger one was still acquiring gender agreement. In contrast, the older one may have fully acquired the feature because it is supposed to be fully acquired by age three in monolingual Spanish-speaking children, and this must have made the younger sister more vulnerable to attrition of the linguistic aspects.

Based on such findings and explanations of Anderson (1999), it is possible that in KHSs in primary school years, the attainment of the four aspects has been delayed or reduced since they started learning English more extensively in the English-immersion setting such as in school. As the tested linguistic aspects are assumed to be mastered relatively late by monolingual Korean-speaking children (as discussed in 0), the aspects are highly likely to be subject to slower development and attrition in the HL acquisition of KHSs in primary school years.

With respect to the development and maintenance of the four linguistic aspects in Korean in KHSs in Australia over primary school years, the results of this study indicated that their linguistic knowledge of those aspects does not develop greatly over the period despite being assumed to develop further as observed in their KNS controls. The underlying reason for this finding was explained as that they do not receive the TL input necessary to develop the linguistic aspects further through primary school years. According to Gathercole and her colleagues (e.g., Gathercole, 2002c, 2007; Gathercole & Thomas, 2009), there is a ‘critical mass’ of input for a linguistic aspect to be acquired. In other words, the child language learner, whether monolingual or bilingual, needs to receive a certain amount of language input to learn the linguistic aspect in question, as he or she needs to draw out its patterns. Consequently, for bilingual children who receive less TL input than their monolingual peers receive in the TL, it will take longer to master the linguistic aspect in question than the monolinguals. Therefore, bilinguals often fall behind their monolingual peers on measures of one of their two languages. The researchers also hypothesise that this critical mass of input varies from a linguistic aspect to another. Some aspects that are more complex or have opaque form-function mappings need a greater amount of input than others, so it takes longer for the language learner to master them (Gathercole, 2002c, 2007; Gathercole & Thomas, 2009). Accordingly, the potential gap between bilinguals and their monolingual peers will be greater or more prominent for more complex or opaque linguistic aspects compared to simpler or more

transparent ones. The researchers even claim that some of the most complex or opaque aspects may never be fully acquired by some bilinguals if they grow out of its acquisition time window before they master it.

As the critical mass hypothesis explains the gap between bilinguals and monolinguals as well as the selectiveness of linguistic aspects more subject to showing such gap very well—despite some criticisms¹⁰⁸—it seems to explain why KHSs in this study performed less well than their KNS counterparts on the GJ task for the four linguistic aspects (i.e., Task 4), as well as why such poorer performance of KHSs than the NS controls was more evident in the task than in the picture selection task that tested basic syntax and semantics (i.e., Task 3). Based on the hypothesis, the four linguistic aspects are assumed to have a relatively high critical mass of input compared to other linguistic aspects that are readily acquired within preschool years since, they seem to require more time to fully develop (i.e., beyond preschool years). Indeed, the four linguistic aspects in Korean appear to be more complex (e.g., the NPI licencing rule, especially in a complex sentence or the use of the verbs *o-* and *ka-*) or have relatively opaque mappings (e.g., verb conjugation or passive constructions). Assuming a relatively high critical mass of input is required for the four linguistic aspects, KHSs, at a given year level in primary school years, must have accumulated less input towards the given critical masses than their KNS peers because they must have received less input in Korean than their KNS peers since they started learning English. As a result, KHSs may have ended up having attained those linguistic aspects to a level lower than their school-year-level-appropriate NS norms.

More importantly, concerning the development of the four features over primary school years in KHSs, the critical mass hypothesis predicts that with continuous exposure to Korean, KHSs can reduce or close their gap to the NS controls, as has been observed in other studies. In the Miami project (Oller & Eilers, 2002), HSs of Spanish were behind their monolingual peers at Grade 2 on measures of some morphosyntactic features in Spanish (as well as in English), also showing differentials within themselves by the exploratory factor of the study (Gathercole, 2002a, 2002b). At Grade 5, however, their gap to the monolingual peers and the differentials among themselves observed at Grade 2 diminished (Gathercole, 2002a, 2002b). Contrary to the results found in the Miami

¹⁰⁸ Some scholars may question the critical mass hypothesis for being unable to specify the exact amount of input for a given linguistic aspect or its acquisition time window.

project, however, the performance gap between KHSs and the NS controls in the GJ task for the four linguistic aspects did not narrow by school year level. Instead, the performance difference between the speaker groups widened between the lower- and middle-year levels; they hardly narrowed their gap to the NS controls as the year level ascended.

Such pattern of performance change by year level in KHSs showing a stagnation at the middle-year levels through to upper-year levels can be interpreted as that they did not receive enough TL input for the four features to develop further through primary school years. However, it is not clear how the observed stagnation should be interpreted in relation to the amount of input that KHSs had received towards the critical masses because the hypothesis does not specify if the frequency of TL input also affects the critical mass.¹⁰⁹ A stagnation could mean that no input for the target linguistic aspects was added into their critical masses between the year levels. However, since a reduction in TL input, which denotes fewer examples of the linguistic aspect in question than before, can actually result in attrition in its acquisition (especially when the acquisition is not yet complete as observed in Anderson's [1999] study), KHSs in this study may have received the minimum input necessary for keeping their level of attainment from one school year level to the next. Without further specifications of the critical mass hypothesis, the interpretation of the results of this study showing a stagnant development of the four linguistic aspects over primary school years is limited to concluding that they have not received sufficient input in Korean for enhancing their acquisition of the aspects further through primary school years. Future studies should investigate whether a critical mass of input truly exist and if so, how much input is required to achieve native-level attainment of the four linguistic aspects.

9.2.3.3 Comprehension of passive sentences

The results of this study showed that Australian KHSs in primary school years have far lower understanding of passive sentences and active sentences in the OSV order

¹⁰⁹ In Gathercole (2002c), the difference in the TL input between monolinguals and bilinguals, as well as the difference within bilinguals, was seen as the difference in the input frequency. Interpreting the study results, Gathercole explains that such effect of input frequency was overridden by reaching the critical mass of input. Nevertheless, it is not clear if the critical mass of input for the acquisition of a linguistic aspect is totally independent from the frequency of input. For example, if the language learner needs 100 samples of a given target feature in his or her TL input to learn it, then do the 100 samples received over one year period tally with the 100 samples received over five years? The hypothesis does not help to answer this question.

than their KNS controls. It was speculated in 7.3.1.3 that their lower ability to understand passive sentences and OSV sentences in Korean was due to their difficulty in processing morphosyntactic cues, following the explanations of relevant previous studies (e.g., Kim K et al., 2018; Song M et al., 1997). This lower ability or greater difficulty in processing functional morphology in the HL must have resulted, at least partly, from their less-than-native exposure to and use of the language since their onset of bilingualism. Greater processing difficulties of HSs compared to NSs—or more generally, of bilinguals compared to monolinguals—across linguistic domains has been well documented by studies showing lower accuracy and/or slower performance (e.g., reaction times) in bilinguals compared to monolinguals (e.g., Gollan & Acenas, 2004; Runnqvist et al., 2013; Sadat et al., 2012). Although hypotheses and assumptions proposed to explain such differences between bilinguals and monolinguals in language processing differ from one to another in detail (its review is beyond the scope of this study), they are in common in postulating a relationship between TL processing and TL exposure and use (especially the frequency), for example, the ‘weaker link’ hypothesis (Gollan et al., 2008) or the ‘activation threshold’ hypothesis (Paradis M, 1993).

A relationship that puts bilinguals at a disadvantage in language processing compared to monolinguals due to less input in one of their two languages must apply to HSs in general since they are bilingual. Undoubtedly, much more research should be done to further explore the linguistic aspects in the HL of HSs of various language combinations that such relationship exercises, as well as of child HSs who constantly undergo a shift in the language input/output and language dominance between their two languages. Nevertheless, assuming that TL processing is closely related to TL experience in bilinguals, the less-than-native exposure to and use of Korean since their start of the acquisition of English may have resulted in lower abilities in processing morphosyntactic cues in Korean in KHSs in Australia in primary school years. This could have made it difficult for them to understand passive sentences and OSV sentences.

When the KHSs’ lower level of understanding of the sentences is assumed to be due to their greater processing difficulty, their lower level of Korean language experience and cross-linguistic influences from English (i.e., their other language) can be named for the possible causes of such processing difficulty, considering the general characteristics of HL acquisition. If reduced Korean language experience and cross-linguistic influences from English were to affect the processing of Korean in KHSs, this effect is expected to

grow in intensity over the course of their formal schooling. This is because their increased proficiency in English further influences their use pattern of English and Korean. The more they use English, the more automatic and comfortable it becomes for them to speak English, as well as doing language-involved thinking in that language. Consequently, they come to speak Korean less and less even at home, as well as doing thinking less and less in Korean over time, so it becomes much more effortful and demanding to speak Korean, further discouraging them from speaking the language. As English gradually takes over Korean in terms of proficiency and dominance as well as use and preference, the cross-linguistic influences from English to Korean grow stronger even if the cross-linguistic influences between their two languages should be bi-directional.

Surprisingly, the KHSs' performance on the task for testing their comprehension of passive sentences in comparison to active sentence in this study (i.e., Task 5) did not follow this prediction of greater effects of reduced Korean language experience and cross-linguistic influences from English on the processing of the HL at a higher-year level. Instead, the results indicated that their understanding of passive sentences and OSV sentences will at least stay at a similar level over primary school years unless improving. If the observed tendency of better performance at a higher-year level in KHSs truly reflects their enhanced ability in processing morphosyntactic cues, their results should be interpreted to suggest that despite being reduced considerably after the start of formal schooling, their continued exposure to Korean at home on a daily basis can help them with maintaining (or even enhancing) their ability to process morphosyntactic cues in Korean in comprehension.

However, the exact mechanism of how their continuous exposure to Korean can positively affect their processing of inflectional morphology in the language remains unclear. Previous research on bilingual processing has thus far indicated that when a bilingual processes one of his or her languages, both languages are jointly activated to some degree (Kroll & Gollan, 2014; Kroll et al., 2015), and the bilingual must inhibit the other language system (Bialystok, 1999; Green, 1998). This is why bilingual language processing is usually more costly (e.g., less accurate or slower) than monolingual processing (Bialystok et al., 2009). Between the two language systems of a bilingual that compete with each other constantly, the language that is less frequently used is supposed to have established a 'weaker link' in the network (Gollan et al., 2008) or have a higher 'activation threshold' (Paradis M, 1993). Thus, processing the weaker language used less

frequently is more difficult than processing the stronger/dominant language used much more frequently.

However, the results of this study do not conform to the predictions of these hypotheses. Instead, they indicate that their continuous exposure to Korean—despite being reduced considerably than before—may facilitate their processing of inflectional morphology over time. This facilitation of continuous TL exposure in TL processing does not seem entirely impossible. In addition, the possibility that the observed performance increase in the given task in KHSs was derived from factors other than their enhanced ability in processing inflectional morphology in Korean cannot be ruled out. The interpretation of their performance of the task should await future research to further investigate the change in the HL processing over primary school years, as well as the effect of continuous HL exposure on HL processing, independent from their processing of the other language.

9.3 Practical implications for KHSs in Australia

9.3.1 Need for provision of bilingual education programs

The results of this study indicate that KHSs in Australia in primary school years have developed linguistic abilities in Korean in many linguistic aspects to a lower level than their school-year-level appropriate native norms. Such lower level of attainment was especially pronounced for vocabulary and the linguistic aspects that continue to develop through primary school years. This must be related to the level of their exposure to and use of Korean in their bilingual environment in Australia. Apparently, KHSs' experience with the Korean language in Australia is far more limited than that of KNSs in the monolingual environment in Korea, not only in its extent, such as the domains of use (e.g., home, school, work or community), but also in its intensity. Setting aside the discussion of many implications that the minority status of the Korean language in Australia has on its use (e.g., no use of Korean in the wider community of Australia and KHSs' possible reluctance to use and maintain their HL), as pointed out by Montrul (2012), the absence of formal schooling delivered in Korean at present clearly restrains the KHSs' experience in their HL by a significant degree not only in its amount but also in its quality.

Currently, bilingual education is almost unavailable to KHSs growing up in Australia since fewer than a handful of schools offer an English–Korean bilingual program in the whole country. Moreover, an application to such a program does not

guarantee one's admission because students are selected based on their abilities (e.g., language aptitude). This means that most KHSs in Australia have no choice but to attend mainstream schools where lessons are entirely in English, even if Korean immigrant parents wish to send their children to an English–Korean bilingual school. Some schools provide foreign language lessons as part of their curriculum, but studying a foreign language is not compulsory at the primary school level. Even if a KHS attends a school that offers Korean language lessons, they are usually for one to two hours per week and not tailored to meet the specific needs of KHSs. As a result, their language experience in Korean is left mostly outside their formal schooling and confined mainly to their homes.

The practical absence of English–Korean bilingual education available to KHSs in present Australia implies limitations imposed on the time available for their exposure to and use of Korean. In NSW, where KHSs in this study were recruited, the compulsory primary school education begins at Kindergarten followed by Year 1 to Year 6; schools usually run from 9 a.m. in the morning to 3 p.m. in the afternoon from Monday to Friday for about 40 weeks a year. This means that KHSs from the Kindergarten level are fully immersed in an English-speaking environment for at least six hours on a weekday during the school year. Their immersion in English is likely to be extended by extracurricular activities before and/or after school and on weekends, such as lessons or practices for music and sport and private tuition for supporting their academic performance at school. Such long school hours and possible extracurricular activities in the English-immersion environment reduce the time available for being exposed to Korean.¹¹⁰ Further, KHSs' exposure to and use of Korean in their home and local Korean community have to share their already restricted proportion available for Korean with English, influenced by various factors such as capability (e.g., if the KHS can carry on conversations in Korean without much effort), availability (e.g., confident Korean-speaking interlocutors, books or TV programs in Korean) and preference. Such an apparent shortfall in the sheer amount of experience in Korean that KHSs can gain access to in their bilingual environment in the current Australian context must have contributed to their linguistic abilities in Korean falling short of their year-level-appropriate NS norms, as observed in this study.

¹¹⁰ It will be very difficult for KHSs to be in a Korean-speaking environment for more than half of their waking time, considering that primary school children are recommended to sleep for 10 to 11 hours a day (Network, 2020).

In addition, the absence of formal schooling provided in Korean for the KHSs implies that their Korean language experience in Australia is different from that of KNSs in its quality as well, even if it seems impossible to dissociate the quality of Korean language experience from its quantity. Undeniably, variations exist between individual families in the quantity and quality of language experience that they provide for their children's language development at home (Hart & Risley, 1995), but an average language experience at home will hardly be as intensive and extensive as that at school. This is not only because children constantly receive language input and generate output at school as they take part in various learning activities, plays and other social interactions but also because they receive lessons on a wide range of subjects. With the lack of schooling delivered in Korean, KHSs in Australia miss out on the rich and stimulating environment for learning extensive vocabulary and more complex linguistic aspects in Korean that their KNS peers in Korea commonly have access to through schooling.

In Australia, the social and political atmosphere regarding the maintenance of LOTEs appears to be friendlier than in other countries of immigration, as the government and education system advocates multiculturalism alongside integration. Facilities to help immigrants with settlement and integration are well established, such as the provision of English as a Second Language instructions and services available in community languages (e.g., information provided in community languages and translation and interpretation services). At the same time, the support for development and maintenance of LOTEs are in place at the policy level and well incorporated into education (e.g., LOTE programs in schools and funding for community-based institutions teaching LOTEs), media (e.g., radio and TV programs in LOTEs) and other public sectors. Despite such institutionalised support for the maintenance of LOTEs in minority language communities in Australia, linguistic abilities in their HL across linguistic areas and aspects comparable to that of NSs is extremely difficult to achieve without the support of an English–HL bilingual education. As mentioned earlier, an English–Korean bilingual education program is not readily available to KHSs in Australia at present. This makes it extremely difficult for KHSs not only to secure certain percentage of their total language experience to be allocated to Korean, but also to ensure the quality of Korean equivalent to what their KNS peers in Korea receive.

Moreover, the absence of such bilingual education makes KHSs' vocabulary development in Korean, as well as their development and maintenance of Korean in

general, entirely dependent on their family and possibly their local Korean community. In homes where both parents speak Korean (i.e., the best condition for HL maintenance in terms of parental language use according to Kondo-Brown [2005]), as was the case for the KHSs in this study), Korean is likely to be the language of communication in the family, especially between parents, as well as between parents and their children, although the children may communicate with one another more often in English than in Korean, as indicated by previous studies (e.g., Ko S & Shin, 2010; Shin S-C, 2008b) as well as in this study.¹¹¹ The Korean-speaking environment at home will provide KHSs with opportunities to learn and retain vocabulary and grammar in Korean by hearing and using them in a natural acquisition setting. However, even if their parents, who are usually the primary source of their HL input, use highly diverse vocabulary and grammar in Korean in their daily conversations at home, the communication between family members at home is more often limited in many aspects—from its topic to its mode of communication. This means, their exposure to and use of Korean with their family members at home rarely provide them with the rich and diverse vocabulary and grammar in Korean that their KNS peers are provided with, especially from the Korean-medium schooling. To complement their children's immersion to a Korean-speaking environment in a classroom setting, many Korean immigrant families like those in this study send their children to Korean community schools, which run for two to three hours on Saturdays or Sundays. However, such efforts do not seem adequate to make up for the gap in receiving formal schooling in Korean, as demonstrated by the results of this study. For successful attainment and retainment of HL abilities beyond the native-like perception of HL sounds and good command of basic syntax and semantics in understanding, bilingual education programs are necessary for KHSs in Australia.

9.3.2 Korean immigrant families

The results of the study showing far lower level of attainment of vocabulary, the grammar that develops further through primary school years and processing in KHSs in Australia in primary school years suggest that Korean immigrant families in Australia will need to invest much more efforts than their current practice if they wish for their children to further develop vocabulary and grammar in Korean comparable to the

¹¹¹ The parents may have no choice but to speak Korean at home because of their limited proficiency in English or they may deliberately choose to speak Korean at home to promote their children's HL maintenance.

children's year-level-appropriate native norms. To support their children's Korean language development, Korean immigrant families should not only increase the amount of their children's exposure to and use of Korean at home in general but also try to provide their children with diverse vocabulary and a wide variety of grammar. Such efforts include maximising the use of Korean between family members at home as much as possible, encouraging their children read books in Korean extensively (by reading Korean books to their children from a young age and ensuring literacy in Korean so that later the children can read Korean books on their own), ensuring their children are exposed to a variety of resources in Korean for education as well as for entertainment (e.g., TV programs, videos, songs, games, other online and offline materials and cultural experiences) and giving them a chance not only to visit Korea but also to attend school while visiting Korea if feasible.

However, such extraordinary efforts required for achieving native-like competence in Korean are likely to be perceived as an enormous burden for most immigrant families and their children. Many of the families and their children may not even see the need for learning extensive vocabulary or complex grammar that is less frequently or hardly used in spoken Korean once they have learned the basic language necessary for communicating with their family members in everyday life. Such a tendency is highly likely to be much more pervasive in the children (i.e., KHSs) than their parents. As indicated in Ko S and Shin's (2010) study, the children's motivation to learn and maintain their HL was primarily for communicating with their family members as well as with their extended family (e.g., grandparents and relatives living in Korea), in comparison to those of their parents for their children's HL maintenance also being laid on instrumental motivation such as better job prospects in the future.

Whether a Korean immigrant family and its children see the need for having native-level competence in Korean and desire to achieve it is a question that the family and its children should answer. Nevertheless, the results of this study highlight far lower lexical knowledge in Korean, stagnant development of the linguistic aspects that are mastered relatively late in L1 acquisition and difficulty with processing in KHSs in Australia in primary school years than their NS peers. This suggests that HSs' early and continuous exposure to their HL at home and in their local ethnolinguistic community (e.g., Korean community schools) does not guarantee native-level attainment of the HL vocabulary, grammar or processing which is clearly different from the case of the HL

sound system or basic syntax or semantics. In fact, the results of this study indicate that the KHSs' level of exposure to and use of Korean in their dual language acquisition environment in Australia is far below the minimum for keeping up with the language development of KNS in Korea over primary school years. The minimum exposure to Korean required for it, supposedly 40–60% of the total language exposure suggested by some studies e.g., Cattani et al. (2014) appears challenging to meet, given the lack of bilingual education available to the KHSs as well as other implications of the minority status of the Korean language in Australia. This, in turn, suggests that Korean immigrant families will need to put much more effort than their current level of support for their children's HL development and maintenance, given the circumstance.

Chapter 10 Conclusion

With a growing interest on HSs and their HL acquisition, the study of HLs expanded greatly in the last two decades. An increasing number of studies have examined linguistic competence in the HL of adult HSs in different parts of the world, striving to investigate the outcomes of their HL acquisition. With the contributions made by these studies, the language research community now has a good overview of HSs' linguistic profiles although some details remain to be filled by future research. However, since previous research has primarily focused on HSs' differences from their corresponding NSs (i.e., the baseline) in their linguistic competence in the HL to examine the end results of their HL acquisition, the investigation into the pathways of their HL acquisition before they reach that end state has been largely neglected. Accordingly, there has been a lack of empirical studies that can support the explanations provided as the underlying reasons for the outcomes of HL acquisition observed in adult HSs. In this respect, this study contributes to such gaps by examining the development and maintenance of the HL in a non-adult HS population—KHSs in Australia in primary school years. The study has examined the linguistic abilities in Korean of the KHSs and has identified and discussed their linguistic knowledge and use of the HL attained and retained in the three broad linguistic areas—the sound system, vocabulary and grammar. The findings of this study are largely consistent with the findings on the HL acquisition outcomes observed in adult HSs as they are summarised below.

The development and maintenance of the HL sound system in the KHSs was investigated by examining their perception of speech sounds in Korean with a phoneme discrimination task. Although they showed a slightly lower level of performance than their school-year-level-matched KNS controls on the given task, the overall results did not provide enough evidence to conclude that they perceive phonemic contrasts between similar sounds in Korean less well than their KNS peers. Despite supporting it only resignedly, the results were in line with the prevalent assumption that HSs have native-like phonetic and phonological competence in their HL for perception. However, given their persistence of lower performance on the task in this study, as well as the findings of some previous studies indicating less-than-native speech sound perception in the HL (e.g., Ahn et al., 2017; Lee-Ellis, 2012), it is still possible that HSs perceives speech sounds in

their HL less well than their NS controls. If they indeed perceive phonemic contrasts between similar sounds in their HL less well than the NS controls, such a lower level of perception may be better revealed in more demanding tasks (e.g., tasks manipulated by speaker variety, listening conditions, acoustic cues or phonological memory capacity). Nevertheless, careful thoughts should be given to the question of how meaningful their difference to the NS controls disclosed by such demanding tasks will be in practice in terms of understanding and producing words and sentences in their HL. The results of this study suggest that KHSs in Australia in their primary school years will not have much more difficulty in perceiving speech sounds in Korean, clearly distinguished from similar sounds, at least at the level of words presented discretely. Their native-like perception of HL speech sounds must have resulted from their exposure to the language since birth and their dominant exposure to it until they started schooling in the majority language of the wider community, as suggested by the researchers who examined HL speech sound perception in adult HSs (e.g., Chang, 2016; Oh et al., 2003). The results of this study also suggest that their perception of speech sounds in Korean does not regress over the course of primary school education. Assuming that this finding correctly reflects the change in their HL speech sound perception over primary school years, it will be interpreted as to suggest that they maintain their native-level perception of HL speech sounds very well at least until the end of primary school years.

With respect to the development and maintenance of their HL vocabulary over primary school years, their receptive vocabulary in Korean was examined by a picture-selection task adapting REVT-R, a test widely used to assess the receptive vocabulary of Korean-speaking children. The results of the task revealed that KHSs in primary school years in Australia are far behind their KNS peers in the level of lexical knowledge in Korean for comprehension. Such results are well explained by their dual language acquisition, because of which they receive less-than-native TL experience in Korean, given that vocabulary learning is closely tied to the quantity (and possibly quality) of TL experience even in L1 acquisition. Nevertheless, the results of this study indicate that KHSs growing up in Australia will need to invest much more effort into learning a wide range of vocabulary in Korean, if they ever wish to communicate in Korean like an educated speaker when they are grown up. Without this effort, they will find it very difficult to communicate in Korean beyond their everyday conversations with family or friends in familiar and informal contexts on common and familial topics. The results of

this study also highlight that their gap to their school-year-level-appropriate native norms in receptive vocabulary in Korean verges at (or from) the middle primary school year levels. This is probably because they struggle with learning new words and expressions in Korean, as well as maintaining the vocabulary learned previously, without formal schooling provided in the language whereas their KNS peers make a great gain in their lexical knowledge in Korean through formal schooling.

The development and maintenance of their HL grammar has been examined regarding basic syntax and semantics, four particular linguistic aspects in different linguistic domains and the passives in Korean. Their linguistic abilities in basic syntax and semantics were assessed by a picture selection task that assessed their understanding of sentences made up of basic syntactic structures and semantic features; their knowledge of the four linguistic aspects (i.e., the verb conjugation, passive, NIPs and use of the verbs *o-* and *ka-*) was assessed by a GJ task; their understanding of passive sentences in comparison to active sentences was assessed by a picture-selection task. The results of the three tasks indicated that KHSs in Australia in primary school years are likely to fall behind their school-year-level-matched NS controls on measures of linguistic abilities in the HL grammar but the degree of such lag will differ by linguistic aspect. These results attested to the overall findings of previous studies conducted on adult HSs that showed a varying degree of attainment of linguistic competence by linguistic domain and linguistic aspect. More specifically, the results of this study suggested that KHSs in Australia will not have much more difficulty than their KNS peers in understanding sentences composed of basic syntactic structures and semantic features in Korean during their primary school years. As everyday conversations at home are comprised of such sentences, they will have little difficulty understanding simple instructions, explanations or narratives in Korean that they hear at home and even in their local Korean community such as their Korean neighbourhood, churches or Korean community schools. On the contrary, the results suggested that they may develop the knowledge of some linguistic aspects in Korean to a lower level than that of their KNS peers, especially if the linguistic aspects are supposed to develop beyond preschool years. Moreover, the results indicated that they will understand passive sentences and OSV sentences in Korean less well than their KNS peers due to difficulties with taking note of and decoding morphosyntactic cues in Korean such as case-marking particles or verb inflections. These results showing differentials in the degree of attainment between linguistic aspects are assumed to be closely related to

the timing of acquisition of different linguistic aspects in L1 acquisition and the nature of HL exposure and use. Many KHSs in Australia are predominantly exposed to Korean until they start formal schooling, especially if both of their parents are KNSs (like those in this study). Therefore, they acquire core grammar of their HL very well—that is, to a level comparable to their NS controls—in syntax and semantics (probably in other linguistic domains as well) that is supposed to develop readily within preschool years. However, after entering school, it is almost impossible for them to have Korean language experience equivalent to what their KNS peers receive in the monolingual environment in terms of quantity and quality, with respect to not only the vocabulary but also the grammar of the language that they are exposed to in the spoken as well as written language. Due to this lack of Korean language exposure and use after the onset of formal schooling, KHSs cannot attain the linguistic aspects that develop further through school years at the same speed as that in their NS controls, thus having a delay. Moreover, this lack of exposure to and use of Korean leads them to be less accurate and slower to process some components of the language, such as inflectional morphology, than their KNS peers, making them fall behind the NS controls not only in their linguistic knowledge but also in the use of their knowledge of Korean grammar.

Taken together, the results of the study demonstrate that HSs who are in their primary school years already present linguistic traits similar to those observed in adult HSs. Therefore, the findings of this study provide empirical evidence that reinforces the explanations given for the outcomes of HL acquisition observed in adult HSs. Since the HSs examined in this study appeared to have native-like perception of HL speech sounds and good command of basic syntax and semantics in the HL in their primary school years, its findings support the explanations that HSs' native-like phonetic and phonological competence for perception and strong resistance of core syntax to attrition result from the early acquisition of those aspects among HSs. The results of this study indicating that the linguistic aspects that continue to develop beyond preschool years do not develop greatly over primary school years in HSs not only provide another example of HSs' varying degree of attainment of different linguistic aspects in the HL, but also support the explanations given for the same observations made in adult HSs that this varying degree of attainment arises from the timing of acquisition of the linguistic aspects in question and the reduction of TL input and use in HSs during the period that those linguistic aspects develop.

Assessing the KHSs' linguistic abilities in Korean in different linguistic areas, this study observed variations between individuals in their level of attainment. Addressing the gap in the HL research on the relationship between HL experience and HL abilities, this study has investigated the correlation between the KHSs' linguistic abilities and their language backgrounds. The results indicated that overall, the differences in their demographic information or their level of HL exposure and use do not explain the variations observed among them in this study very well. It was explained that such results were largely due to relatively little room available for their level of exposure to and use of Korean to vary between individuals. This is because all of them have both parents speaking Korean (most of whom were presumably KNSs, finding it much more comfortable to communicate in Korean than in English), so the primary language of communication between family member at home is Korean mostly. It is also because they attend regular schools in the English-immersion setting for the same amount of time, spend similar hours doing their extracurricular activities and spend similar number of hours in the local Korean community such as churches or Korean community schools. It was also explained that the results could have been derived from how their level of HL exposure and use was measured in this study. Since their level of HL experience was measured by their parents estimates, it is possible that their estimates did not accurately reflect their actual HL exposure and use. Nevertheless, the results observed some correlations between their linguistic abilities in Korean (especially in the areas of vocabulary and grammar) and their level of HL experience such as their use of Korean with their parents. Future studies should further investigate the relationship between HL experience and HL abilities with tools that can measure their HL exposure and use more accurately, as well as among HSs of more heterogenous backgrounds.

As this study has examined the linguistic abilities in Korean attained and retained by KHSs in Australia in primary school years, its results provided empirical information on their level of HL development and maintenance in the linguistic areas examined. This information bears practical implications for the stakeholders of the HL acquisition of KHSs growing up in Australia. The results of the study indicate that their linguistic knowledge and use of Korean that should develop further through primary school years such as more complex grammatical aspects or vocabulary do not develop greatly over the primary school period. The study observed signs of stagnation (if not attrition) in their development of such grammatical aspects and vocabulary, and the signs were especially

pronounced at the middle primary school year levels. This implies that for KHSs growing up in Australia, it will be very difficult to develop high proficiency in Korean, which requires mastery of complex grammar and extensive vocabulary, with the current level of help and support provided to them. This, in turn, advocates the need of English–Korean bilingual education programs that KHSs can readily access although the demand of or response to such a program in the Korean community, more specifically among Korean immigrant families, is questionable.

The results of the study also indicate that KHSs in Australia in primary school years have attained the linguistic aspects in Korean that are mastered early such as speech sound perception or basic syntactic structures very well and that their linguistic knowledge and use of such aspects will be retained well over the first half of their compulsory schooling. Nevertheless, the results suggest that Korean immigrant families and educators in Australia should pay particular attention to the verging gap from the middle primary school years in their development of vocabulary and more complex grammar. The results showing such gap imply that despite their native-like speech sound perception and high command of basic syntax and semantics, they will find it difficult to understand books and texts written in Korean, as well as materials presented orally (e.g., TV programs, movies or YouTube videos), aimed at the readers or viewers of their age based on their cognitive, emotional and social development, especially from the middle primary school years. This difficulty will further discourage them from engaging with independent reading (even if they can readily read texts in Korean) or other activities that can help further develop their grammar and expand their vocabulary in the HL beyond those that they have already attained in preschool years. Therefore, extraordinary effort to maximise their Korean language experience at home and in the local Korean community, as well as enhancing the quality of their HL experience by providing a wide variety of grammar and richer vocabulary presented more saliently (e.g., in more stimulating environments), will be needed to close their verging gap to their school-year-level-appropriate native norms.

Although the findings of this study have provided empirical information on the linguistic abilities in Korean of KHSs in Australia in primary school years, it should be complemented by future studies. A longitudinal examination of the development and maintenance of their HL will provide more precise information on the question. Moreover, to better understand the course of HL acquisition before adulthood, it is crucial

to investigate their development and maintenance of the HL over secondary school years. Given the limitation of recruiting its participants from Korean community schools, the results of this study only presented the development and maintenance of the KHSs with particular family backgrounds (i.e., those from homes where both parents speak Korean). It is necessary to further investigate if and how the HL acquisition of these KHSs differs from that of those of parents with a bi-cultural marriage in the current Australian environment. In addition, future studies should examine their linguistic abilities not only in Korean but also in English and investigate how their linguistic abilities in one of the two languages relate to those in the other language and influence each other's development.

Appendices

Appendix 1. Example pages of the test booklet

1. 소리 구별하기

< 연 습 >

연습 1.

① 가무지

② 나무지

③ 다무지

연습 2.

① 누아리

② 누어리

③ 누오리

연습 3.

① 오비디

② 오비시

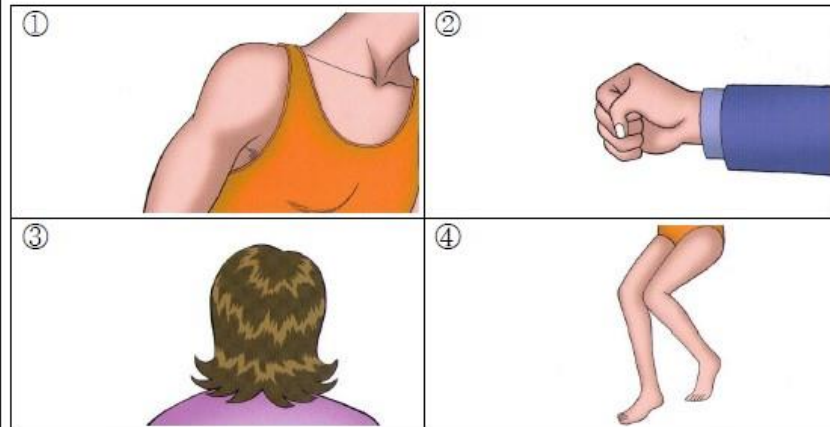
③ 오비지

1

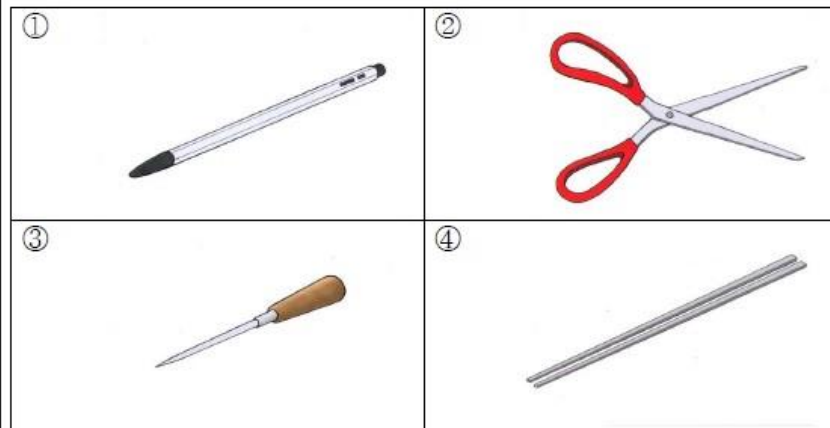
2. 낱말에 맞는 그림 찾기

< 연 습 >

연습 1.



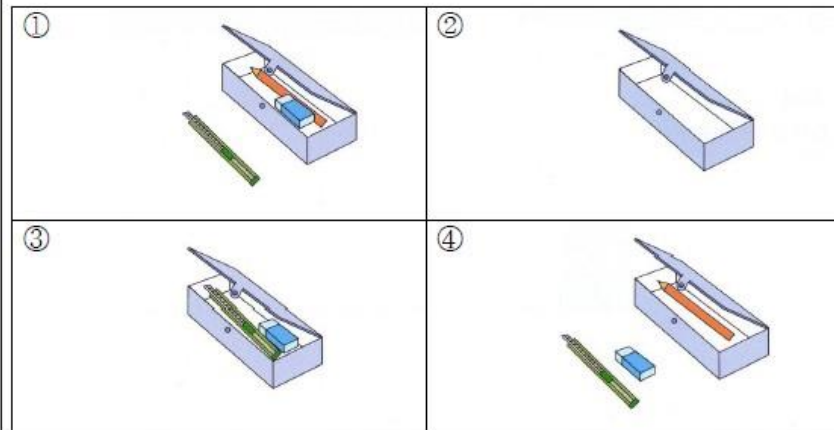
연습 2.



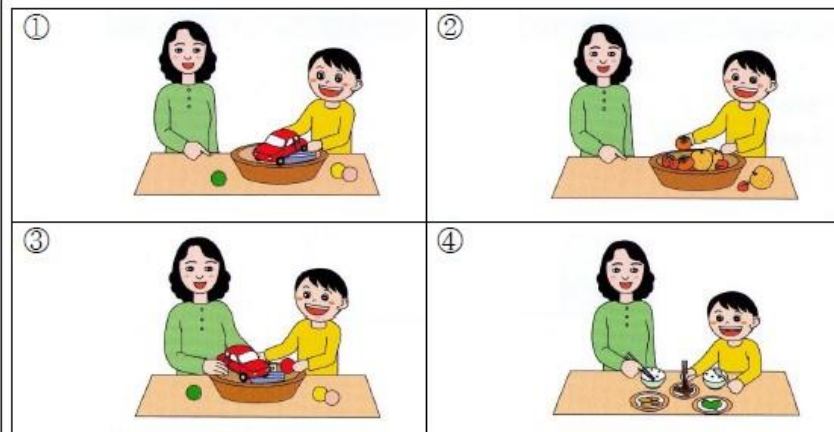
3. 문장에 맞는 그림 찾기

< 연 습 >

연습 1.



연습 2.



4. 틀린 문장 찾기

< 연 습 >

연습 1.

① ○ (맞아요)	② ✕ (틀려요)
-----------	-----------

연습 2.

① ○ (맞아요)	② ✕ (틀려요)
-----------	-----------

연습 3.

① ○ (맞아요)	② ✕ (틀려요)
-----------	-----------

5. 문장에 맞는 그림 찾기

< 연 습 >

연습 1.

①



②



③

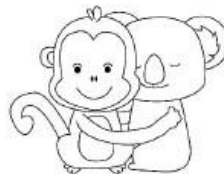


④



연습 2.

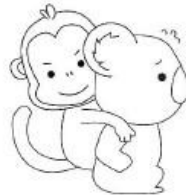
①



②



③



④



Appendix 2. Questionnaire on language background

Questionnaire

This survey is a part of a research study on *Heritage Language Development and Maintenance of Heritage Speakers of Korean in Australia in Primary School Years*. The following questions ask you **about the child in your care** in relation to his/her language background. Please read the questions carefully and answer appropriately. Thank you for taking part in the survey.

⊙ Respondent

- Name:
- Relationship to the child:

⊙ CHILD details

- Name:
- Date of Birth:
- Country of birth: ☐ Australia ☐ South Korea ☐ Other
- (if not born in Australia) Age of arrival in Australia: ____ years old
- Gender: ☐ Male ☐ Female
- School Year:

⊙ FAMILY details

➤ Parent/Carer 1 (with whom the child normally lives)

- Relationship to child:
- Country of birth: ☐ South Korea ☐ Australia ☐ Other
- Ancestry: ☐ Korean ☐ Australian ☐ Other
- (if not born in Australia) Length of residence in Australia: ____ years
- Language proficiency

- How well does parent/carers 1 speak Korean?

- ☐ not at all
- ☐ not very well
- ☐ well
- ☐ very well
- ☐ He/she is a native speaker of Korean

- How well does parent/carers 1 speak English?

- ☐ not at all
- ☐ not very well
- ☐ well
- ☐ very well
- ☐ He/she is a native speaker of English.

▪ Education

- What is parent/carers 1's highest level of education completed?

- ☐ High school
- ☐ TAFE education
- ☐ Undergraduate degree
- ☐ Postgraduate degree
- Occupation

- **What is parent/carer 1's occupation?**

Occupation:

- **Please choose the group that best describes parent/carer 1's occupation.**

- ☐ has not been in paid work in the last 12 months
- ☐ Labourer
- ☐ Machinery operator and driver
- ☐ Sales worker
- ☐ Clerical and administrative worker
- ☐ Community and personal service worker
- ☐ Technician and trades worker
- ☐ Professional
- ☐ Manager

➤ **Parent/Carer 2** (with whom the child normally lives)

▪ **Relationship to child:**

▪ **Country of birth:** ☐ South Korea ☐ Australia ☐ Other

▪ **Ancestry:** ☐ Korean ☐ Australian ☐ Other

▪ (if not born in Australia) **Length of residence in Australia:** _____ years

▪ **Language proficiency**

- **How well does parent/carer 2 speak Korean?**

- ☐ not at all
- ☐ not very well
- ☐ well
- ☐ very well
- ☐ He/she is a native speaker of Korean

- **How well does parent/carer 2 speak English?**

- ☐ not at all
- ☐ not very well
- ☐ well
- ☐ very well
- ☐ He/she is a native speaker of English.

▪ **Education**

- **What is parent/carer 2's highest level of education completed?**

- ☐ High school
- ☐ TAFE education
- ☐ Undergraduate degree
- ☐ Postgraduate degree

▪ **Occupation**

- **What is parent/carer 2's occupation?**

Occupation:

- **Please choose the group that best describes parent/carer 2's occupation.**

- ☐ has not been in paid work in the last 12 months
- ☐ Labourer
- ☐ Machinery operator and driver
- ☐ Sales worker
- ☐ Clerical and administrative worker
- ☐ Community and personal service worker
- ☐ Technician and trades worker
- ☐ Professional
- ☐ Manager

※ If the child has another parent/carer with whom the child normally lives other than those mentioned above, please provide their information on page 10-11.

➤ **Sibling(s)** (Leave empty if no siblings)

Sibling	Age	Gender	
Sibling 1		<input type="checkbox"/> Male	<input type="checkbox"/> Female
Sibling 2		<input type="checkbox"/> Male	<input type="checkbox"/> Female
Sibling 3		<input type="checkbox"/> Male	<input type="checkbox"/> Female
Sibling 4		<input type="checkbox"/> Male	<input type="checkbox"/> Female
Sibling 5		<input type="checkbox"/> Male	<input type="checkbox"/> Female
Sibling 6		<input type="checkbox"/> Male	<input type="checkbox"/> Female
Sibling 7		<input type="checkbox"/> Male	<input type="checkbox"/> Female
Sibling 8		<input type="checkbox"/> Male	<input type="checkbox"/> Female

➤ **Other adult(s) living in the home**

- Excluding the parent(s)/carer(s) and sibling(s) above, **check all adult members** who are currently living with the child **in the same home** and **specify their native language**.

Other member(s) of home	Native language		
<input type="checkbox"/> Grandfather	<input type="checkbox"/> Korean	<input type="checkbox"/> English	<input type="checkbox"/> Other
<input type="checkbox"/> Grandmother	<input type="checkbox"/> Korean	<input type="checkbox"/> English	<input type="checkbox"/> Other
<input type="checkbox"/> Uncle(s)	<input type="checkbox"/> Korean	<input type="checkbox"/> English	<input type="checkbox"/> Other
<input type="checkbox"/> Aunt(s)	<input type="checkbox"/> Korean	<input type="checkbox"/> English	<input type="checkbox"/> Other
<input type="checkbox"/> Cousin(s)	<input type="checkbox"/> Korean	<input type="checkbox"/> English	<input type="checkbox"/> Other

◎ **Child's Korean language experience**

➤ **Korean language input and output in communication with Family**

- Please specify the proportion of the Korean language use in percentage (%) in the current language **input** (language spoken to the child) and language **output** (language spoken by the child) when the child communicates with the listed family member.

Interlocutors (Family member)	Korean language use in language input	Korean language use in language output
Parent/carer 1	%	%
Parent/carer 2	%	%
Parent/carer 3	%	%
Parent/carer 4	%	%
Sibling 1	%	%
Sibling 2	%	%
Sibling 3	%	%
Sibling 4	%	%
Sibling 5	%	%
Sibling 6	%	%
Sibling 7	%	%
Sibling 8	%	%
Other adult	%	%
Other adult	%	%
Other adult	%	%
Other adult	%	%

➤ **Korean language input and output in communication with friends**

- Please specify the proportion of the Korean language use in percentage (%) in the current language input and output when the child communicates with his/her friends including his/her non-Korean-speaking friends outside school.

Interlocutors	Korean language use in language input	Korean language use in language output
Friends	%	%

➤ **Korean language education**

▪ **School attendance in South Korea**

- Has the child ever attended school in South Korea?
☐ Yes ☐ No
- If yes, please specify below.
 When: _____ years old How long: _____ month(s)/year(s)
 When: _____ years old How long: _____ month(s)/year(s)
 When: _____ years old How long: _____ month(s)/year(s)

▪ **Korean language course in school in Australia**

- Has the child taken a Korean language course offered in school in Australia?
☐ Yes ☐ No
- If yes, please specify below.
 When: School Year Hours per week: _____ hour(s)
 When: School Year Hours per week: _____ hour(s)
 When: School Year Hours per week: _____ hour(s)
 When: School Year Hours per week: _____ hour(s)
 When: School Year Hours per week: _____ hour(s)
 When: School Year Hours per week: _____ hour(s)
 When: School Year Hours per week: _____ hour(s)
 When: School Year Hours per week: _____ hour(s)
 When: School Year Hours per week: _____ hour(s)
 When: School Year Hours per week: _____ hour(s)

▪ **Korean Community Language School in Australia**

- Has the child attended a Korean Community Language School such as a Korean Saturday/Sunday School in Australia?
☐ Yes ☐ No
- If yes, please specify below.
 How long: _____ month(s)/year(s) Hours per week: _____ hour(s)

➤ **Visit to Korea**

- Has the child ever visited South Korea?
☐ Yes ☐ No
- If yes, please specify below.
 How many times: _____ time(s) Average duration of one visit: _____

_____week(s)/month(s)

➤ **Korean language input and output by age**

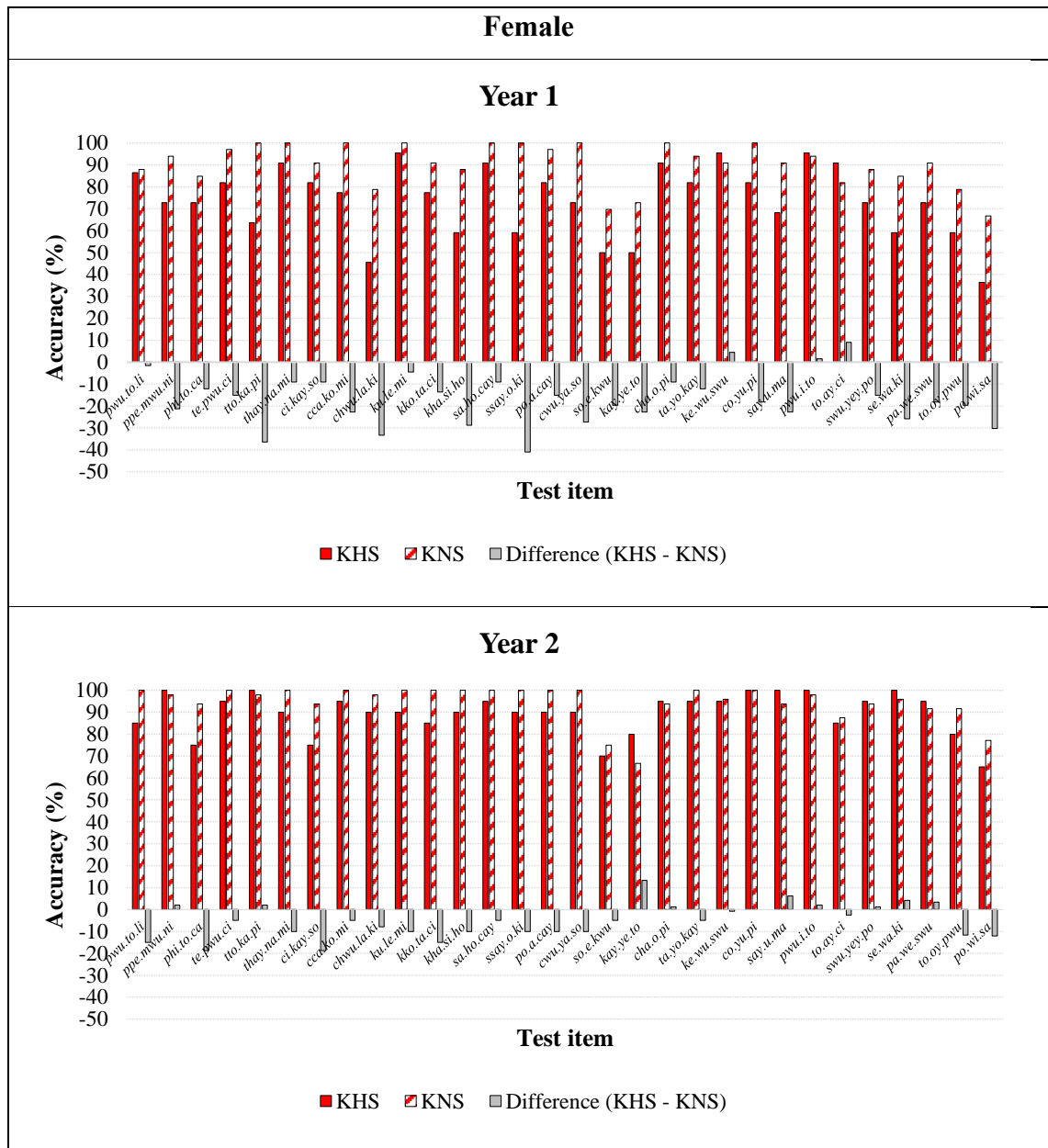
- Please indicate the proportion of the Korean language use in percentage (%) in the language input (listening and reading) and language output (speaking and writing) of the child in his or her waking hours (including hours in school, in non-parental care such as childcare service, preschool or before/after school care service, on weekends and in school holidays) since the child's birth as much as you can recall.

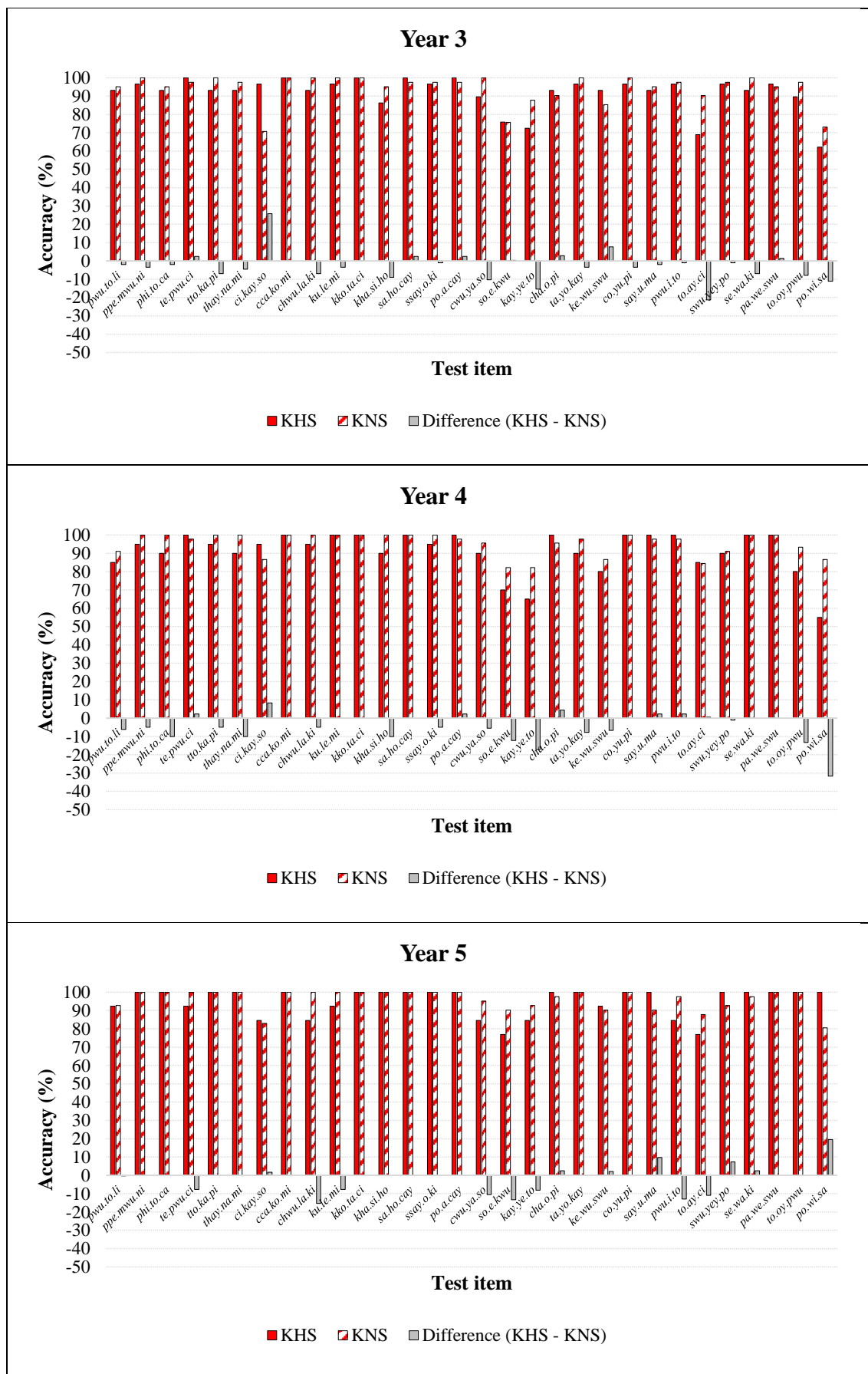
Age	Language input (Listening or reading)		Language output (Speaking or writing)	
	Korean	English	Korean	English
0-1	%	%	%	%
1-2	%	%	%	%
2-3	%	%	%	%
3-4	%	%	%	%
4-5	%	%	%	%
5-6	%	%	%	%
6-7	%	%	%	%
7-8	%	%	%	%
8-9	%	%	%	%
9-10	%	%	%	%
10-11	%	%	%	%
11-12	%	%	%	%
12-	%	%	%	%

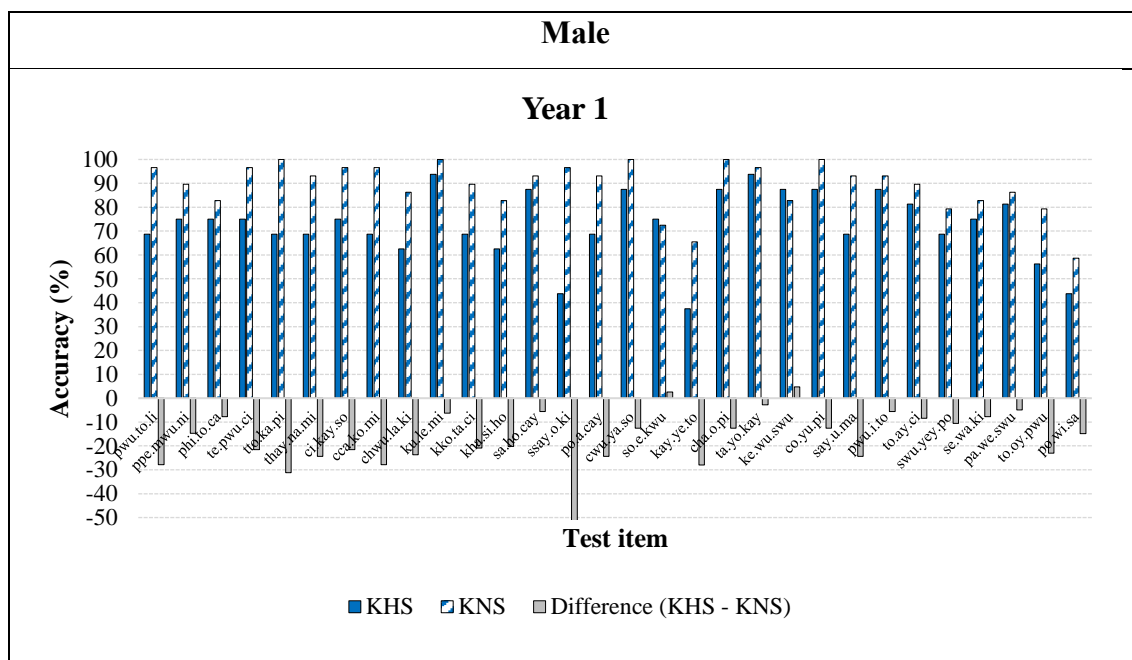
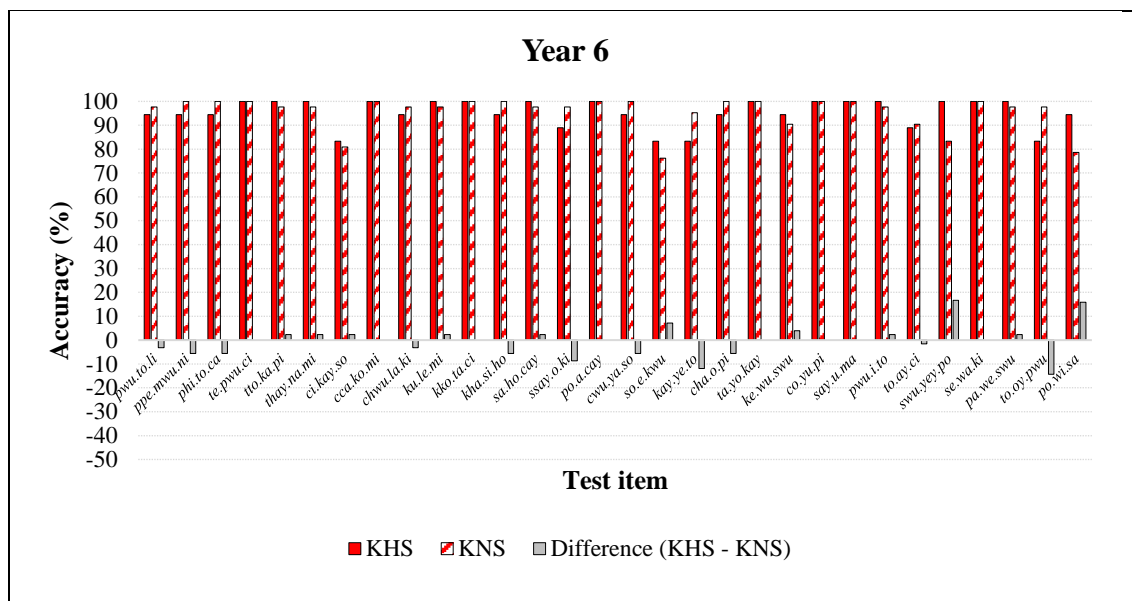
Appendix 3. Test stimuli (non-words) for Task 1

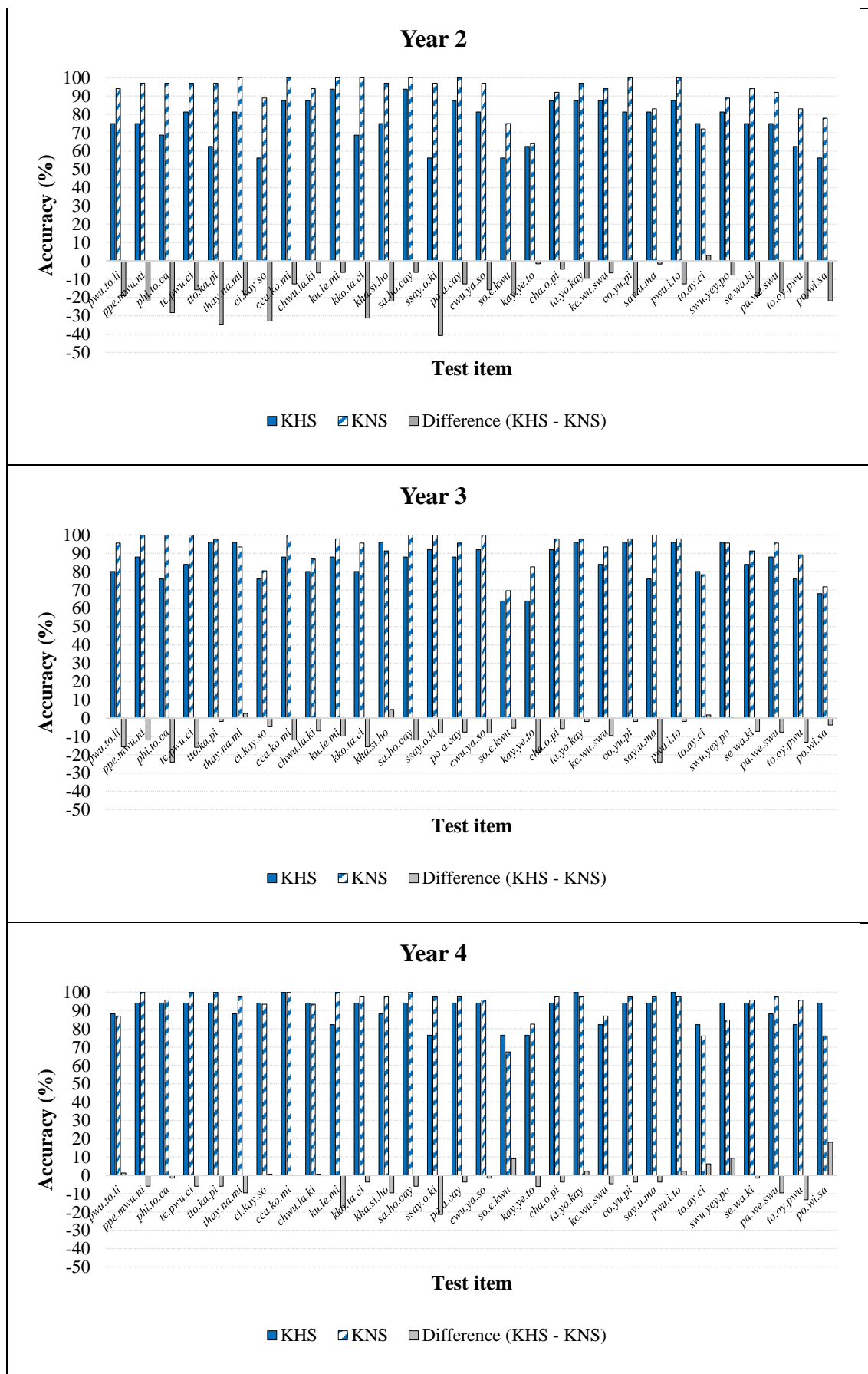
Target phonemes			Test stimuli (in bold) with alternative answers (target phoneme and its contrasting phonemes are underlined)
in Yale	in Hangul	in IPA	
p	ㅍ	/p/	<u>p</u>wu.to.li – ppwu.to.li – phwu.to.li
pp	ㅍㅍ	/p̚/	pe.mwu.ni – <u>p</u>pe.mwu.ni – phe.mwu.ni
ph	ㅍㅍ	/pʰ/	pi.to.ca – ppi.to.ca – <u>ph</u>i.to.ca
t	ㅌ	/t/	<u>t</u>e.pwu.ci – tte.pwu.ci – the.pwu.ci
tt	ㅌㅌ	/t̚/	to.ka.pi – <u>t</u>to.ka.pi – tho.ka.pi
th	ㅌㅌ	/tʰ/	tay.na.mi – ttay.na.mi – <u>th</u>ay.na.mi
c	ㅈ	/t͡ɕ/	<u>c</u>i.kay.so – cci.kay.so – chi.kay.so
cc	ㅈㅈ	/t͡ɕ̚/	ca.ko.mi – <u>c</u>ca.ko.mi – cha.ko.mi
ch	ㅈㅈ	/t͡ɕʰ/	cwu.la.ki – ccwu.la.ki – <u>ch</u>wu.la.ki
k	ㄱ	/k/	<u>k</u>u.le.mi – kku.le.mi – khu.le.mi
kk	ㄱㄱ	/k̚/	ko.ta.ci – <u>k</u>ko.ta.ci – kho.ta.ci
kh	ㄱㅌ	/kʰ/	ka.si.ho – kka.si.ho – <u>kh</u>a.si.ho
s	ㅅ	/s/	<u>s</u>a.ho.cay – ssa.ho.cay – cca.ho.cay
ss	ㅅㅅ	/s̚/	say.o.ki – <u>s</u>say.o.ki – cay.o.ki
a	ㅏ	/a/	po. <u>a</u> .cay – po.ya.cay – po.e.cay
ya	ㅑ	/ja/	cwu.a.so – cwu. <u>ya</u> .so – cwu.ye.so
e	ㅓ	/ʌ/	so.a.kwu – so. <u>e</u> .kwu – so.o.kwu
ye	ㅕ	/jʌ/	kay.ya.to – kay.e.to – <u>ye</u> .to
o	ㅗ	/o/	cha. <u>o</u> .pi – cha.yo.pi – cha.e.pi
yo	ㅛ	/jo/	ta.o.kay – ta. <u>yo</u> .kay – ta.wu.kay
wu	ㅜ	/u/	ke. <u>wu</u> .swu – ke.yu.swu – ke.ɥ.swu
yu	ㅠ	/ju/	co.ɥ.pi – co. <u>wu</u> .pi – co. <u>yu</u> .pi
u	ㅡ	/ɯ/	say.i.ma – say. <u>wu</u> .ma – say. <u>u</u> .ma
i	ㅣ	/i/	pwu.a.to – <u>pwu.i</u> .to – pwu.ɥ.to
ay	ㅢ	/ɛ/ or /E/	to. <u>ay</u> .ci – to.i.ci – to.yey.ci
yey	ㅣ	/je/ or /jE/	swu.a.po – swu.i.po – <u>swu.yey</u> .po
wa	ㅤ	/wa/	se.a.ki – se.ya.ki – <u>se.wa</u> .ki
we	ㅥ	/wʌ/	pa.e.swu – pa.ye.swu – <u>pa.we</u> .swu
oy	ㅦ	/ø/ or /wE/	to.a.pwu – to. <u>oy</u> .pwu – to.ɥ.pwu
wi	ㅧ	/wi/	po.i.sa – <u>po.wi</u> .sa – po.ɥ.sa

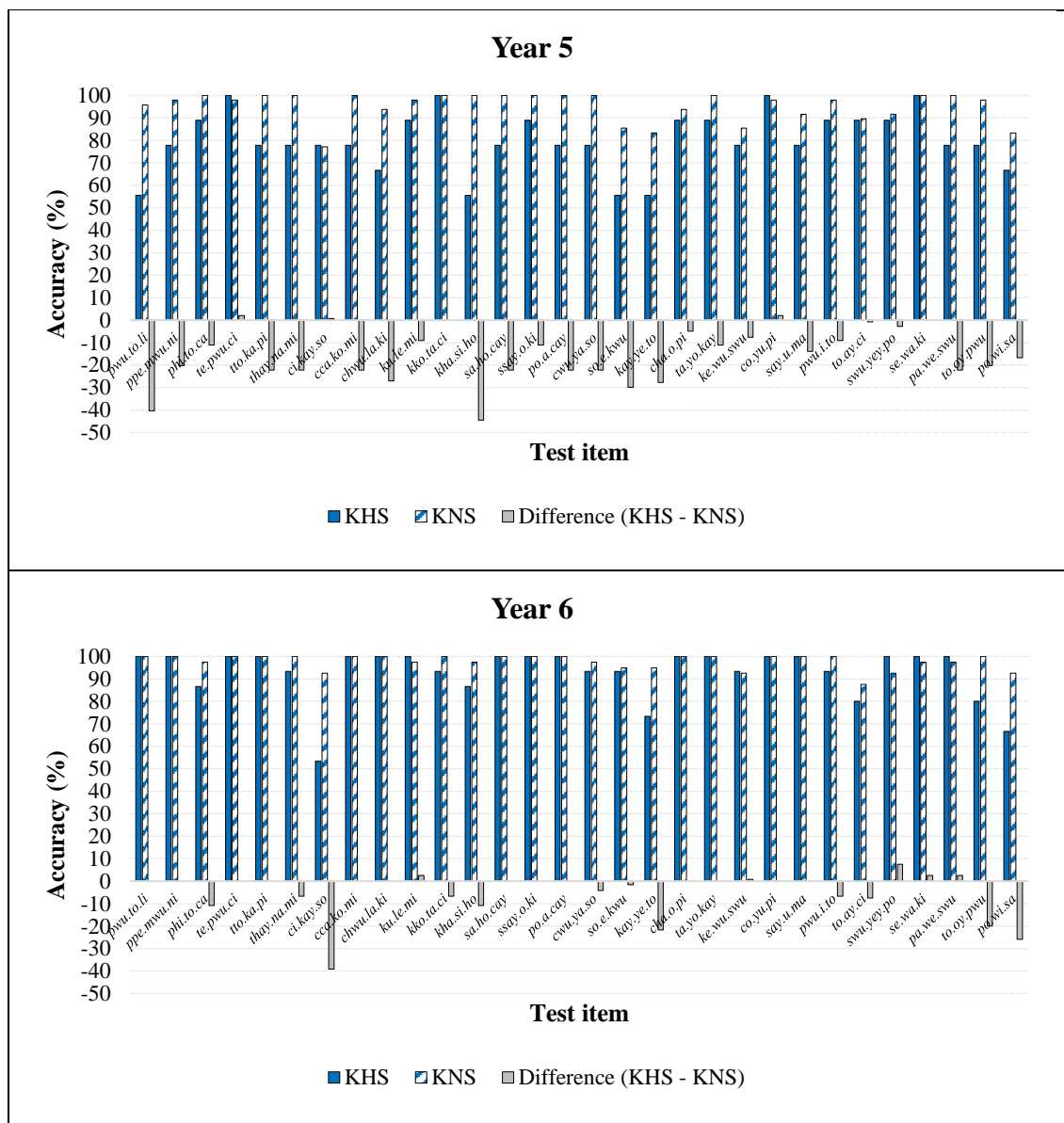
Appendix 4. Accuracy rates of test items in KHSs and KNSs at Years 1 to 6 in girls and boys in Task 1











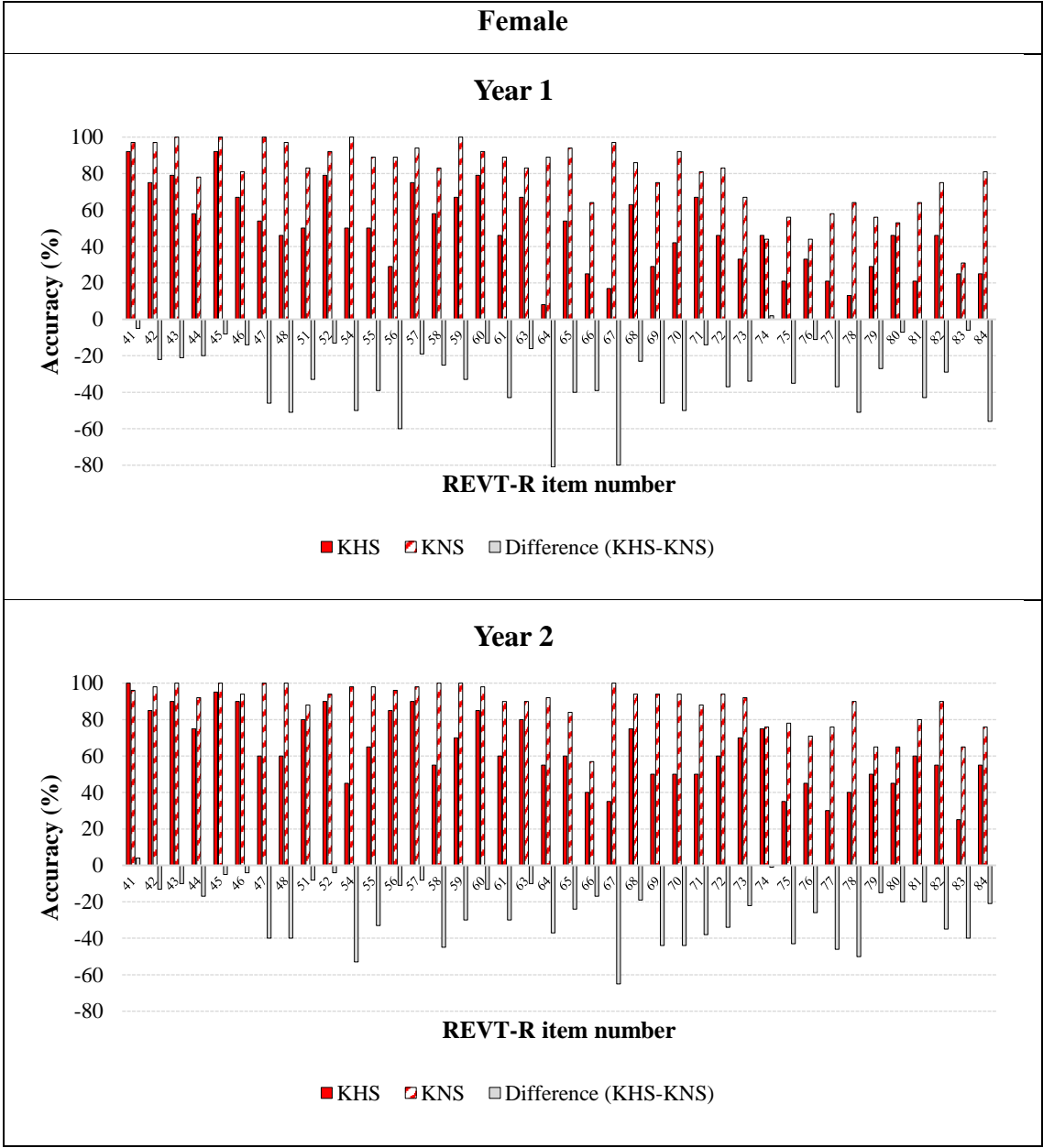
Appendix 5. Test items from REVT-R adopted for Task 2 (a picture selection task for receptive vocabulary in Korean)

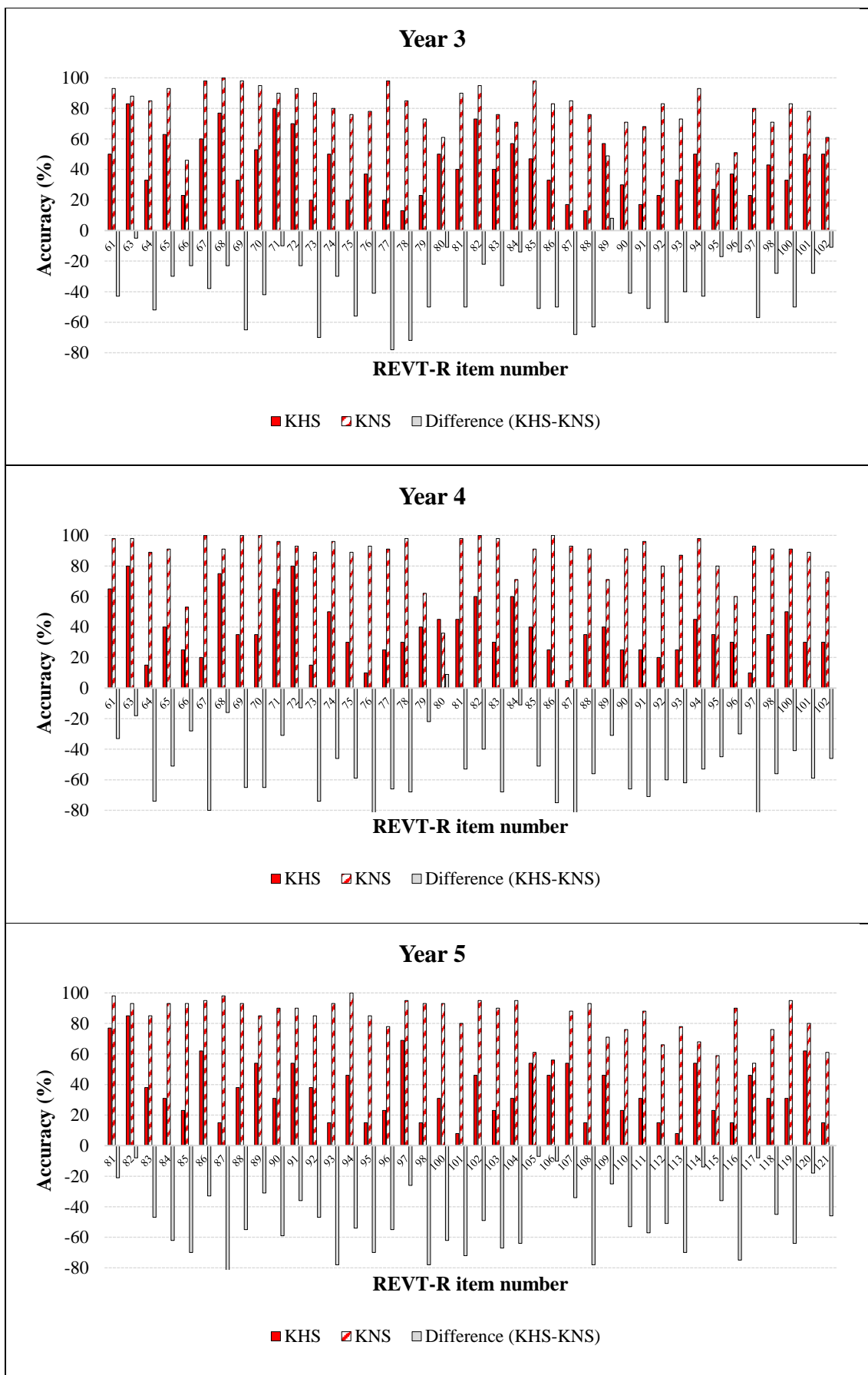
Item No. in REVT-R	Target word		
	in Hangul	in Yale system	Meaning in English
41	가득하다	<i>ka.tuk.ha.ta</i>	be full
42	깎다	<i>kkakk.ta</i>	peel
43	농부	<i>nong.pwu</i>	farmer
44	곡식	<i>kok.sik</i>	grain, crop
45	마르다	<i>ma.lu.ta</i>	be thin, be skinny
46	실망하다	<i>sil.mang.ha.ta</i>	be disappointed
47	쓰다듬다	<i>ssu.ta.tum.ta</i>	stroke, pet
48	외투	<i>oy.twu</i>	overcoat
49	철봉	<i>chel.pong</i>	chip-up bar, pull-up bar
50	궁궐	<i>kwung.kwel</i>	royal palace
51	씹다	<i>ssip.ta</i>	chew
52	숲	<i>swuph</i>	forest
53	집배원	<i>cip.pay.wen</i>	postman
54	둥지	<i>twung.ci</i>	nest
55	겨루다	<i>kye.lwu.ta</i>	compete
56	한 권	<i>han kwen</i>	one copy, one volume (of a book)
57	소근거리다	<i>so.kun.ke.li.ta</i>	whisper
58	엿보다	<i>yes.po.ta</i>	peep into, peek at
59	환자	<i>hwan.ca</i>	patient
60	심다	<i>sim.ta</i>	plant
61	체온계	<i>chey.on.kyey</i>	clinical thermometer
62	만국기	<i>man.kwuk.ki</i>	flags of all nations
63	책상	<i>chayk.sang</i>	desk
64	세면대	<i>sey.myen.tay</i>	wash basin, washstand
65	전등불	<i>cen.tung.pwul</i>	electric light
66	돛	<i>toch</i>	sail
67	협동하다	<i>hyep.tong.ha.ta</i>	cooperate
68	위급하다	<i>wi.kup.ha.ta</i>	be urgent, be exigent
69	정육점	<i>ceng.yuk.cem</i>	butcher's shop
70	얼룩	<i>el.lwuk</i>	stain
71	탄광	<i>than.kwang</i>	coal mine
72	석수	<i>sek.swu</i>	stone mason

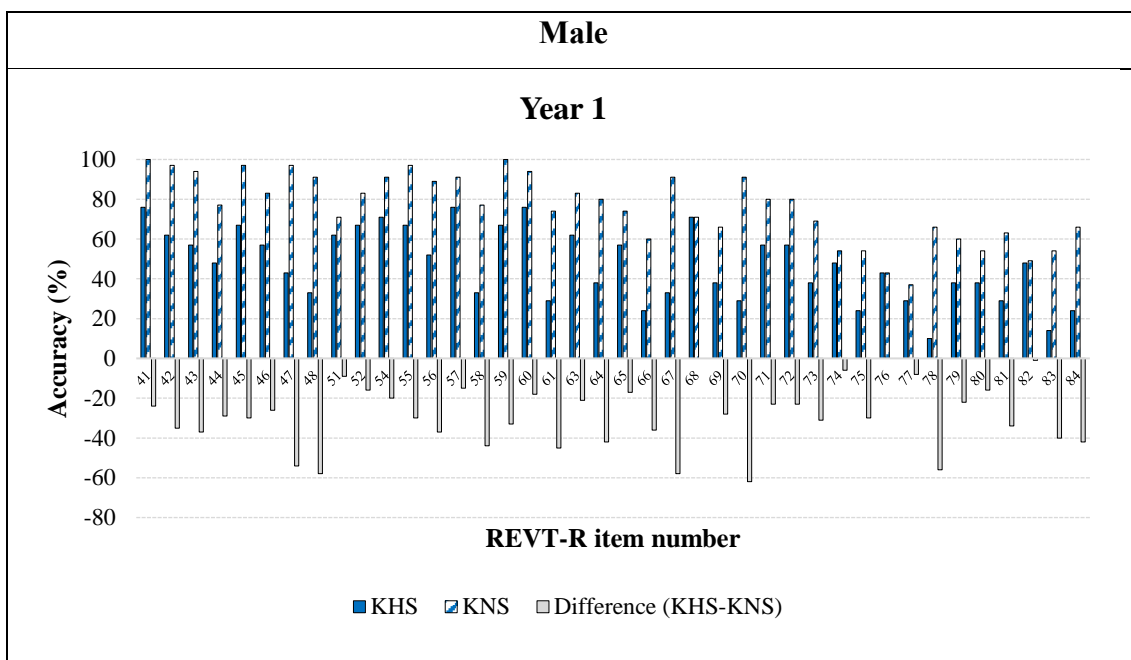
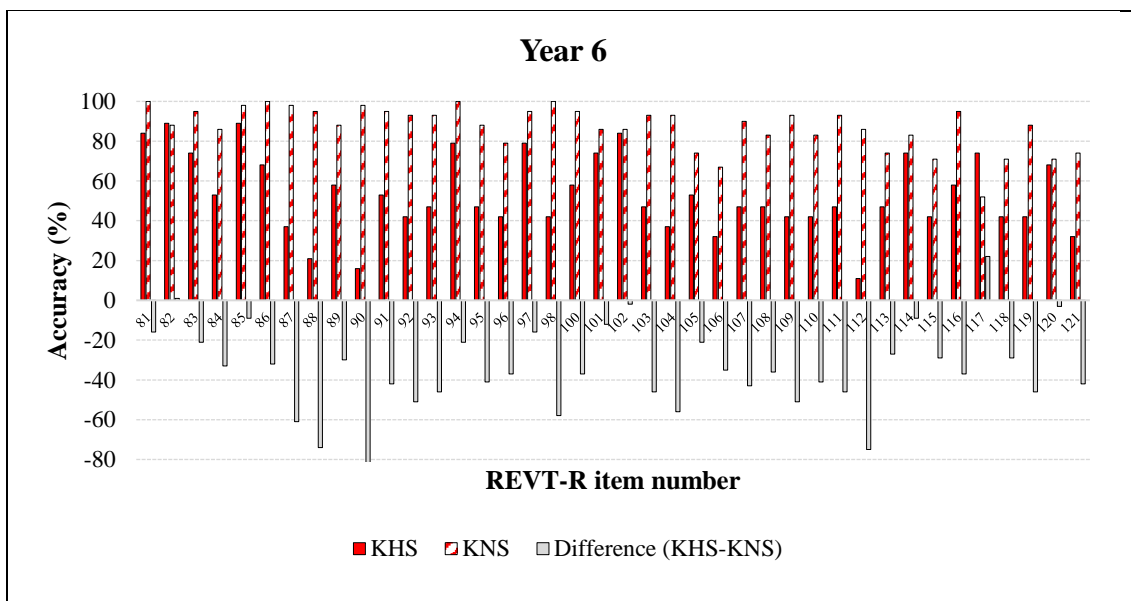
73	식료품	<i>sik.lyo.phwum</i>	groceries
74	뿌리	<i>ppwu.li</i>	root
75	확대하다	<i>hwak.tay.ha.ta</i>	enlarge
76	자매	<i>ca.may</i>	sisters
77	부축하다	<i>pwu.chwuk.ha.ta</i>	help someone by holding his or her arms
78	해안	<i>hay.an</i>	seashore
79	연장	<i>yen.cang</i>	tool
80	도표	<i>to.phyo</i>	diagram
81	해부하다	<i>hay.pwu.ha.ta</i>	anatomise
82	굽이치다	<i>kwup.i.chi.ta</i>	wind, meander
83	토론하다	<i>tho.lon.ha.ta</i>	discuss
84	버드나무	<i>pe.tu.na.mwu</i>	willow tree
85	부화하다	<i>pwu.hwa.ha.ta</i>	hatch
86	설계사	<i>sel.kyey.sa</i>	designer, architect
87	비석	<i>pi.sek</i>	stone monument
88	추수하다	<i>chwu.swu.ha.ta</i>	harvest
89	한 쌍	<i>han sssang</i>	a pair
90	가축	<i>ka.chwuk</i>	livestock
91	각도기	<i>kak.to.ki</i>	protractor
92	조명	<i>co.myeng</i>	lighting, illumination
93	침몰하다	<i>chim.mol.ha.ta</i>	sink, founder
94	방충망	<i>pang.chwung.mang</i>	flyscreen
95	대여섯	<i>tay.ye.ses</i>	five or six
96	늠름하다	<i>num.lum.ha.ta</i>	be dashing, be manly, be valiant
97	철거하다	<i>chel.ke.ha.ta</i>	demolish
98	시위하다	<i>si.wi.ha.ta</i>	protest
99	기마전	<i>ki.ma.cen</i>	korean cavalry battler
100	에워싸다	<i>ey.we.ssa.ta</i>	surround, encircle
101	산만하다	<i>san.man.ha.ta</i>	be messy, be distracted
102	용접하다	<i>yong.cep.ha.ta</i>	weld
103	접종하다	<i>cep.cong.ha.ta</i>	inoculate
104	장착하다	<i>cang.chak.ha.ta</i>	mount, install
105	섬기다	<i>sem.ki.ta</i>	serve, devote oneself to
106	겨누다	<i>kye.nwu.ta</i>	aim, target
107	육군	<i>yuk.kwun</i>	the army
108	소음	<i>so.um</i>	noise

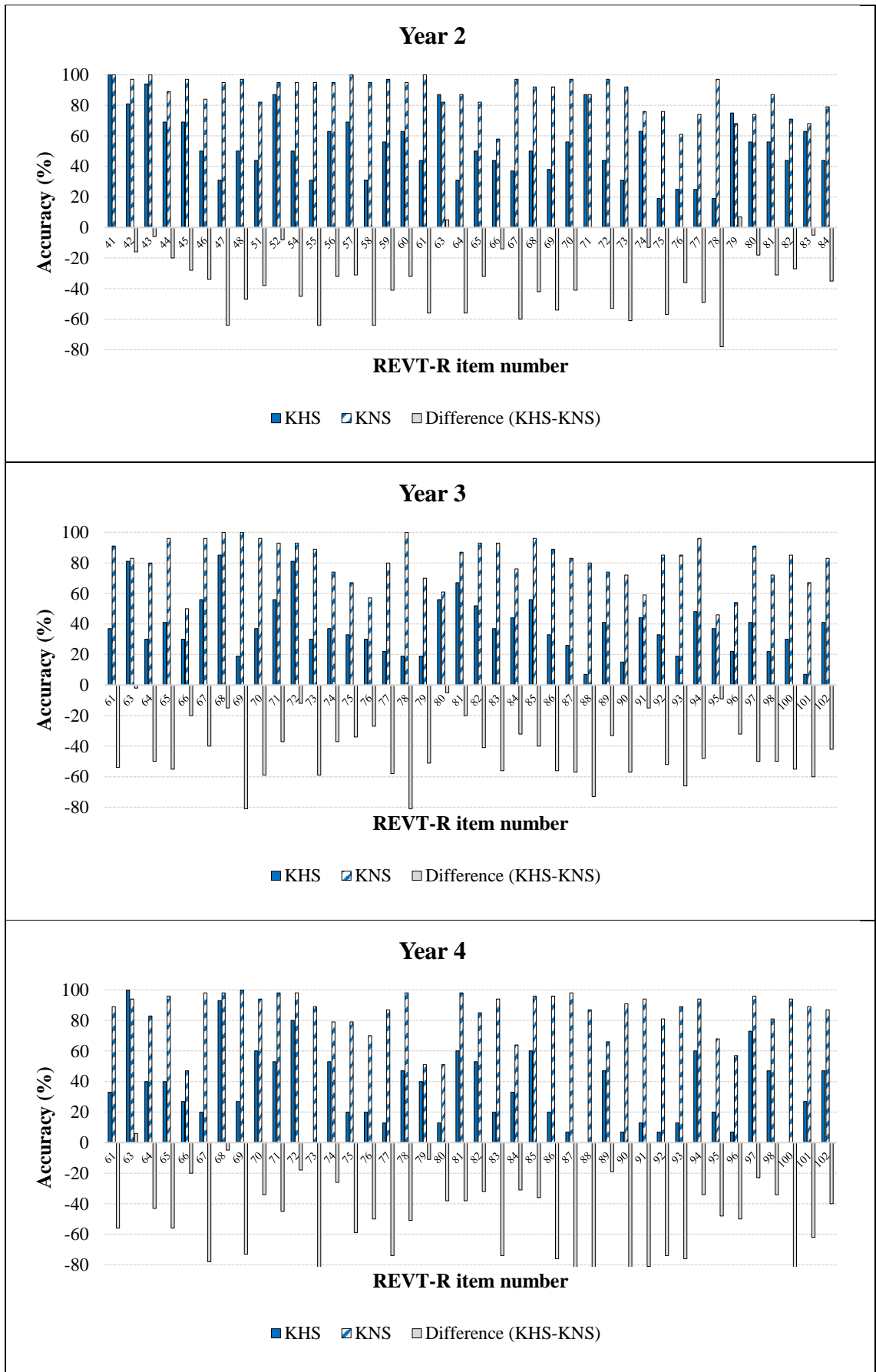
109	침울하다	<i>chim.wul.ha.ta</i>	be depressed, be gloomy
110	폭우	<i>phok.wu</i>	torrential rain
111	후각	<i>hwu.kak</i>	olfactory sense
112	모발	<i>mo.pal</i>	hair
113	사육하다	<i>sa.yuk.ha.ta</i>	breed, keep, rear
114	건널목	<i>ken.nel.mok</i>	crossing, crosswalk
115	현상	<i>hyen.sang</i>	developing a photo
116	시시덕거리다	<i>si.si.tek.ke.li.ta</i>	chat and giggle, chatter
117	엿신여기다	<i>ep.sin.ye.ki.ta</i>	disdain, despise
118	부식되다	<i>pwu.sik.toy.ta</i>	be eroded
119	산호	<i>san.ho</i>	coral
120	땀샘	<i>ttam.saym</i>	sweat gland
121	비집다	<i>pi.cip.ta</i>	push one's way through

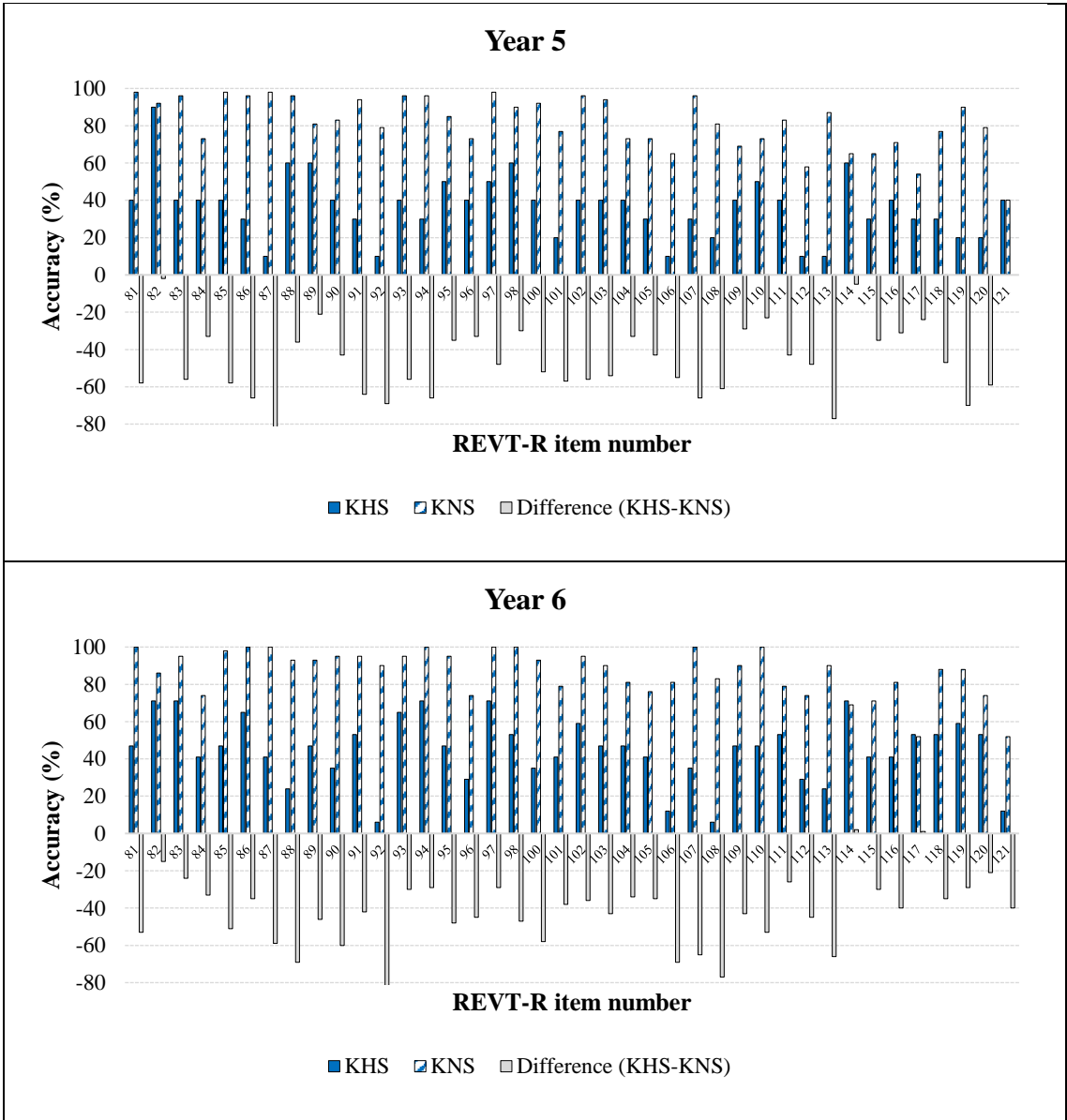
Appendix 6. Accuracy rates on test items in KHSs and KNSs at Years 1 to 6 in girls and boys in Task 2











Appendix 7. Frequency of target words of test item in the semantically tagged corpus in the modern written Korean corpus in the Korean national corpus

Item no. in REVT- R	Target word	Occurrence in the semantically tagged corpus	Occurrence in the primary school textbooks
41	<i>ka.tuk.ha.ta</i>	1,524	79
42	<i>kkakk.ta</i>	593	15
43	<i>nong.pwu</i>	364	51
44	<i>kok.sik</i>	271	17
45	<i>ma.lu.ta</i>	913	11
46	<i>sil.mang.ha.ta</i>	437	0
47	<i>ssu.ta.tum.ta</i>	291	1
48	<i>oy.twu</i>	103	1
51	<i>chel.pong</i>	487	4
52	<i>kwung.kwel</i>	1,136	41
54	<i>SSIP.ta</i>	167	3
55	<i>Swuph</i>	90	11
56	<i>cip.pay.wen</i>	1,113	51
57	<i>twung.ci</i>	8	2
58	<i>kye.lwu.ta</i>	377	0
59	<i>han kwen</i>	1,297	5
60	<i>so.kun.ke.li.ta</i>	1,053	97
61	<i>yes.po.ta</i>	5	0
63	<i>hwan.ca</i>	821	45
64	<i>sim.ta</i>	30	0
65	<i>chey.on.kyey</i>	48	9
66	<i>man.kwuk.ki</i>	33	0
67	<i>chayk.sang</i>	319	0
68	<i>sey.myen.tay</i>	39	3
69	<i>cen.tung.pwul</i>	16	2
70	<i>toch</i>	90	2
71	<i>hyep.tong.ha.ta</i>	77	0
72	<i>wi.kup.ha.ta</i>	1	0
73	<i>ceng.yuk.cem</i>	44	0
74	<i>el.lwuk</i>	1,106	49
75	<i>than.kwang</i>	2,187	26
76	<i>sek.swu</i>	168	0
77	<i>sik.lyo.phwum</i>	160	0
78	<i>ppwu.li</i>	246	5
79	<i>hwak.tay.ha.ta</i>	105	1
80	<i>ca.may</i>	79	0
81	<i>pwu.chwuk.ha.ta</i>	89	0

82	<i>hay.an</i>	35	10
83	<i>yen.cang</i>	909	62
84	<i>to.phyo</i>	77	5
85	<i>hay.pwu.ha.ta</i>	39	0
86	<i>kwup.i.chi.ta</i>	22	0
87	<i>tho.lon.ha.ta</i>	77	1
88	<i>pe.tu.na.mwu</i>	71	0
89	<i>pwu.hwa.ha.ta</i>	232	4
90	<i>sel.kyey.sa</i>	212	8
91	<i>pi.sek</i>	0	33
92	<i>chwu.swu.ha.ta</i>	385	1
93	<i>han sssang</i>	104	0
94	<i>ka.chwuk</i>	3	0
95	<i>kak.to.ki</i>	152	0
96	<i>co.myeng</i>	55	0
97	<i>chim.mol.ha.ta</i>	266	0
98	<i>pang.chwung.mang</i>	617	0
100	<i>tay.ye.ses</i>	128	0
101	<i>num.hum.ha.ta</i>	58	0
102	<i>chel.ke.ha.ta</i>	32	0
103	<i>si.wi.ha.ta</i>	49	0
104	<i>ki.ma.cen</i>	77	0
105	<i>ey.we.ssa.ta</i>	159	0
106	<i>san.man.ha.ta</i>	87	0
107	<i>yong.cep.ha.ta</i>	198	0
108	<i>cep.cong.ha.ta</i>	203	11
109	<i>cang.chak.ha.ta</i>	64	0
110	<i>sem.ki.ta</i>	76	0
111	<i>kye.nwu.ta</i>	58	1
112	<i>yuk.kwun</i>	22	0
113	<i>so.um</i>	98	0
114	<i>chim.wul.ha.ta</i>	51	2
115	<i>phok.wu</i>	14	0
116	<i>hwu.kak</i>	11	0
117	<i>mo.pal</i>	49	0
118	<i>sa.yuk.ha.ta</i>	30	10
119	<i>ken.nel.mok</i>	38	0
120	<i>hyen.sang</i>	6	0
121	<i>si.si.tek.ke.li.ta</i>	97	1

Appendix 8. Test sentences in Task 3 adopted from SSCT

Item no. in Task 3	Item no. in SSCT	Target sentence	Target linguistic feature
-	1	텔레비전 앞에서 아빠만 체조를 한다.	보조사 ‘-만’
1	2	상아는 얼룩무늬 고양이는 좋아하지 않는다.	부정문 (않다)
2	3	크레파스로 엄마도 그림을 그린다.	보조사 ‘-도’
3	4	커다란 고양이가 작은 강아지에게 잡혔다.	피동문
4	5	엄마가 아이에게 옷을 입게 했다.	사동문, 과거형
5	6	상아가 동생에게 종이배를 만들어 주고 있다.	현재진행형
6	7	상아는 연필로 편지쓰기를 막 끝냈다.	과거형
7	8	큰 컵이 작은 컵보다 더 많다.	비교문
	9	누나는 피아노를 치고, 동생을 노래를 부른다.	대등-나열
8	10	자동차가 배보다 더 크고, 공이 가장 크다.	대등-나열, 비교
9	11	상아의 치마는 길지만, 상진이의 바지는 짧다.	대등-대조
-	12	상아가 아이스크림을 먹으면서 걸어가고 있다.	종속절-동시
10	13	상진이는 아가를 보면 기분이 좋다.	종속절-조건
11	14	상진이가 늦게 도착해서 버스를 탈 수 없었다.	종속절-원인
12	15	상진이는 그림을 다 그리고 나서 텔레비전을 보고 있다.	종속절-결과
13	16	상아는 밥을 먹다가 책을 보고 있다.	종속절-전환
14	17	상진이는 밥을 먹으려고 손가락을 들었다.	종속절-의도
-	18	상진이가 학교를 막 나섰을 때 비가 오기 시작하였다.	관형절
15	19	상진이는 엄마가 텔레비전 앞으로 의자를 옮기는 것을 도와드렸다.	관형절
16	20	상진이는 누나에게 강아지가 밥 먹는 것을 가리켰다.	관형절
17	21	책상에서 상아는 모자를 쓴 엄마랑 그림을 그리고 있다.	관형절
18	22	상아가 친구가 입은 옷과 똑같은 것을 입고 있다.	관형절

19	23	선생님께 야단을 맞은 아이 중 한 아이는 눈물을 흘렸다.	관형절, 대조
-	24	상아가 들고 있는 책은 두꺼우나 엄마가 들고 있는 책은 얇다.	관형절 (2 개 절)
20	25	너무 힘들어서 상진이는 가방을 맨 채 의자에 앉아 있었다.	부사절 (원인), 관형절
21	26	의자에 앉아 있는 아이에게 엄마가 물이 담겨 있는 컵을 주었다.	관형절
22	27	화가 난 선생님 앞에서 두 아이는 손을 들고 서 있다.	관형절
23	28	커다란 가방을 맨 상아는 학교에 가다가 잠시 의자에 앉아 쉬고 있다.	관형절 부사절 (전환)
24	29	기다란 톱으로 나무를 자르던 상진이는 톱을 바닥에 내려놓고 땀을 닦고 있다.	관형절 부사절(의도)
25	30	분홍색 모자를 쓰고 있는 아이는 그림을 그리고 있고 파란색 바지를 입고 있는 아이가 그 옆에서 그림을 보면서 앉아 있다.	관형절, 대등절 부사절(동시)
26	31	노랑나비를 잘 날지 못하기 때문에 하늘 높이 날아가는 호랑나비를 따라가지 못하고 풀잎 위에 앉았다.	부사절(이유), 관형절 부사절(결과)
27	32	할머니는 밤을 예쁘게 깎아 옆에 놓으시고 열심히 책을 읽고 있는 상아의 머리를 쓰다듬었다.	부사절(순차) 관형절
28	33	할아버지는 잔디밭에 앉아 음료수를 드시며 상진이가 작은 바위에서 큰 바위로 건너가는 모습을 바라보셨다.	부사절(동시) 관형절
29	34	나무에서 나뭇잎이 떨어지고 있을 때, 커다란 바구니를 든 할머니가 바닥에서 주은 열매를 커다란 바구니에 담고 있다.	부사절(조건) 관형절
30	35	바람이 세차게 불어서 길가에 서있던 두 개의 표지판 중에서 왼쪽으로 구부러지게 되어 있는 화살표 표지판 하나가 빠져 날아가 버렸다.	부사절(이유) 관형절

Appendix 9. Target sentences for the verb conjugation in Task 4

Verb type	Target sentence
<i>l</i> -irregular	머리가 너무 <u>길으니까</u> (√기니까) 조금 자르는 게 좋겠어.
	말이 너무 <u>길면</u> 알아듣기 힘들어요.
	후 하고 입김을 <u>불러서</u> (√불어서) 촛불을 켜어요.
	오늘은 바람이 <u>불고</u> 비가 와요.
<i>u</i> -irregular	아기가 모자를 <u>쓰니까</u> 더 귀여워 보이네.
	안경을 <u>써면</u> (√쓰면) 작은 글씨도 잘 보여요.
	내 가방은 아주 <u>커서</u> 책을 많이 넣을 수 있어요.
	내 친구는 키가 <u>커고</u> (√크고) 안경을 썼어요.
<i>lu</i> -irregular	머리를 짧게 <u>자르니까</u> 시원해 보이네요.
	이 선을 따라서 <u>잘라면</u> (√자르면) 동그란 모양이 돼요.
	우리는 학교가 서로 <u>달라서</u> 자주 못 만나요.
	나는 동생이랑 생긴 것도 <u>달라고</u> (√다르고) 좋아하는 것도 달라요.
<i>p</i> -irregular	밖은 너무 <u>추워니까</u> (√추우니까) 안에서 놀자.
	날씨가 <u>추우면</u> 감기에 걸리기 쉬워요.
	고기를 <u>구워서</u> 접시에 담았어요.
	빵집에서는 매일 빵을 <u>구우고</u> (√굽고) 케이크를 만들어요.
<i>t</i> -irregular	숲속을 <u>걸으니까</u> 기분이 상쾌하네요.
	매일 30 분씩 <u>걸어면</u> (√걸으면) 건강이 좋아져요.
	이 노래는 너무 많이 <u>들어서</u> (√들어서) 이제 지겨워요.
	목소리를 <u>들고</u> 누군지 바로 알아챘어요.

Appendix 10. Target sentences for the Korean passive in Task 4

Grammaticality	Target sentences
Grammatical	밤하늘에 별이 크게 <u>보여요</u> .
	지하철이 도착하고 문이 <u>열렸어요</u> .
	그 사람은 지금 경찰한테 <u>쫓기고</u> 있어요.
	모아진 돈은 좋은 일에 <u>쓰였어요</u> .
	이 운동화는 끈이 자주 <u>풀려요</u> .
	졸려서 자꾸만 눈이 <u>감겨요</u> .
	토끼가 호랑이한테 <u>잡아먹혔어요</u> .
	엄마 얼굴을 보니까 마음이 <u>놓였어요</u> .
	아기가 엄마한테 <u>안겼어요</u> .
	문이 저절로 <u>잠겼어요</u> .
Ungrammatical	옆집에서 싸우는 소리가 <u>들어요</u> (√들려요).
	바람이 불어서 문이 <u>닫았어요</u> (√닫혔어요).
	사고가 나서 길이 <u>막아요</u> (√막혀요).
	나는 모기한테 잘 <u>물어요</u> (√물려요).
	날씨가 안 좋아서 사진이 잘 안 <u>찍어요</u> (√찍혀요).
	바람이 세게 불어서 나무가 <u>뽑았어요</u> (√뽑혔어요).
	받자마자 전화가 <u>끊었어요</u> (√끊겼어요/끊어졌어요).
	쥐가 고양이한테 <u>잡았어요</u> (√잡혔어요).
	요즘은 이 책이 잘 <u>팔아요</u> (√팔려요).
	아기가 엄마한테 <u>업었어요</u> (√업혔어요).

Appendix 11. Target sentences for NPIs in Korean in Task 4

Grammaticality	Target sentence
Grammatical	빵이 <u>한 개 밖에 없네요</u> .
	놀이터에 아이들이 <u>하나도 없어요</u> .
	동생은 너무 어려서 <u>아무것도 몰라요</u> .
	<u>아무도</u> 수지가 지오를 좋아하는 줄 <u>몰랐어요</u> .
	나는 <u>아무도</u> 수지의 생일 파티에 <u>안 갈 거라고</u> 생각해요.
Ungrammatical	우유가 <u>조금 밖에 남았네</u> (√안 남았네).
	오늘은 학원에 <u>한 사람도 왔어요</u> (√안 왔어요).
	수지는 가방에 <u>아무것도 넣었어요</u> (√안 넣었어요).
	<u>아무도</u> 수지가 지오를 안 싫어한다고 <u>생각해요</u> (√생각하지 않아요).
	나는 <u>아무도</u> 수지를 <u>좋아한다고</u> (√안 좋한다고) 생각하지 않아요.

Appendix 12. Target conversations for the verbs *o-* and *ka-* in Korean in Task 4

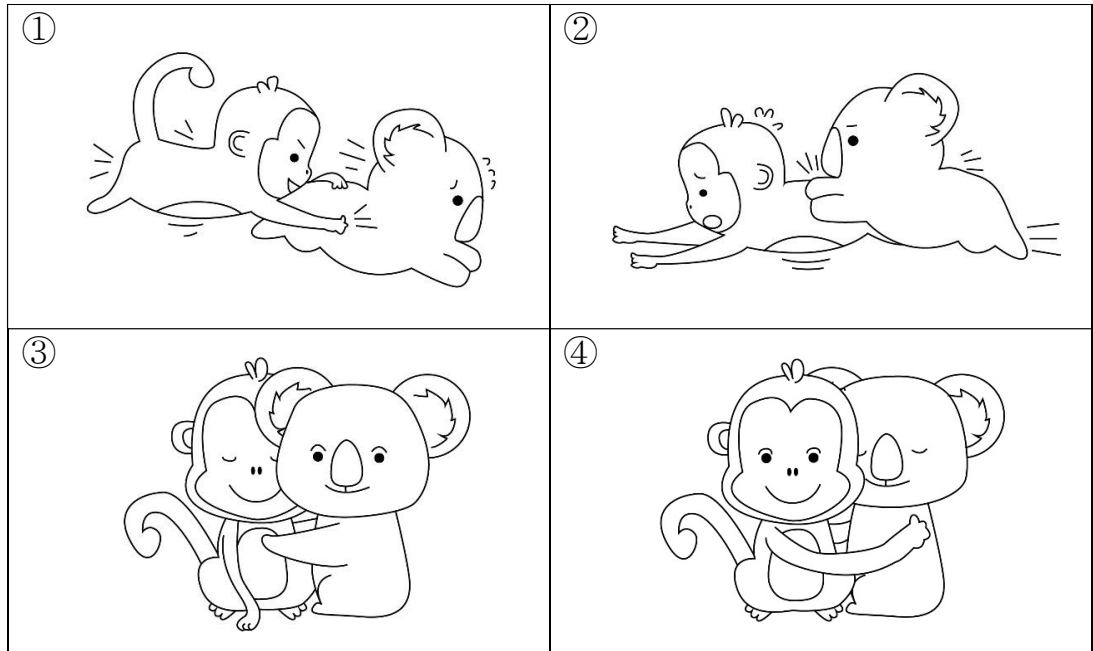
Grammaticality	Target conversation
Grammatical	A: 내일 누가 수진이를 도와주러 갈 거야? B: 유진이랑 우리가 갈 거야.
	A: 밥 다 차렸다. 얼른 와서 먹어. B: 네 지금 가요.
	(전화벨) A: 수지야, 오늘 왜 학원에 안 왔어? B: 아파서 못 갔어.
	A: 이제 출발할 시간인데, 다들 모였니? B: 아니요, 보미가 아직 안 왔어요.
	A: 저, 김수민 선생님 안 계세요? B: 지금 자리에 안 계시는데, 조금 있다가 다시 올래?
Ungrammatical	A: 내일 수지 생일 파티에 갈 거야? B: 아니, 못 올 (√갈) 것 같아.
	A: 내일도 도서관에 갈 거니? B: 응, 내일도 와서(√가서) 공부할 거야.
	(전화벨) A: 야, 왜 아직도 안 와? B: 미안. 조금만 기다려. 이제 거의 다 갔어 (√왔어).
	(전화벨) A: 수지야 내일 아침에 우리 집에 놀러 올래? B: 그래, 좋아. 10 시까지 너네 집으로 올게(√갈게).
	A: 지금 왜 신발을 신어? 밖에 나가려고? B: 네, 놀이터에 가요. 저녁 먹기 전까지 들어 갈게요 (√올게요).

Appendix 13. Test sentences in Task 5

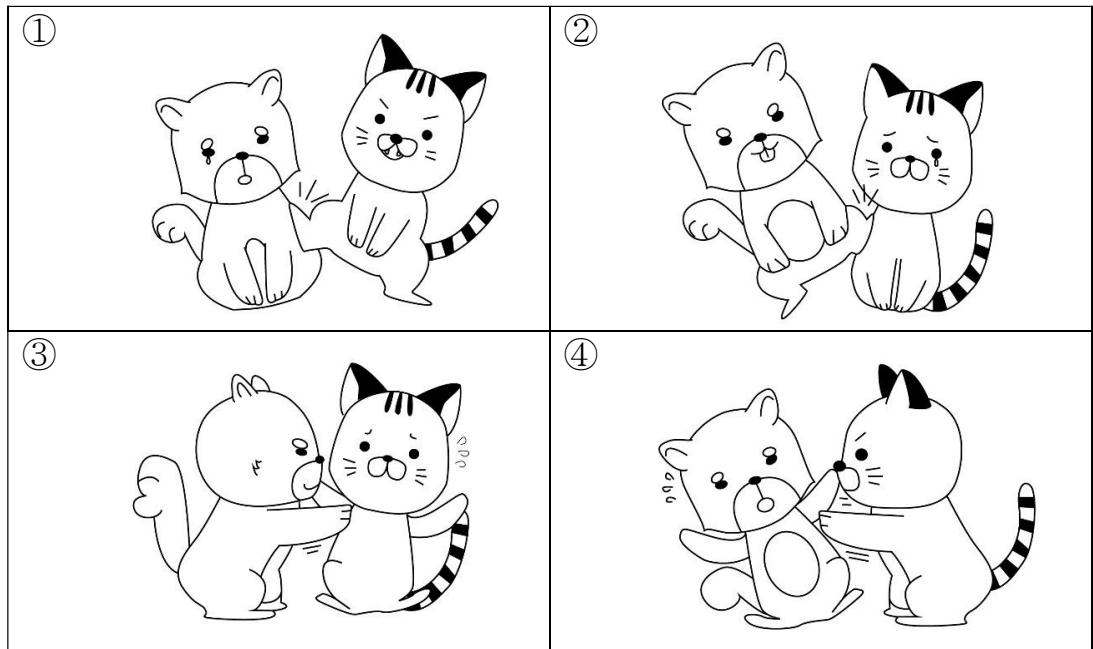
Voice	Word order	Verb	Target sentence
Passive	Canonical	<i>an-</i> (to hug)	사자가 호랑이한테 안겼어요.
		<i>cap-</i> (to catch)	원숭이가 코알라한테 잡혔어요.
		<i>cha-</i> (to kick)	기린이 코끼리한테 차였어요.
		<i>mil-</i> (to push)	개가 고양이한테 밀렸어요.
	Scrambled	<i>an-</i>	원숭이한테 코알라가 안겼어요.
		<i>cap-</i>	기린한테 코끼리가 잡혔어요.
		<i>cha-</i>	개한테 고양이가 차였어요.
		<i>mil-</i>	소한테 말이 밀렸어요.
	Short	<i>an-</i>	기린이 안겼어요.
		<i>cap-</i>	개가 잡혔어요.
		<i>cha-</i>	소가 차였어요.
		<i>Mil</i>	사자가 밀렸어요.
Active	Canonical	<i>an-</i>	개가 고양이를 안았어요.
		<i>cap-</i>	소가 말을 잡았어요.
		<i>cha-</i>	사자가 호랑이를 찼어요.
		<i>mil-</i>	원숭이가 코알라를 밀었어요.
	Scrambled	<i>an-</i>	소를 말이 안았어요.
		<i>cap-</i>	사자를 호랑이가 잡았어요.
		<i>cha-</i>	원숭이를 코알라가 찼어요.
		<i>mil-</i>	기린을 코끼리가 밀었어요.

Appendix 14. Examples of the four pictures prepared for a target sentence

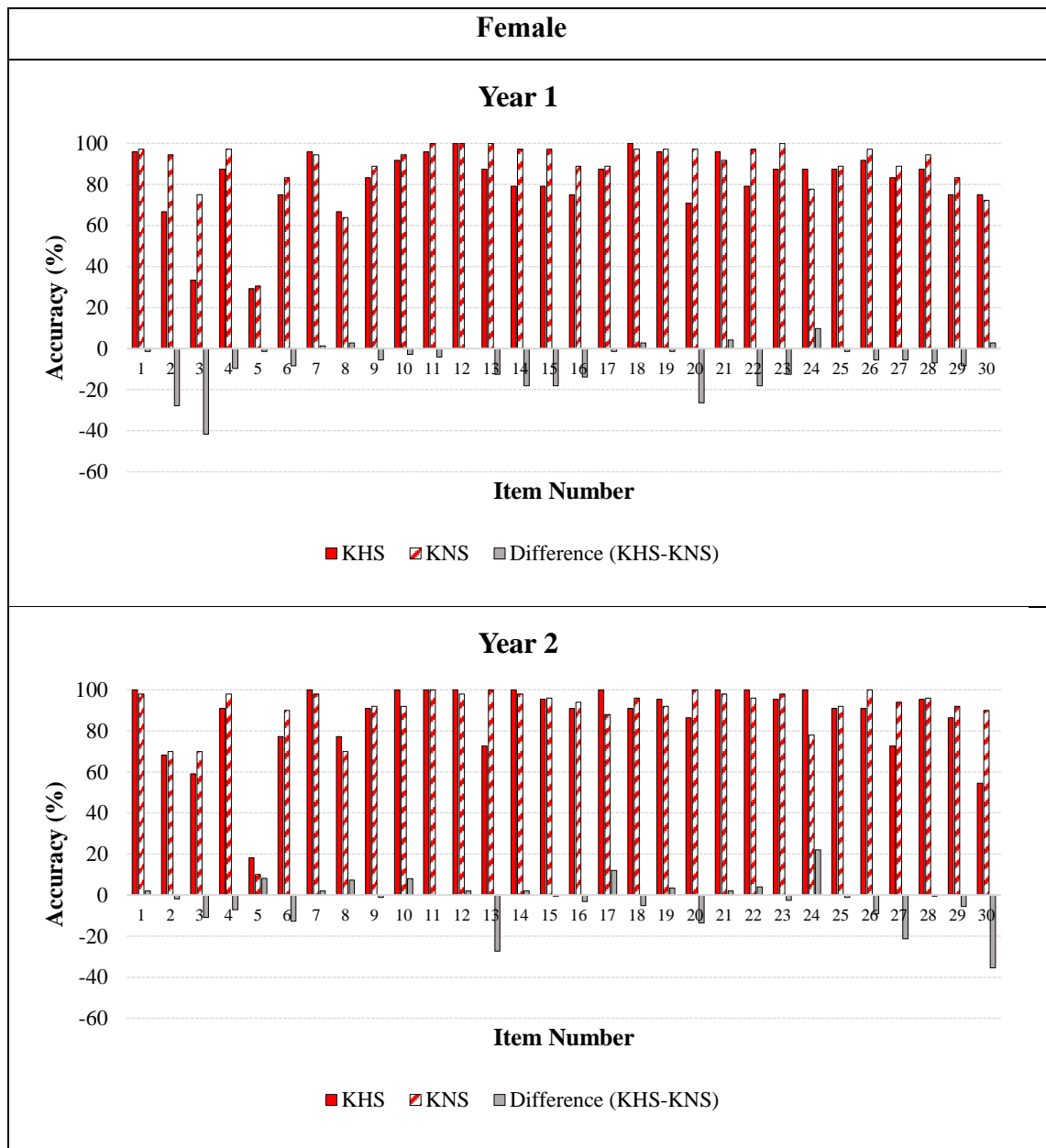
1. 원숭이한테 코알라가 안겼어요. (correct answer: ④)

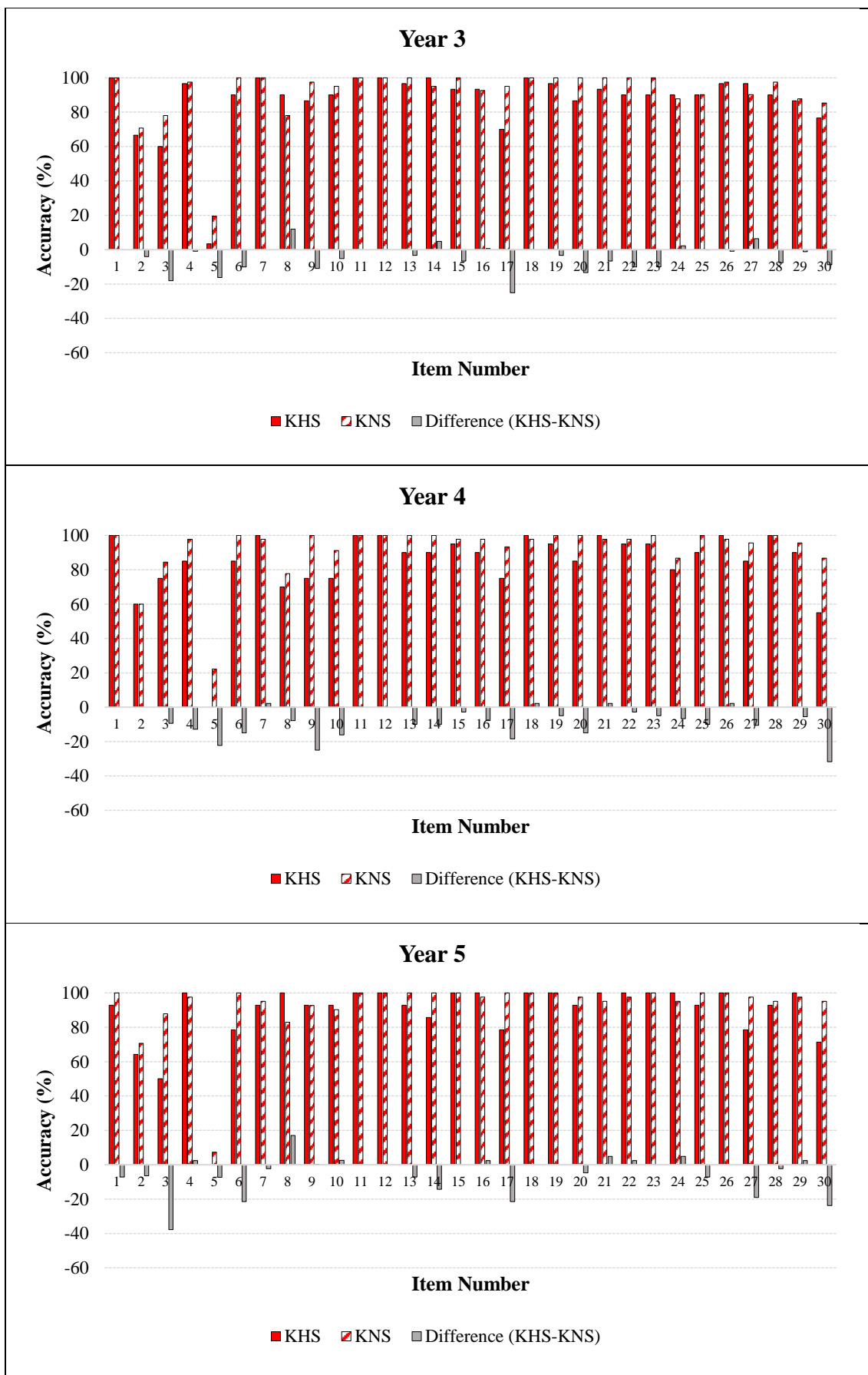


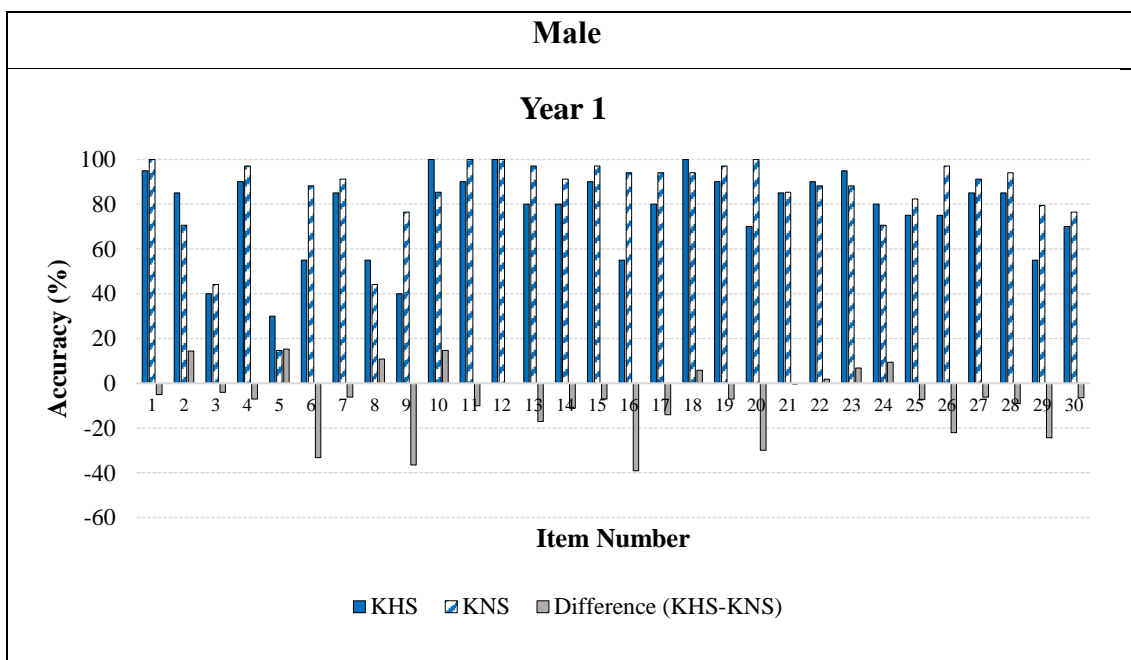
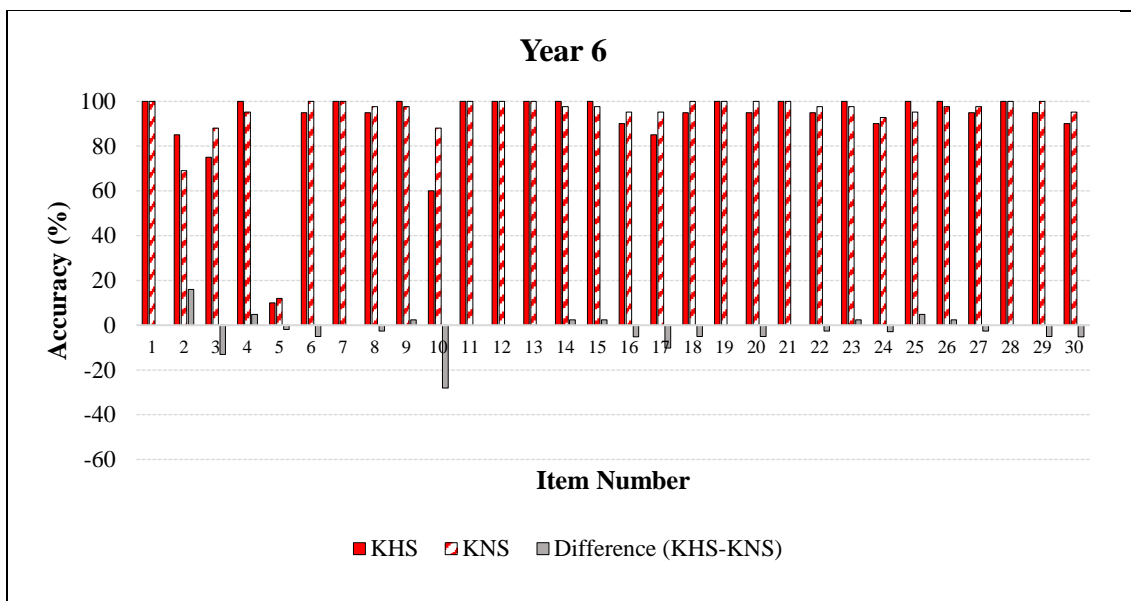
2. 개가 고양이한테 밀렸어요. (correct answer: ④)

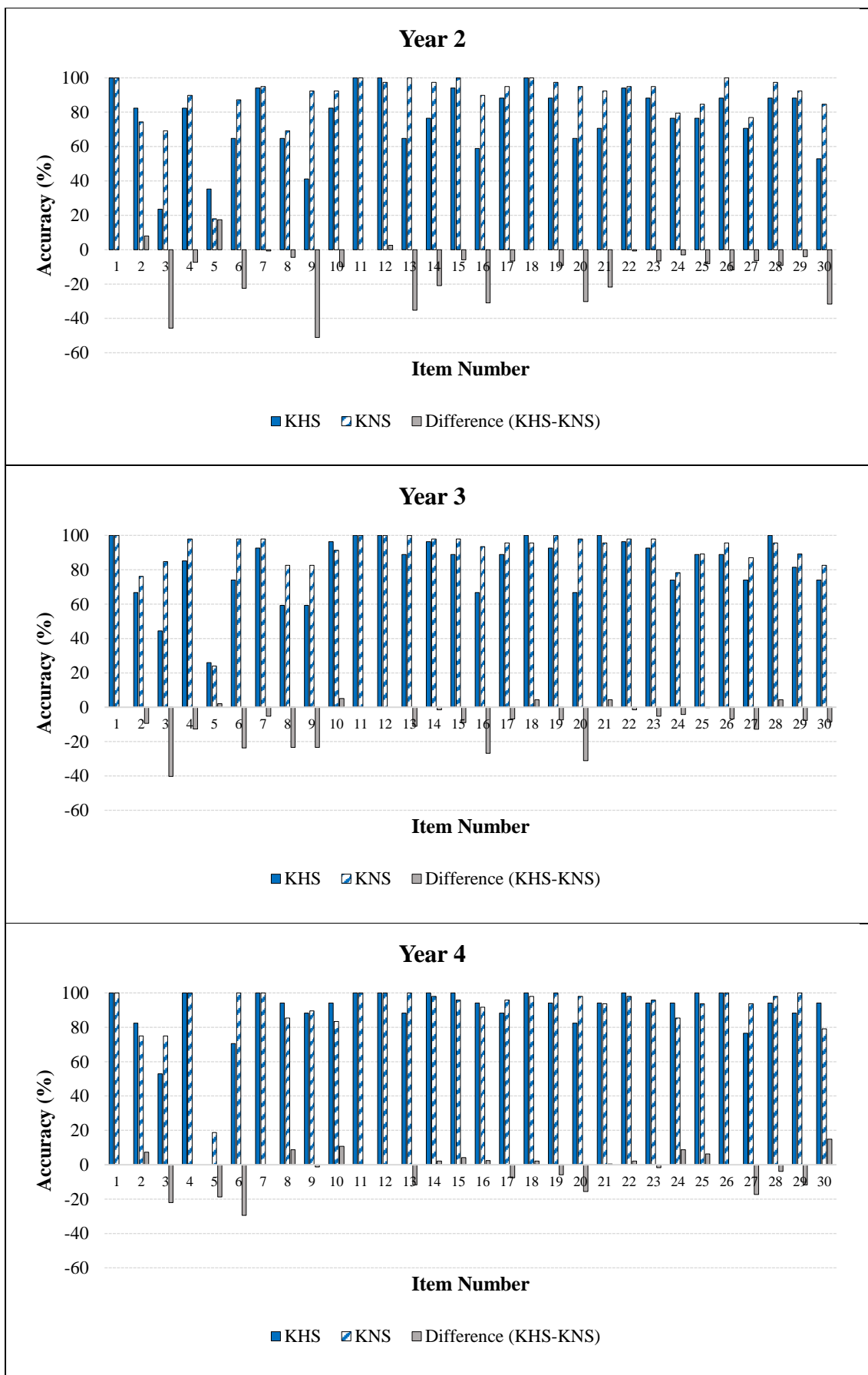


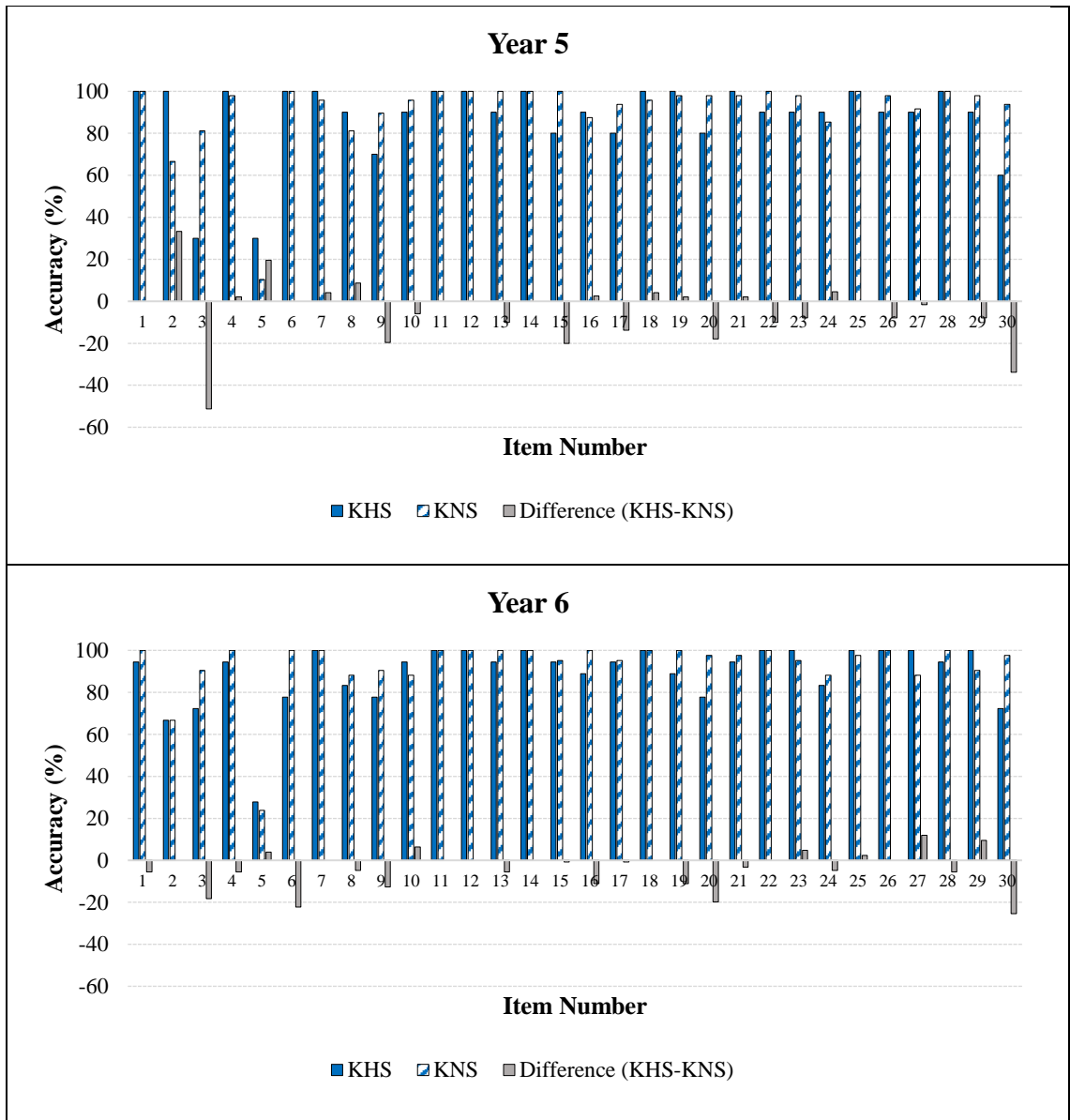
Appendix 15. Accuracy rates of test items in KHSs and KNSs at Years 1 to 6 in girls and boys in Task 3











References

- ABS. (2017). *People in Australia who were born in Korea, Republic of (South)*. Retrieved from https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/6203_036
- ABS. (2018). *South Korea-born community information summary*. Retrieved from <https://www.homeaffairs.gov.au/mca/files/2016-cis-south-korea.PDF>.
- ABS. (2020). TableBuilder Basic. from Australian Bureau of Statistics <https://www.abs.gov.au/websitedbs/censushome.nsf/home/tablebuilder>
- ACARA. (2013). *Australian curriculum: Languages Foundation to Year 10 - Consultation report*. Retrieved from
- ACARA. (2014). *Australian curriculum: Languages - Korean*. Retrieved from
- Ahn, Sunyoung, Chang, Charles B, DeKeyser, Robert, & Lee-Ellis, Sunyoung. (2017). Age effects in first language attrition: Speech perception by Korean-English bilinguals. *Language Learning*, 67(3), 694-733.
- AIHW. (2020). *Australia's children*. Retrieved from Canberra:
- Aitchison, Jean. (1987). *Words in the mind: An introduction to the mental lexicon*. Oxford: Basil Blackwell Ltd.
- Albirini, Abdulkafi, Benmamoun, Elabbas Benmamoun, & Chakrani, Brahim Chakrani. (2013). Gender and number agreement in the oral production of Arabic Heritage speakers. *Bilingualism: Language and cognition*, 16(1), 1-18.
- Albirini, Abdulkafi, Benmamoun, Elabbas, & Saadah, Eman. (2011). Grammatical features of Egyptian and Palestinian Arabic heritage speakers' oral production. *Studies in Second Language Acquisition*, 33(2), 273-303.
- Anderson, Raquel T. (1999). Loss of gender agreement in L1 attrition: Preliminary results. *Bilingual research journal*, 23(4), 389-408.
- Antonova-Ünlü, Elena, & Wei, Li. (2016). Aspect acquisition in Russian as the weaker language: Evidence from a Turkish–Russian child. *International Journal of Bilingualism*, 20(2), 210-228.
- Au, Terry Kit-Fong, Dapretto, Mirella, & Song, You-Kyung. (1994). Input vs constraints: Early word acquisition in Korean and English. *Journal of Memory and Language*, 33(5), 567-582.
- Au, Terry Kit-fong, Knightly, Leah M, Jun, Sun-Ah, & Oh, Janet S. (2002). Overhearing a language during childhood. *Psychological Science*, 13(3), 238-243.
- Au, Terry Kit-fong, Oh, Janet S, Knightly, Leah M, Jun, Sun-Ah, & Romo, Laura F. (2008). Salvaging a childhood language. *Journal of memory and language*, 58(4), 998-1011.
- Austin, Jennifer, Blume, María, & Sánchez, Liliana. (2013). Syntactic development in the L1 of Spanish-English bilingual children. *Hispania*, 96(3), 542-561.
- Baek, Gyeong mi. (2011). A study on the acquisition of language through the error of inflection in childhood. *Journal of Korean Language and Culture*, 44, 255-274.
- Baldwin, Dare A. (1989). Priorities in children's expectations about object label reference: Form over color. *Child development*, 60(6), 1291-1306.
- Balota, David A, Yap, Melvin J, Hutchison, Keith A, Cortese, Michael J, Kessler, Brett, Loftis, Bjorn, . . . Treiman, Rebecca. (2007). The English lexicon project. *Behavior research methods*, 39(3), 445-459.

- Beck, Isabel L, McKeown, Margaret G, & Omanson, Richard C. (1987). The effects and uses of diverse vocabulary instructional techniques. In Margaret G McKeown & Mary E Curtis (Eds.), *The nature of vocabulary acquisition* (pp. 147-163): Lawrence Erlbaum Associates.
- Benmamoun, Elabbas, Montrul, Silvina, & Polinsky, Maria. (2010). *Prolegomena to heritage linguistics*. White Paper. Department of Linguistics, Harvard University.
- Benmamoun, Elabbas, Montrul, Silvina, & Polinsky, Maria. (2013). Heritage languages and their speakers: Opportunities and challenges for linguistics. *Theoretical Linguistics*, 39(3-4), 129-181.
- Berman, Ruth Aronson. (2004). *Language development across childhood and adolescence*: John Benjamins Publishing.
- Bialystok, Ellen. (1986). Factors in the growth of linguistic awareness. *Child development*, 498-510.
- Bialystok, Ellen. (1999). Cognitive complexity and attentional control in the bilingual mind. *Child development*, 70(3), 636-644.
- Bialystok, Ellen, Craik, Fergus IM, Green, David W, & Gollan, Tamar H. (2009). Bilingual minds. *Psychological science in the public interest*, 10(3), 89-129.
- Blair, Sampson Lee, & Cobas, Jose A. (2006). Gender differences in young Latino adults' status attainment: understanding bilingualism in the familial context. *Family Relations*, 55(3), 292-305.
- Blasingame, Michael. (2018). *Early versus Extended Exposure in Speech and Vocabulary Learning: Evidence from Switched-dominance Bilinguals*. (Unpublished doctoral dissertation), Northwestern University,
- Blasingame, Michael, & Bradlow, Ann R. (2012). Perception of speech-in-noise for second language learners and heritage speakers in both first language and second language. *The Journal of the Acoustical Society of America*, 132(3), 1935-1935.
- Bley-Vroman, Robert. (1990). The logical problem of foreign language learning. *Linguistic Analysis*, 20(1-2), 3-49.
- Bley-Vroman, Robert. (2009). The evolving context of the fundamental difference hypothesis. *Studies in Second Language Acquisition*, 31(2), 175-198.
- Bloom, Paul. (2000). How children learn the meanings of words: learning, development and conceptual change. In. Cambridge, Massachusetts/London, England: MIT Press.
- Bodi, Marianne. (1980). Bilingualism of Russian children in Melbourne: some aspects of language retention and language acquisition. *ITL-International Journal of Applied Linguistics*, 49(1), 37-47.
- Bonnesen, Matthias. (2009). The status of the "weaker" language in unbalanced French/German bilingual language acquisition. *Bilingualism*, 12(2), 177-192.
- Bornstein, Marc H, Hahn, Chun-Shin, & Haynes, O Maurice. (2004). Specific and general language performance across early childhood: stability and gender considerations. *First language*, 24(3), 267-304.
- Bowers, Edmond P, & Vasilyeva, Marina. (2011). The relation between teacher input and lexical growth of preschoolers. *Applied psycholinguistics*, 32(1), 221-241.
- Bowers, Jeffrey S, Mattys, Sven L, & Gage, Suzanne H. (2009). Preserved implicit knowledge of a forgotten childhood language. *Psychological Science*, 20(9), 1064-1069.
- Brecht, Richard D, & Ingold, Catherine W. (2002). *Tapping a National Resource: Heritage Languages in the United States*. ERIC Digest. In.
- Brinton, Donna M, Kagan, Olga, & Bauckus, Susan. (2008). *Heritage language education: A new field emerging*: Routledge.

- Brown, Roger. (1973). *A first language: The early stages*. Cambridge, Mass.: Harvard University Press.
- Brysbaert, Marc, Buchmeier, Matthias, Conrad, Markus, Jacobs, Arthur M, Bölte, Jens, & Böhl, Andrea. (2011). The word frequency effect: a review of recent developments and implications for the choice of frequency estimates in German. *Experimental psychology*, 58(5), 412-424.
- Brysbaert, Marc, Mandera, Paweł, & Keuleers, Emmanuel. (2018). The word frequency effect in word processing: an updated review. *Current Directions in Psychological Science*, 27(1), 45-50.
- Brysbaert, Marc, & New, Boris. (2009). Moving beyond Kučera and Francis: a critical evaluation of current word frequency norms and the introduction of a new and improved word frequency measure for American English. *Behavior research methods*, 41(4), 977-990.
- Byers-Heinlein, Krista, & Fennell, Christopher T. (2013). Perceptual narrowing in the context of increased variation: insights from bilingual infants. *Developmental Psychobiology*, 56(2), 274-291.
- Cabo, Diego Pascual Y, & Rothman, Jason. (2012). The (il)logical problem of heritage speaker bilingualism and incomplete acquisition. *Applied linguistics*, 33(4), 450-455.
- Campbell, Russell N, & Christian, Donna. (2003). Directions in research: Intergenerational transmission of heritage languages. *Heritage Language Journal*, 1(1), 1-44.
- Campbell, Russell N, & Rosenthal, Judith W. (2000). Heritage languages. In Judith W Rosenthal (Ed.), *Handbook of undergraduate second language education* (pp. 165-184). Mahwah: Routledge.
- Caplan, David, Waters, Gloria, DeDe, Gayle, Michaud, Jennifer, & Reddy, Amanda. (2007). A study of syntactic processing in aphasia I: Behavioral (psycholinguistic) aspects. *Brain and language*, 101(2), 103-150.
- Cattani, Allegra, Abbot-Smith, Kirsten, Farag, Rafalla, Krott, Andrea, Arreckx, Frédérique, Dennis, Ian, & Floccia, Caroline. (2014). How much exposure to English is necessary for a bilingual toddler to perform like a monolingual peer in language tests? *International journal of language & communication disorders*, 49(6), 649-671.
- Chang, Charles B. (2016). Bilingual perceptual benefits of experience with a heritage language. *Bilingualism: Language and cognition*, 19(4), 791-809.
- Chang, Charles B, Yao, Yao, Haynes, Erin F, & Rhodes, Russell. (2011). Production of phonetic and phonological contrast by heritage speakers of Mandarin. *The Journal of the Acoustical Society of America*, 129(6), 3964-3980.
- Cheon, Sang Yee, & Lee, Teresa. (2013). The perception of Korean stops by heritage and non-heritage learners: Pedagogical implications for beginning learners. *Korean Language in America*, 23-39.
- Cheung, Him, Chung, Kevin Kien Hoa, Wong, Simpson Wai Lap, McBride-Chang, Catherine, Penney, Trevor Bruce, & Ho, Connie Suk-Han. (2010). Speech perception, metalinguistic awareness, reading, and vocabulary in Chinese–English bilingual children. *Journal of Educational Psychology*, 102(2), 367.
- Cho, Kyungyoon. (2005). *Yengekwon hankwu ke haksupcauy itongtongsa 'kata', 'ota'uy sayong yangsang yenkwu (Research on the use of movement verbs, 'kata' and 'ota' by English-speaking learners of Korean)*. (MA thesis), Ewha Womans University,

- Choe Yoon, Inshil. (2007). A preliminary study for efficient learning of Korean orthography for Korean children living in English speaking countries. *Journal of Korean Language Education*, 18(1), 459-486.
- Choi, Hye-Won. (2003). Paradigm leveling in American Korean. *Language Research*, 39(1), 183-204.
- Choi, Soonja, & Gopnik, Alison. (1995). Early acquisition of verbs in Korean: A cross-linguistic study. *Journal of child language*, 22(3), 497-529.
- Chomsky, Carol. (1969). *The acquisition of syntax in children from 5 to 10*. Cambridge, Mass: The MIT Press.
- Chung, Eun Seon. (2013). *Exploring the degree of native-likeness in bilingual acquisition: Second and heritage language acquisition of Korean case-ellipsis*. (Unpublished doctoral dissertation), University of Illinois at Urbana-Champaign,
- Chung, Gyeonghee No. (1994). *Case and its acquisition in Korean*. (Unpublished doctoral dissertation), The University of Texas at Austin,
- Chung, Hyun-Yeol, Makino, Shozo, & Kido, Ken'iti. (1988). Analysis and recognition of Korean isolated vowels using formant frequency. *Journal of the Acoustical Society of Japan*, 9(5), 225-232.
- Clark, Eve V, & Garnica, Olga K. (1974). Is he coming or going? On the acquisition of deictic verbs. *Journal of verbal learning and verbal behavior*, 13(5), 559-572.
- Clyne, Michael. (1991). *Community languages: the Australian experience*: Cambridge University Press.
- Clyne, Michael, & Fernandez, Sue. (2008). Community language learning in Australia. In Nelleke Van Deusen-Scholl & Nancy H Hornberger (Eds.), *Encyclopedia of language and education* (2nd ed., pp. 169-181): Springer.
- Clyne, Michael, & Kipp, Sandra. (1997). Trends and changes in home language use and shift in Australia, 1986-1996. *Journal of multilingual and multicultural development*, 18(6), 451-473.
- Clyne, Michael, & Kipp, Sandra. (2006). Australia's community languages. *International Journal of the Sociology of Language*, 2006(180), 7-21.
- Cohen, Cathy. (2016). Relating input factors and dual language proficiency in French-English bilingual children. *International Journal of Bilingual Education and Bilingualism*, 19(3), 296-313.
- Crandell, Carl C, & Smaldino, Joseph J. (1996). Speech perception in noise by children for whom English is a second language. *American Journal of Audiology*, 5(3), 47-51.
- Cummins, Jim. (2005). A proposal for action: Strategies for recognizing heritage language competence as a learning resource within the mainstream classroom. *Modern Language Journal*, 89(4), 585-592.
- Cuza, Alejandro. (2016). The status of interrogative subject-verb inversion in Spanish-English bilingual children. *Lingua*, 180, 124-138.
- Cuza, Alejandro, & Miller, Lauren. (2015). The protracted acquisition of past tense aspectual values in child heritage Spanish. In Rachel Klassen, Juana M Liceras, & Elena Valenzuela (Eds.), *Hispanic linguistics at the crossroads: Theoretical linguistics, language acquisition and language contact* (pp. 211-230): John Benjamins.
- Cuza, Alejandro, & Pérez-Tattam, Rocío. (2016). Grammatical gender selection and phrasal word order in child heritage Spanish: A feature re-assembly approach. *Bilingualism*, 19(1), 50-68.
- De Groot, Casper. (2005). The grammars of Hungarian outside Hungary from a linguistic-typological perspective. In Anna Fenyvesi (Ed.), *Hungarian language contact*

- outside Hungary: Studies on Hungarian as a minority language* (pp. 351-370): John Benjamins Publishing.
- De Houwer, Annick. (1990). *The acquisition of two languages from birth: A case study*: Cambridge University Press.
- Dockrell, Julie, & Campbell, Robin. (1986). Lexical acquisition strategies in the preschool child. In Stan A Kuczaj & Martyn D Barrett (Eds.), *The development of word meaning* (pp. 121-154): Springer.
- Dodd, Bárbara, Holm, Alison, Hua, Zhu, & Crosbie, Sharon. (2003). Phonological development: A normative study of British English-speaking children. *Clinical Linguistics & Phonetics*, 17(8), 617-643.
- Dollaghan, Chris, & Campbell, Thomas F. (1998). Nonword repetition and child language impairment. *Journal of Speech, Language, and Hearing Research*, 41(5), 1136-1146.
- Donegan, Patricia. (2012). Normal vowel development. In Martin J Ball & Fiona E Gibbon (Eds.), *Handbook of vowels and vowel disorders* (pp. 42-78): Psychology Press.
- Döpke, Susanne. (1998). Competing language structures: The acquisition of verb placement by bilingual German-English children. *Journal of Child Language*, 25(3), 555-584.
- Döpke, Susanne. (2000). *The weaker language in simultaneous bilingualism: Why it is not like L2*. Monash University.
- Döpke, Susanne (Ed.) (2001). *Cross-linguistic structures in simultaneous bilingualism*: John Benjamins Publishing.
- Dulay, Heidi C, & Burt, Marina K. (1974). Natural sequences in child second language acquisition. *Language learning*, 24(1), 37-53.
- Eimas, Peter D, Siqueland, Einar R, Jusczyk, Peter, & Vigorito, James. (1971). Speech perception in infants. *Science*, 171(3968), 303-306.
- Fenson, Larry. (2007). *MacArthur-Bates communicative development inventories*. Baltimore: Paul H. Brookes Publishing Company.
- Fernald, Anne, & Morikawa, Hiromi. (1993). Common themes and cultural variations in Japanese and American mothers' speech to infants. *Child development*, 64(3), 637-656.
- Fishman, Joshua A. (2001). 300-plus years of heritage language education in the United States. In Joy Kreeft Peyton, Donald A Ranard, & Scott McGinnis (Eds.), *Heritage languages in America: Preserving a national resource* (pp. 80-97). Washington, DC: Centre for Applied Linguistics & Delta Systems.
- Florentine, Mary. (1985). Speech perception in noise by fluent, non-native listeners. *The Journal of the Acoustical Society of America*, 77(S1), S106-S106.
- Flores, Cristina, Santos, Ana Lúcia, Jesus, Alice, & Marques, Rui. (2017). Age and input effects in the acquisition of mood in Heritage Portuguese. *Journal of Child Language*, 44(4), 795-828.
- Forster, Kenneth I, & Chambers, Susan M. (1973). Lexical access and naming time. *Journal of verbal learning and verbal behavior*, 12(6), 627-635.
- Gagarina, Natalia, Armon-Lotem, Sharon, & Gupol, Olga. (2007). Developmental variation in the acquisition of L1 Russian verb inflection by monolinguals and bilinguals. In Heather Caunt-Nulton, Samantha Kulatilake, & I-Hao Woo (Eds.), *On-line Supplement to the Proceedings of BUCLD 31* (pp. 1-11). Somerville, MA: Cascadilla Press.
- Garcia, Inaki, Arratibel, Nekane, Barrena, Andoni, & Ezeizabarrena, Maria-Jose. (2008). Adaptation of the MacArthur-Bates Inventories to the Basque language:

- communicative development in children between 8 and 30 months of age. *Infancia Y Aprendizaje (Journal for the Study of Education and Development)*, 31(4), 411-424.
- Gathercole, Virginia C Mueller. (2002a). Command of the mass/count distinction in bilingual and monolingual children: An English morphosyntactic distinction. In D Kimbrough Oller & Rebecca E Eilers (Eds.), *Language and literacy in bilingual children* (pp. 175-206): Multilingual Matters.
- Gathercole, Virginia C Mueller. (2002b). Grammatical gender in bilingual and monolingual children: A Spanish morphosyntactic distinction. In D Kimbrough Oller & Rebecca E Eilers (Eds.), *Language and literacy in bilingual children* (pp. 207-219): Multilingual Matters.
- Gathercole, Virginia C Mueller. (2002c). Monolingual and bilingual acquisition: Learning different treatments of that-trace phenomena in English and Spanish. In D Kimbrough Oller & Rebecca E Eilers (Eds.), *Language and literacy in bilingual children* (pp. 220-254): Multilingual Matters.
- Gathercole, Virginia C Mueller. (2007). Miami and North Wales, so far and yet so near: A constructivist account of morphosyntactic development in bilingual children. *International Journal of Bilingual Education and Bilingualism*, 10(3), 224-247.
- Gathercole, Virginia C Mueller. (2016). Factors moderating proficiency in bilingual speakers. In Elena Nicoladis & Simona Montanari (Eds.), *Bilingualism across the lifespan: factors moderating language proficiency* (pp. 123-140): American Psychological Association & Walter de Gruyter.
- Gathercole, Virginia C Mueller, & Thomas, Enlli Môn. (2009). Bilingual first-language development: Dominant language takeover, threatened minority language take-up. *Bilingualism: Language and Cognition*, 12(2), 213-237.
- Genesee, Fred. (1989). Early bilingual development: One language or two? *Journal of child language*, 16(1), 161-179.
- Genesee, Fred, & Nicoladis, Elena. (2007). Bilingual first language acquisition. In Erika Hoff & Marilyn Shatz (Eds.), *Blackwell handbook of language development* (pp. 324-342): Blackwell Publishing.
- Gentner, Dedre. (1982). Why nouns are learned before verbs: Linguistic relativity versus natural partitioning. In Stan A Kuczaj (Ed.), *Language, thought and culture* (Vol. 2, pp. 301-334): Erlbaum.
- Gharibi, Khadijeh, & Boers, Frank. (2017). Influential factors in incomplete acquisition and attrition of young heritage speakers' vocabulary knowledge. *Language Acquisition*, 24(1), 52-69.
- Gindis, Boris. (2008). Abrupt native language loss in international adoptees. *Advance for Speech Language Pathologists and Audiologists*, 18, 5-13.
- Gleitman, Lila R, & Newport, Elissa L. (2002). The invention of language by children: Environmental and biological influences. In Daniel J Levitin (Ed.), *Foundations of cognitive psychology: Core readings* (pp. 685-704): MIT Press.
- Godson, Linda. (2004). Vowel production in the speech of Western Armenian heritage speakers. *Heritage Language Journal*, 2(1), 44-69.
- Golberg, Heather, Paradis, Johanne, & Crago, Martha. (2008). Lexical acquisition over time in minority first language children learning English as a second language. *Applied Psycholinguistics*, 29(1), 41-65.
- Gollan, Tamar H, & Acenas, Lori-Ann R. (2004). What is a TOT? Cognate and translation effects on tip-of-the-tongue states in Spanish-English and tagalog-English bilinguals. *Journal of Experimental Psychology: Learning, memory, and cognition*, 30(1), 246-269.

- Gollan, Tamar H, Montoya, Rosa I, Cera, Cynthia, & Sandoval, Tiffany C. (2008). More use almost always means a smaller frequency effect: Aging, bilingualism, and the weaker links hypothesis. *Journal of memory and language*, 58(3), 787-814.
- Gopnik, Alison, & Choi, Soonja. (1990). Do linguistic differences lead to cognitive differences? A cross-linguistic study of semantic and cognitive development. *First language*, 10(30), 199-215.
- Gor, Kira. (2014). Raspberry, not a car: context predictability and a phonological advantage in early and late learners' processing of speech in noise. *Frontiers in psychology*, 5, 1449.
- Green, David W. (1998). Mental control of the bilingual lexico-semantic system. *Bilingualism: Language and cognition*, 1(2), 67-81.
- Grosjean, François. (1985). The bilingual as a competent but specific speaker-hearer. *Journal of Multilingual & Multicultural Development*, 6(6), 467-477.
- Gutiérrez-Clellen, Vera F, & Simon-Cereijido, Gabriela. (2010). Using nonword repetition tasks for the identification of language impairment in Spanish-English-speaking children: Does the language of assessment matter? *Learning Disabilities Research & Practice*, 25(1), 48-58.
- Ha, Eun Jin. (1999). *Sa.tong.mwun.kwa phi.tong.muwn.uy i.hay mich phyo.hyun pal.tal.ey tay.han yen.kwu* (*The development of comprehension and production of causative and passive sentences of 4-9 year old normal children*). (Unpublished MA thesis), Ewha Womens University,
- Ha, Seunghye, Kim, Minjung, & Pi, Minkyong. (2019). Percentage of consonants correct and age of acquisition of consonants in Korean-speaking children in one-syllable word contexts. *Communication Sciences & Disorders*, 24(2), 460-468.
- Hakes, David T. (1980). *The development of metalinguistic abilities in children*. Berlin; New York: Springer-Verlag.
- Hakuta, Kenji, & D'Andrea, Daniel. (1992). Some properties of bilingual maintenance and loss in Mexican background high-school students. *Applied linguistics*, 13(1), 72-99.
- Han, Gil-Soo. (2000). Australian immigration policy and settlement of Koreans in Australia. *Korean Social Science Journal*, 2, 197-218.
- Hart, Betty, & Risley, Todd R. (1995). *Meaningful differences in the everyday experience of young American children*: Paul H Brookes Publishing.
- Haugen, Einar. (1987). *Blessings of Babel: Bilingualism and language planning - Problems and pleasures*. Berlin: Walter de Gruyter.
- Hazan, Valerie, & Barrett, Sarah. (2000). The development of phonemic categorization in children aged 6–12. *Journal of phonetics*, 28(4), 377-396.
- Hoff, Erika. (2003). The specificity of environmental influence: socioeconomic status affects early vocabulary development via maternal speech. *Child development*, 74(5), 1368-1378.
- Hoff, Erika, Core, Cynthia, Place, Silvia, Rumiche, Rosario, Señor, Melissa, & Parra, Marisol. (2012). Dual language exposure and early bilingual development. *Journal of Child Language*, 39(1), 1-27.
- Hoff, Erika, Welsh, Stephanie, Place, Silvia, Ribot, Krystal, Grüter, T, & Paradis, J. (2014). Properties of dual language input that shape bilingual development and properties of environments that shape dual language input. In Theres Grüter & Johanne Paradis (Eds.), *Input and experience in bilingual development* (Vol. 119-140, pp. 119-140). Amsterdam/Philadelphia: John Benjamins Publishing Company.

- Hong, Yunsook. (1991). *A sociolinguistic study of Seoul Korean - With a special section on language divergence between North and South Korea*. Seoul: Research Center for Peace and Unification of Korea.
- Hulsen, Madeleine. (2000). *Language loss and language processing: Three generations of Dutch migrants in New Zealand*. (Published doctoral dissertation), Catholic University of Nijmegen,
- Huttenlocher, Janellen, Haight, Wendy, Bryk, Anthony, Seltzer, Michael, & Lyons, Thomas. (1991). Early vocabulary growth: relation to language input and gender. *Developmental psychology*, 27(2), 236-248.
- Hyltenstam, Kenneth, & Abrahamsson, Niclas. (2003). Maturation constraints in SLA. In Catherine J. Doughty & Michael H. Long (Eds.), *The handbook of second language acquisition* (pp. 538-588).
- Imai, Mutsumi, Haryu, Etsuko, Okada, Hiroyuki, Lianjing, Li, & Shigematsu, Jun. (2006). Revisiting the noun-verb debate: A cross-linguistic comparison of novel noun and verb learning in English-, Japanese-, and Chinese-Speaking children. In Kathy Hirsh-Pasek & Roberta Michnick Golinkoff (Eds.), *Action meets word: How children learn verbs* (pp. 450-476): Oxford University Press.
- Isurin, Ludmila. (2000). Deserted island or a child's first language forgetting. *Bilingualism: Language and Cognition*, 3(2), 151-166.
- Jee, Min Jung. (2018). Heritage language proficiency in relation to attitudes, motivation, and age at immigration: A case of Korean-Australians. *Language, Culture and Curriculum*, 31(1), 70-93.
- Jeon, Eun-jin. (2013). 'Ka.ta, o.ta'lyu i.tong tong.sa.uy e.hwi sup.tuk.ey kwan.han yen.kwu (A study on vocabulary acquisition of moving verbs in 'go, come' types). *Urimal*, 34, 81-113.
- Jeong, Hae-Gwon, & Lee, Sun-Young. (2014). Effects of syntactic structures and frequency on the processing of passives in Korean. *Language and Linguistics*, 58, 403-426.
- Jeong, Haegwon. (2015). *Han.kwuk.e thay chey.kyey.ui ceng.lip.kwa sup.tuk mich kyo.yuk yen.kwu (A study on Korean voice system and its application to acquisition and teaching)*. (Unpublished doctoral dissertation), Hankuk University of Foreign Studies,
- Jia, Gisela, Chen, Jennifer, Kim, HyeYoung, Chan, Phoenix-Shan, & Jeung, Changmo. (2014). Bilingual lexical skills of school-age children with Chinese and Korean heritage languages in the United States. *International Journal of Behavioral Development*, 38(4), 350-358.
- Johnson, Carole E. (2000). Childrens' phoneme identification in reverberation and noise. *Journal of Speech, Language, and Hearing Research*, 43(1), 144-157.
- Johnson, Jacqueline S, & Newport, Elissa L. (1989). Critical period effects in second language learning: The influence of maturational state on the acquisition of English as a second language. *Cognitive psychology*, 21(1), 60-99.
- Joo, Alice. (2018). *An investigation of English-L1 KHL learners' written errors and pedagogical implications*. (Unpublished doctoral dissertation), University of New South Wales,
- Joo, Alice, & Shin, Seong-Chul. (2016). Characteristic features of English-L1 KHL learner orthographic errors. *Journal of Korean Language Education*, 27, 1-36.
- Junker, Dörte A, & Stockman, Ida J. (2002). Expressive vocabulary of German-English bilingual toddlers. *American Journal of Speech-Language Pathology*, 11(4), 381-394.

- Kagan, Olga, & Dillon, Kathleen. (2008). Issues in heritage language learning in the United States. In Nelleke Van Deusen-Scholl & Nancy H Hornberger (Eds.), *Encyclopedia of language and education* (2nd ed., pp. 143-156): Springer.
- Kang, Kyoung-Ho, & Guion, Susan G. (2006). Phonological systems in bilinguals: Age of learning effects on the stop consonant systems of Korean-English bilinguals. *The Journal of the Acoustical Society of America*, 119(3), 1672-1683.
- Karidakis, Maria, & Arunachalam, Dharma. (2016). Shift in the use of migrant community languages in Australia. *Journal of multilingual and multicultural development*, 37(1), 1-22.
- Kaushanskaya, Margarita, Gross, Megan, & Buac, Milijana. (2013). Gender differences in child word learning. *Learning and Individual Differences*, 27, 82-89.
- Kaushanskaya, Margarita, Marian, Viorica, & Yoo, Jeewon. (2011). Gender differences in adult word learning. *Acta psychologica*, 137(1), 24-35.
- Keuleers, Emmanuel, Brysbaert, Marc, & New, Boris. (2010). SUBTLEX-NL: A new frequency measure for Dutch words based on film subtitles. *Behavior research methods*, 42(3), 643-650.
- Kida, Shusaku. (2010). *The role of quality and quantity of vocabulary processing in incidental L2 vocabulary acquisition through reading*. Paper presented at the Annual Conference of the American Association of Applied Linguistics, Atlanta, USA.
- Kim, Bokyeong. (2018). A study on children's language development: short form negation and long form negation. *Studies in British and American Language and Literature* 131, 247-261.
- Kim, Eun Joo. (2003). An analysis of particle errors by heritage and non-heritage learners of Korean. *The Korean Language in America*, 8, 37-49.
- Kim, Hi-Sun Helen. (2001). Issues of heritage learners in Korean language classes. *Korean Language in America*, 6, 257-274.
- Kim, Hi-Sun Helen. (2005). *Processing strategies and transfer of heritage and non-heritage learners of Korean*. (Unpublished doctoral dissertation), University of Hawai'i at Manoa,
- Kim, Ji-Hye, Montrul, Silvina, & Yoon, James. (2009). Binding interpretations of anaphors by Korean heritage speakers. *Language Acquisition*, 16(1), 3-35.
- Kim, Jong-Bok. (1995). On the existence of NegP in Korean. In Susumu Kuno (Ed.), *Harvard studies in Korean linguistics* (Vol. 4, pp. 267-282). Seoul, Korea: Hanshin Publishing Company.
- Kim, Jung-Tae. (2001). The degree of L1 interference among heritage and non-heritage learners of Korean: Do heritage students have advantages over non-heritage students? *The Korean Language in America*, 6, 285-296.
- Kim, Kitaek, O'Grady, William, & Deen, Kamil. (2012). *Performance on scrambled Korean OSV sentences by Korean heritage children: Performance, not competence*. Paper presented at the The 5th conference on generative approaches to language acquisition North America (GALANA).
- Kim, Kitaek, O'Grady, William, & Schwartz, Bonnie D. (2018). Case in heritage Korean. *Linguistic Approaches to Bilingualism*, 8(2), 252-282.
- Kim, Min Jung, & Pae, Soyeong. (2005). The percentage of consonants correct and the ages of consonantal acquisition for 'Korean-Test of Articulation for Children (K-TAC)'. *Speech Sciences*, 12(2), 139-149.
- Kim, Minjung, Kim, Soo-Jin, & Stoel-Gammon, Carol. (2017). Phonological acquisition of Korean consonants in conversational speech produced by young Korean children. *Journal of child language*, 44(4), 1010-1023.

- Kim, Miok. (2001). A study on spelling errors in writing. *Teaching Korean as a Foreign Language*, 25-26, 331-359.
- Kim, Seongchan, O'Grady, William, & Cho, Sookeun. (1995). The acquisition of case and word order in Korean: A note on the role of context. *Language Research*, 31(4), 687-695.
- Kim, So-Young. (2013). *Errors in inflectional morphemes as an index of linguistic competence of Korean heritage language learners and American learners of Korean*. (Unpublished doctoral dissertation), University of Kansas,
- Kim, Sok-Ju. (2012). *The syntax and acquisition of negative polarity items in heritage Korean*. (Unpublished doctoral dissertation), University of Kansas,
- Kim, Sok-Ju. (2015). Negative polarity items (NPIs) in heritage Korean: Language maintenance and transfer. *The Korean Language in America*, 19(1), 36-57.
- Kim, Sun Hee Ok. (2012). Learner background and the acquisition of discourse features of Korean in the Australian secondary school context. *Australian Review of Applied Linguistics*, 35(3), 339-358.
- Kim, Young-Tae, Hong, Gyung-Hun, & Kim, Kyung-Hee. (2009a). Content and reliability analyses of the Receptive and Expressive Vocabulary Test. *Korean Journal of Communication Disorders*, 14, 34-45.
- Kim, Young-Tae, Lee, Ju-Yeon, Hong, Gyung-Hun, Kim, Kyung-Hee, & Chang, Hae-Sung. (2009b). *Receptive and Expressive Vocabulary Test*. Seoul: Seoul Community Rehabilitation Centre.
- Kim, Young Tae. (1996). A study of percentage of correct consonant in 2-6 years through picture articulation test. *Korean Journal of Communication & Disorders*, 1, 7-33.
- Kipp, Sandra. (2008). The language ecology of Australia's community languages. In Nancy H Hornberger (Ed.), *Encyclopedia of language and education* (pp. 2962-2976).
- Klatte, Maria, Hellbrück, Jürgen, Seidel, Jochen, & Leistner, Philip. (2010). Effects of classroom acoustics on performance and well-being in elementary school children: a field study. *Environment and Behavior*, 42(5), 659-692.
- Knightly, Leah M, Jun, Sun-Ah, Oh, Janet S, & Au, Terry Kit-fong. (2003). Production benefits of childhood overhearing. *The Journal of the Acoustical Society of America*, 114(1), 465-474.
- Ko, Insung. (2013). *The articulation of Korean coronal obstruents: Data from heritage speakers and second language learners*. (Unpublished Doctoral dissertation), University of Hawai'i at Manoa,
- Ko, Sungbae, & Shin, Gi-Hyun. (2010). The study of Korean as a heritage language: An issue in Korean language education in Australia. *KAREC Discussion Paper*, 11(4), 1-47.
- Kohnert, Kathryn, Windsor, Jennifer, & Yim, Dongsun. (2006). Do language-based processing tasks separate children with language impairment from typical bilinguals? *Learning Disabilities Research & Practice*, 21(1), 19-29.
- Kondo-Brown, Kimi. (2003). Heritage language instruction for post-secondary students from immigrant backgrounds. *Heritage Language Journal*, 1(1), 1-25.
- Kondo-Brown, Kimi. (2006). East Asian heritage language proficiency development. In Kimi Kondo-Brown (Ed.), *Heritage language development: Focus on East Asian immigrants* (pp. 243-258). Amsterdam: John Benjamins Publishing.
- Kondo-Brown, Kimi. (2005). Differences in language skills: Heritage language learner subgroups and foreign language learners. *The Modern Language Journal*, 89(4), 563-581.

- Krashen, Stephen D, Tse, Lucy, & McQuillan, Jeff (Eds.). (1998). *Heritage language development*. Culver City, CA: Language Education Associates.
- Kroll, Judith F, & Gollan, Tamar H. (2014). Speech planning in two languages: What bilinguals tell us about language production. In Matthew Goldrick, Victor Ferreira, & Michele Miozzo (Eds.), *The Oxford handbook of language production* (pp. 165-181). Oxford: Oxford University Press.
- Kroll, Judith F, Gullifer, Jason, McClain, Rhonda, Rossi, Eleonora, & Martín, María Cruz. (2015). Selection and control in bilingual comprehension and production. In John W Schwieter (Ed.), *The Cambridge handbook of bilingual processing* (pp. 485-507). New York; NY: Cambridge University Press.
- Kuhl, Patricia K. (2000). A new view of language acquisition. *Proceedings of the National Academy of Sciences*, 97(22), 11850-11857.
- Kuno, Susumu. (1987). *Functional syntax: Anaphora, discourse and empathy*: University of Chicago Press.
- Kupisch, Tanja. (2013). A new term for a better distinction? A view from the higher end of the proficiency scale. *Theoretical Linguistics*, 39(3-4), 203-214.
- Laleko, Oksana. (2010). *The syntax-pragmatics interface in language loss: Covert restructuring of aspect in heritage Russian*.
- Laleko, Oksana, & Polinsky, Maria. (2013). Marking topic or marking case: A comparative investigation of heritage Japanese and heritage Korean. *Heritage Language Journal*, 10(2), 40-64.
- Laleko, Oksana, & Polinsky, Maria. (2016). Between syntax and discourse: Topic and case marking in heritage speakers and L2 learners of Japanese and Korean. *Linguistic Approaches to Bilingualism*, 6(4), 396-439.
- Landau, Barbara, Smith, Linda B, & Jones, Susan S. (1988). The importance of shape in early lexical learning. *Cognitive development*, 3(3), 299-321.
- Lardiere, Donna. (2011). Who is the Interface Hypothesis about? *Linguistic approaches to bilingualism*, 1(1), 48-53.
- Lee-Ellis, Sunyoung. (2012). *Looking into bilingualism through the heritage speaker's mind*. (Unpublished Doctoral dissertation), University of Maryland,
- Lee, Eun Hee, & Zaslansky, Matthew. (2015). Nominal reference in Korean heritage language discourse. *Heritage Language Journal*, 12(2), 132-158.
- Lee, Hyun Jung, Kim, Young Tae, & Yim, Dongsun. (2013). Non-word repetition performance in Korean-English bilingual children. *International Journal of Speech-Language Pathology*, 15(4), 375-382.
- Lee, Hyunbok. (1971). Sewulmaluy mouncheykyey (The vowel system of Seoul Korean). *Language Research*, 7(2), 19-24.
- Lee, Iksop, & Ramsey, S Robert. (2000). *The Korean language*: State University of New York Press.
- Lee, In-Seop. (1977). A.tong.e.ey.seo.uy phi.tong.kwa sa.tong (Passive and causative in children's speech). *Journal of Graduate School Research Paper of Seoul Women's University*, 6, 25-38.
- Lee, Jin Sook, & Shin, Sarah J. (2008). Korean heritage language education in the United States: The current state, opportunities, and possibilities. *Heritage Language Journal*, 6(2), 1-20.
- Lee, Junghee. (2014). A longitudinal study of Korean vocabulary development as a Heritage Language for Korean-American preschool children. *Journal of Korean Language Education*, 25(3), 259-280.

- Lee, Kwee-Ock, & Lee, Youngjoo. (2007). The role of lexical aspect in the acquisition of the Korean passive: With reference to the difference between monolinguals and bilinguals. *Korean Journal of Linguistics*, 32(4), 691-712.
- Lee, Kwee-Ock, & Lee, Youngjoo. (2008). An event-structural account of passive acquisition in Korean. *Language and speech*, 51(1-2), 133-149.
- Lee, Phil-young, & Im, Yoo-jong. (2004). A study on the acquisition of language through the mistake of inflection in childhood. *Korean Language Education*, 115, 65-85.
- Lee, Sam-hyung, Lee, Phil-young, & Im, Yoo-jong. (2003). E.mal.e.mi.uy sup.tuk kwa.ceng.ey kwan.han yen.kwu (The study on the process of the acquisition of final endings). *Korean Language Education Research*, 18, 319-346.
- Lee, Sue Ann S, & Iverson, Gregory K. (2012). Vowel category formation in Korean–English bilingual children. *Journal of Speech, Language, and Hearing Research*, 55, 1449-1462.
- Lee, Sun-Hee, Jang, Seok Bae, & Seo, Sang-Kyu. (2009). Annotation of Korean learner corpora for particle error detection. *CALICO Journal*, 26(3), 529.
- Lee, Sun-Young, & Jeong, Haegwon. (2014). A ERP study on the processing of case markers by English-speaking heritage learners of Korean. *Bilingual Research*, 57, 149-172.
- Lee, Sunyoung. (2019). L1 vocabulary attrition: a longitudinal case study of a Korean-English bilingual child in L2 immersion context. *Korean Journal of Applied Linguistics*, 35(2), 161-180.
- Lee, Teresa. (2016). Dominant language transfer in the comprehension of L2 learners and heritage speakers. *International Journal of Applied Linguistics*, 26(2), 190-210.
- Lee, YoonKyoung, Heo, Hyunsook, & Jang, Seungmin. (2015). *Language Scale for School-aged Children*. Seoul: Hakjisa.
- Lenneberg, Eric H. (1967). *The biological foundations of language*. New York: John Wiley and Sons.
- Liu, Guo-Qiang, & Lo Bianco, Joseph. (2007). Teaching Chinese, teaching in Chinese, and teaching the Chinese. *Language Policy*, 6(1), 95-117.
- Long, Michael H. (1990). Maturational constraints on language development. *Studies in Second Language Acquisition*, 12(3), 251-285.
- Ludington, Jason D. (2013). Cross-situational learning of foreign vocabulary reveals a possible noun bias in adulthood. *Theory & Practice in Language Studies*, 3(4), 545-555.
- Lukyanchenko, Anna, & Gor, Kyra. (2011). *Perceptual correlates of phonological representations in heritage speakers and L2 learners*. Paper presented at the The 35th Annual Boston University Conference on Language Development.
- MacKay, Ian R A, Flege, James Emil, Piske, Thorsten, & Schirru, Carlo. (2001). Category restructuring during second-language speech acquisition. *The Journal of the Acoustical Society of America*, 110(1), 516-528.
- Macnamara, John. (1982). *Names for things: A study of human learning*: Mit Press.
- Mahon, Merle, & Crutchley, Alison. (2006). Performance of typically-developing school-age children with English as an additional language on the British Picture Vocabulary Scales II. *Child Language Teaching and Therapy*, 22(3), 333-351.
- Markman, Ellen M, & Hutchinson, Jean E. (1984). Children's sensitivity to constraints on word meaning: Taxonomic versus thematic relations. *Cognitive psychology*, 16(1), 1-27.
- Markman, Ellen M, & Wachtel, Gwyn F. (1988). Children's use of mutual exclusivity to constrain the meanings of words. *Cognitive psychology*, 20(2), 121-157.

- Mayo, Lynn Hansberry, Florentine, Mary, & Buus, Søren. (1997). Age of second-language acquisition and perception of speech in noise. *Journal of Speech, Language, and Hearing Research*, 40(3), 686-693.
- McLaughlin, Barry. (1978). *Second-language acquisition in childhood*. Hillsdale, NJ: Lawrence Erlbaum.
- Meir, Natalia. (2018). Morpho-syntactic abilities of unbalanced bilingual children: a closer look at the weaker language. *Frontiers in psychology*, 9, Article 1318.
- Meisel, Jürgen M. (1989). Early differentiation of languages in bilingual children. In Kenneth Hyltenstam & Loraine K Obler (Eds.), *Bilingualism across the lifespan: Aspects of acquisition, maturity and loss* (pp. 13-40): Cambridge University Press.
- Meisel, Jürgen M. (2007). The weaker language in early child bilingualism: Acquiring a first language as a second language? *Applied psycholinguistics*, 28(3), 495-514.
- Meisel, Jürgen M. (2009). Second language acquisition in early childhood. *Zeitschrift für Sprachwissenschaft*, 28(1), 5-34.
- Meisel, Jürgen M. (2013). Heritage language learners: Unprecedented opportunities for the study of grammars and their development? *Theoretical Linguistics*, 39(3-4), 225-236.
- Mercurio, Antonio, & Scarino, Angela. (2005). Heritage languages at upper secondary level in South Australia: A struggle for legitimacy. *International Journal of Bilingual Education and Bilingualism*, 8(2-3), 145-159.
- Merino, Barbara J. (1983). Language loss in bilingual Chicano children. *Journal of Applied Developmental Psychology*, 4(3), 277-294.
- Miller, George A, & Gildea, Patricia M. (1987). How children learn words. *Scientific American*, 257(3), 94-99.
- Min, Hyun-sik. (2004). Cho.tung.hak.kyo kyo.kwa.se han.cha.e mich han.cha pwun.sek yen.kwu (A study on the analysis of Korean words from Chinese characters of elementary school textbooks). *Journal of Chinese Characters and Classical Chinese Education* 13, 185-230.
- Monsell, Stephen, Doyle, Michael C, & Haggard, Patrick N. (1989). Effects of frequency on visual word recognition tasks: where are they? *Journal of Experimental Psychology: General*, 118(1), 43.
- Montanari, Elke G, Akıncı, Mehmet-Ali, & Abel, Roman. (2019). Balance and dominance in the vocabulary of German-Turkish primary schoolchildren. *European Journal of Applied Linguistics*, 7(1), 113-144.
- Montrul, Silvina. (2002). Incomplete acquisition and attrition of Spanish tense/aspect distinctions in adult bilinguals. *Bilingualism: Language and cognition*, 5(1), 39-68.
- Montrul, Silvina. (2005). Second language acquisition and first language loss in adult early bilinguals: Exploring some differences and similarities. *Second Language Research*, 21(3), 199-249.
- Montrul, Silvina. (2008a). *Incomplete acquisition in bilingualism: Re-examining the age factor*: John Benjamins Publishing.
- Montrul, Silvina. (2008b). Second language acquisition welcomes the heritage language learner: Opportunities of a new field. *Second Language Research*, 24(4), 487-506.
- Montrul, Silvina. (2009a). Knowledge of tense-aspect and mood in Spanish heritage speakers. *International Journal of Bilingualism*, 13(2), 239-269.
- Montrul, Silvina. (2009b). Reexamining the fundamental difference hypothesis: What can early bilinguals tell us? *Studies in Second Language Acquisition*, 31(2), 225-257.
- Montrul, Silvina. (2012). Is the heritage language like a second language? *Eurosla Yearbook*, 12(1), 1-29.

- Montrul, Silvina. (2016). *The acquisition of heritage languages*: Cambridge University Press.
- Montrul, Silvina, & Foote, Rebecca. (2014). Age of acquisition interactions in bilingual lexical access: A study of the weaker language of L2 learners and heritage speakers. *International Journal of Bilingualism*, 18(3), 274-303.
- Montrul, Silvina, Foote, Rebecca, & Perpiñán, Silvia. (2008a). Gender agreement in adult second language learners and Spanish heritage speakers: The effects of age and context of acquisition. *Language Learning*, 58(3), 503-553.
- Montrul, Silvina, Foote, Rebecca, & Perpiñán, Silvia. (2008b). *Knowledge of wh-movement in Spanish L2 learners and heritage speakers*. Paper presented at the 10th Hispanic Linguistics Symposium.
- Montrul, Silvina, & Ionin, Tania. (2010). Transfer effects in the interpretation of definite articles by Spanish heritage speakers. *Bilingualism*, 13(4), 449.
- Montrul, Silvina, & Ionin, Tania. (2012). Dominant language transfer in Spanish heritage speakers and second language learners in the interpretation of definite articles. *The Modern Language Journal*, 96(1), 70-94.
- Montrul, Silvina, & Polinsky, Maria. (2011). Why not heritage speakers? *Linguistic approaches to bilingualism*, 1(1), 58-62.
- Montrul, Silvina, & Potowski, Kim. (2007). Command of gender agreement in school-age Spanish-English bilingual children. *International Journal of Bilingualism*, 11(3), 301-328.
- Montrul, Silvina, & Sánchez-Walker, Noelia. (2013). Differential object marking in child and adult Spanish heritage speakers. *Language Acquisition*, 20(2), 109-132.
- Moon, Jihye. (2012). *Maturational and non-maturational factors in heritage language acquisition*. (Unpublished Doctoral dissertation), University of Maryland.
- Morgan, Rosemarie A. (1984). Auditory discrimination in speech-impaired and normal children as related to age. *International Journal of Language & Communication Disorders*, 19(1), 89-96.
- Müller, Natascha. (1998). Transfer in bilingual first language acquisition. *Bilingualism: Language and cognition*, 1(3), 151-171.
- Müller, Natascha, & Hulk, Aafke. (2001). Crosslinguistic influence in bilingual language acquisition: Italian and French as recipient languages. *Bilingualism: Language and cognition*, 4(1), 1-21.
- Müller, Natascha, & Kupisch, Tanja. (2003). Zum simultanen Erwerb des Deutschen und des Französischen bei (un)ausgeglichen bilingualen Kindern. *Vox Romanica*, 62, 145-169.
- Nábělek, Anna K, & Donahue, Amy M. (1984). Perception of consonants in reverberation by native and non-native listeners. *The Journal of the Acoustical Society of America*, 75(2), 632-634.
- Nagy, William E, & Scott, Judith A. (2000). Vocabulary processes. In Michael L Kamil, Peter B Mosenthal, P David Pearson, & Rebecca Barr (Eds.), *Handbook of reading research* (Vol. 3, pp. 269-284): Elbaum.
- Nakazawa, Tsuneko. (1990). A pragmatic account of the distribution of come and go in English, Japanese and Korean. In Hajime Hoji (Ed.), *Japanese/Korean Linguistics* (Vol. 1, pp. 97-110): Centre for the Study of Language and Information.
- Network, The Sydney Children's Hospitals. (2020). Sleep - normal sleep patterns 0 - 16 years. Retrieved from <https://www.schn.health.nsw.gov.au/fact-sheets/sleep-normal-sleep-patterns-0-16-years#:~:text=In%20primary%20school%20the%20average,the%20total%20time%20spent%20asleep>.

- Neuman, Arlene C, & Hochberg, Irving. (1983). Children's perception of speech in reverberation. *The Journal of the Acoustical Society of America*, 73(6), 2145-2149.
- Nic Fhlannchadha, Siobhán, & Hickey, Tina M. (2017). Acquiring an opaque gender system in Irish, an endangered indigenous language. *First Language*, 37(5), 475-499.
- Nittrouer, Susan, & Miller, Marnie E. (1997). Predicting developmental shifts in perceptual weighting schemes. *The Journal of the Acoustical Society of America*, 101(4), 2253-2266.
- O'Grady, William. (2000). Syntactic development. In Patrick Colm Hogan (Ed.), *The Cambridge encyclopedia of language sciences* (pp. 828-831). Cambridge, UK: Cambridge University Press.
- O'Grady, William, Kwak, Hye-Young, Lee, On-Soon, & Lee, Miseon. (2011). An emergentist perspective on heritage language acquisition. *Studies in second language acquisition*, 33(2), 223-245.
- O'Grady, William, Lee, Miseon, & Choo, Miho. (2001). The acquisition of relative clauses by heritage and non-heritage learners of Korean as a second language: A comparative study. *Journal of Korean Language Education*, 12(2), 283-294.
- O'Grady, William, Lee, Miseon, & Choo, Miho. (2003). A subject-object asymmetry in the acquisition of relative clauses in Korean as a second language. *Studies in Second Language Acquisition*, 25(3), 433-448.
- O'Grady, William, Schafer, Amy J, Perla, Jawee, Lee, On-Soon, & Wieting, Julia. (2009). A psycholinguistic tool for the assessment of language loss: The HALA project. *Language Documentation & Conservation*, 3(1), 100-112.
- Oguro, Susan, & Moloney, Robyn. (2012). Misplaced heritage language learners of Japanese in secondary schools. *Heritage Language Journal*, 9(2), 70-84.
- Oh, Janet S, Au, Terry Kit-Fong, & Jun, Sun-Ah. (2010). Early childhood language memory in the speech perception of international adoptees. *Journal of child language*, 37(5), 1123-1132.
- Oh, Janet S, Jun, Sun-Ah, Knightly, Leah M, & Au, Terry Kit-fong. (2003). Holding on to childhood language memory. *Cognition*, 86(3), B53-B64.
- Ohde, Ralph N, & Haley, Katarina L. (1997). Stop-consonant and vowel perception in 3- and 4-year-old children. *The Journal of the Acoustical Society of America*, 102(6), 3711-3722.
- Ohde, Ralph N, Haley, Katarina L, & McMahon, Christine W. (1996). A developmental study of vowel perception from brief synthetic consonant-vowel syllables. *The Journal of the Acoustical Society of America*, 100(6), 3813-3824.
- Ohde, Ralph N, Haley, Katarina L, Vorperian, Houri K, & McMahon, Christine W. (1995). A developmental study of the perception of onset spectra for stop consonants in different vowel environments. *The Journal of the Acoustical Society of America*, 97(6), 3800-3812.
- Oller, D Kimbrough, & Eilers, Rebecca E (Eds.). (2002). *Language and literacy in bilingual children: Multilingual Matters*.
- Oller, D Kimbrough, Pearson, Barbara Zurer, & Cobo-Lewis, Alan B. (2007). Profile effects in early bilingual language and literacy. *Applied Psycholinguistics*, 28(2), 191-230.
- Orena, Adriel John, Byers-Heinlein, Krista, & Polka, Linda. (2019). Reliability of the language environment analysis recording system in analyzing French-English bilingual speech. *Journal of Speech, Language, and Hearing Research*, 62(7), 2491-2500.

- Orena, Adriel John, Byers-Heinlein, Krista, & Polka, Linda. (2020). What do bilingual infants actually hear? Evaluating measures of language input to bilingual-learning 10-month-olds. *Developmental Science*, 23(2), e12901.
- Orton, Jane. (2008). *Chinese language education in Australian schools*. Retrieved from Oyama, Susan. (1976). A sensitive period for the acquisition of a nonnative phonological system. *Journal of psycholinguistic research*, 5(3), 261-283.
- Paradis, Johanne, & Genesee, Fred. (1996). Syntactic acquisition in bilingual children: Autonomous or interdependent? *Studies in Second Language Acquisition*, 18(1), 1-25.
- Paradis, Johanne, & Navarro, Samuel. (2003). Subject realization and crosslinguistic interference in the bilingual acquisition of Spanish and English: What is the role of the input? *Journal of Child Language*, 30(2), 371-393.
- Paradis, Michel. (1993). Linguistic, psycholinguistic, and neurolinguistic aspects of "interference" in bilingual speakers: The activation threshold hypothesis. *International Journal of Psycholinguistics*.
- Park, Eun-Jong, Park, Chan-Hee, & Park, Hyun. (2016). Ta.mwun.hwa ka.ceng a.tong.uy sa.tong.mwun phi.tong.mwun i.hay.wa sa.tong mich phi.tong cep.mi.sa phyo.hyen nung.lyek (Comprehension and production of causative and passive sentences in multicultural family children). *Journal of Fisheries and Marine Sciences Education*, 28(5), 1365-1377.
- Park, Eun-Jung. (2015). Hankwuke haksupcauy cwungkanene 'kata/ota'uy insik yangsang yenkwu (A study aspect of cognition on kata/ota fo Korean learners). *Korean Language & Literature*, 93, 387-406.
- Park, Gi Seong. (2002). Yengewa hankwukeuy enehakcek kongkan insikuy chaiwa tayhak yenge cakmwun kyoyukeyseuy hwalyong pangan yenkwu (A study on the linguistic differences between Korean and English in the recognition of space and the ways to apply the differences to college education of English composition). *Urimal*, 12, 203-239.
- Park, Hyejin, & Schwarz, Ilsa. (2012). Nonword repetition performance of early school-age children in Korea: a preliminary study. *Asia Pacific Journal of Speech, Language and Hearing*, 15(3), 187-196.
- Park, Hyekyung. (2015). Research on Korean orthography teaching methods for heritage language learners in English speaking countries - using consciousness raising tasks. *Journal of Korean Language Education*, 26(3), 117-144.
- Park, Joseph Sung-Yul. (2004). *Globalization, language, and social order: ideologies of English in South Korea*. (Unpublished doctoral dissertation), University of California, Santa Barbara.
- Patterson, Janet L. (2004). Comparing bilingual and monolingual toddlers' expressive vocabulary size: revisiting Rescorla and Achenbach (2002). *Journal of Speech, Language, and Hearing Research*, 47(5), 1213-1215.
- Pauwels, Anne. (2016). *Language maintenance and shift*: Cambridge University Press.
- Pearson, Barbara Zurer, & Amaral, Luiz. (2014). Interactions between input factors in bilingual language acquisition. In Theres Grüter & Johanne Paradis (Eds.), *Input and experience in bilingual development* (pp. 99-117). Amsterdam/Philadelphia: John Benjamins Publishing Company.
- Pearson, Barbara Zurer, Fernández, Sylvia C, & Oller, D Kimbrough. (1993). Lexical development in bilingual infants and toddlers: Comparison to monolingual norms. *Language Learning*, 43(1), 93-120.
- Peyton, Joy Kreeft, Ranard, Donald A, & McGinnis, Scott. (2001). Charting a new course: Heritage language education in the United States. In Joy Kreeft Peyton, Donald A

- Ranard, & Scott McGinnis (Eds.), *Heritage languages in America: Preserving a national resource* (pp. 3-26). Washington, DC: Center for Applied Linguistics & Delta Systems.
- Pinker, Steven. (1999). *Words and rules: the ingredients of language*. London: Weidenfeld and Niolson.
- Pires, Acrisio, & Rothman, Jason. (2009). Disentangling sources of incomplete acquisition: An explanation for competence divergence across heritage grammars. *International Journal of Bilingualism*, 13(2), 211-238.
- Place, Silvia, & Hoff, Erika. (2011). Properties of dual language exposure that influence 2-year-olds' bilingual proficiency. *Child development*, 82(6), 1834-1849.
- Polinsky, Maria. (1995a). *American Russian: language loss meets language acquisition*. Paper presented at the Annual Workshop on Formal Approaches to Slavic Linguistics.
- Polinsky, Maria. (1995b). Cross-linguistic parallels in language loss. *Southwest Journal of Linguistics*, 14(1-2), 87-123.
- Polinsky, Maria. (2006). Incomplete acquisition: American Russian. *Journal of Slavic Linguistics*, 14(2), 191-262.
- Polinsky, Maria. (2008). Gender under incomplete acquisition: Heritage speakers' knowledge of noun categorization. *Heritage Language Journal*, 6(1), 40-71.
- Polinsky, Maria. (2011a). Heritage languages. In Oxford bibliographies online: Linguistics: Oxford University Press.
- Polinsky, Maria. (2011b). Reanalysis in adult heritage language: New evidence in support of attrition. *Studies in Second Language Acquisition*, 33(2), 305-328.
- Polinsky, Maria. (2018). *Heritage languages and their speakers*: Cambridge University Press.
- Polinsky, Maria, & Kagan, Olga. (2007). Heritage languages: In the 'wild' and in the classroom. *Language and linguistics compass*, 1(5), 368-395.
- Portes, Alejandro, & Schauffler, Richard. (1994). Language and the second generation: bilingualism yesterday and today. *International Migration Review*, 28(4), 640-661.
- Rescorla, Leslie, & Achenbach, Thomas M. (2002). Use of the Language Development Survey (LDS) in a national probability sample of children 18 to 35 months old. *Journal of Speech, Language, and Hearing Research*, 45(4), 733-743.
- Rice, Mabel L, & Hoffman, Lesa. (2015). Predicting vocabulary growth in children with and without specific language impairment: a longitudinal study from 2; 6 to 21 years of age. *Journal of Speech, Language, and Hearing Research*, 58(2), 345-359.
- Rogers, Catherine L, Lister, Jennifer J, Febo, Dashielle M, Besing, Joan M, & Abrams, Harvey B. (2006). Effects of bilingualism, noise, and reverberation on speech perception by listeners with normal hearing. *Applied Psycholinguistics*, 27(3), 465-485.
- Rothman, Jason. (2007). Heritage speaker competence differences, language change, and input type: Inflected infinitives in heritage Brazilian Portuguese. *International Journal of Bilingualism*, 11(4), 359-389.
- Rothman, Jason. (2009). Understanding the nature and outcomes of early bilingualism: Romance languages as heritage languages. *International Journal of Bilingualism*, 13(2), 155-163.
- Rott, Susanne. (1999). The effect of exposure frequency on intermediate language learners' incidental vocabulary acquisition and retention through reading. *Studies in Second Language Acquisition*, 21(4), 589-619.

- Rubenstein, Herbert, Garfield, Lonnie, & Millikan, Jane A. (1970). Homographic entries in the internal lexicon. *Journal of verbal learning and verbal behavior*, 9(5), 487-494.
- Runnqvist, Elin, Gollan, Tamar H, Costa, Albert, & Ferreira, Victor S. (2013). A disadvantage in bilingual sentence production modulated by syntactic frequency and similarity across languages. *Cognition*, 129(2), 256-263.
- Saadah, Eman. (2011). *The production of Arabic vowels by English L2 learners and heritage speakers of Arabic*. (Unpublished doctoral dissertation), University of Illinois at Urbana-Champaign,
- Sadat, Jasmin, Martin, Clara D, Alario, F Xavier, & Costa, Albert. (2012). Characterizing the bilingual disadvantage in noun phrase production. *Journal of Psycholinguistic Research*, 41(3), 159-179.
- Sánchez-Walker, Noelia. (2012). *Comprehension of subject and object relative clauses in Spanish heritage speakers and L2 learners of Spanish*. (Unpublished doctoral dissertation), University of Illinois at Urbana-Champaign,
- Scarborough, Don L, Cortese, Charles, & Scarborough, Hollis S. (1977). Frequency and repetition effects in lexical memory. *Journal of Experimental Psychology: Human perception and performance*, 3(1), 1.
- Scarino, Angela, Elder, Catherine, Iwashita, Noriko, Kim, Sun Hee Ok, Kohler, Michelle, & Scrimgeour, Andrew (2011). *Student achievement in Asian languages education*. Retrieved from <http://www.saale.unisa.edu.au/project.html>
- Schafer, Amy, O'Grady, William, Lee, On-Soon, Perla, Jawee, Wieting, Julia, & Perdue, Katherine. (2009). *On the psycholinguistic assessment of relative language strength in bilinguals: Evidence from Korean heritage speakers*. Paper presented at the Mental Architecture for Processing and Learning of Language.
- Schlyter, Suzanne. (1993). The weaker language in bilingual Swedish-French children. In Kenneth Hyltenstam & Ake Viberg (Eds.), *Progression and regression in language: Sociocultural, neuropsychological and linguistic perspectives* (pp. 289–308): Cambridge University Press.
- Schlyter, Suzanne, & Håkansson, Gisela. (1994). Word order in Swedish as the first language, second language and weaker language in bilinguals. *Scandinavian Working Papers in Bilingualism*, 9, 49-66.
- Schwartz, Bonnie D. (2003). *Why child L2 acquisition?* Paper presented at the Proceedings of Generative Approaches to Language Acquisition.
- Schwartz, Mila, & Katzir, Tami. (2012). Depth of lexical knowledge among bilingual children: The impact of schooling. *Reading and Writing*, 25(8), 1947-1971.
- Schwartz, Mila, Minkov, Miriam, Dieser, Elena, Protassova, Ekaterina, Moin, Victor, & Polinsky, Maria. (2015). Acquisition of Russian gender agreement by monolingual and bilingual children. *International Journal of Bilingualism*, 19(6), 726-752.
- Seo, Hee Sun, & Lee, Seung Hwan. (1999). 2-5sey ceng.sang a.tong.uy yen.kyel.e.mi pal.tal (The development of connective endings of 2-5 year old normal children). *Communication Sciences & Disorders*, 4(1), 1-19.
- Shin, Eurie. (2005). The perception of foreign accents in spoken Korean by prosody: Comparison of heritage and non-heritage speakers. *The Korean Language in America*, 10, 103-118.
- Shin, Jiyoung. (2015). Vowels and consonants. In Lucien Brown & Jae Hoon Yeon (Eds.), *The handbook of Korean linguistics* (pp. 3-21). Oxford: Wiley Blackwell.
- Shin, Sarah J. (2002). Birth order and the language experience of bilingual children. *Tesol Quarterly*, 36(1), 103-113.

- Shin, Seoin. (2007). *Corpus-based study of word order variations in Korean*. Paper presented at the Proceedings of the Corpus Linguistics Conference, Birmingham, England.
- Shin, Seong-Chul. (2006). *Australasian strategies for an advancement of Korean language education*. Paper presented at the 1st International Conference for Korean Language Education Organisations and Local Representatives, Seoul.
- Shin, Seong-Chul. (2008a). How to advance Korean programs in Australian schools. *Korea Focus*.
- Shin, Seong-Chul. (2008b). Language use and maintenance in Korean migrant children in Sydney. *Teaching Korean as a Foreign Language*, 33, 139-168.
- Shin, Seong-Chul. (2010). *The current state of Korean language education in Australian schools*: Asia Education Foundation.
- Shin, Seong-Chul. (2018). *Korean language education: Australian practices and perspectives*. Seoul: Sotong.
- Shin, Seong-Chul, & Joo, Alice. (2015). Lexical errors in Korean-Australian heritage learners' compositions. *Journal of Korean Language Education*, 26, 129-162.
- Shin, Seong-Chul, & Jung, Sin Ji. (2015). A critical look at research on heritage language development and maintenance of Korean: With a particular reference to the Australian context. *Teaching Korean as a Foreign Language*, 43, 97-134.
- Shin, Seong-Chul, & Jung, Sin Ji. (2016). Language shift and maintenance in the Korean community in Australia. *International Journal of Korean Language Education*, 2(2), 223-258.
- Shin, Seong-Chul, & Jung, Sin Ji. (2018). Language maintenance and shift in the Korean community in Australia. *Language Facts and Perspectives*, 45, 251-279.
- Silva-Corvalán, Carmen. (1994). *Language contact and change: Spanish in Los Angeles*. Oxford: Clarendon Press.
- Sohn, Ho-Min. (2001). *The Korean language*: Cambridge University Press.
- Sohn, Ho-Min. (2013). *Korean*. Seoul: Korea University Press.
- Song, Jae Jung. (2006). *The Korean language: structure, use and context*: Routledge.
- Song, Juyoung. (2010). Language ideology and identity in transnational space: Globalization, migration, and bilingualism among Korean families in the USA. *International Journal of Bilingual Education and Bilingualism*, 13(1), 23-42.
- Song, Min Sun. (2004). *The first and second language acquisition of negative polarity items in English and Korean*. (Unpublished doctoral dissertation), University at Hawaii,
- Song, Minsun, O'Grady, William, Cho, Sookeun, & Lee, Miseon. (1997). The learning and teaching of Korean in community schools. *Korean language in America*, 2, 111-127.
- Sorace, Antonella. (2004). Native language attrition and developmental instability at the syntax-discourse interface: Data, interpretations and methods. *Bilingualism: Language and Cognition*, 7(2), 143-145.
- Sorace, Antonella. (2011). Pinning down the concept of “interface” in bilingualism. *Linguistic approaches to bilingualism*, 1(1), 1-33.
- Sorace, Antonella, & Filiaci, Francesca. (2006). Anaphora resolution in near-native speakers of Italian. *Second Language Research*, 22(3), 339-368.
- Sorace, Antonella, & Serratrice, Ludovica. (2009). Internal and external interfaces in bilingual language development: Beyond structural overlap. *International Journal of Bilingualism*, 13(2), 195-210.

- Stoel-Gammon, Carol, & Herrington, Paula Beckett. (1990). Vowel systems of normally developing and phonologically disordered children. *Clinical Linguistics & Phonetics*, 4(2), 145-160.
- Stuart, Andrew. (2005). Development of auditory temporal resolution in school-age children revealed by word recognition in continuous and interrupted noise. *Ear and hearing*, 26(1), 78-88.
- Sturak, Katharine, & Naughten, Zoe. (2010). *The current state of Chinese, Indonesian, Japanese and Korean language education in Australian schools: Four languages, four stories*. Retrieved from
- Sutter, Judith C, & Johnson, Cynthia J. (1990). School-age children's metalinguistic awareness of grammaticality in verb form. *Journal of Speech, Language, and Hearing Research*, 33(1), 84-95.
- Talarico, Maria, Abdilla, Geraldine, Aliferis, Martha, Balazic, Irena, Giaprakis, Irene, Stefanakis, Toni, . . . Paolini, Antonio G. (2007). Effect of age and cognition on childhood speech in noise perception abilities. *Audiology and Neurotology*, 12(1), 13-19.
- Tardif, Twila. (1996). Nouns are not always learned before verbs: Evidence from Mandarin speakers' early vocabularies. *Developmental psychology*, 32(3), 492-504.
- Tardif, Twila, Gelman, Susan A, & Xu, Fan. (1999). Putting the "noun bias" in context: A comparison of English and Mandarin. *Child development*, 70(3), 620-635.
- Thordardottir, Elin. (2011). The relationship between bilingual exposure and vocabulary development. *International Journal of Bilingualism*, 15(4), 426-445.
- Uccelli, Paola, & Pérez, Mariela M. (2007). Narrative and vocabulary development of bilingual children from kindergarten to first grade: Developmental changes and associations among English and Spanish skills. *Language, Speech, and Hearing Services in Schools*, 38, 225-236.
- Ullman, Michael T. (2001). A neurocognitive perspective on language: the declarative/procedural model. *Nature reviews neuroscience*, 2(10), 717-726.
- Ullman, Michael T. (2004). Contributions of memory circuits to language: the declarative/procedural model. *Cognition*, 92(1-2), 231-270.
- Ullman, Michael T. (2007). The biocognition of the mental lexicon. In M. Gareth Gaskell (Ed.), *The Oxford handbook of psycholinguistics* (pp. 267-286): Oxford University Press.
- Ullman, Michael T. (2015). The declarative/procedural model: a neurobiologically motivated theory of first and second language. In Bill VanPatten & Jessica Williams (Eds.), *Theories in second language acquisition: an introduction* (pp. 135-158). New York: Routledge.
- Unsworth, Sharon. (2013). Assessing the role of current and cumulative exposure in simultaneous bilingual acquisition: The case of Dutch gender. *Bilingualism: Language and Cognition*, 16(1), 86-110.
- Unsworth, Sharon. (2015). Amount of exposure as a proxy for dominance in bilingual language acquisition. In Carmen Silva-Corvalán & Jeanine Treffers-Daller (Eds.), *Language dominance in bilinguals: issues of measurement and operationalization* (pp. 156-173): Cambridge University Press.
- Unsworth, Sharon. (2016). Quantity and quality of language input in bilingual language learning development. In Elena Nicoladis & Simona Montanari (Eds.), *Bilingualism across the lifespan: factors moderating language proficiency* (pp. 103-121): the American Psychological Association & Walter de Gruyter.

- Valdés, Guadalupe. (2001). Heritage language students: Profiles and possibilities. In Joy Kreeft Peyton, Donald A Ranard, & Scott McGinnis (Eds.), *Heritage languages in America: Preserving a national resource* (pp. 37-77). Washington, DC: Center for Applied Linguistics & Delta Systems.
- Valdés, Guadalupe. (2005). Bilingualism, heritage language learners, and SLA research: Opportunities lost or seized? *The Modern Language Journal*, 89(3), 410-426.
- Valenzuela Jr, Abel. (1999). Gender roles and settlement activities among children and their immigrant families. *American Behavioral Scientist*, 42(4), 720-742.
- Van Deusen-Scholl, Nelleke. (2003). Toward a definition of heritage language: Sociopolitical and pedagogical considerations. *Journal of language, identity, and education*, 2(3), 211-230.
- Van Heuven, Walter JB, Mandera, Pawel, Keuleers, Emmanuel, & Brysbaert, Marc. (2014). SUBTLEX-UK: A new and improved word frequency database for British English. *Quarterly journal of experimental psychology*, 67(6), 1176-1190.
- Vasquez, Olga A, Pease-Alvarez, Lucinda, & Shannon, Sheila M. (1994). *Pushing boundaries: Language and culture in a Mexican community*. New York: Cambridge University Press.
- Ventureyra, Valérie A G, Pallier, Christophe, & Yoo, Hi-Yon. (2004). The loss of first language phonetic perception in adopted Koreans. *Journal of Neurolinguistics*, 17(1), 79-91.
- Verhoeven, Ludo Th, & Boeschoten, Hendrik E. (1986). First language acquisition in a second language submersion environment. *Applied Psycholinguistics*, 7(3), 241-255.
- von Hapsburg, Deborah, & Bahng, Junghwa. (2009). Effects of noise on bilingual listeners' first language (L1) speech perception. *Perspectives on Hearing and Hearing Disorders: Research and Diagnostics*, 13(1), 21-26.
- Walley, Amanda C, & Flege, James E. (1999). Effect of lexical status on children's and adults' perception of native and non-native vowels. *Journal of phonetics*, 27(3), 307-332.
- Wang, Hye-Sook. (1995). Yeng.e.hwa.ca.uy han.kwuk.e cak.mwun.ey na.tha.nan e.hwi.sang o.lyu pwun.sek (An analysis of lexical errors in the Korean compositions produced by English speakers). *Bilingual Research*, 12, 383-399.
- Wang, Hye-Sook. (1997). The effects of topic on lexical errors in writings by intermediate learners of Korean. *Korean language in America*, 2, 39-56.
- Weltens, Bert, & Grendel, Marjon. (1993). Attrition of vocabulary knowledge. In Robert Schreuder & Bert Weltens (Eds.), *The bilingual lexicon* (pp. 135-156): John Benjamins Publishing Company.
- Werker, Janet F, Gilbert, John HV, Humphrey, Keith, & Tees, Richard C. (1981). Developmental aspects of cross-language speech perception. *Child development*, 52(1), 349-355.
- Werker, Janet F, Yeung, H Henny, & Yoshida, Katherine A. (2012). How do infants become experts at native-speech perception? *Current Directions in Psychological Science*, 21(4), 221-226.
- White, Lydia. (2011). The interface hypothesis: How far does it extend? *Linguistic approaches to bilingualism*, 1(1), 108-110.
- Wiley, Terrence G. (2001). On defining heritage languages and their speakers. In Joy Kreeft Peyton, Donald A Ranard, & Scott McGinnis (Eds.), *Heritage languages in America: Preserving a national resource* (pp. 29-36). Washington, DC: Center for Applied Linguistics & Delta Systems.

- Wiley, Terrence G. (2005). Discontinuities in heritage and community language education: Challenges for educational language policies. *International Journal of Bilingual Education and Bilingualism*, 8(2-3), 222-229.
- Williams, Lee. (1980). Phonetic variation as a function of second-language learning. In Grace H Yeni-Komshian, James F Kavanagh, & Charles A Ferguson (Eds.), *Child phonology* (pp. 185-215). New York: Academic Press.
- Winter, Joanne, & Pauwels, Anne. (2005). Gender in the construction and transmission of ethnolinguistic identities and language maintenance in immigrant Australia. *Australian Journal of Linguistics*, 25(1), 153-168.
- Yagmur, Kutlay, Bot, Kees de, & Korzilius, Hubert. (1999). Language attrition, language shift and ethnolinguistic vitality of Turkish in Australia. *Journal of multilingual and multicultural development*, 20(1), 51-69.
- Yang, Myong-Duk. (2010). Ho.cwu ta.mwun.hwa.sa.hoy.wa cay.ho han.in tong.pho (Australian multicultural society and overseas Koreans in Australia). *Studies of Koreans Abroad*, 22, 97-137.
- Yeni-Komshian, Grace H., Flege, James E., & Liu, Serena. (2000). Pronunciation proficiency in the first and second languages of Korean–English bilinguals. *Bilingualism: Language and cognition*, 3(2), 131-149.
- Yeon, Jaehoon. (2015). Passives. In Jaehoon Yeon & Lucien Brown (Eds.), *The handbook of Korean linguistics* (pp. 116-136). Hoboken, NJ.
- Yi, Soon Hyung. (2000). The acquisition of Korean grammatical morphemes in early childhood. *Korean Journal of Child Studies*, 21(4), 51-68.
- Yip, Virginia, & Matthews, Stephen. (2000). Syntactic transfer in a Cantonese–English bilingual child. *Bilingualism: Language and cognition*, 3(3), 193-208.
- Yip, Virginia, & Matthews, Stephen. (2007). *The bilingual child: Early development and language contact*: Cambridge University Press.
- Yoon, Tae-Jin, & Kang, Yoonjung. (2014). Monophthong analysis on a large-scale speech corpus of read-style Korean. *Phonetics and Speech Sciences*, 6(3), 139-145.
- Yoshitomi, Asako. (1999). On the loss of English as a second language by Japanese returnee children. In Lynne Hansen (Ed.), *Second language attrition in Japanese contexts* (pp. 80-111): Oxford University Press.
- Yu Cho, Young-mee (2016). Korean phonetics and phonology. from Oxford University Press
<https://oxfordre.com/linguistics/view/10.1093/acrefore/9780199384655.001.0001/acrefore-9780199384655-e-176>