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A Diachronic Analysis of North and South Korean Monophthongs: Vowel Shifts on the Korean Peninsula

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ABSTRACT

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The linguistic situation on the Korean peninsula is one ripe for research. For the past 70 years the two halves of the peninsula have been isolated from one another, thus creating two very different environments for development and change within the Korean language. It is hypothesized that due to conflict, divide, and social turmoil on the peninsula, the Korean language will have undergone a period of change in the last 70 years. This particular investigation looks at North and South Korean monophthong systems for evidence of a phonological shift. Studies of North Korea's language planning (Yong, 2001; Kumatani, 1990) will be incorporated to provide a background for lexical change in the country, which may also have contributed to phonological change. This study was carried out with the expectation that, due to the turmoil following the Korean War, both standard dialects would display some signs of phonetic shift.

In order to track the changes to the monophthong systems over the last 70 years, a total of 7156 samples of the Korean language's eight monophthongs were collected from both North and South Korean films from the 1950s, 1980s, and 2010s. The vowels' F1 and F2 formants were measured using the computer program Praat. The data was then separated by vowel and run through statistical analyses. The results of a mixed methods ANOVA determined which vowels had shown significant variance between decades; the estimated means were then determined for each formant. Based on the statistical analysis, the North Korean vowels /a/, /ʌ/, and /u/ have shifted significantly since the 1950s, while the rest of the North Korean monophthong system has not changed significantly. Most of the shifting occurred in the period after the 1980s. In the South, all vowels have shown significant variance for the variable of decade in F1, F2, or both formants. South Korea's results also indicate separate shifts between the 1950s and 1980s, and between the 1980s and 2010s.

If the results of this study could be successfully replicated with the languages of other countries thrown into post-WWII turmoil, this study could prove that WWII left a lasting effect on the languages of the world as well. Even if there are not far-reaching implications, the study still demonstrates strong evidence that linguistic change has occurred in both the northern and southern halves of the Korean peninsula since it was split into two separate countries.

Keywords: North Korea, South Korea, vowel shifts, language planning, language change

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Furthermore, I would like to express gratitude to all my many Korean friends and acquaintances, as well as all the people in Seoul, South Korea and Provo, Utah who kindly allowed me to interview them, generously sharing their views on their beautiful language. 6 년 전 처음 한국에 갔을 때 한국과 그의 민족들 이렇게 사랑하게 될 거라고 생각조차 못했어요. 저를 도와 주신 분에게 영원히 감사 하겠습니다.

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Chapter 1: Introduction

1.1. Introduction

The Korean peninsula was a united country for over a millennium until it was colonized by the Japanese in 1910, then divided by Cold War politics following the Japanese surrender at the conclusion of WWII. Since that time, the two halves of the peninsula have been isolated from each other. Post-division, the two sides installed opposing political systems as well as employed divergent diplomatic tactics with the rest of the world. Due to the divide, the Korean peninsula has experienced a lot of political and social turmoil in the last 70 years, thus it is reasonable to assume that due to the peninsula's social upheaval, the Korean language has been thrust into a period of fluctuation in its national language. While much research has been performed to determine the extent of lexical variation that has developed between the two Koreas due to division, very little research has been done on the phonological side. Some synchronic studies have been done on South Korean phonology. However, North Korean phonology remains mostly untouched by modern scholars, at least by scholars who are able to publish their work outside of North Korea. No comparative diachronic studies of the two phonological systems have been done to date, as data collection in a controlled environment on either side of the demilitarized zone (DMZ) is next to impossible. The current study makes the attempt, as far as possible to fill this gap in the research, focusing on the basic vowel systems of the two Koreas.

1.2. Research Purpose

The purpose of this study is to determine the extent to which North Korea's isolation and South Korea's globalization have caused the vowel systems of each country to shift, possibly on

divergent paths. The vowels systems were chosen for analysis as opposed to the consonant systems due to the historical precedent on the Korean peninsula for vowel shifts to occur in conjunction with political shifts (Hong, 1991; Cummings, 2005). This study examines language on both sides of the 38th Parallel[1] to see if the two Koreas are indeed in a state of linguistic change brought on by the Japanese occupation and division of the peninsula post WWII. R.M.W. Dixon, in his punctuated equilibrium model of language change, describes the characteristics of a punctuated period of language change as when "each (dialect/language) undergoes fairly radical changes in grammar and replaces lexemes at a faster rate than usual; there are also likely to be changes in pronunciation" (Dixon, 1997). There exists a large amount of research showing the lexical divide that has arisen between the two nations since the split, but very little research has gone into how phonology has changed over the past 70 years. This study is based on the assumption that both North and South Korean standard dialects will have undergone some phonological change over the past 70 years: the South due to its increased contact with the outside world, and the North due to the extreme rearrangement of its class system and strict language planning. It is posited that though only two generations have passed since the split, this phonological divergence will be evident through phonological analyses of media taken from the 1950s, 1980s, and 2010s on either side of the heavily guarded border. The hypothesis of this study is that language that is considered the "standard" of the North, as well as the language that is considered the "standard" of the South will both show shifts in their monophthongal vowel systems. In the North, due to strong media censorship and extensive language planning, it is further hypothesized that the data will only display weak signs of phonological change, while the standard language of the South will display stronger signs of a phonological shift, having

[1] The 38th Parallel is the latitudinal line that divides North and South Korea.

acquired some foreign elements due to increased globalization, as well as having adopted some characteristics of other dialects of Korean due to the varied population which flooded the South's capital following the Korean War. Though the current study is focused only on the Korean vowel system, I believe that should the hypothesis be proved correct, it will provide justification for further investigations into the rest of the Korean phonological system, as well as research looking for similar results in other countries that have undergone drastic social change.

1.3. Outline of Thesis Structure

The presentation of this study will be divided into six chapters. Following the introduction, pre-existing literature and related studies of the topic at hand will be considered in chapter 2. Chapter 2 will be further divided into five sections by topic, exploring literature concerning (1) frameworks for analyses of language change and vowel shifts, (2) historical and political context for the Korean divide, (3) language planning on the Korean peninsula, (4) previous studies that inform the current study, as well as (5) gaps in the existing research. Chapter 3 will mainly be concerned with the research methodology used to carry out the study, as well as an explanation of the statistical treatment given to the gathered data. Following the methodology and explanation of statistical treatments, chapter 4 will contain a presentation of the results of the study and organization of the gathered data. Chapter 5 will discuss the presented results and draw conclusions, analyzing the implications of the results in both social and linguistic contexts. Finally, chapter 6 will present an overview of the limitations of the current study, highlight possibilities for further extensions of the study to other aspects of the Korean language, as well as discuss promising applications of the methodology to related studies in other languages.

Chapter 2: Literature Review

2.1. Language Change Frameworks

2.1.1. *Punctuated Equilibrium Model*

The origin of the punctuated equilibrium model in reference to biological evolution is generally attributed to German biologist Ernst Mayr (1992), and the shaping of Mayr's hypothesis into a theoretical framework is generally attributed to Niles Eldredge and Stephen Jay Gould (Geary, 2008). According to Geary, "Punctuated equilibrium (PE) describes a particular pattern of morphological change in the fossil record; it is about the 'origin and deployment of species in geological time' (Gould, 2002c)" (Geary, 2008). He goes on to describe that in fossil records, the appearance of "daughter species" is abrupt rather than gradual (Geary, 2008). According to Dixon, linguists have noticed a similar pattern in the "fossil record" of languages. Dixon noticed that mutual intelligibility between two dialects is usually around 70 percent, while mutual intelligibility between two closely related languages is usually only around 10 percent. There is almost never an overlap of 50 percent comprehensibility between two languages or dialects indicating that the shift from a dialect to a separate language is rapid (Dixon, 1997). For the most part, languages maintain a state of equilibrium, interrupted every few centuries by a period of punctuation. It is during this period of punctuation that languages change, develop, and sometimes diverge into separate languages[2]. This period of punctuation is instigated when, "…the state of equilibrium is punctuated by some cataclysmic event" (Dixon, 1997)[3]. In the case

[2] Dixon lists Spanish and Portuguese as an example of the split of one language into two, while still geographically contiguous. He also cites Okinawan and Japanese as examples of the divergence on one language into two in a situation where the two societies are cut off from one another (Dixon, 1997).

[3] Dixon goes on to cite natural events such as volcanoes, floods, famines, droughts, etc.; or social events such as the emergence of a new aggressive political party, religious sect, or technological innovation as catalysts to linguistic change. He also mentions that a group of people simply moving into a new territory could also cause that group's language to undergo change.

of the Koreas, this event could be the Japanese occupation period, combined with the post WWII splitting of the peninsula and the consequent installation of opposing political systems in the North and the South.

While the causes of a period of punctuation are well delineated in Dixon's discussion of the linguistic applications of the punctuated equilibrium model, he focuses mainly on lexical and grammatical change and neglects to mention if or how the model explains changes to the phonology of a language during this punctuated period. He states that lexical change happens quickly while grammatical change generally takes place over a longer period of time. He further posits that the cross-language diffusion of these grammatical changes typically take place once the language has returned to a period of equilibrium (Dixon, 1997). So where does phonetic change fit into this framework? In *The rise and fall of languages*, Dixon consistently cites Edward Sapir's theory of language drift (an explanation of which is given in section 2.1.2). In the sequence of language change, Sapir places phonetic change after lexical change, but before grammatical/morphological change. Thus if Dixon supports Sapir's theory of drift, which states that phonetic changes occur more slowly than lexical changes but more quickly than grammatical changes, it would follow that Dixon would place phonetic change in between lexical and grammatical change in his own language change model.

If, as Dixon suggests, languages follow biology's punctuated equilibrium model and we further speculate that the Korean language is currently undergoing a punctuated period of linguistic change before it returns to equilibrium, the driving forces behind this change are not only the "natural" factors of language contact resulting in borrowing and phonological shift. In the North the degree and extent of linguistic change is being controlled by strict language planning and government control; this will be discussed further in Section 2.3.

If the Korean language is in a period of punctuation, after the end of this punctuated period, what will the Korean language look like? Will there still only be one Korean language with multiple dialects, or will it have split into two separate but related languages? To what degree will they be mutually intelligible? According to Dixon, these extreme periods of language change occur "…within the space of a generation or two" (Dixon, 1997). It has already been a few generations since the Japanese occupation began, throwing the Korean peninsula into social upheaval, yet the language continues to fluctuate with each new dramatic event. Because the time frame for a typical period of punctuation has been exceeded and the language still has not entered into a state of equilibrium, it follows that while this language change model can't adequately explain the changes to Korean over the last century, it does give a theoretical framework for "cataclysmic events" causing linguistic change, which can be applied to the Korean situation.

2.1.2. *William Labov*

One cannot mention language change without mentioning William Labov and his groundbreaking work on the subject. Labov's famous sociolinguistic studies in New York and Martha's Vineyard (Labov, 1994), set the groundwork for investigations into the relationships between society and language. Simultaneously, he introduced the beginnings of a framework for language change analysis by isolating some of the factors such as social class, gender, neighborhood and ethnicity, which generally drive language change. Taking into account these factors, we can more easily recognize where phonetic change is more likely to occur. In the case of North and South Korea, the standard form of the language is most consistently represented in each country's media, thus making films the ideal place to look for phonological shift in

progress[4]. Also, Labov points out women as innovators of linguistic change, citing that in most chain shifts he has observed, "Women are considerably more advanced than men" (Labov, 1994). Therefore if the speech of the women is compared to that of the men, if a change is taking place it should appear earlier in the speech of the women and then later in the speech of the men. Labov gives an example of a 1995 study by Seo-Yong Chae demonstrating that in Korean, in the now completed raising of /o/ to /u/ in non-initial stressed syllables, women were a whole generation ahead of the men (Labov, 2001). Due to the assertions by various academics concerning the effect of gender on linguistic change, this study will examine the vowels of both women and men to see if there is significant variation between the productions of the two genders. On the other hand, other researchers have asserted opposite claims regarding gender, avowing that women are actually more conservative when it comes to innovation in speech, due to the static and secluded nature of their lives as observed by early sociolinguists (Coates, 2003). From a more neutral standpoint, Jennifer Coates, in her book *Women, Men and Language* (2003), states that neither women as linguistically conservative nor women as linguistic innovators "seems a very satisfactory explanation of gender differences in language." Traditionally, however, women are generally the people who pass on language to their children, especially in Korean culture where even in contemporary Korean households, fathers take a very hands-off approach to childrearing. In a 2011 article in the New York Times, Joon Cho, a volunteer for a program to teach Korean fathers how to be more present in their children's lives, is quoted as saying, "Traditionally, in the Korean family, the father is very authoritarian. They're not emotionally linked with their children or their wife" (Laporte, 2011). Thus it can be assumed

[4] Both North and South Korea have had thriving film industries since the 1950s. North Korea's late leader Kim Jong Il was even considered somewhat of a film expert. He wrote and directed many films prior to his rise to power and wrote books, *On the Art of Cinema (1989)* as well as *The Cinema and Directing (1987)*, that North Korean film makers today still use as guides for filmmaking.

that on the Korean peninsula, language is passed down almost exclusively by females, which would support Labov's theory of linguistic change originating with women. Therefore it is important to analyze the data by gender as well as by time period.

An additional factor that Labov emphasizes is social class. There will inherently be a difference in speech between people of different social groups due to the division of societies into certain speech communities largely based on socioeconomic and educational backgrounds. Given this factor, the attempted leveling of North Korean society that took place in North Korea following the implementation of a communist regime, if truly accomplished, would show itself throughout the standard dialect regardless of societal position. The levelling of speech is also aided by the interdependent nature of Korean society, where it is undesirable to be perceived as different from the rest of one's social group. Group goals outweigh personal goals and "individual distinctiveness is not particularly desirable" (Nisbett, 2003). Using films to collect data for the study at hand ensures for the most part that the prestige or standard form of the language will be utilized, thus removing the possibility that subjects will utilize covert prestige in order to intentionally appear different from other subjects. Labov advocates the study of language as it is truly used, focusing on idiolects and dialects[5] that are found in actual usage rather than a single, ideal, prescriptionist idiolect (Labov, 2001). While films are not ideal for examination of the natural use of morphology and lexical items due to the scripted nature of the dialogue, it is believed that the phonological aspects are fairly representative of the standard form of the language at the time of filming.

[5] An idiolect, for the purpose of this paper is the speech style and patterns of an individual speaker of a language. A dialect is defined as the speech styles and patterns used by a larger group of people generally with geographic or political boundaries.

2.1.3. *Sapir on Language Change and Language Drift*

As mentioned in the discussion of the punctuated equilibrium model, another influential theorist in the study of language change is Edward Sapir (Sapir, 1921). Sapir stresses that there is no such thing as total commonality of language between people; however, groups of idiolects have enough similarities to create a dialect that will contrast with the similarities that comprise another group of idiolects. Sapir's theory of language change stipulates that due to certain factors, such as social developments, local literatures, urbanization, tendencies towards breaking up localism, etc. (Sapir, 1921), language will fracture creating dialects. Whatever the cause of the social fracture, the language of the group will then gravitate towards one norm. Idiolects will still exist but the idiolects of a group will have commonalities that contrast with the similarities of another group of idiolects.

Geography can be a cause of a language diverging into separate dialects as "no language can be spread over a vast territory or even over a considerable area without showing dialectic variations" (Sapir, 1921). Different people and groups will flock together and a person's idiolect will naturally move towards the language of the group with which they most often associate and away from the language of groups with which they do not associate. In the case of North and South Korea, because they have two different standard dialects, it is possible that both standards may be adding new features to their dialects, further pulling them apart from one another. Because there are so many ways in which a language can change its phonology, morphology, and grammar, it is possible that due to isolation, the two standard dialects on the Korean peninsula could be moving in different directions. If studies can show that the standard dialects are diverging from each other, one would assume that the non-standard dialects are more likely to be changing in a direction more closely aligned with the standards of their respective countries

(Sapir, 1921). Thus if a divergent drift can be demonstrated in the standard dialect of each country, it would follow that the non-standard dialects of the respective countries are also moving further away from the non-standard dialects of the other country.

In his theories on language change, Sapir also asserts an order in which changes to a language are likely to occur, stating that vocabulary change is most likely to be the first change in a given language, followed by phonetic change, which generally demonstrates a "slow drift." Grammatical shifts are the final stage of language change (Sapir, 1921). Previous studies have already shown the high amount of lexical change that has taken place on the Korean peninsula. If this study shows that the phonological system has changed as well, then perhaps future studies should be geared towards isolating morphological changes on the peninsula, as that could indicate that the Korean language is drawing ever closer to becoming two different languages.

In Sapir's book *Language* he outlines his theory of language drift, especially as it concerns phonetic change. He asserts that languages change in predictable patterns or "drifts." His theory posits that language generally shifts in a discernable direction (1921). According to Sapir's theory, a language will generally follow historical precedent when it changes. If a language has shown a historical tendency for its vowels to front, it is likely that in future vowel shifts, this same tendency will be observed. Furthermore, related languages are likely to shift in similar ways. Sapir cites the example of German and English phonetic morphological drift. The drift began in English long before German followed suit, but similar phonetic changes occurred in related words in both languages. Despite the separate time spans during which these changes took place, the parallelism of the changes in these two related languages are striking evidence that drifts exist, and related languages will follow the same drifts when changing (Sapir, 1921). Thus linguists may observe language changes in one language and hypothesize that similar

changes may occur in the near future in related languages. The origin of the Korean language, however, is highly debated. Some Korean experts assert that it is an Altaic language, while others claim it to be a language isolate, while still others claim that its only relative is Japanese (Lee & Ramsey, 2000). Thus it may be difficult to predict the types of change that will take place in Korean based on related languages. However, researchers can look at historical changes in the Korean language itself and make assumptions based on those. For example, Korean has undergone multiple vowel shifts in the past, thus it might be assumed that any contemporary vowel shifts will follow the patterns of the previous shifts.

Dixon's theory of punctuated equilibrium informs the study at hand by providing an explanation of how changes to the Korean language may have been instigated by calamitous events on the peninsula. Sapir's theory of drift, provides an explanation of the direction of the change within a historical context of Korean language change trends. Combined the two theories provide a framework for why and how the two standard dialects of Korean are changing.

2.1.4. *Vowel Shift Framework*

Sapir's investigation of language change led him to assert that vowels will generally either level/merge or shift in a chain reaction where one vowel becomes either high or low and another vowel must move in to fill the empty space, causing a chain reaction until eventually all of the vowels have shifted either higher or lower (Sapir, 1921). This would stipulate that as long as the first vowel to shift in the North and the South Korean vowel systems is the same vowel and it shifts in the same direction, the chain shift should put the two nations' vowel systems on similar tracks of change.

Along with insight into factors leading to natural and systematic language change, Labov also provides us with a framework for vowel shifts. In the first volume of *Principles of Language*

Change (1994), he outlines the idea of order and predictability in the chain shifting of vowels. He cites three principles:

1. "In chain shifts, long vowels rise."
2. "In chain shifts, short vowels fall."
    a. "In chain shifts, the nuclei of upgliding diphthongs fall."
3. "In chain shifts, back vowels move to the front."

Based on Labov's observations, and the numerous examples he uses to illustrate them, these principles have generally been observed to hold true. The Korean language, however, does not generally have a distinction between long and short vowels, which may make the direction of a vowel shift in the language difficult to predict, and imply that Labov's chain shift patterns might not apply to Korean phonological shifts. Martinet claims that chain shifts are prevalent in the phonological changing of vowels in order to avoid any mergers within a vowel system that might result in an overwhelming number of homophones (1955). In a merger, two sounds move towards each other as opposed to changing in the same direction. Like chain shifts, mergers are also common changes that occur in the vowel systems across languages. In modern Korean, the vowels 에 (/e/) and 애 (/ɛ/) have almost completely merged, with younger generations being unable to discern between the two sounds in minimal pairs (Hong, 1991). Along with various mergers throughout its linguistic history, as cited by Labov, Korean's vowel system has already undergone multiple chain shifts. First the fronting and raising of /a/ to /e/ in Old Korean followed Labov's pattern 2 chain shift, though not to completion, with only the two vowels showing evidence of movement (Labov, 1994). Another chain shift supposedly occurred in the transition from Old Korean to Early Middle Korean (Hong, 1991; Lee, 1961). This shift, assumed to have taken place around the end of the 10th century C.E., would coincide historically with the

unification of the three kingdoms, Goguryeo, Silla, and Baekje, which had governed the peninsula since before the Common Era. The merging of the three kingdoms through decades of war would have been what Dixon may have termed a "cataclysmic event," which set off a period of linguistic change, shaping the dialects of the three kingdoms into one uniform language. In Labov's analysis of Korean vowel shifts, he also noted that while the first major shift followed the previously stated principles, the vowel shift that took place in Middle Korean did not conform to these patterns (Labov, 1994). Other scholars have even denied that this vowel shift actually took place, due to the majority of the analysis supporting a shift having been carried out on loan words from Mongolian, thus negating the legitimacy of the analysis' application to the Korean language as a whole (Ko, 2011; Lee & Ramsey, 2000). However, if this shift did in fact take place and, as Labov asserts, did not follow the norms observed in other chain shifts throughout history, it would set a precedent for the Korean language not following established patterns of chain shifting.

The Great Vowel Shift in English is one that is, to many scholars, more familiar than those that have occurred in Korean. In observing this shift, some widely applicable patterns can be noted. In the 1950s, Robert Stockwell, a contemporary of Labov, asserted in his PhD dissertation that sound changes under certain constraints, as evidenced through the Great Vowel Shift. He noted that vowels, when shifting, would move to "the next contiguous phonemic notch in any direction within a structural frame" (Wolfe, 1972). This general statement is one that echoes Sapir's theory of language drift and has proved more consistently true in regards to predicting where vowels will shift than those constraints outlined by Labov. Thus, as the term vowel *shift* denotes, vowels will not simply rise or lower, or move drastically to the front or the back, but will gradually move into an adjacent phonemic notch, generally one that has been left

vacant by the previous movement of another vowel, thus creating the chain shift. The Great Vowel Shift was a phonetic change in English in which /i/ and /u/ dropped creating phonemic gaps and setting off a chain shift that caused the remainder of the English vowel system to raise. The Great Vowel Shift in English was also characterized by the preceding diphthongization of certain phonemes (Wolfe, 1972). This diphthongization has also occurred in other languages, and if a vowel shift is occurring in either of the Koreas, that may indicate that certain high Korean vowels have already undergone diphthongization. However, given that Korean monophthongs all have one or more associated diphthong forms, it is difficult to determine whether or not a monophthong has merged with one of the existing diphthong indicating a shift. If, on the other hand, monophthongs have shifted to other monophthongal phonemic notches, it would be a much more reliable indicator of a shift in progress in the Korean language.

2.2. Historical and Social Context

2.2.1. *North and South Korea*

If Korea is currently undergoing a period of dramatic language change, the cause of such must be understood within a historical and a social context. In 1945 after the Allied powers were declared the victors of World War II, they were left with the responsibility of deciding what to do with the remnants of the former Japanese and Nazi empires. Following the war, without a common enemy to unite them, the Allied powers' political differences caused massive disagreements, which ultimately led to the Cold War. Great Britain, France, and the United States all exercised forms of government that favored a capitalistic society. The Soviet Union, on the other hand, had instituted a communist regime which preached equality for everyone, decrying the tenets of a capitalistic free market economy. The Soviet Union refused to cooperate

with the other Allied powers as they deliberated on what to do with the newly liberated Korean peninsula. Thus when Japan surrendered Korea to the UN in 1945, they surrendered the northern region to the Soviet Union and the southern region to the other three Allied powers (Cumings, 2005). The country was effectively split across the 38th parallel. This latitudinal barrier was reinforced by the opposing political systems installed shortly after the division. In the North, the Soviets supported Kim Il Sung and his followers as they set up a communist regime. The Americans, however, rejected the government that the people had set up in the South and instead aided in the appointment of their own preferred leaders, forcing a form of semi-democracy on the people, that actually drifted more towards military dictatorship until the 1980s (Cumings, 2005). Thus a few months after the conclusion of WWII, the Korean peninsula had two divergent governments supported by the occupying forces, but not necessarily supported by the Korean people.

The North's newly installed communist government immediately set into action a string of reforms that would influence all portions of North Korean society. The main goal of the reform was to remove class distinction in the quest for social equality. According to Kim Il Sung scholar Takagi Takeo, this leveling was necessary because "once class distinction between the working class and the peasantry is eliminated and cooperative property is turned into public property, the entire society will achieve complete political and ideological unity with the common ideology on the same socio-economic basis" (Takeo, 1976). Thus, in order for everyone to be able to work within the ideology of a true communist idea, Korea's historical societal hierarchy had to be done away with. Because the spirit of hard work is one of the core points of communist ideology, the North decided to "revolutionize and working-classize the whole society" (Takeo, 1976). The leveling of the society had wide-spread effects, both socially and

linguistically. In his book *North Korea*, Bruce Cumings notes that "it became important to marry a woman with the proper class background, meaning poor peasant or worker, because this was the ticket to better life chances" (Cumings, 2004). So, despite claiming to rid society of social class, in the beginning, a person's past social status was very influential on their social opportunities under the new regime. Descendants of the wealthy and intellectuals of the old society were now treated as low class in the new society. Because the former working and peasant classes were now the preferred social status, the language of this class now became the prestige dialect. Eventually, this dialect was declared the standard language of the North. "In 1966, North Korea adopted a new term for the standard language, *Munhwao* (문화어) 'cultured language', and proclaimed that the speech of Pyongyang would be adopted as this new Munhwao. In addition, it was announced that the speech of the working class would form the basis of the standard" (Lee & Ramsey, 2000). Linguists may therefore assume that the North Korean language of the 1950s, prior to the strict enforcement of linguistic policy, will be somewhat different from that of the later decades, after everyone had adapted their speech to this new prestige dialect. However, in films, the North Korean government would have strictly controlled the language being used, ensuring that actors were using the standard dialect. Therefore we can expect consistency in the dialect used in North Korean films.

T.B. Mukherjee, an Indian socialist who revered North Korea's communist system, in writing on the perceptions of intellectuals when North Korea first started forming as a country, wrote "…in spite of the trust imposed in them the intellectuals were found to be timid and vacillating. They failed to be enthusiastic about the party programme and the cause of revolution" (Mukherjee, 1983). Intellectuals were not appreciated for their education, rather they were seen to be at a disadvantage because of their upbringing. Intellectuals were seen as a risk,

liable to make mistakes "because of their class origin" (1983). However, intellectuals were warned to heed the criticism heaped upon them by the Party, accepting it as "an effective educational remedy to save them" (1983). They were seen as a risk, but still valued for the knowledge they possessed. The overall goal of the regime was to "revolutionize them." Mukherjee blames the fickleness of intellectuals in the face of revolution on selfishness and egoism. The regime interpreted the intellectuals' dislike of the socialist construct as fear that intellectuals would no longer be placed on a pedestal above everyone else. So, rather than listen to the educated intellectuals who declared that socialism was not what North Korea needed, the masses, driven by Kim Il Sung's declared opinion, were led to think of intellectuals as selfish people complaining about losing their material comforts and having to be equal with all other classes.

Because of this attitude towards intellectuals in North Korea, education was reformed to a system very different from that found in most parts of the world. Of course the students learn basic subjects like math, science, reading and writing, but these subjects are interspersed with ideological propaganda. Word problems in math classes feature valiant North Korean soldiers defeating the evil capitalist bastards; readings are centered on the heroics of Kim Il Sung and the lives of Kim Jong Il and Kim Jong Un. Thus, to avoid the danger of becoming a free-thinking intellectual, North Korean students are constantly fed revolutionary propaganda from the moment they can speak. This distaste for intellectuals gave North Korean language another push towards that of the uneducated peasants and workers.

As the North was reorganizing their societal system, in South Korea, the United Nations forces helped to install and run a military government, holding back on installing a Korean government in the hopes of peninsula-wide elections. Eventually the UN mandated that the

Koreans hold democratic elections of their officials, but only the South participated in the vote. The candidates were all those who had worked with the Americans and had their support. Thus the new occupiers effectively installed the South's first elected government. Because the peninsula's capital, Seoul, remained on Southern land, the standard dialect of their language did not change. However, the current Seoul dialect is actually a mix of many other dialects. Most people do not consider their "hometown" to be Seoul. Even people who were born and raised there will still claim the place where their families originate. When urbanization hit the Korean peninsula following the Korean War, people flocked to Seoul bringing their local dialects with them. These dialects, when placed in one geographic area, levelled into the Seoul dialect. Even within Seoul there still exist various dialects, but the standard form, based predominately on this levelled, post-war Seoul dialect, has developed into the prestige dialect of the South and is the form of speech taught in schools (Lee & Ramsey, 2000). Lee and Ramsey go on to point out that while the standard form of Korean is based on Seoul speech, not everything in the spoken Seoul dialect is considered standard. Thus the true standard of South Korea is more of a prescriptive standard that doesn't exist in actual spoken production, but is rather taught in schools and maintained in written Korean. However, as Labov (1994) has pointed out, actual speech production rarely perfectly reflects the prescriptive standard.

Since the end of the Korean War, the DMZ has become one of the most heavily fortified borders in the world. Very little communication has been exchanged between the two sides since the conclusion of the armed conflict (Kim & Lee, 2007). Most of what South Koreans know about their neighbors to the north comes from biased public education and media, as well as the testimonies of North Korean defectors who have made their way to the South. The information from the defectors is not positive, thus reiterating the wholly negative image of North Korea that

has been engendered in most South Koreans through their educational system. The North is much the same. Writings from North Korea constantly refer to the United States as "the U.S. imperialists" and to South Korea as the "hirelings," "lackeys," or "puppets" of the United States (Kim, 1965). Generally the brunt of the negativity is heaped on the United States with South Korea being painted as having been subjugated by the US and forced to follow their will. These preconceived notions have made it difficult for many who defect to the South to adapt to their new environment. Multiple studies have been done showing the ostracism and decreased opportunities available to those who defect from the North and come to the South (Nicewater, 2013; Lankov, 2006; Kim & Jang, 2007). Many defectors modify their speech to mask their original dialect in an attempt to fit into South Korean society, while others dream of returning to their families in the North (Demick, 2009). Because most defectors begin changing their speech as soon as they arrive in South Korea, it is difficult for linguists to use defectors' speech as a way of determining how far apart the Northern and Southern dialects have drifted phonetically. Therefore, to date, most studies of North and South Korean linguistic variation have centered on the lexical divide rather than the phonetic one.

2.2.2. *East and West Germany*

Discussions of what the peninsula will be like following a potential reunification are often based on what happened to Germany when the country was reunified following the fall of the Berlin Wall. East and West Germany were divided for approximately 40 years. Just as with North and South Korea, the division between East and West Germany arose from the inability of the four Allied powers to agree on one single political system that would govern all of Germany. Thus France, Great Britain and the United States merged their three parts of the country into West Germany, while the Soviet Union governed East Germany (Johnson & Braber, 2008). In

further parallels with the situation on the Korean peninsula, a communist government was instituted in the East, while an anti-communist government was set up in the West. Many studies have been carried out to determine the effect that this period of division had on the German language. According to Johnson and Braber, most of the changes that occurred during the 40 year separation were lexical (2008). Similar to North Korea, East Germany adopted a lot of Soviet-influenced words, while the West borrowed a lot of words from the British, French and Americans. However, ultimately, "despite the separation of the two speech communities, Germans on either side of the border continued to speak the same language…After unification in 1990, it soon became clear that fears surrounding the separate developments of the language were unfounded" (Johnson & Braber, 2008). Thus only lexical remnants remain as evidence of the language's 40 year division and only minor communication problems have arisen as a result.

No studies have provided evidence that phonological shift occurred during the time of the Berlin Wall. However, the width of the Berlin Wall and the width of Korea's DMZ are incomparable. East and West Germany had communication lines that could be utilized by those with influence. There were also underground means of communication between East and West Berlin (Smoot, 2014). At certain points during the separation, there were even ways for people from West Germany to obtain visas to visit the East (Buchholtz, 1994). North and South Korea, on the other hand, are completely cut off from one another, with almost no direct communication between the two sides. Given the 2.5-4 km width of the DMZ, along with the thousands of troops patrolling its borders, opportunities for underground communication exchange are scarce. Black market Chinese cell phones are sometimes used along the Chinese border, and different activist groups often attempt to fly leaflets to the North, however these rare communications are the exception rather than the norm (Kim & Lee, 2007). The North's communicative isolation from

the South may have removed their ability to curb phonological change, or at least impeded their ability to change along the same path as their neighbors to the south.

2.3. Language Planning

Language planning on the divided peninsula is one Korean language related topic that is very well represented in the literature. In-depth studies and comparisons have been done on the topic by many scholars in Korean linguistics (King, 2007; Kumatani, 1990; Yim, 1980; Yim, 2007). All experts in the field, while sometimes disagreeing on the extent of the difference, all concur that North Korea used and enforced language planning to a much higher degree than the South.

2.3.1. *North Korean Language Planning*

North Korea's language policy was initially patterned after that of the Soviet Union. In his article on the subject, Akiyasu Kumatani cites "the claim that 'language is a weapon for revolution and construction,'" as the impetus for most of the language planning that took place initially in North Korea as well as the language planning that still takes place today (1990). The successful institution of a communist regime is dependent upon its ability to communicate massive amounts of communist ideology to all of the people.

> "Under the dominant leadership of Kim Il Sung and later Kim Jong-il, language has been explicitly recognized as an important ideological tool for nation building, leading to a deliberate, large-scale redirection of the national language towards a 'purer', native form of Korean, and several decades of heavy state-led language planning." (King 2007)

The recognition of the utility of language in the spread of communist ideology led to a media blitz on the North Korean people. By the 1960s, the majority of North Korean households contained a radio or a television, which had been welded to stay on the government-run station in order to ensure that the North Korean people were listening only to government propaganda and not to radio and television waves coming from the South (Demick, 2009). However, directly following the split of the country in 1945, North Korea was not economically or technologically advanced enough to be able to afford a radio in every household. They therefore had to rely on relaying their ideological propaganda by means of print. This presented its own difficulties as in 1945 it was estimated that there were over 2 million illiterate North Koreans and "the percentage of children of elementary school age attending school was 35 percent" (Kumatani, 1990). Everyone knew how to speak Korean, but the Japanese occupation's Japanese-only educational policies had taken a drastic toll on the Korean people's ability to read and write their national language. Thus, "the urgent task was not the spread of standard speech but of Korean literacy" (Kumatani, 1990). This "eradication of illiteracy" was the first wave of language planning that took place in the North.

In order to decrease/eradicate illiteracy in North Korea, the government's first act was to rid the orthography of all *Hanjja*[6]. "It was hardly possible to teach complex Chinese characters to these illiterates (at least three-fourths of the inhabitants) from the beginning level in a short time" (Kumatani, 1990). The government therefore decided to abandon the former "dual writing system" in favor of exclusive use of *Hangeul,* the Korean script invented by King Sejong the Great in the 1400s. The government also set up adult schools, and concentrated their educational focus on the illiterates ages 12-50. Through these efforts, North Korea claims that they were able

[6] *Hanjja* (한자: 漢字) are the Chinese characters which prior to the invention of *Hangeul* comprised the entirety of the Korean writing system and up to the Japanese occupation still represented the writing of the educated class.

to completely eradicate illiteracy by 1949, a mere four years after liberation (Kumatani, 1990). Once all North Koreans were reportedly able to read, the Party, led by Kim Il Sung, was able to spread its ideology to all corners of the communist nation. "In North Korea the eradication of illiteracy was an essential prerequisite to enable the party and the government to spread their policies among the people" (Kumatani, 1990). With this prerequisite fulfilled, the Party put into effect their second wave of language planning. This second wave did not occur until after the armistice was signed during the Korean War.[7]

Traditionally, prior to the split of the peninsula, "standard speech" or 표준어 /pjo.jun.ə / was based on the Seoul dialect. Seoul[8] had been the capital of the Korean peninsula since 1392, from the beginning of the Joseon Dynasty[9] (Hill & Kim, 2001). Seoul's status as the nation's capital elevated the local dialect to become the standard form of speech for Koreans. Following the split, North Korea didn't want to maintain the speech of the feudalistic South's capital as their own standard form, so they came up with their own standard, "cultural language" or 문화어 /mun.hwa.ə/, based on the dialect of Pyongyang, the capital city of North Korea. Kim Il Sung touted the Pyongyang dialect as the "cultural language" because "[Pyongyang] speech contains the most exuberant and the most refined words composed of the best elements, since [Pyongyang] was full of revolutionists and intellectuals from all over the world, as well as South Korea, and was headquarters of the foundation of the republic" (Kumatani, 1990). One problem with adopting the Pyongyang dialect as the "cultural language" is that traditionally the

[7] The Armistice signed on July 27, 1953 put an end to the fighting in the Korean War; however, it did not officially end the war. Technically the Korean peninsula is still in a state of war. Also, it is interesting to note that while a representative of North Korea and a representative of the United Nations Command both signed the armistice, no representative of South Korea ever signed the document.

[8] Since its foundation in 1104, Seoul has gone through a number of names. It started out as Namgyeong, then changed to Hanyang and then Hansung during the Joseon Dynasty and finally to Seoul in the late 1800s.

[9] The Joseon Dynasty lasted from 1392 until the beginning of the Japanese occupation in 1910 (Cumings, 2005).

Pyongyang accent was seen as a country dialect or 사투리 /sa.tu.ɾi/. Those who used it were seen as somewhat uneducated and rustic by those who spoke the "standard" Seoul dialect. Since North Koreans now speak in this dialect and use some of the vocabulary formerly considered pastoral slang in their formal speech, many South Koreans look on the North Korean accent as quaint and uneducated. This view is not aided by the fact that many colloquial words that were only used in speech were adopted into formal written Korean in the North because they originated from pure Korean words and were therefore used to replace some of the Sino-Korean words. While the North viewed this as a necessary step towards purifying the Korean language, the South sees this use of colloquialism in formal writing as another sign of the North's rusticity and lack of education (Kumatani, 1990). In the end, standardization of colloquial forms has served to widen the gap between North Korea's "cultural language" and South Korea's "standard language."

After the selection of Pyongyang speech as the North's "cultural" dialect, the government body in charge of language planning moved on to "fixing" the lexicon (King, 2007). Their first act was to attempt to cleanse the language of all words that represented the old system. These terms were either banned from use, or they underwent pejoration. "New revolutionary terms were coined during the course of partisan struggle, while words reflecting the old-fashioned society were scarcely used" (Kumatani, 1990). This "old-fashioned society" was the society of feudalistic and capitalistic Korea. Thus the Confucian terms of address based on age, occupation, and social level largely went into disuse. In communist society all are supposedly considered to be on equal footing, thus the formerly stratified system of address was leveled so that 동지 and 동무 /dong.ji/ and /dong.mu/ or "comrade" became the acceptable forms of address in the North,

and any of the former stratified forms of address became negatively associated with feudalism, the South, and that great enemy, the United States.

In a third wave of language reform, beginning in 1966 and continuing through to today, the governing body over language, as guided by Kim Il Sung, set out to cleanse the Korean language of foreign influence. This attempt to purify the Korean language began by "replacing every Sino-Korean term with a pure Korean one as far as possible" (Kumatani, 1990). According to a South Korean dictionary, 52 percent of Korean words are Sino-Korean. This number was probably similar in the North prior to their implementation of language policy. In a sample survey of three Korean dictionaries conducted by Kumatani (1990), results showed that in the 1962 North Korean dictionary, the lexicon was comprised of 38 percent Sino-Korean words and 14 percent compound Sino-Korean/Pure Korean adding up to 52 percent of the words having some Chinese influence, with 36 percent pure Korean. However, in a 1981 North Korean dictionary the number of Sino-Korean words had decreased to 18 percent while the number of compound Sino-Korean/Pure Korean had increased to 18 percent, still showing that the total of Chinese-influenced words had decreased to 38 percent of the total vocabulary. Also supporting the claim that they successfully cleansed a large number of foreign words from their vocabulary is the increase in pure Korean words to 54 percent of the total entries. The amount of pure Korean words in South Korea on the other hand, in their 1982 dictionary had decreased to only 17 percent, 37 percent being accounted for by Sino-Korean words and compounds, and 24 percent by foreign word borrowings from non-Chinese sources. There was a further 8 percent of the total made up of compounds between Chinese particles and other foreign loan words. If these statistics are to be believed, it would show that North Koreans have been quite successful in "purifying" their language, as well as keeping out foreign loan words. In the 1981 North Korean

dictionary, only 7 percent of the vocabulary came from foreign borrowings, a number which had not changed since the 1962 dictionary despite the takeoff of the technological age (Kumatani, 1990). It would be interesting to see how these results stand up in modern Korean dictionaries, with the advent of the cyber age.

While the results of Kumatani's dictionary study are interesting, the true state of a country's language cannot be judged strictly based on the words that appear in its dictionaries, especially in a country that uses its dictionaries as a form of linguistic control. According to Kumanati, only 30 percent of the vocabulary in the 1981 dictionary, which is asserted as the standard vocabulary of the North, "is regarded as standard in South Korea" (Kumatani, 1990). These words may not be in use in North Korea any more than they are in the South, an assertion which is further supported by the statement of a South Korean journalist who went to North Korea in 1985 and came back reporting that, "'there is no difference, since their speech is flooded with loan words, as ours is'" (Kumatani, 1990). The dictionary may just be a tool used in an attempt to wipe out the presence of Chinese and other foreign loan words. "After the 1964 'Dialogue',[10] it was ordered that the Korean dictionary be made to play the instrumental role which would unify popular speech into the officially approved and prescribed speech. As a result, strict social control, eliminating all elements inconsistent with language prescription has been applied" (Kumatani, 1990). One has to wonder, however, how many North Koreans have actually dedicated much of their time to studying the dictionary. On the other hand, if these linguistic prescriptions are taught in schools, North Korea's massive network of informants could easily ensure that the people adhere to these linguistic prescriptions.

[10] On January 3, 1964, Kim Il Sung had a "Talk with the Linguists" of North Korea, in which he set forth the path of language planning, and advised the linguists on the value of language as both a tool and a weapon.

Along with cleansing the language of loan words and words that represented the old feudal system, Kim Il Sung and his advisors set out to use language as a means of social and ideological control. This was partially achieved through semantic shift in existing Korean words. Thus many words that have the same orthographic form in both North and South Korea, as well as the same general semantic meaning, have become politically polarized. For example, in the South the word 부자 /bu.dʒa/ denotes a very wealthy person and is generally thought to be a positive term. In the North however, a 부자 /bu.dʒa/ is an unhappy victim of the old feudalistic system (Jang, 2003). This was an ingenious move on the part of the North Korean government to get inside the psyche of their people and control them. In a 2013 CNN interview with a North Korean defector, the defector, who had fled North Korea 10 years earlier, was shown current propaganda from the North and it still elicited a strong emotional response from her. This defector, who fled North Korea before the death of Kim Jong Il, said that when presented with propaganda about Kim Jong Un for the first time, she still felt that same surge of emotion and love for him that she had felt for Kim Jong Il and Kim Il Sung (Lah, 2013). Language is truly a dangerous weapon. “This language policy deepens the language differentiation between South and North Korean because lexical meaning influences human consciousness” (Kumatani, 1990). If the political and linguistic divide between the two Koreas is irrevocably stored in the consciousness of the two Koreas, it will make relations very difficult if the opportunity arises to one day reunify the peninsula.

One final piece of North Korea’s interesting language-planning puzzle is the attempt to standardize an entire language after the idiolect of a single person, Kim Il Sung. In North Korea, Kim Il Sung and the son and grandson who succeeded him in leadership are revered akin to gods.

In the place of a national religion, they simply worship their Great Leader and his descendants. Because Kim Il Sung was always in the spotlight spouting the Party's ideology, he and his language came to represent the Party. Words coined by Kim Il Sung entered into the official lexicon of "cultural language" almost immediately after his having spoken them. "The 1981 dictionary states explicitly that an attempt is made to include all the words appearing in Kim Il-Sung's works and speeches. This is the first among nine principles used as guidelines in the selection of entries" (Kumatani, 1990). So, the people in charge of language planning have raised not only Pyongyang speech as the standard form of North Korean Language, but the form of Pyongyang speech is even more specific, as it is styled specifically to follow that of Kim Il Sung, further immortalizing the Great Leader in the minds of the North Korean people.

While the changes instituted were numerous and wide-spread, they could have been even more drastic were it not for Kim Il Sung's desire not to linguistically drift further away from the South. As they were renovating the North Korean lexicon, some North Korean linguists proposed that while they were at it, they revamp *Hangeul.* However, Kim Il Sung, in his 1964 conversation with linguists, declared "Language is one of the most important common features which characterize a nation. Even though a people are all of the same stock and live on the same territory, they cannot be called a nation if they speak different languages" (Kim, 1964). With that, Kim Il Sung stopped any reform that would have taken place in the orthography in an attempt to avoid further divergence between the two nations in the hopes of future reunification. The South later made slight changes to some spellings, but for the most part the orthography used by both sides remains almost identical.

North Korea's language policies have served the purposes of spreading literacy to all its citizens, ensuring the continued indoctrination of successive generations to the ideology of the

regime, as well as cleansing the language as much as possible from outside influences. Due to North Korea's clandestine nature, it is difficult to know for sure to what extent these language policies have been effective. However, the few cross-border talks, as well as the speech of scores of defectors who have fled to South Korea have given scholars plenty of data affirming that the policies have been successful enough to cause some serious lexical divergence to the point that often North Koreans find it difficult at first to operate in South Korean society due to the lexical changes that were strictly instituted in the North as well as the massive number of foreign loan words in common usage in the South (Yeon Ah, 2012).

2.3.2. *South Korean Language Planning*

In contrast to its Northern counterpart, most studies have shown that South Korea's linguistic change over the past 70 years has been on par with the rest of the world, as affected by the establishment of English as a global lingua franca and the advent of the technological age. This is what makes the two Koreas ripe for a comparison of natural language change versus ideologically driven language planning. Since the end of the Korean War, when South Korea established a somewhat stable government under the controversial military leader Syngman Rhee, there has not been much official language planning enacted in the South. Most of the campaigns have been instigated by the people, and though some have found support in the government, there was very little government policy enacted to enforce the desired linguistic changes. Campaigns in the South echoed many of the policies enacted in the North; however, compared to the North, the South's government took a very *laisser-faire* attitude towards language policy. Eventually in the South even the idea of strict language planning became negatively associated with the leaders of the North (King, 2007). There have been several cycles of *Hangeul* only campaigns, each meeting with a certain level of success, but they have never

been able to rid South Korean publications entirely of the Chinese characters. There have also been campaigns to alter the orthography, as well as purify the South Korean language from loan words. These various attempts at forced linguistic change were successful only to varying small degrees. In King's evaluation of South Korean language planning, he states that while "there has been less forceful and widespread government intervention in language matters" (2007), the consequences of this hands-off attitude has been that rather than purifying the Korean language, in the South, even more foreign loanwords have entered the language. Still, in a democratic environment, the constant back and forth typical of group decision making is expected; truly effective, strict language planning cannot take place outside of an authoritarian system.

Directly following the end of WWII, when the Japanese were forced by their defeat to relinquish their claim to the Korean peninsula, the new South Korean government, driven by the fresh wave of nationalism, made some attempts to "purify" the Korean language, similar in some respects to what was happening at the same time in the North. During the Japanese occupation, as the Japanese were threatening to erase Korean from every facet of life, a group of Korean nationalists set up a society for the promotion and preservation of their language. To this end, the members of this society created a "Unified Orthography" that would unite all of Korea in the spellings of their lexicon. They also wrote a variety of papers all with the aim to creating a "pure" Korean language (Song, 2001). These men were imprisoned by the Japanese; some died before the end of their confinement. These men are now seen as national heroes. Once the Japanese were evicted from the country, in the new spirit of patriotism, the Koreans immediately adopted this "Unified Orthography" without serious consideration as to the consequences. This orthography was based on the Seoul dialect's pronunciation, as well as outdated traditional spellings. Thus, with the implementation of the Unified Orthography, *Hangeul* became a

morpho-phonemic writing system as opposed to the phonemic writing system it was originally intended to be (Song, 2001). There would later be a long period of attempted revision of this Unified Orthography, but it ended with the various scholars involved deciding to maintain most of the original changes. Currently, one major difference encountered when comparing North and South Korean scripts is that the word initial flap ㄹ /ɾ/ has been either removed or replaced with ㄴ /n/ in the South, whereas in the North, they have maintained the flap in the word initial position.

South Korea has also spent decades wrestling with extent to which *Hanjja* should be used. Following the end of the Japanese occupation, there was a strong drive towards *Hangeul* only. Riding the wave of nationalism, this first campaign met with great success, until many of the intellectuals in South Korean society realized that obliterating Chinese characters from writing and from the educational curriculum would result in generations of Koreans who could not read any of the old Korean texts. Also, the use of Chinese characters linked them culturally with the rest of Eastern Asia, and to some, the idea of cultural seclusion was not appealing. "The elimination of *Hanjja* would […] cut them off from the 'Asian Cultural Block,' to which Korea, China and Japan all belonged (the use of Chinese characters being one of the bonding factors)" (Song, 2001). Thus the education department drew up a list of 1200 *Hanjja* that all Korean students should be expected to know by the end of their education. Often during this time, *Hangeul* only supporters were suspected of being communists or North Korea sympathizers, as they were supporting linguistic change mirroring that being instituted in the North (Song, 2001). After a few more waves in which studying *Hanjja* was thrown out and once again re-established in the educational system, the South Korean Ministry of Education finally decided on 1800 characters that students should be able to recognize and use by the conclusion of their schooling.

However, nowadays, *Hanjja* can really only be seen in newspapers and advanced academic writing, and not anywhere near the extent to which it had been used previously. Many Korean students, though they spend years memorizing characters in school, cannot use them to any extent, only recognizing the most commonly used ones: e.g. country names, dates, etc..

There was a drive for a time in the South to purify their language of loan words, just as the North was doing. However, due to lack of government support for the issue, it soon died out with very little success. There was limited success in cleansing the language of a large number of Japanese loan words, fueled mostly by the Korean people's dislike of the Japanese following colonization. They used pure Korean or Sino-Korean particles to create new words with the same semantic meaning to replace many of the borrowed words. This campaign was not fully successful however, and many words adopted during the time of colonization still remain in common usage in South Korea; e.g. 아라바이트 (/a.ɾa.ba.i.tɯ/, part-time job), 호치키스 (/ho.tʃi.ki.sɯ/, stapler), and 가방 (/ka.baŋ/, bag).

One of the reasons for the South Koreans' lack of drive to implement linguistic reform was the government's preoccupation with economic advancement. Their desire to quickly become a developed country and economic powerhouse precluded most thoughts of language planning. Another consequence of this drive to succeed was that "the opening of Korea to the outside world in response to globalization […] forced the country to assimilate elements of foreign cultures" (Yim, 2007). If South Korea had cut itself off from the world to preserve its language and culture, it would currently be in the same dire economic situation in which the North is currently entangled.

2.3.3. *Linguistic Variation*

The North maintains a very separate culture from that of its neighbors, and does not accept influences from other cultures. They strive to maintain their image as "the purest race." One main difference between the North and South Korean dialects is the amount of borrowing from other languages that happens in the South. Through American movies, television, music, and the prolonged presence of American troops in the South, they have become what the North call "cultural flunkeys" (Mukherjee, 1983). This cultural flunkeyism is very apparent when comparing North and South Korean films. The dialogue in North Korea films is almost purely Korean, whereas in South Korean films, even in the 1950s, foreign loanwords are constantly inserted into the characters' speech.

Word selection and style are also very different between the two countries. However, no major studies have been done on this topic. Still, it is obvious in print and visual media from both countries that while in North Korean there are constant references to their leader and political system in news broadcasts, dramas, films, and literature, in the South, references to the country's leadership and political system are generally confined to the news or political papers. The communist regime has transformed North Korea's speech and writing style, due mostly to the government's strict control of the state's media. Though not the pursuit of the study at hand, this is a topic ripe for future research.

Phonetically, because the standard forms of each country's language are based on separate dialects, there are inherent differences. While both dialects maintain the same set of basic phonemes, they vary somewhat in prosodic features as well as varying situational usage. For example, in a series of interviews with South Koreans, the most consistent difference pointed out between North and South Korean speech was the variation in intonation patterns (Morgan,

2014). In the North, at the end of a sentence, the intonation is more likely to rise, then fall sharply, especially in the speech of North Korean women. On the other hand, in the South, speech maintains a more even tone. Also, in the North, as mentioned in the previous section, word-initial liquids are still used in both spelling and pronunciation, whereas in the South, they have either been removed or changed to a nasal. On top of that, many word initial nasals which are used in the North have also been removed in the South. However, even in the 1990s, most linguists maintained that other than inherent dialectal differences, there is no phonetic variation between the two nations' standard forms (Lee, 1990). The purpose of the study at hand is to show that apart from the lexical variation that has been observed between the two countries, phonetic variation is also starting to cause more extreme divergence between the two standard dialects of Korean.

2.4. Previous studies

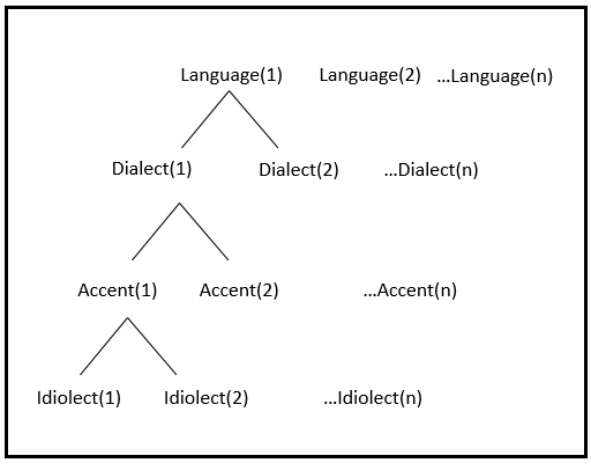
The topic of phonological variation and change in Korea, while underrepresented, has not been wholly ignored by linguists. However, most of the phonological research is focused on phonetic change in the standard dialect of South Korea. Very little recent work, especially in English, has been done on the dialects of the North, most likely due to the difficulty of acquiring data from the hermetic country. As of yet, there have not been any comparative diachronic studies of the phonologies of the standard dialects of North and South Korea.

One of the earliest and most well-known comprehensive, dialectal studies of the Korean language was carried out by Ogura Sinpei, a Japanese linguist during the time of Japan's colonization of Korea. He was very interested in the Korean language, most specifically dialectology, and spent years on the peninsula gathering data for his dissertation entitled "The

outline of the Korean dialects." He contributed much to the study of Korean dialectology through the papers he published during his lifetime (Ogura, 2009). Recently, his research was rediscovered at Tokyo University. It was compiled into *The Korean Dialect Dictionary,* a book that shows the geographic boundaries of Korean dialects in the early 1900s through lexical variation and difference of pronunciation.

Another study on Korean dialectal variation was carried out by Kim Young Hwang, a professor of Korean linguistics in North Korea (Kim, 2013). Due to his ability to access material in the North and to some degree material from the South, his analysis gives a pretty good dialectal picture of the Korean peninsula. His study was published in 1982 in North Korea, but was not made available through a South Korean publishing company until 2013, at which point the information contained within its pages was already out of date. However, it paints a more up to date picture of North Korean dialects than Ogura Sinpei's study from the early 1900s. His study attempts to describe the lexical, grammatical, and phonological variation that takes place in the different parts of the peninsula. In his book, Kim provides a chart (Figure 1) that outlines how North Koreans envision variation between different versions of speech. The chart shows that languages are split into dialects, dialects are split into accents, and accents are split into idiolects (Kim, 2013). This four part distinction shows that while they realize that there is more than just pronunciation variance between the different versions of Korean spoken around the peninsula, this added lexical and grammatical variation merely creates dialectal distinction as opposed to language distinction.

Figure 1: Language Division Chart (Kim 2013)



Most linguists would agree that the two Koreas still speak dialects of the same language, yet this flowchart shows that they are but one step away from splitting into two languages. Both Ogura and Kim's work have been invaluable contributions to Korean dialectology. However, because both of their studies center on the variation between dialects they do not offer much insight into what was considered the standard form of language at the time of their studies.

Lisa Jeon, a graduate student at the University of North Texas, also noting the lack of current research in Korean dialectology, performed a study to determine dialect boundaries and speech attitudes (Jeon, 2013). Her study, though yielding only preliminary results, indicated that Koreans' perceptions of dialect boundaries are not limited to administrative boundaries. The study also has implications for a study of associations between language and place. Jeon's results showed that while most Koreans refer to the varying kinds of speech of mainland South Korea as /sa.tu.ɾi/ 사투리, or accents, they refer to the language of Jeju Island and North Korea more commonly as /baŋ.ən/ 방언, or dialects. This would imply that they feel the language of the North is much further from the Seoul standard than the language of other areas on the southern half of the peninsula. By categorizing North Korean speech with that of Jeju, it further suggests that North Korean Korean is on the brink of becoming a separate language, as predicted using Dixon's assertion that once two dialects reach a percentage of mutual unintelligibility higher than 25, the potential of rapid divide into separate languages is highly likely (Dixon, 1997). Many South Koreans admit to being unable to understand Jeju speech. When it is featured on television programming, there are always subtitles translating the dialect into the standard form. Another interesting result uncovered in Jeon's research is the grouping of all North Korean speech into one dialect, while splitting the speech patterns of the South into six different dialect

areas. This result is a strong indication of the lack of contact South Koreans have with the speech of North Korea. Despite the communist government's attempts to level the language, similar to the South, the North still contains various dialect groups. However, South Korean citizens have not had contact with these different Northern dialects, and are only familiar with the standard they hear being mimicked in television dramas and movies, as well as the bombastic speaking style of Northern television anchors. This isolation from varied Northern speech has made it more difficult for the South to differentiate between Northern dialects.

For her dissertation at the University of Pennsylvania, Yunsook Hong conducted an in-depth synchronic study of the standard Seoul dialect (1991). This study is probably the closest previous research to the study at hand. For her study, Hong interviewed 52 speakers of the Seoul dialect, half male and half female. She was especially interested in examining the South Korean vowel system and the mid-front merger[11]. All data was collected through personal, tape-recorded interviews with the subjects. She separated her subjects into five age groups, and then separated subjects within each age group by level of education, resulting in a total of 19 different groups. The main problem with this study was that by the time you divide the total number of test subjects by the number of groups, you end up with between two and four subjects per group, half of which are male and half of which are female. Thus in the majority of groups, two speakers' idiolects are defining the speech patterns of that entire social group. The study was wonderfully designed and within the limitations imposed by the parameters of the late 1980s linguistics research framework, her work was groundbreaking. She was one of the first to use tape-recorded materials to analyze modern Seoul Korean. Since this study, however, technology has evolved,

[11] The mid-front merger in Korean is the merger of 에 /e/ and 애 /ɛ/ into a single phoneme. It has been going on for quite some time, and Hong (1991) showed in her study that especially in younger generations, the merger is seemingly complete.

as has access to more audio recordings from throughout the last century. Thus with Hong's study as a solid foundation, the Korean vowel system is ready for an even more in-depth, diachronic investigation. As part of the discussion in chapter 5, the 1980s results of this paper's study are compared with Hong's results, using the group that most closely corresponds with the subjects selected for this diachronic study, the 24 year-old male.

A 2006 study on word-initial stops in the standard Seoul dialect provides acoustic evidence that phonological shifts have begun to emerge in South Korea (Silva, 2006). The study tested word initial stops in South Korea, looking specifically at voice onset time (VOT) for the three different types of word initial stops in the Korean language: lax (ㅂ /b/,ㅈ /dʒ/, ㄷ /d/, ㄱ /g/)[12], aspirated (ㅍ /pʰ/, ㅊ /tʃʰ/, ㅌ /tʰ/, ㅋ /kʰ/), and tense (ㅃ /b'/,ㅉ / dʒ'/,ㄸ /d'/,ㄲ /g'/). The study concluded that while VOT had not changed for tense word-initial stops since the 1960s, the VOT of lax stops has decreased in the last 50 years to the point that in production, they now closely resemble their aspirated counterparts. The difference between VOT in some speakers' productions of the lax/aspirated stops has even decreased so much that they now overlap, and the phonetic structure of the language is developing to create a new way to distinguish between the merging sounds. The study went on the provide evidence that tone was re-entering the Korean language as the new prosodic feature used to differentiate between the lax and aspirated word-initial stops. Historically, Middle Korean (~918-1592 C.E.) utilized tone to differentiate between certain phonemes. There were three tones, Even Tone, Going Tone, and Rising Tone, which were represented by zero, one, or two dots to the left of the *Hangeul* representation of the syllable. Use of these dots to represent tones has gone into disuse, as has the use of tones in the

[12] In this and the following transcriptions, the Korean orthographic representations of the phonemes are immediately followed by the IPA equivalent of the same phoneme.

standard dialects of both Koreas since Early Modern Korean (~1600 C.E.-1900 C.E.) (Lee & Ramsey, 2000). However, this study shows the first indication in Modern Korean that tonal contrast has begun to re-enter the standard form of the language. If phonetic changes are occurring in the consonants of the standard form of South Korea's language, it would provide a basis for the assumption that other phonetic changes are taking place as well.

More studies have been performed on prosodic features of South Korean dialects including a 2004 study to determine the prosodic features and pitch accent in Northern Kyungsang Province (Jun, J.H.; Kim, J.S.; Lee, H.Y. & Jun, S.A. 2004) and a 1988 study mapping the prosodic features of Daegu speech (Kim, 1988). However, these studies don't deal with changes of actual phonemes, but rather change in intonation patterns and pitch accent in variance to the standard Seoul dialect.

One study more closely tied to the study at hand is Chin-Wu Kim's 1968 description of the Korean vowel system (Kim, 1968). In his description, Kim lists 19 Korean vowels, nine of which are monophthongs. Kim's study takes a generative approach based on Chomsky's theories. Therefore his description outlines the Korean vowel system as "a system of ordered rules that relate the 'underlying' or 'systematic phonemic' representation to phonetic representation" (Kim, 1968). This is the closest that the available research has come to a full vowel inventory. However, this study describes a system based on the underlying rules and the limited observations of the researcher without provisions of empirical evidence to support his assertions. On top of that, it is almost 50 years old. Since then, economic success and globalization has had drastic effects on the South while isolation and ideological revolution have had their effects on the North. What's more, contemporary Korean scholars generally only

observe eight monophthongs in Korean (Lee & Ramsey, 2000) as opposed to the nine that Kim observed in this study.

Another of the recent investigations into Korean phonology was carried out by Park Junsuk of Michigan State University. In 2007 he published a study of phonological changes that have taken place in Korean since the 1980s. According to Park, since the 1980s, Korean has experienced "(1) vowel shortening in near homophones, (2) the merger of different final consonants into one consonant at word-final position and (3) consonant cluster reduction" (Park, 2007). Park's research leads him to conclude that near homophones are now differentiated by vowel length. He also states that unreleased, syllable-final consonants have merged. Thus while in the orthography you'll often see a variety of symbols used, in phonological production, in certain phonetic environments, all of these symbols will be pronounced as an unreleased /d/ (ㄷ) or /k/ (ㄱ), depending on the place of articulation of the original orthographic symbol. Finally, Korean doesn't generally use many consonant clusters, in fact, orthographically they can only appear in a syllable final position. Park's research shows that these syllable final consonant clusters are almost always reduced to a single sound in production. Which sound is produced depends on the adjacent phonetic environment. Park has noticed that changes are occurring and in his attempt to describe them, opens up avenues for extensive future research. Thus further investigation is needed to determine the current trends concerning both Korean consonants and Korean vowels.

2.5. Gaps in Research

The above studies and research are by no means comprehensive of all the work that has been done regarding the Korean language. However it is a fairly accurate representation of the

span of research that has been done. From the above research, it is apparent that much has been done concerning lexical variation between North and South Korea. However, more research could still be done, placing these lexical differences in a historical environment highlighting the polarization of once neutral terminology with the possibility of expansion to calculate the extent of the polarization. Future research could also be done to see how many of the lexical items North Korea created following WWII are actually in use by the North Korean people. Like all North Korean research, though, this would be difficult to determine as natural North Korean speech is next to impossible to acquire. Apart from this, lexical variation has been pretty well covered in the literature.

This leaves morphological/syntactic, as well as phonological variation. Both have been referred to in some of the above studies, but while they point out differences between the two dialects or claims of a change, they offer very little empirical proof that these differences exist. It is part of the phonological portion of this gap that the following research strives to fill. The literature offers very little in the way of phonological analyses of North and South Korean dialects. This study looks at the vowel system, more specifically monophthongs, which leaves diphthongs, consonants, and prosodic features, as well as morphology and syntax to be investigated in future studies. A comparative analysis of North and South Korean vowel quality over the past 70 years will provide insight to the peninsula's phonology, and should the results prove positive for change, it would provide a basis for further research into diphthongs, consonants, and prosody.

In recent linguistic studies, theoretical frameworks for language change have not been applied in any investigations of the modern state of the Korean language. The theoretical frameworks mentioned in Section 2.1 could provide possible explanations for the linguistic

changes that have taken place on the Korean peninsula over the past century. The lexical changes that have taken place, causing the lexicons of the two Koreas to diverge, are undeniable. However, there is very little evidence thus far of phonological divergence. This is most likely due to the scarcity of phonological data from North Korea. Perhaps the results of the current study will lay some groundwork for future explorations on the subject, leading to empirical evidence proving phonological shifts in the standard dialects of the two nations.

Chapter 3: Methodology

3.1. Data Collection

Due to the impossibility of performing interviews in each of the time periods, audio samples for the acoustic analysis were taken from movies filmed in the 1950s, 1980s, and 2010s. As far as it was possible, movies selected for data collection were those filmed in the capital of their respective countries, with the main actors and actresses utilizing their country's standard dialect. For the earlier films in North Korea, as there wasn't much selection, whatever films were available were used for data collection regardless of subject matter.

3.1.1. *Sources of North Korean Vowel Samples*

Publicly available North Korean audio data from the 1950s/1960s is somewhat scarce. The samples for the study at hand were harvested from two of the three films that could be accessed online, the third having such bad sound quality that no useful data could be taken from it. North Korean vowel samples from the 1950s were collected using videos uploaded onto North Korea Today (DPRK News Channel)'s Youtube channel. These samples include the 1957 film *Malkongbujaengi (말공부쟁이)* and the 1955 film *"Comrades! Take this gun!"("동지들! 이 총을 받아주!")*. Both are short films made following the Korean War, mostly centered on those who fought and died in the battle for communism. The 1980s data was much easier to come by. It was taken from the films *The Lighthouse (등대, 1983), A Forest is Swaying (숲은 설레인다, 1982),* and *Wolmi Island (월미도, 1982).* All three films, like most North Korean cinema, tell a story of one patriot who loyally serves the nation and people, contrasted with another character who displays selfish tendencies, but by the end of the film learns the error of their ways and

follows the protagonist's patriotic example. For the data from the 2010s, the following films were used: *The Day of Father's Return* (*아버지가 오는 날*, 2010), *Glow of Sunset in the Mountain Village* (*산촌에 피는 노을*, 2010), and *Wheel of Happiness* (*행복의 수레바퀴*, 2010). As with the films from the 1950s and 1980s, these films all revolve around the glorification of those who live with communist zeal and follow Juche[13] ideology closely, while those who begin to stray from the ideology find themselves unhappy, realize the error of their ways, and return to the fold. North Korean movies from the 1980s and 2010s were accessed through the DPRK Video Archive YouTube channel. To ensure accuracy of the videos' dates, further research was conducted through the Joseon Film Archive available on North Korea's news and information service *Uriminzokkiri*.

3.1.2. *Sources of South Korean Vowel Samples*

South Korean samples were also taken from the audio tracks of films from the respective time periods. The films from the 1950s and 1980s were accessed through the Korean Film Archive's YouTube channel. For the 1950s, the films *The Hyperbolae of Youth* (*청춘쌍곡선*, 1956), *The Widow* (*미망인*, 1955), and *Holiday in Seoul* (*서울의 휴일*, 1956) were used. Each story is set in Seoul, with plot lines involving love, and various societal issues of the time, such as women's roles and socioeconomic class distinctions. For the 1980s, the films *Manchu* (*만추*,

[13] Juche is a term coined by Kim Il Sung to describe the attitude of the ideal North Korean patriot. It is difficult to define, but is generally loosely translated as self-reliance. According to Takeo (1976), "establishing Juche means that the people approach the revolution and construction in their own country as masters. In other words it means the embodiment of independent and creative spirits; the people must adopt an independent and creative stand to solve mainly by themselves all the problems arising from the revolutionary struggle and constructive work, in the context of their own country's actual conditions." In other words, Koreans and Koreans alone can revolutionize Korea.

1981), and *The Memo of a 21-year-old* (*스물하나의 비망록*, 1983) were used. The eighties were an experimental time for South Korean cinema with stories of strange love matches between people of varying backgrounds and predominately unhappy endings. Finally for the 2010s, data was gathered from the films *Hello Ghost* (*헬로우 고스트,* 2010), *Villain and Widow* (*이층의 악당*, 2010), and *Finding Mr. Destiny* (*김종욱 찾기*, 2010). These films were all set in modern day Seoul involving a mixture of genres including intrigue, romance, comedy, and horror. The 2010s South Korean films were all taken from the researcher's personal film collection.

After film selection, the audio tracks of the films were separated from the video using VLC media player's video to mp3 converter or the TTFA Voice Recording software. To ensure accuracy of the spectrogram, all audio files were converted to .wav files using Audacity's audio editing software. The audio files were then imported into the phonetic analysis software Praat for vowel mining. Vowels were selected from the movie's dialogue using the following criteria. Only word initial vowels or vowels following stops or fricatives were collected. All vowels were taken from commonly used Korean words or grammatical components. For example, from the words 밥 /bab/ (rice), and –겠어요 /gɛ.sə.yo/ (will/may) the vowels /a/, /ɛ/, and /ʌ/ could be collected for analysis. A word or grammatical component was considered to be commonly used if the primary researcher, a non-native speaker of Korean, could easily pick out and understand the meaning of the word or grammatical component without the use of a dictionary. A full list of words, times and measurements is available in through the link provided in Appendix B.

Korean has a vast vowel system, utilizing single, double and triple vowels. For the purpose of this study, diphthongs were not investigated; only single phoneme vowels were collected and analyzed. In Korean, double and triple vowels consist of two or three of the orthographic single vowels put together to make a new sound. For example, /u/ (우) and /i/ (이) combined become /wi/ (위). Generally, the vowels join to create a diphthong, but in two specific cases, the orthographic double vowel in production is still a monophthong: 아 /a/ and 이 /i/ combine to make 애 /ɛ/, and 어 /ə/ and 이 /i/ combine to make 에 /e/. These two cases were included in the study for two reasons. First they are one single sound, rather than a diphthong and therefore fit the definition of a monophthong despite their orthography. Second, though the two sounds are represented differently in the orthography, in modern day South Korean, they are pronounced almost exactly the same (Hong, 1991). This study will be able to determine how closely the two orthographic constructions are in actual production and investigate if that has been a consistent merger over the last 70 years, or if it is a merger that has happened since the divide of the peninsula. With only the six single vowels and the two double vowels, the following list is comprised of those vowels that will make up the data for this study: /a/ (아), /ə/ (어), /o/ (오), /u/ (우), /i/ (이), /ɯ/ (으), /ɛ/ (에), and /ɛ/ (애).

Vowels were taken from 190 adult subjects with the following distributions: 1950s North Korea, 24 subjects; 1980s North Korea, 33 subjects; 2010s North Korea, 37 subjects; 1950s South Korea, 40 subjects; 1980s South Korea, 30 subjects; and 2010s South Korea, 26 subjects. Seventy-nine of the subjects were female, with 34 from the North and 45 from the South, while

111 subjects were male, with 58 from the North and 53 from the South. Of the 7156 total vowel samples collected, 3148 were collected from the female subjects and 4008 were collected from the male subjects. At least 600 vowel samples were collected from each gender, from each country, for each decade. The higher number of samples taken from males is mainly due to the lack of availability of female audio from 1950s North Korea, resulting in the collection of no more than 190 vowel samples for that group of subjects. To make up for lack of female samples, a total of 908 male vowel samples were collected from 1950s North Korean audio samples.

Table 1: Gender Distribution by Nation and Decade

	1950s	*1980s*	*2010s*	*Total*
North Korean Men	18	20	20	*58*
North Korean Women	5	11	18	*34*
South Korean Men	21	15	17	*53*
South Korean Women	19	12	14	*45*
Total	*63*	*58*	*69*	***190***

Subjects were selected based on the clarity and volume of their speech. In some of the older movies, the sound quality made it impossible to use some of the data, thus only those actors and actresses whose vocal performances could be clearly understood over the static of the recording were considered valid sources of vowels. In the 1980s and 2010s due to the wider availability of films, the data was harvested only from actors who appeared to be between the ages of 20 and 40. This helped to control as far as was possible the variable of age, ensuring that no contemporaries would be measured in different decades. No data was collected from any teenagers, children, or elderly people due to the possibility of crossover with other time periods, which could compromise the legitimacy of the data.

Each film was watched in its entirety and the vowel samples were taken from various parts of each film. In order to ensure naturalness and clarity, no data was harvested when

characters were crying, drunk or talking with food in their mouth (which ruled out a surprisingly large amount of data in modern South Korean films). The usage of standard dialect was also an important factor in subject selection. As determined by the story line of each film, characters were selected based on their residence and upbringing in Seoul or Pyongyang. Because there is not much information available on North Korean actors, it was impossible to guarantee the selection of only actors and actresses from Pyongyang, but it is most likely that someone with enough beauty, talent, and loyalty to the country's communist regime to be allowed into the film industry would be granted a residency in North Korea's prestigious capital. For the South, stories that took place predominately in Seoul, or concerning people from Seoul were selected to ensure that the dialect being used in the film was predominately the standard dialect of the country. Also, thanks to the availability of information concerning South Korean actors from the 1980s until now, for the later decades, actors who were either born or educated in Seoul were given preference in subject selection.

Actual vowel collection was done by hand using Praat. Consideration was given to the use of a script in order to collect the vowel samples computationally. However, due to the unreliability of available scripts, and the necessity of double checking all vowels to ensure that the script was reliable, it was determined by the researcher that measuring vowels by hand would ultimately yield more accurate results as well as be more time-effective. Vowels were measured by placing the cursor at the zenith of the frequency curve of the vowel, then recording the measurements for the first and second formants. The measurements were then imported into a Microsoft Excel spreadsheet along with a record of the character who said the word, the word the vowel came from, the time within the recording that the vowel occurred, as well as the decade, nationality and gender of the speaker.

Though using data from films made it impossible to control certain elements, everything possible was done to ensure that samples were taken from similar phonetic environments, from people of similar age, speaking the standard dialects of their country. Despite the limitations placed on this study, the results give an idea of the trends of Korean vowels over the last 70 years and indicate whether or not vowel shifts might be immerging on either side of the 38th Parallel.

3.2. Data Analysis

The data was brought to Dr. Dennis L. Eggett of the Brigham Young University Statistics Department who used a mixed models approach to determine the significance of the variance between each vowel in each country based on the variables of decade and gender. The data was separated by nationality, and within nationality, the data was further separated by vowel. Finally each vowel was separated by formant and separate analyses was performed for each. A mixed models analysis of variance (ANOVA) was performed for each vowel. As each character provided multiple observations of each vowel sound, for the mixed ANOVA Eggett blocked on the variable of character. F1 and F2 were the dependent variables in each analysis. The initial model contained decade, gender, and their interaction as independent variables. The effects that were not significant were removed from the model. Means from the final model were examined. An alpha level of 0.05 was used to determine significance. All analyses were performed using Proc Mixed in SAS version 9.3. The complete output of the statistical analyses is available through the link provided in Appendix A.

Chapter 4: Results

The next chapter will go through the results of the statistical analyses in two major sections. First the results of the North Korean data will be examined, followed by a survey of the South Korean data. Within each nation, the results will be broken down by vowel. Each vowel will be examined separately to see if its variance between the 1950s, 1980s and 2010s is statistically significant. For the majority of the formants analyzed in this study the interaction between the factors of gender and decade was not statistically significant. However, for the analysis, because a few of the cases were significant, estimated means for vowels that showed significant interaction between gender and decade were calculated separately by gender within each decade. The estimated means of vowels that did not display significant interaction between the variables of gender and decade were not analyzed separately by gender within each decade.

4.1. North Korea

Results of the statistical analysis on the North Korean monophthong data were predominately not significant. In the sections below, the least squares means are analyzed only for those vowels whose p-values for tests of fixed effects turned out significant for the variable of decade. Because the decade variable is the main variable under observation in this study, if it is not a significant variable for a monophthong, it can be concluded that that vowel has not undergone any sort of significant vowel shift in the past 70 years in North Korea.

4.1.1. */a/ (ㅇㅏ)*

The only North Korean vowel that showed significant variance for both gender and decade in North Korea was the /a/ phoneme. The decade variable showed significance with p-values of 0.0010 and 0.0030 for F1 and F2 respectively. The variable of gender showed

significance with p-values of <.0001 for both F1 and F2. There was no significant interaction between the variables of decade and gender.

Figure 2: North Korean /a/ (아) Tests of Fixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	69	7.68	0.0010
	Gender	1	69	95.84	<.0001
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	69	6.34	0.0030
	Gender	1	69	151.88	<.0001

The estimated means for F1 and F2 in the 1950s were calculated as 750.00 Hz and 1618.85 Hz. For the 1980s they were 769.73 Hz and 1602.95 Hz. Finally for the 2010s the mean F1 and F2 estimated means were 706.63 Hz and 1534.93 Hz. This data indicates a shift towards the back, as well as a raising in the pronunciation of the vowel. The /a/ phoneme is the only North Korean monophthong that displayed statistically significant variance in both F1 and F2 for the variable of decade. Other North Korean vowels demonstrating significant signs of a shift only showed significance in the F2 formant.

Figure 3: North Korean /a/ (아) Least Squares Means

	Effect	Decade	Gender	Estimate	Standard Error
F1					
	Decade	1950s		750.00	12.9176
	Decade	1980s		769.73	11.7845
	Decade	2010s		706.63	11.5432
	Gender		F	812.70	11.1083
	Gender		M	671.54	8.8957
	Effect	Decade	Gender	Estimate	Standard Error
F2					
	Decade	1950s		1618.85	19.6788
	Decade	1980s		1602.95	17.8644
	Decade	2010s		1534.93	17.0237
	Gender		F	1719.15	17.0683
	Gender		M	1452.00	13.1015

4.1.2. /ʌ/ (어)

Figure 4: North Korean /ʌ/ (어) Tests of Fixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	61	2.87	0.0645
	Gender	1	61	0.70	0.4063
	Decade*Gender	2	61	5.85	0.0047
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	63	7.65	0.0011
	Gender	1	63	13.70	0.0005

In North Korea, the /ʌ/ phoneme has an F1 p-value of 0.0645 for the variable of decade, and 0.4063 for the variable of gender, which are both higher than the threshold for significance, though the variable of decade is close to the threshold. Therefore no significant variance between decades can be taken from the /ʌ/ data. The F2 data, on the other hand had significant p-values for both decade (0.0011) and gender (0.0005). The F1 data showed significant interaction between the variables of decade and gender (0.0047), while there was no significant interaction between the two variables for F2.

Figure 5: North Korean /ʌ/ (어) Least Squares Means

	Effect	Decade	Gender	Estimate	Standard Error
F1					
	Decade	1950s		542.67	16.9566
	Decade	1980s		514.36	12.4900
	Decade	2010s		492.25	12.6757
	Gender		F	523.28	13.0455
	Gender		M	509.58	9.9171
	Decade*Gender	1950s	F	589.29	29.7812
	Decade*Gender	1950s	M	496.06	16.2230
	Decade*Gender	1980s	F	514.10	16.9040
	Decade*Gender	1980s	M	514.63	18.3918
	Decade*Gender	2010s	F	466.46	18.9473
	Decade*Gender	2010s	M	518.04	16.8432
	Effect	Decade	Gender	Estimate	Standard Error
F2					
	Decade	1950s		1454.48	23.1001
	Decade	1980s		1421.26	19.4586
	Decade	2010s		1343.18	19.7326
	Gender		F	1452.57	18.4286
	Gender		M	1360.04	15.8889

The variance for F1 was determined

not to be statistically significant; however, it was very close to the threshold for significance, and because the F2 variance was determined to be significant, both the F1 and F2 estimated means will be analyzed. Because the F1 data showed significant interaction between the variables of gender and decade the F1 estimated means must be broken down by gender as well as decade. For the 1950s, the women had an estimated mean of 589.29 Hz for F1, while the men's was calculated at 496.06 Hz. Analysis of the 1980s data calculated the F1 estimated means at 514.10 Hz and 514.63 Hz for women and men respectively. Finally the 2010s data revealed an estimated means of F1 as 466.46 Hz for women and 518.04 Hz for men. Though this variance across decades is not yet determined as significant, the data does suggest a raising of the /ʌ/ phoneme in the pronunciation of women. The estimated mean F2 measurements were calculated as 1454.48 Hz for the 1950s, 1421.26 Hz for the 1980s, and 1343.18 Hz for the 2010s. This shift in F2 indicates a significant move towards the back of the mouth in the pronunciation of the /ʌ/ phoneme in North Korea.

4.1.3. */o/ (오)*

Figure 6: North Korean /o/ (오) Tests of Fixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	54	0.18	0.8367
	Gender	1	54	1.37	0.2467
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	54	0.40	0.6734
	Gender	1	54	6.67	0.0126

For the North Korean /o/ phoneme data, the tests of mixed effects yielded no significant results with p-values of 0.8367 (F1) and 0.6734 (F2) for the variable of decade and 0.2467 (F1) and 0.0126 (F2) for the variable of gender. While F2 showed significant variation between genders, as the study is mainly concerned with the variation between decades, not genders, the

estimated means of the /o/ phoneme in the North Korean dialect will not be included in the analysis.

4.1.4. */u/ (우)*

Figure 7: North Korean /u/ (우) Tests of Fixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	53	0.50	0.6095
	Gender	1	53	2.93	0.0926
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	53	4.56	0.0148
	Gender	1	53	0.27	0.6034

The F1 measurements for North Korea's /u/ phoneme showed insignificant variance between decades with a p-value of 0.6095 for the variable of decade. The variance between genders was also determined to be insignificant with a p-value of 0.0926. While gender was also an insignificant variable for F2, with its p-value of 0.6034, the decade variable was shown to be significant with a p-value of 0.0148. There was no significant interaction between the variables of decade and gender.

Figure 8: North Korean /u/ (우) Least Squares Means

F1

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		434.64	23.4969
Decade	1980s		424.14	21.8020
Decade	2010s		452.99	19.7620
Gender		F	414.73	21.0348
Gender		M	459.78	15.2315

F2

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		1446.81	39.4405
Decade	1980s		1446.62	38.2395
Decade	2010s		1577.24	33.6580
Gender		F	1502.15	36.5898
Gender		M	1478.29	25.8592

The estimated means for the data for /u/ phoneme's F2 measurements show a sharp rise between the 1980s and 2010s. In the 1950s and 1980s the means are almost equal with values of

1446.81 Hz and 1446.62 Hz respectively. However, in the 2010s, the mean rises to 1577.24 Hz, indicating a statistically significant amount of fronting occurring in the way the phoneme is being pronounced in modern North Korea.

4.1.5. */i/ (ㅇ/)*

Figure 9: North Korean /i/ (ㅇ/) Tests of Fixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	64	1.72	0.1866
	Gender	1	64	0.03	0.8722
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	64	1.30	0.2809
	Gender	1	64	30.92	<.0001

As with the /o/ phoneme in North Korea, the /i/ phoneme only demonstrates significant variance with regards to the gender variable in the F2 data (p-value <.0001). For F1, gender did not significantly affect the data (p-value 0.8722). The decade variable did not cause significant variation in the data of either F1 (p-value 0.1866) or F2 (p-value 0.2809). There was also no significant interaction between the variables of decade and gender. Because there was no significant variance between decades, the estimated means of the North Korean /i/ phoneme require no further analysis, like all other phonemes, they will be included in the vowel chart in section 4.1.9.

4.1.6. */ɯ/ (으)*

Figure 10: North Korean /ɯ/ (으) Tests of Fixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	49	1.67	0.1990
	Gender	1	49	2.58	0.1148
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	49	1.87	0.1650
	Gender	1	49	6.83	0.0119

Consistent with the /o/ and /i/ phonemes, the only significant variance with the North Korean /ɯ/ phoneme was in regards to the effect of gender on the F2 data. While there was a significant variance indicated between genders, with a p-value of 0.0119 for that variable in the F2 data, the F1 data did not show significant variation with that same variable (p-value 0.1148). The variable of decade was not shown to be significantly correlated with variability between either F1 or F2 measurements with respective p-values of 0.1990 and 0.1650. As the variance between decades was found to be insignificant, the estimated means of North Korea's /ɯ/ phoneme will not be discussed as they offer no valuable insight into significant vowel shifts.

4.1.7. */e/ (에)*

Figure 11: North Korean /e/ (에) Tests of Fixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	68	2.43	0.0959
	Gender	1	68	0.71	0.4039
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	66	0.08	0.9254
	Gender	1	66	63.57	<.0001
	Decade*Gender	2	66	2.64	0.0787

Like the /o/, /i/, and /ɯ/ phonemes, the North Korean /e/ phoneme shows no significant variation between decades for either F1 (p-value 0.0959) or F2 (p-value 0.9254). Also like the aforementioned phonemes, the /e/ phoneme demonstrated no significant variance across genders for the F1 data (p-value 0.4039), but did show significant variation across genders with the F2 data (p-value <.0001). However, because the decade variable does not show significant variation, the estimated means for the /e/ phoneme, will not be further analyzed.

4.1.8. */ɛ/ (애)*

Figure 12: North Korean /ɛ/ (애) Tests of Fixed

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	54	1.16	0.3217
	Gender	1	54	0.75	0.3913

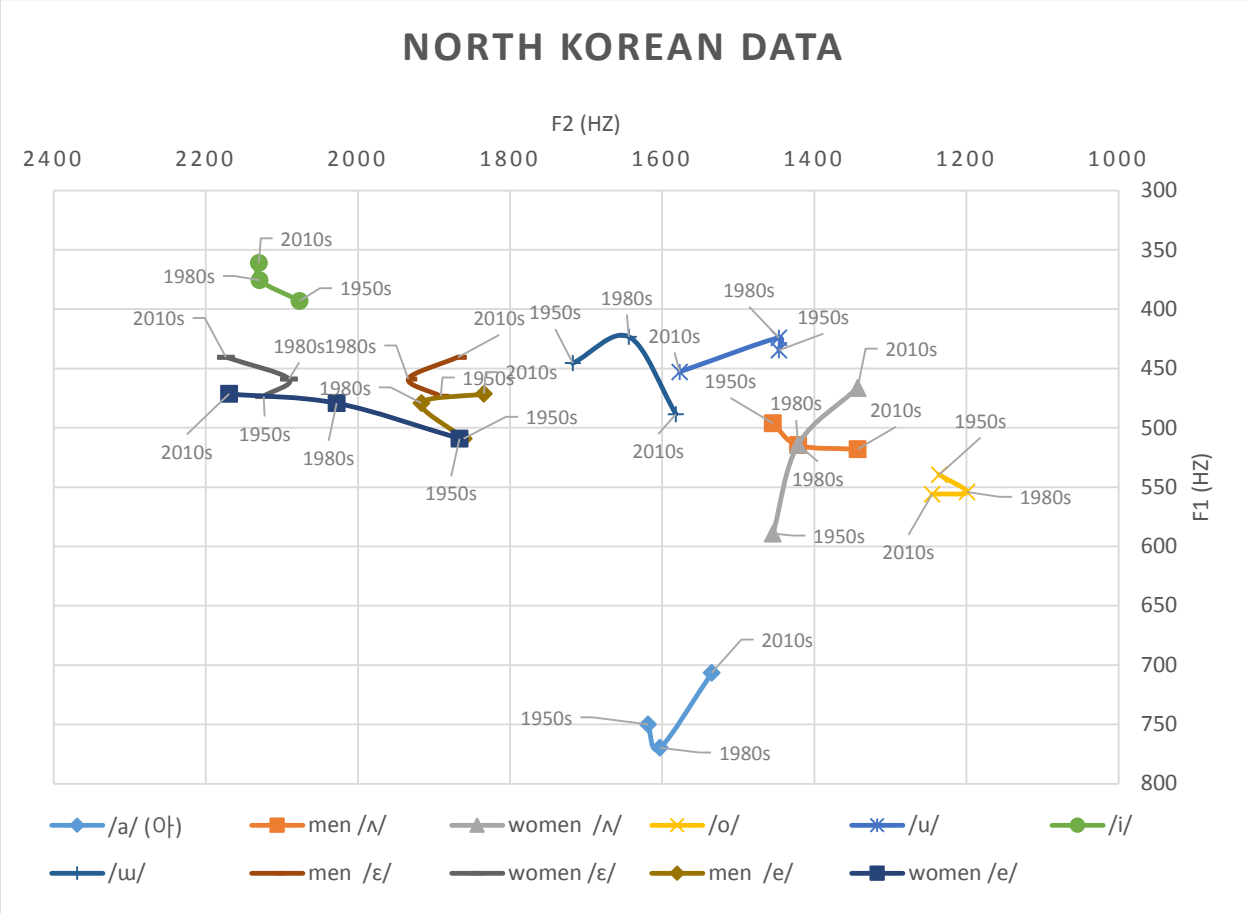
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	52	2.78	0.0716
	Gender	1	52	11.53	0.0013
	Decade*Gender	2	52	4.88	0.0114

The /ɛ/ phoneme follows the preceding pattern demonstrated by the /o/, /i/, /ɯ/, and /e/ phonemes in North Korea. The decade variable proved insignificant in variations between both F1 (p-value 0.3217) and F2 (p-value 0.3913) measurements. Gender was also an insignificant variable for variation in the F1 data (p-value 0.0716), though it proved to be a significant variable in the F2 data (0.0013). Unlike the other phonemes, however, the /ɛ/ phoneme showed a significant interaction between the two variables of gender and decade. Nevertheless, due to the present study's focus on the variable of decade, this interaction will not be analyzed further as it does not affect the significance of the decade variable's correlation with variance in the formants of North Korea's /ɛ/ phoneme.

4.1.9. *Vowel Chart*

The mean F1 and F2 formants for each decade have been plotted in Figure 13. A line connects the same vowels indicating the path of change between the 1950s, 1980s, and 2010s. Those vowels which showed a significant interaction between the variables of decade and gender are plotted twice on the graph, once for male and once for female. Charting the estimated means of both formants, for all decades, for all vowels, shows visually the lack of a clear shift pattern in North Korea's vowel system. Notice, the three vowels, however, that have demonstrated significant variance across decades. The /a/ phoneme has risen and moved slightly back, the / ʌ/ phoneme has shifted backwards in the mouth for both men and women, and has risen in female

Figure 13: North Korea's estimated mean F1 and F2 formants graphed over time



production, and the /u/ phoneme has shifted towards the front. The implications of these shifts will be discussed in Chapter 5.

4.1.10. *Summary of North Korean Results*

With the exception of the /u/ phoneme, the F2 data for all North Korean vowels showed significant variation for the variable of gender, while only the /a/ phoneme demonstrated significant cross-gender variation. A brief look at the mean F2 measurements for each vowel for each decade indicates that women in North Korea tend to pronounce their vowels farther forward than the men. This is an interesting result, though consistent with preexisting studies on gender variation in phonetic production. Thus, it will not be investigated further in this study. With regards to the variable of decade, only three vowels, /a/, /u/, and /ʌ/ showed significant variation between the 1950s, 1980s, and 2010s.

4.2. South Korea

In South Korea, the monophthong systems of both genders have displayed significant shifts. For both genders, between the 1950s and the 1980s, the majority of their vowels shifted down and back. Then between the 1980s and the 2010s, the vowels rose again, but continued to move back. Detailed information will be presented for each vowel in the following sections. First the results of the tests of fixed effects for variance in the F1 and F2 data will be analyzed separately for each vowel. If the variable of decade is significant the estimated means of the formant will be analyzed as well. As all South Korean vowels demonstrated significant shift in at least one formant, the estimated means for both F1 and F2 will be included in the analysis. Also, for those vowels that displayed a significant interaction between the variables of gender and decade, the estimated means will be broken down by gender within decade.

4.2.1. */a/ (아)*

Figure 14: South Korean /a/ (아) Type 3 Tests of Fixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1	Decade	2	60	1.41	0.2520
	Gender	1	60	15.21	0.0002
	Decade*Gender	2	60	2.81	0.0679
	Effect	**Num DF**	**Den DF**	**F Value**	**Pr > F**
F2	Decade	2	62	13.99	<.0001
	Gender	1	62	54.53	<.0001

For the vowel /a/ (아), South Korean results displayed a p-value of 0.2520 for F1 and a p-value of .0001 for F2 for the effect of decade, demonstrating a significant variance between decades for F2, but not for F1. With regards to the variable of gender, both F1 (P-value = 0.0002) and F2 (P-value = <.0001) showed significant variation. With F1, there is a significant interaction between gender and decade, therefore the appropriate F1 values must be evaluated separately by decade within gender.

Figure 15: South Korean /a/ (아) Least Squares Means

F1

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		715.79	24.0887
Decade	1980s		713.06	27.9924
Decade	2010s		657.98	28.3981
Gender		F	756.17	23.4485
Gender		M	635.05	20.3652
Decade*Gender	1950s	F	825.65	37.5203
Decade*Gender	1950s	M	605.93	30.2207
Decade*Gender	1980s	F	753.13	40.6764
Decade*Gender	1980s	M	672.99	38.4673
Decade*Gender	2010s	F	689.73	43.4300
Decade*Gender	2010s	M	626.23	36.6012

F2

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		1720.11	24.3011
Decade	1980s		1568.82	27.6913
Decade	2010s		1542.73	28.5459
Gender		F	1725.09	23.5011
Gender		M	1496.02	20.4270

Based on the results of the statistical analysis, the South Korean /a/ is demonstrating

estimated mean F1, F2 measurements of 825.65 Hz, 1720.11 Hz for the 1950s females; 605.93 Hz, 1720.11 Hz for 1950s males; 753.13 Hz, 1568.82 Hz for 1980s females; 672.99 Hz, 1568.82 Hz for 1980s males; 689.73 Hz, 1542.73 Hz for 2010s females; and 626.23 Hz, 1542.73 Hz for 2010s males. These means indicate that while the /a/ phoneme for South Korean men lowered and moved backwards between the 1950s and 1980s and raised again but stayed further back between the 1980s and 2010s, the same phoneme for the women consistently rose over the last 70 years to almost the same F1 as the men. The women's /a/ phoneme also moved farther back as it was raising.

4.2.2. */ʌ/ (어)*

The South Korean /ʌ/ demonstrated p-values of 0.0093 and <.0001 for F1 and F2 respectively for the effect of decade and p-values of 0.0029 and 0.0019 for F1 and F2 for the effect of gender, with no significant interaction between the variables of decade and gender. Thus the variance between both genders and decades are statistically significant.

Figure 16: South Korean / ʌ/ (어) Type 3 Tests of Mixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1	Decade	2	57	5.09	0.0093
	Gender	1	57	9.69	0.0029
	Effect	Num DF	Den DF	F Value	Pr > F
F2	Decade	2	57	13.68	<.0001
	Gender	1	57	10.61	0.0019

The estimated means of the first and second formants of the South Korean /ʌ/ phoneme were calculated as 519.08 Hz and 1570.67 Hz for the 1950s, 573.67 Hz and 1509.52 Hz for the 1980s, and 466.29 Hz and 1366. 31 Hz for the 2010s. This points at a lowering and a slight shift back between the 1950s and 1980s, followed by a further shift back while raising between the 1980s and 2010s.

Figure 17: South Korean /ʌ/ (어) Least Squares Means

F1

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		519.08	18.5248
Decade	1980s		572.67	23.0762
Decade	2010s		466.29	24.0936
Gender		F	558.06	18.2680
Gender		M	480.63	17.2930

F2

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		1570.67	25.5676
Decade	1980s		1509.52	30.0623
Decade	2010s		1366.31	29.9617
Gender		F	1535.40	23.3612
Gender		M	1428.94	23.1022

4.2.3. */o/ (오)*

South Korea's /o/ phoneme also showed significant variation across decades and gender with p-values for the variable of decade of <.0001 and 0.0204 for F1 and F2, and p-values of 0.0562 and .0152 for F1 and F2 based on the variable of gender. The /o/ phoneme data does not display significant interaction between the variables of decade and gender. This indicates

Figure 18: South Korean /o/ (오) Type 3 Tests of Mixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	58	11.76	<.0001
	Gender	1	58	3.80	0.0562
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	58	4.17	0.0204
	Gender	1	58	6.26	0.0152

statistical significance in the variance between decades with both formants, but only significant variation between genders in the F2 data.

For the estimated mean measurements of F1 and F2 for /o/, the analysis returned the following values: 492.41 Hz and 1312.87 Hz for the 1950s, 557.28 Hz and 1258.93 Hz, for the 1980s, and 426.81 Hz and 1116.07 Hz for the 2010s. This shift mirrors the shift shown by the South Korean /ʌ/ phoneme. The /o/ phoneme lowered and shifted back between the 1950s and 1980s, then raised and continued to shift back between the 1980s and 2010s.

Figure 19: South Korean /o/ (오) Least Squares Means

F1

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		492.41	14.1304
Decade	1980s		557.28	17.5086
Decade	2010s		426.81	20.6726
Gender		F	511.15	14.6934
Gender		M	473.18	13.4993

F2

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		1312.87	37.0610
Decade	1980s		1258.93	47.9080
Decade	2010s		1116.07	57.2926
Gender		F	1294.83	39.9756
Gender		M	1163.74	36.4290

4.2.4. */u/ (우)*

The South Korean /u/ phoneme has shown statistically significant variation by decade with an F1 p-value of <.0001 and an F2 p-value of 0.0359. The variable of gender, however, did not show statistical significance between the productions of males and females. The analysis of

Figure 20: South Korean /u/ (우) Tests of Fixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	51	13.43	<.0001
	Gender	1	51	0.09	0.7692
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	51	3.55	0.0359
	Gender	1	51	0.16	0.6919

variance between genders yielded p-values of 0.7692 and 0.6919 for F1 and F2. The /u/ phoneme data also showed no interaction between the variables of decade and gender.

Figure 21: South Korean /u/ (우) Least Squares Means

F1

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		391.38	14.1651
Decade	1980s		489.12	16.4950
Decade	2010s		383.00	16.3032
Gender		F	423.83	13.5264
Gender		M	418.50	12.0612

F2

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		1720.52	45.4485
Decade	1980s		1586.06	56.0520
Decade	2010s		1540.67	56.5505
Gender		F	1627.79	46.0212
Gender		M	1603.71	39.9455

The estimated means for the F1 and F2 formants of the /u/ phoneme are 391.38 Hz and 1720.52 Hz in the 1950s, 489.12 Hz and 1586.06 Hz in the 1980s, and 383.00 Hz and 1540.67 Hz in the 2010s. These means display a lowering and a shift towards the back between the 1950s and 1980s followed by a raising and slight shift further back between the 1980s and the 2010s.

4.2.5. */i/ (ㅇ|)*

Figure 22: South Korean /i/ (ㅇ|) Tests of Mixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	57	5.09	0.0093
	Gender	1	57	9.69	0.0029

	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	66	6.57	0.0025
	Gender	1	66	27.05	<.0001

South Korea's /i/ phoneme showed significant variation with both variables. For the variable of decade, the tests of fixed effects calculated p-values of 0.0093 for F1 and 0.0025 for

F2. Gender was also a significant variable with p-values if 0.0029 for F1 and <.0001 for F2. The tests did not uncover any significant interaction between the two variables.

The estimated means for F1 and F2 were calculated as 519.08 Hz and 2279.87 Hz for the 1950s, 572.67 Hz and 2130.86 Hz for the 1980s, and 466.29 Hz and 2222.80 Hz for the 2010s. These estimated means indicate that between the 1950s and 1980s, the /i/ phoneme moved back and down in the mouth. However, between the 1980s and 1950s, in moved back forward and rose, settling in a position equal in height, but slightly farther back than its position in the 1980s. The implications of both the shift down and the shift back will be discussed in the following chapter.

Figure 23: South Korean /i/ (ㅇ/) Least Squares Means

F1

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		519.08	18.5248
Decade	1980s		572.67	23.0762
Decade	2010s		466.29	24.0936
Gender		F	558.06	18.2680
Gender		M	480.63	17.2930

F2

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		2279.87	28.1339
Decade	1980s		2130.86	30.4935
Decade	2010s		2222.80	30.7205
Gender		F	2301.42	26.6568
Gender		M	2120.94	22.2750

4.2.6. */ɯ/ (으)*

Figure 24: South Korean /ɯ/ (으) Tests of Fixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	56	16.25	<.0001
	Gender	1	56	1.08	0.3024
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	56	1.63	0.2052
	Gender	1	56	8.03	0.0064

The /ɯ/ phoneme in South Korea, though showing significant variation between decades for F1, did not display significant variation across genders for the same formant data with p-

values of <.0001 for decade, and 0.3024 for gender. The F2 data yielded the opposite results. The decade variable was not significantly correlated with variance between F2 values (0.3024), but the F2 data did show significant variation across genders (p-value 0.0064)

Figure 25: South Korean /ɯ/ (으) Least Squares Means

F1

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		380.89	15.1259
Decade	1980s		493.93	16.9535
Decade	2010s		376.83	16.0925
Gender		F	426.89	13.8732
Gender		M	407.54	12.3994

F2

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		1812.97	37.9310
Decade	1980s		1710.71	44.4731
Decade	2010s		1748.33	42.1562
Gender		F	1825.31	36.2057
Gender		M	1689.37	31.7100

While the /ɯ/ phoneme did not show significant variation in the F2 formants across decades, the F1 estimated means show a lowering of the vowel between the 1950s and the 1980s, as the mean shifted from 380.89 Hz to 493.93 Hz. Then, between the 1980s and the 2010s the vowel rose again with an estimated mean of 376.83 Hz, which is almost exactly the same estimated mean as the 1950s. Though, consistent with many other South Korean vowels the mean for the F2 formant, though not significant, placed the vowel slightly farther back in the 2010s than it was in the 1950s.

4.2.7. */e/ (에)*

Figure 26: South Korean /e/ (에) Tests of Fixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	60	5.89	0.0046
	Gender	1	60	6.51	0.0133
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	60	12.39	<.0001
	Gender	1	60	107.67	<.0001

The /e/ phoneme in South Korea showed a statistically significant correlation between both variables and the variation between formants in the data. This significance was apparent in both F1 and F2. The decade variable was significant with p-values of 0.0046 for F1 and <.0001 for F2. The gender variable was significant with p-values of 0.0133 for F1 and <.0001 for F2. There was no significant interaction between gender and decade.

The pairs of estimated means for the F1 and F2 formants of the /e/ phoneme over the three decades measured were 475.59 Hz and 2156.75 Hz for the 1950s, 549.50 Hz and 2021.13 Hz for the 1980s, and 460.69 Hz and 2064.73 Hz for the 2010s. These estimated means signify that between the 1950s and 1980s the pronunciation of the vowel lowered and moved towards the back. Between the 1980s and 2010s, the vowel raised again to where it was in the 1950s, however it stayed farther back. This lowering and consequent raising is consistent with the shifts shown in the rest of the South Korean monophthong system.

Figure 27: South Korean /e/ (에) Least Squares Means

F1

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		475.59	12.2617
Decade	1980s		549.50	14.2402
Decade	2010s		460.69	12.1689
Gender		F	527.86	10.9763
Gender		M	462.66	10.0567

F2

Effect	Decade	Gender	Estimate	Standard Error
Decade	1950s		2156.75	23.6182
Decade	1980s		2021.13	28.6763
Decade	2010s		2064.73	24.8592
Gender		F	2251.67	22.1252
Gender		M	1910.07	19.8433

4.2.8. */ɛ/ (애)*

The statistical analysis of the South Korean /ɛ/ phoneme showed significance in the variation of F1 and F2 measurements between both decades and genders. The F1 data yielded p-

values of <.0001 for both decade and gender variables. The analysis of the F2 data showed a significant p-value of 0.0013 for the variable of decade and a p-value of <.0001 for the variable of gender. The /ɛ/ phoneme also showed no significant interaction between gender and decade.

Figure 28: South Korean /ɛ/ (애) Tests of Fixed Effects

	Effect	Num DF	Den DF	F Value	Pr > F
F1					
	Decade	2	64	12.36	<.0001
	Gender	1	64	19.37	<.0001
	Effect	Num DF	Den DF	F Value	Pr > F
F2					
	Decade	2	64	7.41	0.0013
	Gender	1	64	133.84	<.0001

The variance in F1 and F2 measurements resulted in the following means for each decade: 436.77 Hz and 2155.91 Hz for the 1950s, 495.21 Hz and 2033.28 Hz for the 1980s, and 442.86 Hz and 2015.35 Hz for the 2010s. These estimated means show a lowering of the vowel and a shift towards the back between the 1950s and 1980s. As with the rest of the South Korean vowels, between the 1980s and 2010s, the vowel raised back to near its 1950s height, but stays farther back in the mouth.

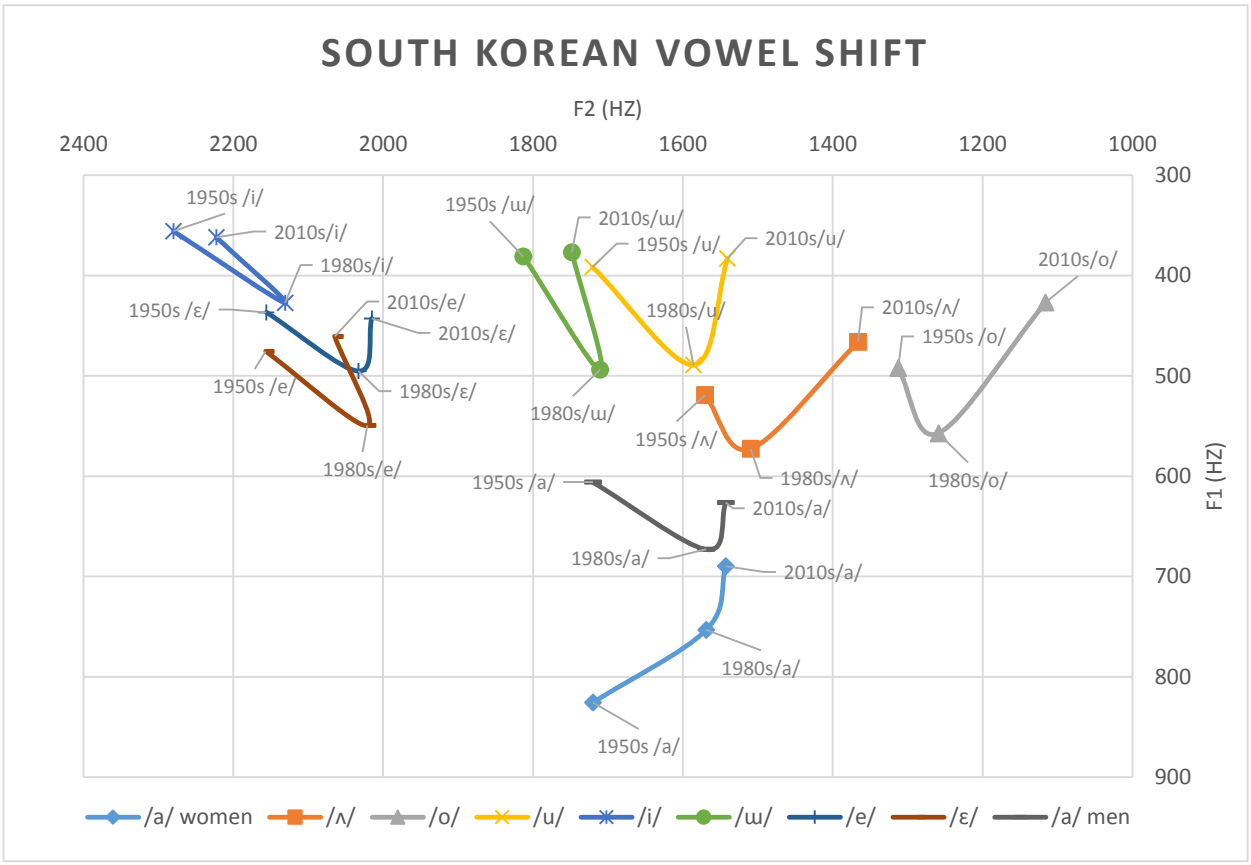
Figure 29: South Korean /ɛ/ (애) Least Squares Means

	Effect	Decade	Gender	Estimate	Standard Error
F1					
	Decade	1950s		436.77	11.5650
	Decade	1980s		495.21	13.9245
	Decade	2010s		442.86	13.5535
	Gender		F	477.47	11.6013
	Gender		M	439.09	9.7189
	Effect	Decade	Gender	Estimate	Standard Error
F2					
	Decade	1950s		2155.91	20.5275
	Decade	1980s		2033.28	24.5872
	Decade	2010s		2015.35	23.8240
	Gender		F	2205.95	20.3421

4.2.9. *Vowel Chart*

Figure 30 shows the plotting of the mean F1 and F2 formants of the South Korean data and tracks their changes over the three decades that were measured in this study. Because the /a/ showed a significant interaction between the variables of decade gender, two sets of data have been plotted for the /a/ phoneme, one for the estimated means of the men and one for the estimated means of the women. The visual representation of the vowel shift in South Korea shows a clear pattern in the movement of its monophthongs over the last 70 years.

Figure 30: South Korea's estimated mean F1 and F2 formants graphed over time



4.2.10. *Summary of South Korean Results*

The results of the analysis of the South Korean data show a consistent trend in the South Korean vowel system of lowering and shifting backward between the 1950s and 1980s, then

raising between the 1980s and 2010s. All vowels showed significant variance for the variable of decade in at least one formant, with most of them showing significant variance in both formants. The /a/ phoneme results for women were the only results that, rather than lowering as they moved towards the back of the mouth, raised as they moved backward. According to the statistical analysis, however, the F1 data for the /a/ phoneme does not show statistically significant variation between decades. However, looking at Figure 30, the shifts between the means in the 1950s, 1980s, and 2010s are quite distinct, whether they're statistically significant or not.

Chapter 5: Discussion of Results

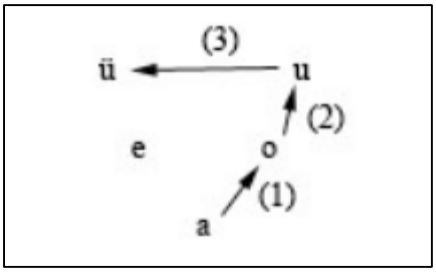
The results of this study, while not definitive, do lead to some interesting conclusions. The fact that South Korea's system of monophthongs is displaying a system-wide shift, while in the North Korean system, only 3 vowels have shown movement, does point at the possibility that the two dialects, if they continue on their current paths may diverge even further. The following chapter will first take a separate look at the shifts that are occurring in both North and South Korea, linking them with existing literature on vowel shifts and historical precedents for those specific kinds of shifts, which may point to where the Korean vowels may shift in the future. Following a discussion of these results, the implications of these shifts will be explored.

5.1. Discussion of North Korean Shifts

The results of the North Korean data are quite fascinating. The three vowels that are moving would indicate that there is a vowel shift just beginning to get underway in the North. The Northern data actually indicates a shift more supported by previous research than that represented in the data from the South. Since the 1950s, the North Korean /a/ has raised to a point that had the North Korean /ʌ/ stayed in the same place, there would have been a possible merger. However, the /ʌ/ rose simultaneously, while it moved towards the back. This move, would have put the North Korean /ʌ/ in almost the same place as the North Korean /u/, threatening another merger. Circumventing that danger, the /u/ moved forward. According to the data, the movement of these vowels didn't truly get underway until after the 1980s; with the /u/ phoneme, the estimated means for F2 between the 1950s and 1980s are a mere 0.2 Hz apart, indicating very little movement during that time period. This would support the theory that the shift is just getting underway. As /u/ was already a high, back vowel, there was nowhere higher

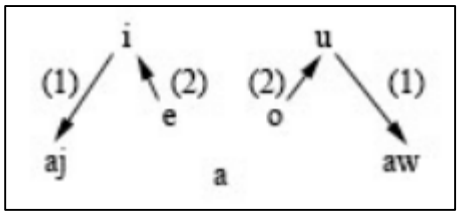
for it to raise. Thus it moved forward into the /ɯ/ phoneme's space. If the pattern continues, we may see, in the next few decades, a shifting of the /ɯ/ phoneme to another space in the mouth, or a merger of the /u/ and the /ɯ/ phonemes in North Korea.

Figure 31: Pattern 3 Shift



Though the shifts in the North Korean vowel system all apparently happened simultaneously, implying that the shifts were not what Labov would term a chain shift, they closely follow the type of vowel movement shown in Labov's pattern 3 chain shift, sometimes referred to as a push chain shift (Labov, 1994). In a push chain shift, the /a/ rises, generally causing the /o/ to rise pushing the /u/, which fronts as there is nowhere higher for it to rise. This shift is illustrated in Figure 31. Chain shifts generally take place over longer periods of time, implying that what has occurred on the current peninsula cannot truly be referred to as a chain shift. However, the movement of the vowels in North Korea is following the movement patterns of this particular chain shift quite closely except that instead of the vowels moving sequentially, they all appear to have moved simultaneously, also instead of the /a/ forcing the /o/ to rise, it has forced the /ʌ/ to rise. This most likely occurred because in the Korean vowel system, the /ʌ/ rather than the /o/ is pronounced more directly above the /a/. While pull chain[14] shifts, as illustrated in Figure 32, are much more common historically, there are a few examples of push chain shifts in vowel shift literature. Labov cites the "Germanic Vowel Shift" that occurred in the transition from Indo-European to Proto-Germanic, The Swedish and East Norwegian vowel shift that resulted in Old Scandinavian, the

Figure 32: Pattern 1 Shift

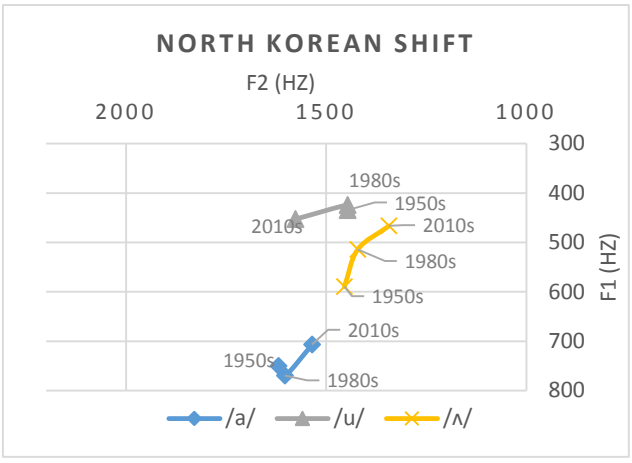


[14] In a pull chain shift, the /i/ phoneme diphthongizes and creates a high, front gap, pulling the rest of the vowel system forward to fill the gap.

Albanian Vowel Shift, and the Lithuanian raising as examples of Pattern 3 vowel shifts. The results of this study show that the North Korean dialect may be joining this list of examples.

This shift, however, when compared with the system-wide shift that has occurred in the South, would indicate that the language in North Korea is changing at a pace somewhat behind that of the South. The fact that all of North Korea's vowels have not significantly shifted may be a testament either to how well they regulate the state-media, or to the success of their language planning. Because the data for this study was taken from films, it is almost certain that the actors' and actresses' were trained in acting and vocal styles highly controlled by the North Korean government. Their pronunciation was sure to be that of the North Korean capital, Pyongyang, as that is the standard on which the North Korean dialect is based. As the idea of a pure language and race is integral to the North Korean ideology (Meyers, 2011), any change in the language would have to be so slow and imperceptible that it was unnoticeable to the government or the people. The results of this study are in line with this assumption. The vowels that have shifted have done so in such a way that the change must have been imperceptible, and thus not corrected by those who controlled the film industry. This provides evidence that even in a society whose media and education are controlled through strict language planning and censorship, natural language change can still occur.

Figure 33: North Korean Shift



Another possibility is that this shift is much more widespread than the results of this study would lead us to believe. The everyday North Korean speaker's vowels may have already

completed the chain shift, but the voice of the North Korean propaganda machine maintains its 1950s timbre, and the few shifts that have slipped into the media are there because everything else has changed so much, these slight changes are nothing in comparison to the actual production of the average citizen. This is just speculation, however, and could only be proven or refuted through extensive interviews with actual North Korean citizens. This is unlikely to happen, though, as most interviews granted to with North Korean citizens are staged, and with people in the graces of the upper echelons of the North Korean regime (Fleury, 2004). Because of this, their speech is most likely not natural, and not an accurate representation of the ordinary speech of everyday North Koreans, unless the government's language planning has been so effective that all citizens actually do utilize standard pronunciation in their daily interactions.

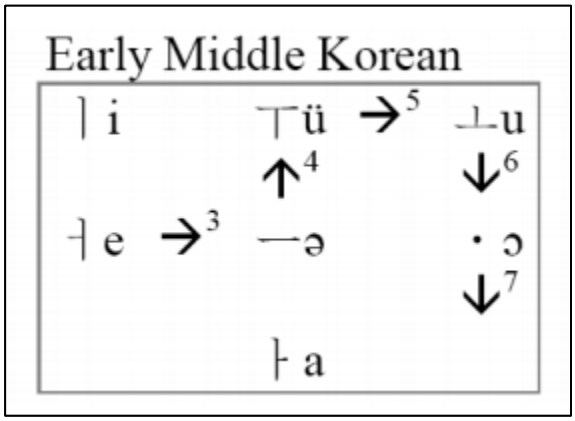
The data provides strong evidence that a vowel shift is occurring in North Korea, however, it did not really get underway until after the 1980s. Why didn't the shift begin immediately amongst the social upheaval and reconstruction in the wake of both WWII and the Korean War? A possible explanation for the delay in any sort of significant vowel shift could be a combination of Dixon's linguistic theory of punctuated equilibrium and intense government language planning. The period following the Korean War was the time of the most intensive linguistic and social planning in North Korea. Almost every part of the society was being systematically reorganized (Cumings, 2005). Thus strict attention was given to the institution of a new standard or "cultural" language based on Pyongyang speech and the idiolect of Kim Il Sung, despite the social and political upheaval the peninsula was undergoing. Stability was the main goal in the North. This is evident in the statistical insignificance of the variance in most of the data. Even the mean formants of the three vowels that would eventually show significant change, varied only slightly between the 1950s and the 1980s, a testament to the effectiveness of

the North's language planning in staving off a period of change in their phonetic evolution. The 1990s, however, were a period of dramatic turmoil in North Korea. Their great leader, Kim Il Sung, died July 8, 1994 of a heart attack (Cumings, 2005). The personality cult of the Kim dynasty in North Korea is such that Kim Il Sung, his son Kim Jong Il, and his grandson Kim Jong Un are considered almost godlike. The death of their "Great Leader" was a huge blow to the North Korean populace, leading to nation-wide mourning, verging on mass hysteria (Cumings, 2005). Following Kim Il Sung's death the nation was plunged into misfortune after misfortune. Floods, droughts, energy crises, and famine claimed the lives of a half million people as well as the North Korean economy (Cummings, 2004). The country has been unable to recover, and even now continues to rely on massive amounts of foreign aid to maintain the regime. This massive amount of social and economic upheaval in the 1990s could be one of the events described by Dixon as a catalyst for a period of linguistic change. Dixon lists natural disasters such as droughts and floods, as well as hierarchical changes among other social changes as possible causes of language change. North Korea experienced all three of these things in the 1990s, and has undergone significant phonetic change since then. The variance between vowel formants from the 1950s and the 1980s, when compared with the variance between the 1980s and 2010s, also provides a look at the contrast between the effects of language planning and natural language change. When the regime was incredibly strict about its linguistic and social programs, only slight variation in the quality of the North Korean vowels resulted; however, once the nation was distracted by misfortune after misfortune, natural language change crept in and set off a period of linguistic change resulting in a vowel shift and possibly other phonetic changes that could be uncovered through further studies of the North Korean standard dialect's phonology.

5.2. Discussion of South Korean Shifts

The South Korean vowel system has shown significant changes since it became the standard form of speech for the newly formed Republic of Korea in the late 1940s. The data from this study shows a lowering and backing of every vowel except the female /a/ between the 1950s and 1980s. Rather than falling, the female /a/ phoneme rose as it moved back during this time period. This would indicate that the whole vowel system in general was shifting towards the back. This shift does not follow any of the chain shift patterns established by Labov. Also, because one vowel didn't move first leaving a gap to be filled by other vowels, the shift cannot really be referred to as a chain shift. Labov's principles do not make any mention of movements back in his principles of vowel shifting (Labov, 1994). Therefore if the shift shown by this study's data did in actuality occur, it is a shift with only one similar precedent in the existing literature. Interestingly enough this precedent example is also a shift observed to have taken place in the Korean language. Both Hong (1991) and Lee (1961) assert that "extended chain shifts to the back and downward" supposedly took place in Middle Korean. This is the much disputed Early Middle Korean vowel shift mentioned by both Labov, Lee, and Hong. Labov mentions this supposed shift as an exception to the principles stating that "there is no doubt that the history of Korean vowels is different from that of all other languages considered so far" (Labov, 1994). Ko (2011) claims that this particular shift may or may not have happened as the analysis to determine the existence of the shift was mostly done using comparisons with Mongolian loan

Figure 34: Middle Korean Vowel Shift (Ko 2011)



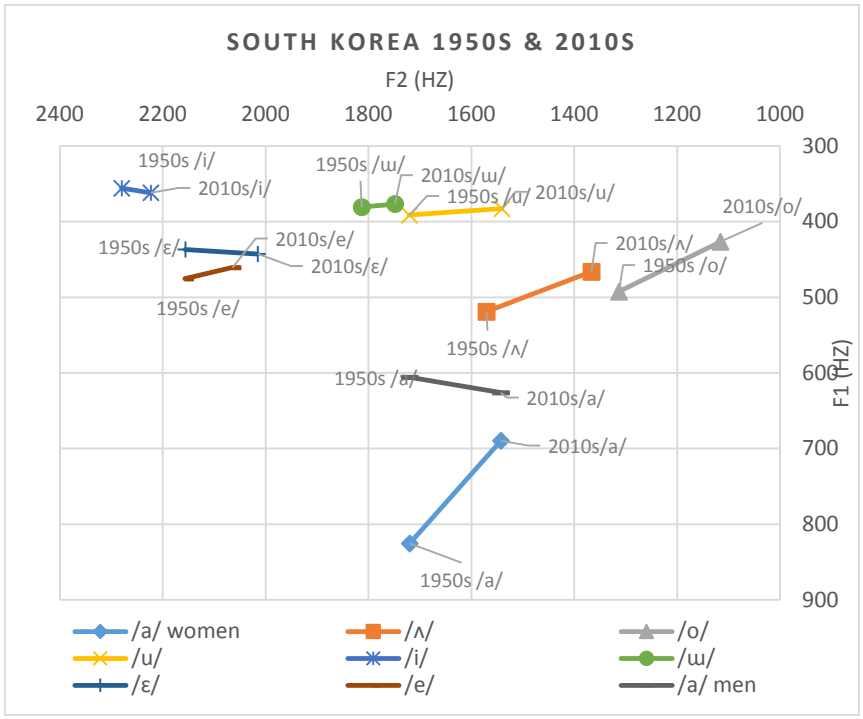
words from the time. However, given the variance between the 1950s and 1980s, this study provides evidence not only of a shift having taken place in modern Korean, but also, given the precedent in Early Middle Korean, establishes this as a possible pattern of Korean vowel movement, possibly confirming that this sort of shift did actually take place back in Early Middle Korean. Sapir's theory of drift stipulates that languages generally have historical patterns of language change, and that the direction of a language's phonological shift "may be inferred, in the main, from the past history of the language" (Sapir, 1921). Thus within the confines of the language drift framework, it would make sense that this pattern, possibly established in Early Middle Korean would appear once more in modern Korean vowel shifts.

Furthermore because Korean does not generally have a long/short distinction with its vowels, apart from recent developments in homophones, it makes sense that Labov's principles for vowel shifts might not apply to Korean data, as his first two principles for constraints to vowel shifts have to do with the direction in which long and short vowels tend to shift. This could explain why, despite the lack of similar examples in other languages, the South Korean monophthong system underwent an almost system-wide lowering and backing. This simultaneous shifting can be partially explained by Labov's theory that vowel shifts occur in languages in order to avoid mergers. If all vowels were going to simply shift in the same direction however, why did the female /a/ vowel rise rather than lower like the rest of the vowels? Part of Labov's theory concerning his pattern 3 vowel shifts states that when the /o/ rises, the /u/, already being a high vowel, can rise no further and therefore moves towards the front (Labov, 1994). In the case of South Korea, the reverse may have happened. As all of the other vowels were lowering, female /a/, as the lowest vowel in the contemporary South Korean standard dialect, could not go any lower, and therefore raised as it moved backwards with the

other vowels. As the /a/ phoneme raised, it may have threatened a merger with the phoneme immediately above it.

As we look at the transition between the 1980s and the 2010s, rather than a continued lowering, all vowels except this rising female /a/ phoneme changed trajectory and rose again. The back vowels continued to move farther back as they rose, not having lowered very much between the 1950s and 1980s anyway. The front vowels, however, moved back forward as they rose, settling in a place only slightly farther back in the mouth from where the data starts in the 1950s. This move down and back followed by a raising shift where half the vowels went back to the front could be interpreted one of two ways. First, it may indicate skewed data from the 1980s that caused it to appear as if a vowel shift had taken place between the 1950s and 1980s, then another vowel shift between the 1980s and 2010s, when in reality the only shifts that took place were those between the 1950s' and 2010s' back vowels. Second, there may have actually been two distinct vowel shifts in divergent directions.

Figure 36: South Korean Data without the 1980s mean formants



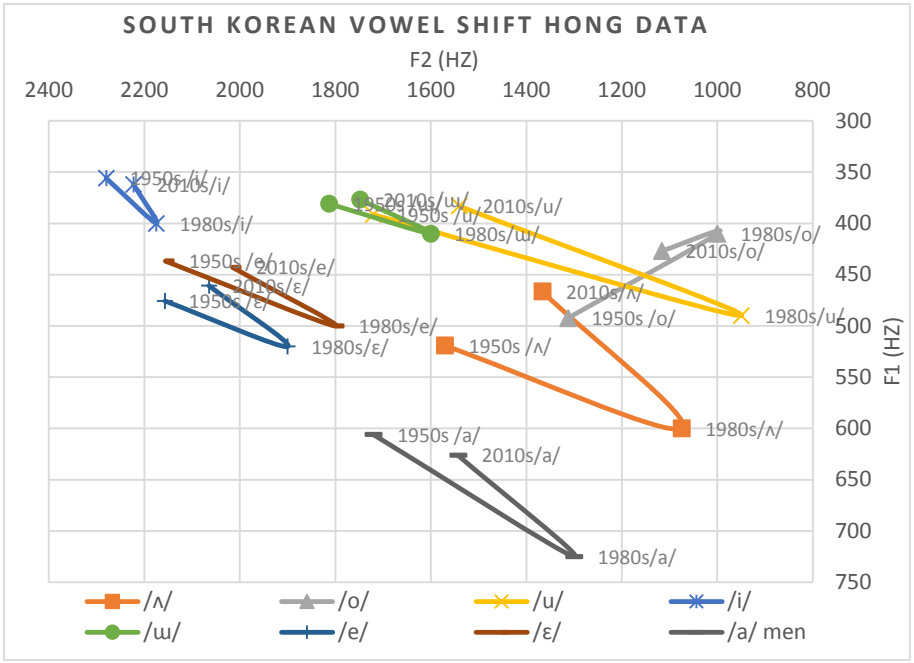
From the standpoint of the first interpretation, if the 1980s data is skewed, then we need only look at the variance between the 1950s and 2010s. Figure 36 gives us an idea of what the data would look

like without the 1980s data included. The 1980s data was collected in the exact same manner as that from the other decades, so it shouldn't be skewed, unless there was something unaccounted for in the recording methods used in the 1980s that could have caused an increase in base frequency, thereby corrupting all of the F1 data. Whether or not the 1980s F1 data was corrupt, it is interesting to see a direct line of where the vowels started in the 1950s and where they are now. Any movements in the front vowels are so small as to be insignificant, the back vowels however have undergone a significant amount of change. The /u/ phoneme has moved backwards, seemingly to avoid a merger with the /ɯ/ phoneme. The /a/ phoneme has risen, threatening to merge with the /ʌ/ phoneme, which rose to where /o/ had been in the 1950s. The /o/ phoneme, however, also rose and moved back, avoiding the threat of a merger. This shift taking place in the back vowels of South Korea is similar to what has happened in the North since the 1980s. It has some of the characteristic vowel movements of a push shift. However, unlike North Korea, because the /ʌ/ and /o/ phonemes moved back as they rose, they avoided pushing the /u/ phoneme forward. Thus the backing pattern of the posited Early Middle Korean vowel shift is combined with the rising of a Pattern 3 chain shift to create the contemporary Korean vowel shift.

The data from Hong's 1991 study was actually collected in 1986. Thus a good test of whether or not the data from the current study was skewed would be to insert Hong's data in place of the present study's 1980s data. Because Hong's study didn't list means, estimated means were gathered by measuring the midpoint on Hong's graphs, and collecting the F1 and F2 measurements from those points. The graph chosen was that of the 24 year-old male (Hong, 1991). While not 100% accurate, without access to Hong's raw data, it is the best that could be derived, and gives a rough idea of what the data looked like. Figure 37 is the 1950s and 2010s

data from the present study with Hong's 1980s data inserted. The insertion of Hong's data indicates even more dramatic shifts down and back between the 1950s and 1980s, and then up and front between the 1980s and 2010s. This would indicate that either the present study's data is not skewed or there was something strange with all of the South Korean recording equipment in the 1980s.

Figure 37: South Korean Hong Data vowel shift chart



From the other viewpoint, if there have in actuality been two significant vowel shifts in South Korea since the 1950s, this has many implications for the both the nation and pre-existing theories of language change and vowel shift. Language change, especially phonetic change, is generally thought to happen over long periods of time. Even Dixon's (1997) application of the punctuated equilibrium model to language change asserts that the change will happen over a few generations, then the language will return to a state of equilibrium. To have two distinct vowel shifts occur, each within a generation, without a separating period of equilibrium is a difficult hypothesis to support. However, the Korean peninsula has been in a constant state of political and social upheaval since the beginning of the 1900s, so rather than a state of linguistic punctuation, one might say that the Korean peninsula is in a turmoil-induced state of linguistic flux.

Much like North Korea, following the war, the South Koreans set out to put their country back together. However, without a strong government dictating everything to the people, it took much longer for the South to settle into a national routine. The UN forces, with the US providing the most advice, helped the South to set up their government with Syngman Rhee as the first president. The new government, while not the democratic republic the UN had hoped for, was not a communist regime, which was good enough for them. Democracy movements didn't start until the 1960s, and a truly democratic government did not replace the authoritarian one until the 1980s (Cumings, 2005). After the signing of the armistice, while a number of American troops remained in South Korea to discourage the North from trying anything, the majority left the peninsula. As Rhee was trying to establish a government, the people of South Korea were trying to put their war-torn country back together. Unlike the North's strong central government who organized the nation and dictated to the people what they needed to do, the South Koreans were predominantly left to figure it out themselves. It required a lot of innovation, and eventually led the Korean economy to where it is today; however, it was slow going at first (Cumings, 2005). Until the 1970s, the North Korean economy was faring better than that of the South. The people of the South were developing a capitalistic society from the remnants of a feudalistic society, and in the 1970s, it finally started taking off. By the 1980s, South Korea was industrialized and contributing to the global economy (Cumings, 2005). The post-war reconstruction period, and drive towards being an economic power, all with the threat of North Korea looming right above them, could both be considered social factors that would have instigated fluxes of linguistic change in South Korea. The only way that another period of Korean phonetic change could have followed so closely on the heels of the vowel shift demonstrated between the 1950s and 1980s is if another event, similar to the famines and droughts of the North, set it off.

In 1997, the Asian economy took a massive hit. It began in Thailand and by the time it spread to Korea, the crisis dealt a devastating blow to the newly established economic powerhouse. Within months the country's economy was bankrupt and the value of its currency had depreciated by 50 percent. The International Monetary Fund (IMF) marched in with a $57 billion bailout, but it came at a cost (Cumings, 2005). The IMF wanted Korea to undertake massive restructuring of its political economy, saying that the financial crisis had been a result of the nation's flawed economic model. The United States had a heavy hand in the demands for Korea's economic restructuring. With no one else to turn to, Korea accepted the money along with its conditions. The IMF agreement required the country to "restructure and recapitalize the financial sector and make it more transparent, market-oriented, and better supervised" (Cumings, 2005).The "IMF Crisis" was devastating to the Korean people. During my three and a half years in South Korea, people talked more often of the IMF Crisis than of the Korean War or the looming threat of North Korea. The way it is talked about is reminiscent of the way my grandparents' generation talks about the Great Depression. In Korea there was even a 45 percent increase in suicides amongst South Korean males (Chang, Gunnell, Sterne, Lu, & Cheng, 2009). A crisis like this, which made such a huge impact on South Korean society, may have been cause for another period of punctuation.

Whether or not the 1980s data was reliable, there is enough data to support a significant vowel shift in South Korea's back vowels. There is also evidence of a contemporary vowel shift in South Korea that mirrors the much debated, Early Middle Korean vowel shift. In both interpretations of the data there is a clear backing of all of the vowels. The data is consistent, unlike the insignificant shifts shown in the North Korean data, where some of the front vowels had moved forward and some had moved backward, with no discernable pattern. In South Korea,

except for the raising of /a/ over the entire measured time period, all vowels consistently lowered and moved back between the 1950s and 1980s, then raised and remained farther back than they were in the 1950s between the 1980s and 2010s. Whether there were two distinct vowel shifts, or just one that the skewed data made look like two, the South Korean vowels have shifted, and even more noteworthy is the fact that two of the back vowels appear to be moving in a manner similar to Labov's pattern 3 vowel shift, contemporary with a comparable shift in the North. The significance of this will be discussed in the next section.

5.3. Implications of North and South Korean Vowel Shifts

Since 1989, scholars from North and South Korea have been working to create a unified dictionary that combines words from both sides of the 38th parallel into one volume, symbolically unifying the North and South Korean dialects as one language. The project has run into many political stumbling blocks as bellicose rhetoric from both sides has often made it impossible for the contributing scholars to meet and discuss their project (Borowiec, 2014). In November of 2014, after more than five years of cancelled meetings, scholars from South Korea were finally able to go to the North and discuss the progress that has been made on their joint dictionary. Han Young-un, chief editor of the unified dictionary, claims that the lexical variation between North and South has grown quite serious. "It's so marked that architects from each side would probably have difficulty building a house together" (Agence France-Press, 2014). This lexical divide has serious implications should the peninsula ever reunify. The further the languages diverge, the more difficult it will be for the country to reunify and identify with one another as the same nationality. To reiterate the words of Kim Il Sung, "Even though a people are all of the same stock and live on the same territory, they cannot be called a nation if they

speak different languages" (1964). Thus any sort of linguistic divergence is something that should be considered carefully by those hoping for a reunified Korea.

North and South Koreans have long realized the lexical divide that has arisen since the peninsula's division. Projects like the aforementioned dictionary have been instigated to increase awareness of each other's lexical variation. When North Korean defectors come to the South, their difficulty in understanding fellow Koreans arises mostly from unknown lexemes (Yeon Ah, 2012). This study suggests, however, that lexical variation is not the only linguistic change that separates the Northern cultural language and Southern standard language; phonetic change is beginning to creep in. As the direction of phonological variation is nearly impossible to predict, there is no telling whether division will ultimately cause two separate languages to develop, or whether it will simply result in two very different but mutually intelligible methods of pronunciation, as with the United States and England. Due to the unpredictability of phonetic change, it is important to keep a constant record of what the language is doing in order to notice changes over time. If North and South Korean linguists could do an inventory of their standard dialects every 5-10 years, a phonological census of sorts, cross-border meetings between scholars would be even more productive.

Phonetic change has serious implications for the two Koreas. However, the data currently shows the two nations to be trending in the same general direction when it comes to vowel shifts. Further study would be required to show whether or not this trend is applicable to other phonetic components. If the vowel systems both North and South Korea are undergoing shifts that closely follow Labov's pattern 3 vowel shifts, their vowel systems should end up in the same general area. The only concerning factor is that while in North Korea the /u/ phoneme has shifted forward towards the /ɯ/ phoneme, in South Korea, the /u/ phoneme has continued backing with

the rest of the South Korean vowel system. This opposite movement of /u/ could set off divergent chain shifts in the two Koreas in which various vowels either merge or shift to avoid mergers. Due to the lack of a significant shift in the North Korean vowel system between the 1950s and 1980s, it would appear that the South's shift got a head start, which may be the reason that the shifts are not happening in completely parallel fashion. But once again, phonetic change is difficult to accurately predict, thus Korean scholars will simply have to keep a watchful eye on the vowel system, periodically measuring the formants for indications of further shifts.

It has been established that vowel shifts on the Korean peninsula could have serious linguistic implications, which might lead to the formation of completely separate languages. At the same time, these shifts may have political implications as well. As mentioned in the beginning of this paper, study of the linguistic situations in North and South Korea is a study of language planning versus natural language change. North Korea attempts to control most of the aspects of its language. It recognizes language "as a powerful weapon in the development of the economy, culture, science and technology of [its] country, in all fields of socialist construction" (Kim, 1964). From the foundation of North Korea, the government valued language so highly that between the hammer and sickle present on many communist flags, the North Korean communist flag has a calligraphy brush. This brush represents the necessity for writers and poets alongside the builders of the nation and workers of the land. From the beginning, writing was encouraged but strictly controlled in the North. People who had been intellectuals and writers prior to the installation of a communist regime were no longer seen as trustworthy conveyors of information (Mukherjee,

Figure 38: North Korea's Communist Emblem. Wikipedia

1983). Therefore, the common man became the new writer in North Korea. This changed the literary landscape of the country, as well as ensuring complete control by the government over everything that was written (Pihl, 1977). Despite the importance placed on language and control in the North, as well as the relative success that the government has had with the North Korean lexicon, if the results of this study are accurate, after the initial implementation period, language planning appears not to have been very successful with regard to the phonology of the North Korean dialect. Over the past 70 years, the government has been able to control what the people were saying, but not necessarily how they are saying it. The political implications in the South are not as far-reaching. The increased amount of significant change in the South's monophthongs compared to the North supports the assumption that languages change more drastically when a government does not exercise strict control over the nation's language.

As for the time period in which phonological change occurs, in the case of South Korea, if we operate on the assumption that the data was not skewed by some unforeseen differences in recording equipment, this study implies that languages can naturally change in shorter periods of time than expected. Dixon hypothesized that once a language is thrown into a period of punctuation, the changes will occur within a matter of a couple of generations, then the language will return to a prolonged state of equilibrium. He differentiated between sudden and gradual changes. Sudden changes are generally lexical or grammatical shifts, whereas gradual changes are more likely to occur in categorical shifts or phonological shifts (Dixon, 1997). In contrast to this assertion, however, South Korea is displaying evidence of having undergone two phonological shifts in about two generations, this both supports and undermines Dixon's theory. Two adjoining shifts occurring without a separating period of equilibrium would add a level of complication to Dixon's theory that he doesn't mention in his work. This doesn't necessarily

refute Dixon's theory, but it could mean that drastic language change in a short period of time may be caused by not only one punctuation, but by a series of contiguous linguistic fluctuations. It could also just be another example of the Korean peninsula being unique, for, as previously pointed out by Labov, "the history of Korean vowels is different from that of all other languages considered so far" (Labov, 1994). Thus Korean has a history of not sticking to theoretical frameworks or established patterns of language change; this may just be another example.

The tendency to move towards the back shown by the South Korean monophthongs supports what Labov said about the Early Middle Korean Vowel shift and the language's tendency to set its own patterns. At the same time, the upward movements of the /a/ and /ʌ/ phonemes in both North and South Korea, especially combined with the /u/ phoneme's move forward in the North displays certain similarities to Labov's pattern 3 vowel shift. These similar shifts in both North and South, combined with the backward movement of the South Korean vowel system reminiscent of the Early Middle Korean vowel shift also support Sapir's theory of language drift in that, though they are separated, they are changing along similar paths. The South is also following a historical Korean pattern of vowel shift.

In summation, the results of this study support the partial application of Labov's, Dixon's, and Sapir's language change frameworks to the changes taking place in the North and South Korean vowel systems. Yet at the same time, the results show that Korean also complicates the basic patterns of these frameworks, allowing for sequential periods of punctuation with no interceding equilibrium, as well as group vowel shifts towards the back, which do not follow the principles of vowel shifts as put forth by Labov (1994). These shifts are significant not only because of their complication of existing frameworks, but also because of their significance in measuring the effects of language planning on a language's phonology.

Chapter 6: Limitations, Future Research, and Conclusions

6.1. Limitations of the Present Study

The present study had many unavoidable limitations. Due to the political situation on the Korean peninsula, gathering data was no easy task, especially in regards to North Korea. Gathering vowel samples from live interviews with various subjects would have been ideal for the 2010s data, but access to the country is limited, and an American researcher, no matter how academic the motivation behind the study, would most likely not be trusted to carry out interviews with the North Korean people. Even in the current medium of film, increased access to North Korea's archives would have given a much larger and more accurate sampling of the North Korean vowel system, especially in regards to the speech of women in the 1950s. Because very few materials were available online from 1950s North Korea and most of the characters in the films were male, the female sampling was rather small in comparison to that of the males, as well as in comparison to female vowel samples from the following decades. If access to more footage were to be granted, the 1950s data could benefit from an increased number of female vowel samples in order to strengthen the evidence for an existing vowel shift in North Korea.

Another limitation of the current study was the number of researchers able to perform the data mining. To be able to more efficiently mine larger amounts of data in a shorter amount of time, a larger team of researchers would be necessary. If this study were to be repeated in the future, a team of Korean-speaking researchers would be a huge asset. A larger team would be able to harvest examples from a wider range of films, which would account for a larger number of voices and speaking styles, leading to estimated means that would be more representative of the population as a whole.

A final limitation of the study at hand was the lack of information on actors and actresses from North Korean films, and even some of the older South Korean films. This made it somewhat difficult to ensure that the speakers were native speakers of the standard dialect. With the North Korean films, thanks to the country's strictly controlled media, it was assumed that those actors and actresses allowed to be in film, verbalizing the nation's communist beliefs to the masses, were those considered high enough quality patriots to be granted a living in the capital, the source of the standard dialect. Under this assumption, the North Korean data should be accurate. South Korea's early film industry probably selected actors from among the large number of people living in its capital as well; however, following the Korean war, Seoul was populated by people who had come flooding in from all different parts of the war-torn country. Because of this diverse population, even if it were possible to determine that Seoul was the birth-place of the actors and actresses from the 1950s films, it does not necessarily mean that their speech is indicative of the rest of the Seoul population at the time, as it was a time of flux in the city. Due to the difficulty of finding accurate information on the actors and actresses from the older films, this study was carried out with the assumption that as long as the plot revolved around characters from Seoul, or around an unspecified city, they would be using the standard Seoul dialect, even if the actors weren't from the capital.

Despite limitations in the amount of older data available, the number of researchers, and accessible information on the actors from the older films, this study gives a pretty clear picture of how the vowels were pronounced in both North and South Korea in all three examined decades. If these limitations could be rectified, future studies could provide even more concrete evidence of the vowel shifts indicated in the present study.

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6.2. Future Research

One of the most important findings of this study is the strong evidence that phonetic change has occurred in North Korea over the last 70 years. If the vowels have shifted, what else might have changed? These indications of phonetic change open the language up to even further scrutiny. Perhaps the VOT of unaspirated stops in word initial positions has increased and tone has been reintroduced into the dialect, just as it has in the South, as shown in Silva's study (2006). A parallel study examining this in the North Korean standard dialect would either confirm that North and South Korean dialects are changing in the same ways or indicate further divergence.

A more exhaustive study of both North and South Korean vowel systems is also merited. Examining the monophthongs is good for noticing general shifts; however, examination of the vast system of diphthongs alongside a more in-depth examination of the monophthongs would be intriguing. If more samples from a wider spread of people could be collected, the results would be even more significant. The study at hand shows a positive indication of significant change. The limitations of the researcher, however, were such that the number of vowels mined from the various films were limited. If more researchers were to join in on the project and compile a database of thousands of formants for each vowel, the picture of what has happened with the Korean vowel systems over the last 70 years would become even clearer.

Ideally I would like to repeat this study using interviews with live subjects for the contemporary data. If samples of vowels in actual production could be obtained from both North and South Korea at 10-15 year intervals, the continuing shifts in the language could be tracked across time as the two nations stay separated from one another. Sadly, the odds of being granted access to subjects in the North are not good, much less being granted access to North Korean

subjects who could speak candidly with a researcher, be they foreign or North Korean. However, if the time comes when North Korea opens up its borders and allows free interaction with the North Korean people, the amount of linguistic data that could be gathered is exciting just to think about, and would provide opportunities for massive amounts of research into the overarching effects of language planning and language isolation.

As Sapir has dictated in his theories on language change, "phonetic change is frequently followed by morphological rearrangements" (Sapir, 1921). Consequently, as this study has shown that phonetic change has taken place on the Korean peninsula, future studies should begin to examine the complex Korean morphological system. The basic framework of this study could be replicated, using films from various decades to perform a diachronic study of certain morphological patterns in Korean, to see which ones have decreased in usage, which ones have increased in usage, and what new patterns have immerged over the past 70 years.

Apart from further applications with the Korean language, it would be interesting to see if the same methodology could be applied to German, by collecting vowel samples from East and West German films from the early days of post-WWII Germany, and then collecting vowel samples again from media filmed in the 1980s, prior to the fall of the Berlin Wall. Scholars agree that lexical variation was the only linguistic result of the country's 45 year separation (Johnson & Braber, 2008). While on the surface this might be true, it would be interesting to measure the vowels on either side of the wall and see if Germany experienced a period of change in their phonology that was unable to go to completion due to the reunification of the country. German has gone through at least one vowel shift in the past in High Middle German during the end of the 10th century and the beginning of the 11th (Labov, 1994). Due to political upheaval, the German language may have undergone some almost imperceptible phonological change. In fact,

thanks to the existence of film and audio recordings beginning in the early 1900s, it would be interesting to see how many of the countries directly affected by war experienced some sort of phonological shift in the following decades.

6.3. Conclusion

In conclusion, despite the limitations of the study due to the political situation on the Korean peninsula, as well as the possible skewing of the data from South Korea in the 1980s, this study paints a pretty clear picture of phonetic change having occurred in both the North and South Korean vowel systems. The two countries' monophthong systems are changing in similar directions, as they both seem to have undergone a vowel shift where the /a/ phoneme has risen along with the /ʌ/. However, they are also diverging in that the /ʌ/ phoneme's rise in North coincided with a fronting of the /u/ phoneme, while in the South, the /ʌ/ phoneme rose alongside the /o/ phoneme. As the /a/, /o/, and /ʌ/ phonemes were both rising and moving back in the South, all of the other South Korean phonemes were moving back as well, most noticeably the back vowels. As the back vowels were moving even farther back, the /u/ phoneme followed suit, moving backward rather than fronting like its Northern counterpart, thus avoiding the possibility of the future merger between /u/ and /ɯ/ that North Korea may face. These vowel shifts in both the North and South, though the phonemes seem to have move simultaneously rather than undergoing a chain reaction, to a certain degree follow Labov's pattern 3 vowel shift. The movement of the North's shift fits almost perfectly within Labov's framework. The South's shift, on the other hand follows the Pattern 3 framework to a certain extent, but also shows trends of a repetition of the Middle Korean vowel shift in which the whole Korean vowel system purportedly moved back.

The strong evidence of vowel shifts in both standard dialects on the Korean peninsula has many implications for both studies of future vowel shifts in general, and future language change in North and South Korea. The original hypothesis of this study was proven both true and false. South Korea is indeed undergoing a marked shift in its vowel system, possibly due to globalization. However, though we posited that due to intense language planning in the North there would be very little sign of phonological shifts, in actuality the insular nation does appear to be undergoing some change, especially since the 1980s, which, while refuting our original hypothesis, supports both Dixon's assertion that "cataclysmic events" cause language change and Labov's vowel shift framework. Overall, with historical precedent, empirical evidence, and a supporting theoretical framework, the results of this study indicate that there is significant change happening in both North and South Korean vowel systems, which if it continues unchecked, could result in more wide-spread and divergent linguistic change on both sides of the 38th Parallel.

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APPENDIX A: Full Statistical Analysis Output

The complete output for the statistical analyses conducted on the data for this study can be accessed through the following link:

https://drive.google.com/file/d/0B5R9_37DmDtEMmZKT1ZnNWh5aFU/view?usp=sharing

APPENDIX B: Data Sampling

Coding Guide:

	0	1	2	3	4	5	6	7	8	9
Nationality	North Korea	South Korea								
Decade	1950s	1980s	2010s							
Gender	Female	Male								
Vowels	아 /a/	어 /ʌ/	오 /o/	우 /u/	이 /i/	으 /ɯ/	에 /e/	애 /ɛ/	어 /ʌ/ Final	오 /o/ Final

	조선 (North Korea):		한국:
N1	내 고향 My Hometown	S1	서울의 휴일 Holiday in Seoul
N2	동지들!이총을받아주! Comrades! Take this gun!	S2	미망인 The Widow
N3	말공부쟁이 Malkongbujaengi	S3	청춘 쌍곡선 Hyperbolae of Youth
N4	등대 The Lighthouse	S4	만추 Manchu
N5	숲은 설레인다 The Forest is Swaying	S5	스믈하나의 비망록 Memo of a 21-year-old
N6	월미도 Wolmi Island	S6	
N7	아버지가 오는 날 The Day of Father's Return	S7	헬로우고스트 Hello Ghost
N8	행복의 수레바퀴 Wheel of Happiness	S8	이층의 악당 Villain and Widow
N9	산촌에 피는 노을 Glow of Sunset in the Mountain Village	S9	김종욱 찾기 Finding Mr. Destiny

1980s Korean Men Data:

Film	Decade	Nationality	Time	Character	Gender	Vowel	F1	F2	Word
N5	1	0	74.7167	narrator	1	4	534.8513	2079.014	기쁜
N5	1	0	75.2931	narrator	1	5	484.2997	1114.118	으로
N5	1	0	76.27176	narrator	1	9	496.0581	1153.701	도
N5	1	0	77.01727	narrator	1	5	355.3539	1289.945	그것
N5	1	0	77.12642	narrator	1	1	493.8003	1364.63	그것
N5	1	0	77.40349	narrator	1	0	608.757	1513.127	갖고는
N5	1	0	79.99585	narrator	1	7	485.8083	2180.487	대해서
N5	1	0	80.12102	narrator	1	7	495.7425	1961.302	대해서
N5	1	0	80.24542	narrator	1	8	529.6873	1628.349	대해서
N5	1	0	81.23101	narrator	1	0	536.6028	1462.306	생각
N5	1	0	81.7608	narrator	1	0	598.0483	1548.692	다고다
N5	1	0	81.88094	narrator	1	2	459.1022	1120.453	다고다
N5	1	0	85.60352	narrator	1	0	532.083	1228.474	불타고
N5	1	0	85.70526	narrator	1	9	523.0787	1485.58	불타고
N5	1	0	86.02943	narrator	1	1	529.8707	1544.419	거치러진
N5	1	0	87.19841	narrator	1	6	501.0669	2067.899	에서
N5	1	0	87.37209	narrator	1	8	512.243	1271.243	에서
N5	1	0	88.27241	narrator	1	0	644.771	1264.011	누가
N5	1	0	88.50862	narrator	1	2	477.1089	1089.611	보고
N5	1	0	90.24497	narrator	1	6	435.9911	1984.461	함게
N5	1	0	91.97138	narrator	1	4	631.0375	1904.764	있었다
N5	1	0	92.16395	narrator	1	1	653.5631	1376.452	있었다
N5	1	0	92.41655	narrator	1	0	713.4269	1447.996	있었다
N5	1	0	95.3825	narrator	1	2	499.9554	995.6582	군복
N5	1	0	95.59898	narrator	1	4	449.6659	2209.634	입고
N5	1	0	95.86666	narrator	1	9	513.7654	1267.017	입고
N5	1	0	104.1878	narrator	1	2	530.013	1209.076	보게
N5	1	0	104.2911	narrator	1	6	421.3704	2042.108	보게
N5	1	0	106.1868	narrator	1	8	539.5845	1175.769	벌써
N5	1	0	107.6144	narrator	1	7	486.3137	2091.156	애어린
N5	1	0	108.7703	narrator	1	9	430.7639	894.1226	심고
N5	1	0	109.7761	narrator	1	2	455.8934	966.3104	심고있었다
N5	1	0	110.0715	narrator	1	1	682.9785	1366.599	심고있었다
N5	1	0	110.2988	narrator	1	0	698.4227	1533.826	심고있었다
N5	1	0	125.974	narrator	1	4	465.8032	1913.214	이렇게
N5	1	0	126.1529	narrator	1	6	355.1373	1959.685	이렇게
N5	1	0	126.2852	narrator	1	2	657.3253	1129.482	도와
N5	1	0	126.5284	narrator	1	8	514.8433	1270.844	주어서

N5	1	0	126.6604	narrator	1	8	598.3752	1458.421	주어서
N5	1	0	188.7576	tree planter	1	6	493.7332	1737.115	글세
N5	1	0	189.2539	tree planter	1	0	718.1842	1418.638	입니다
N5	1	0	219.2052	tree planter	1	5	499.6738	1551.631	그
N5	1	0	219.3177	tree planter	1	6	396.6634	2142.688	그렇게
N5	1	0	219.7979	tree planter	1	0	715.4678	1539.778	입니다
N5	1	0	220.5767	tree planter	1	9	389.8566	1146.132	그래도
N5	1	0	220.701	tree planter	1	5	147.9175	1616.221	그
N5	1	0	221.8873	tree planter	1	2	411.2026	1017.667	소가
N5	1	0	221.9729	tree planter	1	0	679.5049	1473.792	소가
N5	1	0	222.1884	tree planter	1	6	433.5092	2012.337	나겠지요
N5	1	0	312.7497	tree planter	1	2	669.1134	1155.375	오시요
N5	1	0	314.8813	tree planter	1	0	702.2706	1349.397	밭
N5	1	0	315.1913	tree planter	1	6	553.2052	1769.517	에서
N5	1	0	315.3102	tree planter	1	8	457.1464	1401.29	에서
N5	1	0	315.4308	tree planter	1	9	491.456	1242.423	또
N5	1	0	315.5319	tree planter	1	0	581.9265	1464.791	다시
N5	1	0	315.6459	tree planter	1	4	365.9175	1800.312	다시
N5	1	0	316.638	tree planter	1	6	487.2398	1825.385	그렇게
N5	1	0	317.4264	tree planter	1	6	429.4173	1977.278	되겠어
N5	1	0	317.6079	tree planter	1	8	477.6662	972.1633	되겠어
N5	1	0	360.3197	tree planter	1	2	491.36	1413.224	초직
N5	1	0	360.4084	tree planter	1	4	360.6136	2093.767	초직
N5	1	0	360.6184	tree planter	1	0	591.6982	1522.165	가겠습니다
N5	1	0	360.6817	tree planter	1	6	459.4866	2097.997	가겠습니다
N5	1	0	435.3372	tree planter	1	4	352.5357	2162.921	일찍
N5	1	0	435.5122	tree planter	1	2	649.6984	1145.22	오셨습니다
N5	1	0	436.0231	tree planter	1	0	989.4797	1613.448	오셨습니다
N5	1	0	438.0917	tree planter	1	5	516.2564	1792.944	그래
N5	1	0	438.5385	tree planter	1	1	534.7522	1335.255	어떴습니까
N5	1	0	438.6497	tree planter	1	1	473.1053	1444.353	어떴습니까
N5	1	0	438.9978	tree planter	1	0	658.139	1540.002	어떴습니까
N5	1	0	457.5444	tree planter	1	5	401.2845	1261.058	그건
N5	1	0	491.1958	tree planter	1	6	442.8693	1841.334	언제
N5	1	0	491.4304	tree planter	1	0	637.6446	1462.726	누가
N5	1	0	491.7259	tree planter	1	0	633.615	1471.566	된다고
N5	1	0	491.8083	tree planter	1	2	375.4747	1183.815	된다고
N5	1	0	491.8786	tree planter	1	7	525.0483	1642.999	해서
N5	1	0	491.972	tree planter	1	8	480.3134	1581.298	해서
N5	1	0	493.7777	tree planter	1	2	582.0082	1188.103	또

N5	1	0	494.1079	tree planter	1	2	554.8221	960.826	봅시다
N5	1	0	494.2999	tree planter	1	4	296.0856	1762.19	봅시다
N5	1	0	494.3585	tree planter	1	0	688.5216	1503.913	봅시다
N5	1	0	498.0768	tree planter	1	8	515.5901	962.8241	더
N5	1	0	498.3944	tree planter	1	2	542.4609	1174.091	꽃
N5	1	0	498.7378	tree planter	1	0	593.6127	1467.123	다고
N5	1	0	498.7938	tree planter	1	9	412.9804	1062.471	다고
N5	1	0	499.1632	tree planter	1	6	523.4785	1912.174	는데
N5	1	0	501.4776	tree planter	1	7	613.3238	1786.208	새들
N5	1	0	501.7533	tree planter	1	2	503.8514	1091.279	또 오고
N5	1	0	501.8089	tree planter	1	2	431.8028	889.8761	또 오고
N5	1	0	501.9146	tree planter	1	9	392.2952	1189.887	또 오고
N5	1	0	503.5997	tree planter	1	2	486.1596	912.1074	있고 올테니
N5	1	0	505.4862	tree planter	1	5	401.4814	1147.045	읍시다
N5	1	0	510.4203	Won Gi	1	5	398.0749	1624.333	그
N5	1	0	510.7124	Won Gi	1	2	487.1756	1059.928	보호사
N5	1	0	511.6696	Won Gi	1	7	452.9316	1855.744	때
N5	1	0	542.8472	Won Gi	1	3	391.482	1272.949	친구
N5	1	0	542.9718	Won Gi	1	0	630.8273	1341.422	가
N5	1	0	544.1982	Won Gi	1	3	472.0929	995.5072	고생
N5	1	0	547.5317	Won Gi	1	6	433.8724	1787.375	는데
N5	1	0	555.052	Won Gi	1	5	393.4476	1676.682	그
N5	1	0	555.3791	Won Gi	1	3	467.7721	1619.162	친구
N5	1	0	555.4975	Won Gi	1	0	640.1366	1310.431	가
N5	1	0	555.6144	Won Gi	1	2	501.4829	1028.547	고생
N5	1	0	555.9746	Won Gi	1	1	494.5321	1574.299	것
N5	1	0	557.274	Won Gi	1	2	523.6929	1110.208	오 지 않
N5	1	0	557.6918	Won Gi	1	9	497.5283	1322.5	않소
N5	1	0	562.0993	Won Gi	1	9	449.4644	1054.988	도
N5	1	0	563.4188	Won Gi	1	4	315.9724	2184.051	식수
N5	1	0	563.5342	Won Gi	1	3	407.7131	1633.362	식수
N5	1	0	564.2308	Won Gi	1	9	451.3813	1051.027	라고
N5	1	0	565.6761	Won Gi	1	1	480.5975	1142.286	것
N5	1	0	565.7716	Won Gi	1	0	608.5572	1535.872	같습니다
N5	1	0	571.7041	Won Gi	1	6	487.2359	2115.929	그렇게
N5	1	0	574.6251	원기동료	1	4	163.0698	1994.576	식수
N5	1	0	574.7512	원기동료	1	3	376.0013	1469.482	식수
N5	1	0	574.9738	원기동료	1	5	333.3312	1152.357	그만두
N5	1	0	576.1915	Won Gi	1	5	377.9042	1535.392	그만두
N5	1	0	576.4031	Won Gi	1	3	304.1989	1421.418	그만두

N5	1	0	578.2897	Won Gi	1	2	500.5614	982.082	보게
N5	1	0	578.402	Won Gi	1	6	382.4125	2059.114	보게
N5	1	0	586.7796	bad news guy	1	2	445.6545	1110.844	조사
N5	1	0	588.4178	bad news guy	1	6	333.7885	2041.983	같은데
N5	1	0	604.3821	tree planter	1	1	518.1416	1207.091	어쩌면
N5	1	0	605.0437	tree planter	1	3	311.8873	1308.828	수가
N5	1	0	605.087	tree planter	1	0	526.1331	1388.682	수가
N5	1	0	606.6755	tree planter	1	5	605.1105	1660.846	그래도
N5	1	0	606.8558	tree planter	1	9	406.4286	1404.975	그래도
N5	1	0	607.576	tree planter	1	9	316.4437	1456.585	믿고
N5	1	0	607.9616	tree planter	1	6	396.4414	1945.256	는데
N5	1	0	627.4216	tree planter	1	2	514.6234	900.3604	고생
N5	1	0	627.751	tree planter	1	9	422.801	1038.18	이라고
N5	1	0	628.1512	tree planter	1	7	465.3424	1931.528	했바면
N5	1	0	629.9294	tree planter	1	8	474.6939	1379.363	벌써
N5	1	0	634.285	tree planter	1	0	690.2685	1346.152	가서
N5	1	0	634.4607	tree planter	1	8	564.6331	1239.639	가서
N5	1	0	635.6325	tree planter	1	8	466.689	1286.718	더
N5	1	0	636.0003	tree planter	1	0	605.2747	1326.894	다고
N5	1	0	636.0993	tree planter	1	9	435.6622	964.7661	다고
N5	1	0	681.2973	아저씨	1	9	591.7246	1002.273	여보
N5	1	0	681.8163	아저씨	1	3	395.1846	989.6079	우산
N5	1	0	682.936	아저씨	1	4	361.1336	2176.226	비가
N5	1	0	683.5599	아저씨	1	6	476.8913	1838.73	는데
N5	1	0	691.009	아저씨	1	5	441.0722	1578.356	그
N5	1	0	693.4844	아저씨	1	3	390.0381	1390.377	수록
N5	1	0	795.9382	아저씨	1	5	425.7318	1557.692	그사람
N5	1	0	799.2833	아저씨	1	7	432.7148	1816.217	대해서
N5	1	0	799.357	아저씨	1	7	409.5266	1783.026	대해서
N5	1	0	799.4506	아저씨	1	8	452.1537	1607.656	대해서
N5	1	0	801.2544	아저씨	1	3	392.4441	1402.331	주거니
N5	1	0	803.2983	아저씨	1	4	359.4523	1878.486	여기서
N5	1	0	803.4231	아저씨	1	8	555.3409	1329.401	여기서
N5	1	0	805.8515	아저씨	1	7	421.3569	1536.38	양배
N5	1	0	811.1557	아저씨	1	8	518.2688	1153.67	저 적에
N5	1	0	811.3718	아저씨	1	1	495.9574	1454.338	저 적에
N5	1	0	811.5026	아저씨	1	6	460.8032	1898.069	저 적에
N5	1	0	814.5705	아저씨	1	2	466.578	1055.038	고생
N5	1	0	815.268	아저씨	1	8	543.7157	1286.891	면서
N5	1	0	816.926	아저씨	1	3	390.1108	1095.561	추은

N5	1	0	817.1352	아저씨	1	1	505.7916	1291.013	것
N5	1	0	817.5394	아저씨	1	6	473.0484	1867.593	인데
N5	1	0	818.2218	아저씨	1	4	290.39	2107.38	이제
N5	1	0	818.3431	아저씨	1	6	391.9001	1973.773	이제
N5	1	0	867.1202	아저씨	1	0	623.3573	1475.637	다고
N5	1	0	867.2087	아저씨	1	9	526.8493	1314.449	다고
N5	1	0	867.3004	아저씨	1	7	495.9351	1729.478	했지만
N5	1	0	869.4605	아저씨	1	5	609.4845	1596.536	그
N5	1	0	870.1872	아저씨	1	7	569.8622	1955.954	해야겠다
N5	1	0	870.4431	아저씨	1	6	466.8628	1953.766	해야겠다
N5	1	0	893.5832	아저씨	1	5	347.987	1439.64	읍시다
N5	1	0	893.7872	아저씨	1	0	670.7742	1399.255	읍시다
N5	1	0	895.1642	아저씨	1	2	466.945	946.7545	복
N5	1	0	895.829	아저씨	1	9	387.6678	1083.364	라고
N5	1	0	896.2408	아저씨	1	6	429.0261	1856.281	는데
N5	1	0	900.7977	tree planter	1	2	543.1364	1026.325	보호원
N5	1	0	900.8699	tree planter	1	2	553.679	1011.679	보호원
N5	1	0	901.1781	tree planter	1	0	725.297	1321.947	하다가
N5	1	0	901.2342	tree planter	1	0	621.7897	1411.724	하다가
N5	1	0	901.3233	tree planter	1	0	618.7947	1356.752	하다가
N5	1	0	901.6039	tree planter	1	7	476.0275	1611.32	군대
N5	1	0	902.5028	tree planter	1	9	360.5014	1233.374	라고
N5	1	0	903.2982	tree planter	1	6	509.9273	1702.474	제가
N5	1	0	903.377	tree planter	1	0	584.1839	1371.382	제가
N5	1	0	905.1572	아저씨	1	5	344.0274	1501.089	그랬습니까
N5	1	0	905.6578	아저씨	1	0	656.7008	1315.722	그랬습니까
N5	1	0	919.8617	tree planter	1	5	1115.754	1826.815	그사람
N5	1	0	925.6632	tree planter	1	2	570.651	1049.241	돌아오지
N5	1	0	926.1092	tree planter	1	0	433.7356	1148.393	하고
N5	1	0	926.2302	tree planter	1	9	399.2073	831.4418	하고
N5	1	0	929.0048	아저씨	1	9	452.3671	906.6346	라고
N5	1	0	933.4313	tree planter	1	6	404.1483	2086.057	에게
N5	1	0	933.572	tree planter	1	6	459.4635	2008.201	에게
N5	1	0	934.4029	tree planter	1	9	354.2965	1617.467	이라도
N5	1	0	934.7557	tree planter	1	0	577.9626	1451.717	자고
N5	1	0	934.8961	tree planter	1	9	357.6709	889.5318	자고
N5	1	0	935.9276	tree planter	1	6	401.0982	2093.062	이렇게
N5	1	0	945.6643	아저씨	1	8	589.9167	1072.111	더
N5	1	0	949.4559	아저씨	1	5	268.9845	1605.578	그사람
N5	1	0	951.6885	아저씨	1	7	423.714	1859.832	때문에

N5	1	0	963.2057	아저씨	1	7	464.8646	1878.776	군대
N5	1	0	967.0627	아저씨	1	6	419.7167	1714.691	그렇게도
N5	1	0	967.1766	아저씨	1	9	374.4375	1190.123	그렇게도
N5	1	0	967.3578	아저씨	1	3	219.5521	1420.882	국선
N5	1	0	971.6628	아저씨	1	3	395.7682	1622.416	두달
N5	1	0	977.4035	아저씨	1	6	437.7754	1777.745	겠어
N5	1	0	977.6187	아저씨	1	8	398.7438	1093.697	겠어
N5	1	0	985.2524	tree planter	1	5	296.3172	1967.075	그집
N5	1	0	985.4781	tree planter	1	7	370.3033	1971.416	애어린
N5	1	0	1053.881	tree planter	1	0	689.2267	1342.974	짯인데
N5	1	0	1054.266	tree planter	1	6	451.3491	1943.952	짯인데
N5	1	0	1088.907	tree planter	1	8	479.2784	1254.49	면서
N5	1	0	1090.924	tree planter	1	9	625.5338	1314.358	다니고
N5	1	0	1093.257	tree planter	1	1	372.0795	1342.24	면서도
N5	1	0	1093.368	tree planter	1	9	400.8012	994.1191	면서도
N5	1	0	1095.774	tree planter	1	7	404.0757	1924.207	때가
N5	1	0	1095.896	tree planter	1	0	504.8199	1237.33	때가
N5	1	0	1103.462	tree planter	1	7	380.0511	2029.881	부대
N5	1	0	1112.102	tree planter	1	5	393.5172	1583.946	그 때
N5	1	0	1112.263	tree planter	1	7	435.359	1914.493	그 때
N5	1	0	1118.494	tree planter	1	4	348.6079	1887.369	집에
N5	1	0	1118.594	tree planter	1	6	423.1698	1808.065	집에
N5	1	0	1119.252	tree planter	1	7	414.0955	1889.955	대신
N5	1	0	1121.094	tree planter	1	2	408.542	840.5865	보호원
N5	1	0	1121.181	tree planter	1	2	434.942	962.021	보호원
N5	1	0	1121.515	tree planter	1	2	425.4283	911.8582	하고 있을
N5	1	0	1121.623	tree planter	1	4	366.0353	1936.077	하고 있을
N5	1	0	1127.868	tree planter	1	6	408.9391	1834.571	께서
N5	1	0	1131.907	tree planter	1	1	472.9938	1458.494	거든
N5	1	0	1136.271	tree planter	1	1	467.5482	989.5345	없어도
N5	1	0	1136.453	tree planter	1	1	458.636	1297.513	없어도
N5	1	0	1136.568	tree planter	1	9	358.5898	1042.425	없어도
N5	1	0	1137.635	tree planter	1	2	656.7452	1158.985	조각
N5	1	0	1137.739	tree planter	1	0	592.3913	1371.723	조각
N5	1	0	1138.523	tree planter	1	5	358.5874	1429.144	뜻
N5	1	0	1149.948	tree planter	1	2	359.5855	1107.538	고 있던
N5	1	0	1150.033	tree planter	1	4	344.6462	2090.34	고 있던
N5	1	0	1153.462	tree planter	1	5	353.6807	1664.243	뜻
N5	1	0	1156.297	tree planter	1	0	481.973	1398.781	생각
N5	1	0	1156.763	tree planter	1	4	370.2843	2060.741	있다는 것

N5	1	0	1157.021	tree planter	1	1	417.575	1256.302	있다는 것
N5	1	0	1171.948	아저씨	1	0	650.272	1279.805	가
N5	1	0	1183.188	아저씨	1	0	637.0553	1162.866	수가
N5	1	0	1185.632	아저씨	1	1	388.5964	1464.561	없어도
N5	1	0	1185.801	아저씨	1	1	262.5224	1460.368	없어도
N5	1	0	1185.874	아저씨	1	9	495.0832	1291.355	없어도
N5	1	0	1188.506	아저씨	1	4	421.9218	1922.56	있었으면
N5	1	0	1188.6	아저씨	1	1	441.8779	1454.841	있었으면
N5	1	0	1189.221	아저씨	1	0	636.862	1626.792	까지
N5	1	0	1189.325	아저씨	1	4	415.0537	2092.821	까지
N5	1	0	1189.984	아저씨	1	6	474.2913	1865.967	뭔데
N4	1	0	80.04235	young watchman	1	4	146.2371	1835.838	지도
N4	1	0	80.1539	young watchman	1	9	317.7426	1326.012	지도
N4	1	0	80.71031	young watchman	1	6	529.1447	1976.981	는데
N4	1	0	82.80704	young watchman	1	2	593.3635	1280.428	혹시
N4	1	0	82.97823	young watchman	1	4	353.7795	1902.101	혹시
N4	1	0	84.47674	young watchman	1	0	1026.674	1594.836	빠진건
N4	1	0	89.60116	lighthouse cleaner	1	0	912.8315	1484.674	바다
N4	1	0	108.3198	general	1	0	648.3286	1528.416	잡이가
N4	1	0	108.4177	general	1	4	362.7209	2073.749	잡이가
N4	1	0	108.5119	general	1	0	510.866	1572.765	잡이가
N4	1	0	113.3107	general	1	7	461.5271	2077.789	등대
N4	1	0	121.8218	lighthouse cleaner	1	6	612.7078	1797.842	한데
N4	1	0	126.9274	young watchman	1	0	665.7681	1409.284	잡이
N4	1	0	127.1227	young watchman	1	4	336.3861	2030.265	잡이
N4	1	0	130.8345	young watchman	1	0	725.2828	1298.308	반갑소
N4	1	0	131.2862	young watchman	1	9	431.0459	1051.024	반갑소
N4	1	0	134.5224	young watchman	1	9	304.884	1375.042	많아져고
N4	1	0	135.6908	young watchman	1	4	307.9995	2581.75	이개
N4	1	0	135.7735	young watchman	1	7	341.6427	2221.951	이개
N4	1	0	136.4708	young watchman	1	9	480.9008	1126.203	신호
N4	1	0	140.5641	young watchman	1	7	462.9459	1839.676	등대
N4	1	0	141.5292	general	1	2	534.6306	1127.75	보지

N4	1	0	141.651	general	1	4	499.9066	2112.654	보지
N4	1	0	143.1364	general	1	1	471.4907	1437.52	저기
N4	1	0	143.2404	general	1	4	360.664	2216.739	저기
N4	1	0	144.9942	young sailor	1	0	593.6772	1355.315	입니까
N4	1	0	146.8787	general	1	7	455.8558	2023.558	등대
N4	1	0	149.6384	young sailor	1	7	332.4429	1978.55	등대
N4	1	0	151.1342	general	1	1	402.3763	1776.111	믿어지지않아
N4	1	0	151.3299	general	1	4	480.1754	1893.298	믿어지지않아
N4	1	0	151.5543	general	1	0	879.9055	1490.252	믿어지지않아
N4	1	0	154.3324	general	1	4	308.344	1990.491	있어
N4	1	0	154.4954	general	1	8	466.75	1152.139	있어
N4	1	0	154.8294	general	1	9	514.1296	933.177	하고
N4	1	0	155.4042	general	1	4	545.2186	1958.15	치지 않아
N4	1	0	161.7787	young sailor	1	1	469.6957	1486.053	저
N4	1	0	163.3425	young sailor	1	0	622.398	1376.164	있습니까
N4	1	0	163.8858	general	1	4	387.2098	2108.874	있고
N4	1	0	164.1095	general	1	9	441.5414	992.736	있고
N4	1	0	165.762	general	1	6	492.8059	1993.071	세상
N4	1	0	167.1832	general	1	3	394.3606	1589.412	부터
N4	1	0	167.3195	general	1	8	546.7617	1374.064	부터
N4	1	0	169.0009	general	1	7	424.4933	1933.406	등대
N4	1	0	169.7812	general	1	9	443.7506	1140.39	알고 있어
N4	1	0	169.8334	general	1	4	452.5623	2189.721	알고 있어
N4	1	0	170.0835	general	1	8	483.055	1239.777	알고 있어
N4	1	0	175.0535	general	1	6	452.7824	2037.814	에게
N4	1	0	175.1875	general	1	6	448.2018	2073.885	에게
N4	1	0	176.1922	general	1	7	422.5432	1938.931	등대
N4	1	0	180.0797	general	1	2	404.8422	971.5967	보기
N4	1	0	180.1537	general	1	4	349.939	2282.221	보기
N4	1	0	181.078	general	1	7	428.3044	2062.337	때
N4	1	0	181.1361	general	1	1	444.9817	1206.348	없고
N4	1	0	187.5917	general	1	4	301.1958	2128.907	시작
N4	1	0	187.7013	general	1	0	655.021	1720.206	시작
N4	1	0	290.7424	narrator	1	7	470.0162	1977.425	할 때
N4	1	0	291.8222	narrator	1	2	548.3597	1284.677	조선
N4	1	0	292.2619	narrator	1	6	502.1538	1874.885	에서
N4	1	0	292.4225	narrator	1	8	531.8805	1501.426	에서
N4	1	0	293.3172	narrator	1	7	534.6712	1848.287	등대
N4	1	0	295.6077	narrator	1	0	712.6065	1571.179	생각
N4	1	0	298.8225	narrator	1	7	493.8095	2062.933	해방

N4	1	0	299.8328	narrator	1	1	496.5714	1023.479	것
N4	1	0	302.9647	narrator	1	7	528.8445	2027.101	해방
N4	1	0	303.3236	narrator	1	2	502.7463	1426.678	소식
N4	1	0	303.4523	narrator	1	4	438.5113	2100.843	소식
N4	1	0	304.897	narrator	1	5	465.5377	1739.431	전득
N4	1	0	367.1313	Cheon Deuk	1	7	475.1595	1931.85	등대
N4	1	0	370.2196	office guy 1	1	7	380.9137	1657.303	등대
N4	1	0	371.266	office guy 1	1	5	321.6988	1710.741	전득
N4	1	0	373.3622	office guy 2	1	7	440.8861	1956.567	등대
N4	1	0	373.464	office guy 2	1	0	620.4681	1409.503	등대가
N4	1	0	373.6347	office guy 2	1	9	428.6558	1125.238	또
N4	1	0	378.1732	Cheon Deuk	1	9	333.8755	1234.317	당신도
N4	1	0	395.1759	Dong Gu	1	1	402.2677	1194.143	어디
N4	1	0	395.2355	Dong Gu	1	4	396.7984	2092.532	어디
N4	1	0	397.4044	Dong Gu	1	6	486.113	1936.862	는데
N4	1	0	462.4245	Dong Gu	1	5	393.2428	1486.996	전득
N4	1	0	502.8755	Dong Gu	1	2	528.9991	1320.824	오빠
N4	1	0	503.0527	Dong Gu	1	0	703.1257	1165.906	오빠
N4	1	0	503.5877	Dong Gu	1	2	616.5037	1126.936	오빠가
N4	1	0	503.7802	Dong Gu	1	0	757.3539	1142.004	오빠가
N4	1	0	503.8815	Dong Gu	1	0	768.1852	1485.75	오빠가
N4	1	0	508.8415	Dong Gu	1	5	399.9346	1580.367	전득
N4	1	0	509.2128	Dong Gu	1	0	724.2019	1676.092	오니까
N4	1	0	509.873	Dong Gu	1	2	425.0867	1165.66	좋아는
N4	1	0	522.9712	Dong Gu	1	1	558.8334	1365.56	어서
N4	1	0	523.1453	Dong Gu	1	8	695.3416	1405.714	어서
N4	1	0	532.1175	Dong Gu	1	3	364.0834	1261.672	죽
N4	1	0	532.356	Dong Gu	1	0	883.8348	1442.112	따게
N4	1	0	532.4414	Dong Gu	1	6	465.0892	1860.112	따게
N4	1	0	539.55	Dong Gu	1	0	440.9916	1873.958	잡이
N4	1	0	539.6601	Dong Gu	1	4	354.8555	2037.367	잡이
N4	1	0	541.1156	Dong Gu	1	2	439.6027	1169.553	보다
N4	1	0	541.2218	Dong Gu	1	0	739.9048	1495.456	보다
N4	1	0	542.0288	Dong Gu	1	9	480.787	1313.806	도
N4	1	0	542.1242	Dong Gu	1	4	340.2035	1971.381	기다린
N4	1	0	542.7686	Dong Gu	1	6	427.0786	1977.927	인데
N4	1	0	544.0388	Dong Gu	1	1	607.7966	1151.861	걱정
N4	1	0	545.551	Dong Gu	1	7	548.3942	2115.599	해주겠나
N4	1	0	545.6669	Dong Gu	1	3	373.0601	1897.071	해주겠나
N4	1	0	556.9004	Dong Gu	1	1	534.6163	1330.633	어떤가

N4	1	0	558.0443	Dong Gu	1	6	626.2453	2238.575	하게
N4	1	0	561.4891	Cheon Deuk	1	0	636.7242	1489.27	가
N4	1	0	567.3816	Cheon Deuk	1	1	540.2185	1319.164	어떻실인지
N4	1	0	567.5237	Cheon Deuk	1	1	494.3859	1496.27	어떻실인지
N4	1	0	567.9904	Cheon Deuk	1	4	389.2874	2066.729	어떻실인지
N4	1	0	576.4036	Dong Gu	1	6	518.3803	1894.947	한테
N4	1	0	579.8142	Dong Gu	1	6	465.6962	1963.863	에서
N4	1	0	579.9063	Dong Gu	1	8	521.7187	1506.041	에서
N4	1	0	580.8613	Dong Gu	1	3	391.8507	1180.592	공부
N4	1	0	581.239	Dong Gu	1	7	491.4155	1952.179	책임
N4	1	0	582.7263	Dong Gu	1	4	311.1661	2342.607	이제
N4	1	0	583.111	Dong Gu	1	4	361.4897	2473.17	집에
N4	1	0	587.8128	Cheon Deuk	1	1	538.8164	1312.056	어떻게
N4	1	0	587.932	Cheon Deuk	1	1	464.7835	1721.41	어떻게
N4	1	0	588.0312	Cheon Deuk	1	6	360.9272	2191.53	어떻게
N4	1	0	591.373	Dong Gu	1	6	457.3132	1982.721	는데
N4	1	0	592.5338	Dong Gu	1	6	504.0634	1910.429	에서
N4	1	0	592.667	Dong Gu	1	8	532.5674	1196.714	에서
N4	1	0	593.229	Dong Gu	1	0	889.4525	1630.873	가지
N4	1	0	593.3368	Dong Gu	1	4	367.0823	2437.847	가지
N4	1	0	614.1225	Young Pil's Friend	1	3	886.5597	2027.001	동구
N4	1	0	616.3421	Young Pil's Friend	1	7	605.1459	1521.549	대단
N4	1	0	616.7499	Young Pil's Friend	1	0	633.6612	1356.762	수다
N4	1	0	618.1327	Young Pil's Friend	1	1	492.285	1044.809	어제
N4	1	0	618.2404	Young Pil's Friend	1	6	455.1719	1557.101	어제
N4	1	0	618.7371	Young Pil's Friend	1	7	452.213	1838.442	등대
N4	1	0	619.1346	Young Pil's Friend	1	8	593.83	1288.936	와서
N4	1	0	621.9351	Young Pil's Friend	1	1	453.698	1038.072	저기
N4	1	0	622.0427	Young Pil's Friend	1	4	359.7528	1993.994	저기
N4	1	0	626.1601	Young Pil's Friend	1	9	479.195	1360.097	나오고
N4	1	0	628.9078	Young Pil's Friend	1	9	393.457	1162.195	그리고
N4	1	0	629.0329	Young Pil's Friend	1	8	505.7215	1246.958	저
N4	1	0	629.386	Young Pil's Friend	1	5	410.9483	1314.471	전득
N4	1	0	629.7945	Young Pil's Friend	1	9	457.1458	1200.614	형님도

N4	1	0	631.122	Young Pil's Friend	1	8	496.4284	1111.162	더
N4	1	0	631.5536	Young Pil's Friend	1	8	563.3773	1159.807	나가서
N4	1	0	632.286	Young Pil's Friend	1	4	319.0641	1877.816	기다릴
N4	1	0	633.1664	Young Pil's Friend	1	9	420.2925	922.5785	돼지고
N4	1	0	635.1976	Dong Gu	1	5	452.7072	1309.05	그
N4	1	0	635.6991	Dong Gu	1	7	410.3615	1931.155	해
N4	1	0	636.436	Dong Gu	1	0	956.303	1431.495	사고도
N4	1	0	636.564	Dong Gu	1	2	486.4869	1153.215	사고도
N4	1	0	636.6514	Dong Gu	1	9	500.6686	1598.678	사고도
N4	1	0	637.7633	Dong Gu	1	5	439.4354	1825.142	전득
N4	1	0	641.1865	Dong Gu	1	4	319.8894	2202.168	이건
N4	1	0	643.9922	Young Pil	1	0	679.9533	1476.042	하도
N4	1	0	644.0854	Young Pil	1	9	431.4082	1304.247	하도
N4	1	0	644.5499	Young Pil	1	6	457.8219	1808.222	세상
N4	1	0	644.2898	Young Pil	1	2	1024.083	485.6067	배고픈
N4	1	0	646.3393	Young Pil	1	7	615.8138	1911.656	해방
N4	1	0	646.8699	Young Pil	1	6	532.1834	1940.849	는데
N4	1	0	647.5693	Young Pil	1	9	467.8383	1389.146	나도
N4	1	0	648.1334	Young Pil	1	4	322.5459	2130.173	집 사고
N4	1	0	648.2957	Young Pil	1	0	688.8128	1381.36	집 사고
N4	1	0	648.4012	Young Pil	1	9	490.4336	1270.695	집 사고
N4	1	0	648.8236	Young Pil	1	1	477.4607	1498.646	얻었어요
N4	1	0	648.8819	Young Pil	1	1	512.0717	1489.563	얻었어요
N4	1	0	651.5929	Young Pil	1	8	530.544	1497.201	면서
N4	1	0	652.0946	Young Pil	1	6	474.3274	2018.155	겝시다
N4	1	0	652.3248	Young Pil	1	0	677.9804	1448.735	겝시다
N4	1	0	656.127	Young Pil	1	0	764.3342	1487.521	안가
N4	1	0	665.0451	Young Pil's Friend	1	4	319.0011	1923.814	이거
N4	1	0	665.1611	Young Pil's Friend	1	8	591.3126	1210.399	이거
N4	1	0	667.1198	Young Pil's Friend	1	3	410.4167	1356.436	동구
N4	1	0	671.2281	Cheon Deuk	1	3	407.7688	1112.244	구경
N4	1	0	671.6488	Cheon Deuk	1	0	730.6041	1497.769	하자고
N4	1	0	671.7503	Cheon Deuk	1	0	663.8101	1480.508	하자고
N4	1	0	671.8536	Cheon Deuk	1	9	407.3934	1618.531	하자고
N4	1	0	676.6889	Cheon Deuk	1	0	760.7109	1605.909	같은데
N4	1	0	677.3526	Cheon Deuk	1	3	391.0639	1573.171	두 사람
N4	1	0	677.8211	Cheon Deuk	1	9	386.3693	1169.462	이라고

N4	1	0	683.8028	Cheon Deuk	1	1	510.7291	1219.195	없어요
N4	1	0	684.7992	Cheon Deuk	1	6	455.6405	1862.357	에서
N4	1	0	684.8959	Cheon Deuk	1	8	437.6405	1665.128	에서
N4	1	0	685.1732	Cheon Deuk	1	6	492.1717	1998.301	이렇게
N4	1	0	720.105	Cheon Deuk	1	1	528.9332	1350.015	썼어
N4	1	0	720.3127	Cheon Deuk	1	8	558.3254	970.0654	썼어
N4	1	0	726.6615	선생님	1	2	643.586	1218.406	들어보시오
N4	1	0	729.7558	선생님	1	2	489.3711	1402.094	민족
N4	1	0	730.0448	선생님	1	7	539.2916	2109.392	태양
N4	1	0	731.99	선생님	1	6	442.6745	2122.788	만세
N4	1	0	732.8961	선생님	1	6	431.7449	2287.777	이렇게
N4	1	0	733.0352	선생님	1	1	508.7197	1766.816	써 있어
N4	1	0	733.1282	선생님	1	4	358.6781	2309.869	써 있어
N4	1	0	740.3869	선생님	1	0	711.9404	1643.262	잡으시고
N4	1	0	740.4937	선생님	1	5	446.6416	1841.932	잡으시고
N4	1	0	740.5953	선생님	1	4	397.8907	2057.124	잡으시고
N4	1	0	740.7097	선생님	1	9	461.9162	969.6624	잡으시고
N4	1	0	742.6586	선생님	1	0	823.7973	1800.993	찾아주신
N4	1	0	742.7538	선생님	1	0	636.1508	1547.501	찾아주신
N4	1	0	747.7408	Cheon Deuk	1	2	487.0675	1240.972	여보시요
N4	1	0	753.6384	Cheon Deuk	1	7	730.8648	2068.905	백두산
N4	1	0	753.8499	Cheon Deuk	1	3	482.2833	1783.744	백두산
N4	1	0	758.9252	Cheon Deuk	1	5	300.2301	1753.757	그
N4	1	0	763.4197	선생님	1	7	510.0689	1983.695	백
N4	1	0	764.8504	선생님	1	1	466.2368	1246.955	어쩌다는
N4	1	0	766.3597	Cheon Deuk	1	7	566.8976	1896.818	백군
N4	1	0	767.8579	Cheon Deuk	1	1	512.9317	1100.324	없으다
N4	1	0	770.6172	Cheon Deuk	1	3	487.9905	897.5874	부하
N4	1	0	773.9113	Cheon Deuk	1	4	272.66	2170.466	이 걱임
N4	1	0	774.0655	Cheon Deuk	1	1	667.4924	1708.933	이 걱임
N4	1	0	775.3253	Cheon Deuk	1	8	543.8525	1126.828	부러서
N4	1	0	777.4623	Cheon Deuk	1	5	393.4839	1027.778	그군사
N4	1	0	777.2537	Cheon Deuk	1	9	478.6583	1228.216	또
N4	1	0	777.7798	Cheon Deuk	1	0	656.8634	1514.706	그군사
N4	1	0	779.0787	Cheon Deuk	1	6	457.5665	1949.646	인데
N4	1	0	779.8533	Cheon Deuk	1	5	472.9375	1737.958	그들은
N4	1	0	780.4031	Cheon Deuk	1	0	982.6689	1552.955	같이
N4	1	0	780.5517	Cheon Deuk	1	4	233.038	2007.342	같이
N4	1	0	780.9466	Cheon Deuk	1	3	396.6975	1546.892	참수
N4	1	0	781.1286	Cheon Deuk	1	4	317.6147	2021.794	이고

N4	1	0	781.2427	Cheon Deuk	1	9	221.7203	915.848	이고
N4	1	0	783.5262	Cheon Deuk	1	4	293.0646	1970.73	이주목
N4	1	0	787.6892	Cheon Deuk	1	9	396.2337	925.0464	고
N4	1	0	793.1252	Cheon Deuk	1	8	501.0629	1472.761	그래서
N4	1	0	793.5908	Cheon Deuk	1	7	602.5901	1976.534	백군
N4	1	0	795.6052	Cheon Deuk	1	7	512.3134	1889.727	등대
N4	1	0	796.1058	Cheon Deuk	1	9	384.2827	1333.648	믿고
N4	1	0	796.3836	Cheon Deuk	1	0	733.6968	1557.276	산다고
N4	1	0	796.4876	Cheon Deuk	1	9	398.4985	1389.577	산다고
N4	1	0	796.5936	Cheon Deuk	1	7	670.3232	1866.988	했어
N4	1	0	799.2083	Cheon Deuk	1	6	514.3647	1797.369	께서
N4	1	0	799.3493	Cheon Deuk	1	8	620.04	1510.069	께서
N4	1	0	813.1774	Barber	1	0	676.7559	1739.361	됐습니다
N4	1	0	815.3465	Barber	1	2	575.8328	1208.446	또 오세요
N4	1	0	815.4962	Barber	1	6	553.9055	1786.932	또 오세요
N4	1	0	821.2255	Barber	1	7	715.3425	1914.141	해방
N4	1	0	821.8228	Barber	1	6	505.4314	1944.316	되는데
N4	1	0	824.9583	Barber	1	2	431.9892	1121.26	옷
N4	1	0	825.2859	Barber	1	1	543.2396	1088.276	벗고
N4	1	0	825.4589	Barber	1	9	437.4523	1026.209	벗고
N4	1	0	826.04	Barber	1	1	515.4408	1544.04	여기
N4	1	0	826.1172	Barber	1	4	366.7229	2125.453	여기
N4	1	0	828.8474	Barber	1	6	478.755	2045.362	는데
N4	1	0	848.142	Barber	1	0	731.4181	1445.44	파견
N4	1	0	853.918	Barber	1	6	426.3343	2049.431	제가
N4	1	0	854.0279	Barber	1	0	657.9366	1645.542	제가
N4	1	0	854.1289	Barber	1	0	713.4586	1450.785	가서
N4	1	0	854.2511	Barber	1	8	435.0415	1575.769	가서
N4	1	0	854.7409	Barber	1	7	511.5601	2077.224	해드릴
N4	1	0	855.2203	Barber	1	6	507.2608	1788.484	던데
N4	1	0	855.7817	Barber	1	6	435.5315	1704.318	이렇게
N4	1	0	862.7764	Barber	1	4	453.2551	1926.583	기다려
N4	1	0	866.0775	Barber	1	6	396.8637	2027.556	이렇게
N4	1	0	866.4294	Barber	1	4	339.7238	1798.041	눈치도
N4	1	0	866.5117	Barber	1	9	441.1201	1354.074	눈치도
N4	1	0	866.8364	Barber	1	0	656.204	1660.773	바닥
N4	1	0	866.9366	Barber	1	0	766.633	1845.528	바닥
N4	1	0	869.0257	Barber	1	3	609.5412	1689.519	부하
N4	1	0	869.3755	Barber	1	2	444.9328	1161.021	오셨네
N4	1	0	877.5736	Barber	1	1	677.3265	1473.459	어서

N4	1	0	877.6533	Barber	1	8	503.1112	1592.975	어서
N4	1	0	879.5533	general	1	1	512.9259	1531.039	없읍니까
N4	1	0	879.9469	general	1	0	650.4779	1451.994	없읍니까
N4	1	0	882.2407	Barber	1	4	392.5225	2269.379	있단들
N4	1	0	883.3722	Barber	1	0	849.1917	1683.175	파견
N4	1	0	885.262	Barber	1	7	349.4206	1696.536	해들이겠습니까
N4	1	0	885.8532	Barber	1	0	821.6307	1700.173	해들이겠습니까
N4	1	0	886.5755	general	1	0	633.3954	1598.794	뭐가
N4	1	0	886.8018	general	1	8	467.4642	1205.79	돼서
N4	1	0	889.6397	general	1	0	607.4232	1514.641	생각
N4	1	0	902.1263	general	1	1	463.2219	1329.177	저 동무
N4	1	0	906.236	Barber	1	3	405.4457	1539.825	구했습니다
N4	1	0	906.3047	Barber	1	7	455.3827	1872.475	구했습니다
N4	1	0	906.6125	Barber	1	0	670.9719	1715.475	구했습니다
N4	1	0	912.8908	general	1	4	321.379	2121.97	있습니다
N4	1	0	914.9291	general	1	1	663.3701	1195.001	어서
N4	1	0	915.0625	general	1	8	584.4394	1242.681	어서
N4	1	0	916.147	general	1	4	387.2338	2267.558	이거
N4	1	0	916.2005	general	1	8	441.8338	1374.255	이거
N4	1	0	916.6708	general	1	6	468.9874	1936.379	하게
N4	1	0	922.8672	general	1	3	352.0332	1599.62	부터
N4	1	0	922.9759	general	1	8	723.6593	1478.592	부터
N4	1	0	923.0803	general	1	0	849.0093	1550.032	까까주시요
N4	1	0	923.1842	general	1	0	760.1811	1626.56	까까주시요
N4	1	0	926.6768	general	1	1	628.739	1435.625	없어
N4	1	0	926.8842	general	1	8	663.7878	1545.037	없어
N4	1	0	928.4456	general	1	1	648.1638	1185.701	어서
N4	1	0	928.5516	general	1	8	844.7833	1509.908	어서
N4	1	0	981.393	Barber	1	6	422.7324	1925.686	세상
N4	1	0	982.8462	Barber	1	6	462.8259	1707.337	이렇게
N4	1	0	985.5921	Barber	1	9	518.5557	1214.927	라고
N4	1	0	988.9108	general	1	7	582.0107	1856.945	배고픈
N4	1	0	989.2345	general	1	0	932.2258	1411.374	탔어
N4	1	0	989.4443	general	1	8	563.0201	1142.11	탔어
N4	1	0	1011.632	general	1	6	415.5921	2045.348	멋지게
N4	1	0	1011.883	general	1	0	629.522	1667.647	까까주시요
N4	1	0	1011.99	general	1	3	622.3944	1992.639	까까주시요
N4	1	0	1012.152	general	1	4	456.413	1922.082	까까주시요
N4	1	0	1012.189	general	1	9	521.6997	1343.03	까까주시요
N4	1	0	1027.157	general	1	3	526.9229	1001.61	전국

N4	1	0	1027.319	general	1	7	495.576	1742.418	해방
N4	1	0	1032.899	general	1	3	311.0375	1664.386	주던
N4	1	0	1034.031	general	1	7	664.1595	2012.497	등대
N4	1	0	1037.937	general	1	0	798.1976	1254.913	밟아보고십던
N4	1	0	1038.061	general	1	2	610.961	1652.946	밟아보고십던
N4	1	0	1038.146	general	1	2	872.2015	1118.594	밟아보고십던
N4	1	0	1043.842	general	1	4	345.1624	2066.155	불빛
N4	1	0	1044.281	general	1	2	595.8507	1309.988	보시다
N4	1	0	1047.868	general	1	1	470.618	1097.378	저 불빛
N4	1	0	1048.265	general	1	4	344.6207	2239.692	저 불빛
N4	1	0	1048.588	general	1	2	493.4258	1044.807	보자고
N4	1	0	1048.695	general	1	0	472.317	1733.751	보자고
N4	1	0	1048.86	general	1	9	445.9574	1239.126	보자고
N4	1	0	1050.152	general	1	4	337.7324	2251.738	이국
N4	1	0	1050.278	general	1	3	440.2996	1204.679	이국
N4	1	0	1055.345	general	1	6	476.3719	2028.466	이렇게
N4	1	0	1061.124	general	1	2	516.5671	1102.179	속으로
N4	1	0	1063.483	general	1	5	418.2081	1214.36	그불빛이
N4	1	0	1064.08	general	1	4	410.6533	2101.594	그불빛이
N4	1	0	1075.778	Cheon Deuk	1	6	513.0194	1663.183	께서
N4	1	0	1075.933	Cheon Deuk	1	8	472.9257	1460.261	께서
N4	1	0	1076.636	Cheon Deuk	1	4	264.6918	1894.612	이백
N4	1	0	1076.782	Cheon Deuk	1	7	461.0673	1639.497	이백
N4	1	0	1080.167	general	1	6	470.6025	1933.158	께서
N4	1	0	1080.273	general	1	8	474.4918	1647.682	께서
N4	1	0	1081.28	general	1	3	456.5167	1133.157	전국
N4	1	0	1081.443	general	1	7	557.4763	1751.817	해방
N4	1	0	1089.497	general	1	6	488.6573	1894.619	께서
N4	1	0	1089.623	general	1	8	563.3224	1719.121	께서
N4	1	0	1090.863	general	1	7	412.0232	2059.404	등대
N4	1	0	1097.044	general	1	1	622.323	1543.874	적당해서
N4	1	0	1097.382	general	1	7	456.5197	2057.67	적당해서
N4	1	0	1097.541	general	1	8	537.1522	1320.588	적당해서
N4	1	0	1117.812	Cheon Deuk	1	1	403.3912	1699.318	저같은
N4	1	0	1117.946	Cheon Deuk	1	0	563.9897	1478.641	저같은
N4	1	0	1141.044	general	1	4	442.0402	2045.758	있게
N4	1	0	1141.178	general	1	6	482.8465	2028.542	있게
N4	1	0	1143.346	general	1	4	342.689	1911.562	이젠
N4	1	0	1146.717	general	1	9	443.7754	1150.704	우리도
N4	1	0	1193.634	Cheon Deuk	1	4	306.1125	1698.303	여기

N4	1	0	1211.04	Cheon Deuk	1	7	544.4517	2087.641	등대
N4	1	0	1241.741	Cheon Deuk	1	8	703.0127	1671.03	먼저
N4	1	0	1288.867	Office Guy 2	1	1	515.3088	1187.169	어떻게
N4	1	0	1288.946	Office Guy 2	1	1	744.3386	1968.648	어떻게
N4	1	0	1289.037	Office Guy 2	1	6	475.8173	2095.65	어떻게
N4	1	0	1289.286	Office Guy 2	1	7	519.3023	2179.168	등대
N4	1	0	1293.863	Office Guy 1	1	3	336.1379	1063.164	누구
N4	1	0	1294.247	Office Guy 1	1	6	437.1628	1795.748	보내겠어
N4	1	0	1369.341	Bad Guy 1	1	4	945.9273	2063.143	이거
N4	1	0	1369.389	Bad Guy 1	1	1	627.9608	1799.692	이거
N4	1	0	1475.761	Young Pil's Friend	1	5	421.4073	1454.031	전득이
N4	1	0	1480.597	Young Pil	1	3	744.5201	1851.848	부지
N4	1	0	1485.992	Young Pil's Friend	1	3	841.9705	1427.164	죽고
N4	1	0	1519.545	Young Pil	1	2	493.894	1161.54	고생
N4	1	0	1610.951	Young Pil's Friend	1	3	671.617	1738.961	부치게
N4	1	0	1704.547	Cheon Deuk	1	3	422.4099	1534.629	두들이면
N4	1	0	1706.108	Cheon Deuk	1	2	494.8544	849.6783	꼭
N4	1	0	1727.73	Cheon Deuk	1	5	485.6935	1784.011	끝
N4	1	0	1729.695	선생님	1	5	379.0543	2019.511	끝
N4	1	0	2051.881	Young Pil	1	2	448.9671	915.3672	옷이
N4	1	0	2062.932	Young Pil	1	5	388.2897	1471.756	그건
N4	1	0	2265.382	Cheon Deuk	1	5	505.4088	1622.173	그개
N4	1	0	2373.38	Young Pil	1	3	410.9982	1037.067	두구두구
N4	1	0	2373.51	Young Pil	1	3	436.6743	981.9327	두구두구
N4	1	0	2373.736	Young Pil	1	3	447.3195	1256.171	두구두구
N4	1	0	2373.935	Young Pil	1	3	421.6221	949.055	두구두구
N4	1	0	2701.922	Young Pil's Friend	1	5	386.0528	1363.828	전득이
N4	1	0	2807.557	general	1	5	624.2011	1850.775	그때

A complete set of the data for this study can be accessed through the following link:

https://drive.google.com/file/d/0B5R9_37DmDtEY2RJbWpXTDBoeXc/view?usp=sharing