A Study on Obstruent Nasalization and Vowel Insertion in Korean EFL High School Students' English Productions: Focusing on L1 Transfer Effect, Error Frequency, and Speech Intelligibility

한국 고등학생 영어 발화의 장애음 비음화와 모음 삽입에 대한 연구: 모국어 전이 현상과 오류 빈도, 발화 명료도를 중심으로

2019년 8월

서울대학교 대학원

외국어교육과 영어전공

이 서 현

A Study on Obstruent Nasalization and Vowel Insertion in Korean EFL High School Students' English Productions: Focusing on L1 Transfer Effect, Error Frequency, and Speech Intelligibility

by

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APPROVED BY THESIS COMMITTEE:

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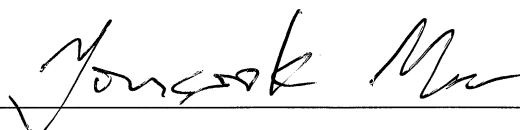
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ABSTRACT

A Study on Obstruent Nasalization and Vowel Insertion in

Korean EFL High School Students' English Productions:

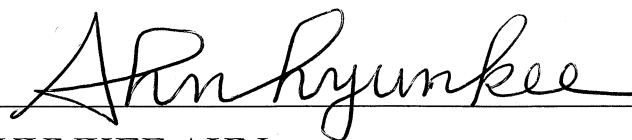Focusing on L1 Transfer Effect, Error Frequency, and Speech Intelligibility

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This study attempted to diagnose Korean high-school EFL learners' English pronunciation with particular focus on Korean obstruent nasalization and vowel insertion, in terms of interlanguage transfer, error frequency, and speech intelligibility.

In the era where speakers from various mother-tongue backgrounds engage in communication in English, the idea of *native* became unclear, and consequently aiming for achieving *native-like* pronunciation continued downtrend. However, this does not mean that the traces of L1 can be excused at all cost. The language learners' peculiarity of their mother tongue should be accepted only to the extent that does not hamper the recognition of the individual speech sounds, especially in English as a Lingua Franca (ELF) situation. Considering the nature of information processing procedure between the speakers engaged in ELF communication where the speakers

involved in ELF situations do not share a common linguistic background, the possibility of top-down processing is very slim. They not only lack the common pool of sociocultural information that they can utilize to guess the overall direction of the speech, but also to "read between the lines" when the communication in English breaks down because of cultural implications. The very speech segments that the speakers utter serve as the sole cornerstone that lead to the full understanding of their interaction, and therefore, the communication can only be unhindered only when the speakers correctly produce and understand the individual segment.

Starting from this importance of speech accuracy at the segmental level, the study involved 42 Korean high school EFL learners with different English speaking proficiency and recorded their read-alouds of the words containing sound sequences that are expected to be affected by Korean obstruent nasalization rule and vowel epenthesis. Based on the recordings, the frequency and intelligibility of obstruent-nasalized speech were measured. The results revealed that 60.4% Korean students are under the influence of obstruent nasalization and vowel epenthesis when speaking in English, while this ratio decreases as the learners' English speaking proficiency increases. Also, the intelligibility of obstruent-nasalized speech was 47.52%, which indicates one out of two native speakers of English misunderstood Korean EFL learners' speech.

Key Words: L1 transfer, intelligibility, obstruent nasalization, vowel insertion, interlanguage phonology, Syllable Contact Law

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CHAPTER 1.
INTRODUCTION

This is an introductory chapter to the whole thesis. Starting with the motivation for the study (1.1.), the purpose and significance of the study (1.2) continues. After dealing with contemporary stream of research and its research gaps, three main research questions of this research (1.3) are introduced. This chapter concludes with the overall organization of this thesis (1.4.).

1.1. The Background of the Study

The emphasis on oral English ability continues to increase in Korea. As communicative language teaching (CLT) became the dominant language teaching pedagogy in the field of contemporary second language [1] education, language learners are expected not only to understand and produce written texts, but also to actively engage in oral communications in the target language. For any sort of verbal interaction to be effective, proper understanding of the segments is prerequisite. In other words, for a language learner to actively participate in communication, he/she should not only possess the ability to comprehend the meaning of the speech, but also should be capable of producing speech to the extent that the interlocutor has no

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[1] The term ″second language″ is used as a cover term for all language acquired after the first language in any context.

difficulty in understanding. This being the case, acquiring proper way of speaking for smooth and effortless interaction naturally gained gravity in this era of Communicative Language Teaching.

When learning another language after fully acquiring his/her mother tongue, however, it is natural for learners to hypothesize the target language system based on the system of L1 (Lado, 1957; Gass, 2013). The hypothesized system may facilitate the acquisition of the target language, but it can also be wrongly applied to debilitate learning, and serve as the major source of errors. Therefore, it is necessary to consider L1 influence in language learning and teaching situations because there lie several elements that affect the learning process. Oral language learning is of no exception as suggested in Flege (1995)'s Speech Learning Model(SLM) and Best (1994)'s Perceptual Assimilation Model (PAM). The two models illustrate that both phonological and phonetic system of the first language have significant influence on L2 listening and speaking. Following this line of study, it was of interest to know whether this widely accepted phenomenon still holds true in Korean EFL context; how and to what extent are Korean EFL learners influenced by their first language.

1.2. The Purpose and Significance of the Study

The prime purpose of the current study is twofold: first is to diagnose Korean high school EFL learners' English pronunciation with special attention to transfer of Korean sound patterns, and second is to explore whether L1 transfer in L2 speech hinders the English native speaker-interlocutors' successful recognition

of the speech. To further this goal, the present study collected actual English read-aloud recordings from Korean high school students, and analyzed the data focusing on frequency of L1 rule transfer and intelligibility. This research aims to give meaningful implications on teaching and learning English pronunciation in Korean EFL context.

Indeed, there have been a growing body of research in Korea during the last few decades addressing the issue of transfer of L1 sound patterns onto L2 English productions (Lee, 1996; Kang and Lee, 2001; Seo, Kim, Shin, Kim 2005; Park, 2006; Park, Lee and Choi, 2010; Park, 2013 etc.). For instance, Kang and Lee (2001) proved that Korean high school EFL learners required detailed instructions on certain sound sequences to speak accordingly to the standard General American pronunciation. Similarly, Park, Lee and Choi (2010) examined how frequently the Korean lateralization rule is applied in English words within identical phonological context. Also, based on his findings on the instances of negative L1 phonological rule transfer among Korean university students, Lee (1996) strongly pointed out that postulating L1 sound patterns in L2 speech can serve as one of the threats to effective communication.

To our knowledge, however, there has been insufficient amount of study which has explored the relationship between intelligibility and negative L1 transfer. In other words, intelligibility of L1 transferred L2 speech has rarely been directly studied. Lee (1996) supposed there may be certain issues on intelligibility, but did not further the study in relation with the matter. Majority of the previous studies on Korean sound patterns and English production mentioned earlier were very much of

the same in that the intelligibility of L1 transferred speeches was not brought into light. Lim and Seo (2011) was one of the few trials that had intelligibility as one of the main concerns of the research, but the target sound patterns were limited to a handful of segments (i.e. [ʃ], [tʃ], [ʒ] and [dʒ]) and only examined whether Korean EFL learners can distinguish the sounds from [s] and [z]. So to say, the focus of intelligibility was on the perception of Korean learners themselves rather than others' perception of Korean learners' productions. Another study that exclusively dealt L1 transfer and intelligibility was done outside Korea by Munro and Derwing (1995). This study tested intelligibility of L1 influenced speech (i.e. Chinese accented English production), but the spotlight was on the transfer of suprasegmental features such as L1 accent and intonation which has yet to do with single segments.

To fill this literature gap, the present research focused on two Korean sound patterns that militate on the segment level, and addressed the intelligibility of Korean learners' production to the native speakers of English. The obstruent nasalization and vowel insertions are chosen as the two rules of focus because the rules involve apparent change in the segmental level, and as mentioned above, the key factor that determines the mutual understanding of the conversation is accuracy of each segments. Also, the subjects' English proficiency level was also taken into consideration to see whether the English proficiency affects the subjects' performance. Through the planned course of the study, this thesis aims to document findings not only on the frequency of obstruent nasalization and vowel insertion in English production made by Korean high school EFL learners, but also on how those productions are recognized to the native speaking listeners.

1.3. Research Questions

This research aims to answer the following research questions:

(1) How frequently do obstruent nasalization, vowel insertion Korean occur in English productions of Korean high school EFL learners?

(2) Do students show different frequency of transfer depending on their English speaking proficiency levels?

(3) In case of obstruent-nasalized utterances, how intelligible are they to the native speakers of English?

1.4. Organization of the Thesis

The present thesis consists of five chapters. In this chapter – Chapter 1 – discussed the background, purpose and significance of the study, along with the three research questions of this thesis. Chapter 2 presents theoretical background and the key concepts of the study. Following are Chapter 3, where the methodology of the two main experiments are discussed, and Chapter 4, where the results of each experiments are presented in detail. In Chapter 5, discussions and pedagogical implications based on the results of the study will be in place. This paper concludes with Chapter 6, with a brief summary of the main findings and limitations and suggestions for future studies.

CHAPTER 2.
LITERATURE REVIEW

This chapter reviews the theoretical backgrounds and main concepts that forms the basis of the study. Related literatures will be discussed in relevant sections respectively.

2.1. Influence of L1 on L2

2.1.1. General Discussions

Research on L1 influence on L2 learning has a long tradition. Starting from the classical Contrastive Analysis and transfer studies (Lado, 1957; Levenston, 1979; Weinreich, 1953), studies on cross-linguistic influence have underlined the influence of language learners' first language in second language learning. Learners are under the shade of their L1's linguistic system, but the degree varies across individuals. The L2 learners' target language usage is often referred to as "interlanguage." In this point of view, learning a language is analogous to heading towards a goal. The end of the journey may be the perfect mastery of the target language, and the starting point will be the learners' first language. As Brown (2007) clearly noted, L2 learning is an endless cycle of setting up a hypothesis on L2 system and testing it. During this period, the learner's first language provides ground for hypothesis, endlessly exercising its influence on him/her. Cook (2002a: 4-8) focused on these factors regarding the inseparable relationship between L2 learning and L1

influence, and stated that "the L2 user's knowledge of the second language is typically not identical to that of a native speaker" and "(his or her) knowledge on … first language is in some respect not the same as" what he/she had before learning an additional language.

The questions that then naturally arise would be how and to what extent is a learners' L1 influential in L2 learning process. Fortunately, traces of L1 are not always the obstacles to successful L2 learning. In some cases, language learners can acquire the target system faster through analogical interpretation with their mother tongue (i.e. positive transfer). This is the case where L1 and L2 shares certain language patterns and therefore inferring to L1 does not lead to any errors. On the other hand, when linguistic features of L1 and L2 are different, postulating the first language system may produce erroneous results, slowing the learning process. The term "negative transfer" is used to describe this type of L1 impact.

Negative transfer has been more central concern in the field of language learning and teaching since it is accounted for as one of the sources of learners' error. As a representative, contrastive analysis hypothesis (CAH) compared L1 and L2 and tried to list all the possible types of errors based on the differences. The primary assumption of this approach was that (i) language learners transfer what they already know (i.e., L1) to understand what they do not know (i.e., L2), and (ii) if the transferred L1 feature does not match L2, it becomes a source of error. Although countless counterevidence emerged and consequently the value of CAH dwindled over time, this approach still holds significance and has been used as the theoretical background of further studies on cross-linguistic influences in the field of language

education.

2.1.2. Previous Studies on L1 Transfer

Other than the studies mentioned in the earlier section, there still exists a considerable body of literature on L1 transfer around the globe, and across the four skills of language. Ringbom (1992) investigated the influence of L1 both on L2 comprehension and production and weighed relative impact of positive transfer and negative transfer on four language skills. According to his study, L2 comprehension, L2 production and L1 influence are all in constant three-way interaction throughout oral communication. However, in terms of relative impact, L1 transfer in production skills were more influential because when the speaker "… is faced with the problem of expressing an intention for which he or she has not learned, … there is a high possibility of much more laborious and unsuccessful interactions." This study emphasizes the risk of losing a chance for meaningful oral communication on target language due to negative L1 transfer.

A large number of existing research have examined the transfer of Korean sound patterns onto L2 English production (Park, 2006; Seo, Kim, Shin and Kim, 2005; Park, 2013 etc.). Among them, Lee (1996) focused on lateralization and obstruent nasalization in connected English speech, while Park, Lee and Cho (2010) narrowed their scope of study to lateralization and examined /nl/ and /ln/ sequences. Both studies suggest a handful of factors that effects L1 rule transfer such as word boundary, syntactic structure, vowel quality, and word familiarity. These findings are noteworthy in that Korean learners are not free from overgeneralizing Korean

speech patterns in L2 speech, just as researches from other countries suggest.

Kang and Lee (2001) went a step further and examined the effect of instruction in reducing L1 transfer in English speech by Korean high school students. The participants of the study could not properly pronounce certain English sounds such as aspiration of syllable initial oral stop (6.3%), frequently nasalized oral stop preceding a nasal sound (27.0%), and lateralized the /nl/ and /ln/ sequences (18.5%). The study attributed theses errors to Korean sound patterns, with which the participants are more familiar. After a month of explicit instruction, however, the participants grew awareness of the English sound patterns and were able to pronounce the same sound sequences following English sound patterns (62.1%, 58.0%, and 56.5% respectively). The results of this study acknowledge the strong influence of Korean sound patterns among EFL learners and suggest possibility for establishing a separate system for proper pronunciation of English through instructions. Similar experiment was in place by Simon (2008) based on the oral corpus data of Dutch speakers learning L2 English. The subject rules of inquiry were voicing and devoicing rules of Dutch language, and the study hypothesized that Dutch phonological rules will be transferred to L2 English speech and that traces of L1 will be eliminated after a period of certain instruction. The findings of her study verified her initial presumptions and again highlighted that phonological rules are indeed one of the common sources of mispronunciation in other EFL contexts and reckless generalization of L1 sound patterns can be corrected through careful learning and teaching

2.2. L1 Transfer in L2 Speech: Korean EFL Context

2.2.1. Korean Obstruent Nasalization and Syllable Contact Law

2.2.1.1. Syllable Contact Law: Definition The concept of Syllable Contact Law was first introduced by Venneman (1988:40). The key point of this idea lies in the phonological qualities of neighboring sounds in a syllable, namely the coda of a preceding syllable and the onset of the following syllable.

Venneman (1988:40) first defined the term using "consonantal strength" and said as follows: "A syllable contact A\$B is the more preferred, the less the consonantal strength of the offset A and the greater the consonantal strength of the onset B." Later on, Davis and Shin (1999) paraphrased the same notion through "sonority" as "a syllable contact A\$B is the more preferred, the greater the sonority of the offset A and the less the sonority of the onset B." The cores of the two definitions are identical. Sonority of a sound usually refers to "its relative loudness compared to other sounds, everything else being equal." (Giegerich, 1992) and sonority is commonly understood as the opposite of consonantal strength. So the lower the consonantal strength, the higher the sonority, and vice versa. English speech sounds can be ranked according to their sonority levels. The voiceless stop is at the left end and low vowels at the right end. Giegerich (p. 133)'s hierarchy of speech sounds based on their relative sonority is in Table 2.1.

Table 2.1 *Sonority scale*

Oral stops		Fricatives		Nasals	Liquids	Semivowles	Vowels	
Vls	Vd	Vls	Vd				High	Low
p	b	f	v	m				
t	d	θ	ð	n		j	i	a
k	g	s	z	ŋ	l r	w	u	ɑ
s o n o r i t y								

Syllable Contact Law is one of the important indicator in explaining various linguistic phenomenon that involves segment changes in polysyllabic speech. One of the common features which are driven by the concept is loanword formation. Gouskova (2001) analyzed English loanwords in Hindi and Russian loanwords in Kirgiz, and suggested that the preference for falling sonority across syllable boundary is the reason for recurring patterns in loanwords. For example, English "school" in Hindi became [ɪs.kul] while "fruit" became [f**ɪ**.rut], and Russian "zveno" (meaning *link*) is transferred as [**u**z.va.na] while "kvas" (meaning *kvass*) is [k**ɯ**.bas] in Kirgiz. The reason that the bold-faced vowels are inserted in that particular position, according to the study, is the tendency to create a downward slope within a syllable boundary. As Table 2.1. demonstrates, [sk] in [ɪs.kul] and [zv] in [uz.va.na] have downward slope, so there is no motivation for the vowel to be inserted between the two sounds. On the other hand, [fr] in [fɪ.rut] and [kb] in [kɯ.bas] would have had upward sonority profile since [f] and [k] are less sonorous than [r] and [b].

Therefore, the speaker may feel the need to modify the speech by inserting a vowel in between to maintain the downward profile. Gouskova (p.179) summarizes this finding as "the epenthesis (of vowel) itself is driven by the prohibition on clusters, its site is determined by SYLLABLE CONTACT. Epenthesis in clusters is peripheral (CCV→VCCV) whenever C1 is of higher sonority than C2, but internal (CCV→CVCV) whenever C1 is of lower sonority than C2."

2.2.1.2. Demonstration: Korean Data

Obstruent nasalization in Korean language is also one of the linguistic phenomena driven by Syllable Contact Law. Korean obstruent nasalization is unconditionally and unconsciously applied in most of the native Korean speakers' natural speech. The phonological context of sound alternation is a coda stop sound followed by homorganic nasal onset. Presence of word or morpheme boundary, or even sentence boundary does not influence rule application. Table 2.2. is some examples of obstruent-nasalization from Davis and Shin (1999). The examples depict the same phenomenon, where oral stop transforms into homorganic nasal sound within a single word (a, d) and also across morpheme boundary (b, c). Yet, oral stops remain unchanged when the followed by non-nasal sounds, for in this case a vowel ([ɨ]).

Table 2.2. *Examples of obstruent-nasalization in Korean*

Input	Output	Gloss	Related forms
a. /sip-nyən/	- [sim.nyən]	ten years	[sip+il] 'ten acc.'
b. /pat^h+noŋsa/	- [pan.noŋ.a]	(dry) field farming	[pat^h+il] 'field acc.'
c. /kuk+mul/	- [kuŋ.mul]	broth	[kuk+il] 'broth acc.'
d. /kuk-min/	- [kuŋ.min]	the nation	[kuk-ə] 'Korean language'

*acc. = accusative

According to the sonority scale (see Table 2.1.), the sonority profile of /sip-nyən/ is as illustrated in Figure 2.1. There is a rise of sonority in the syllable boundary – between /p/ and /n/ - which is not a preferable structure in light of Syllable Contact Law. Therefore, the speakers are motivated to change the oral stop sound into homorganic nasal sound so as to at least even the sonority at syllable boundary and avoid rising sonority. The output of /sip-nyən/, which is [sim-nyən], has the sonority profile as Figure 2.2. with even sonority in syllable boundary. The situation is the same for other examples in Table 2.1. and for other words not included in the table but contain stop-nasal sequence in syllable boundaries.
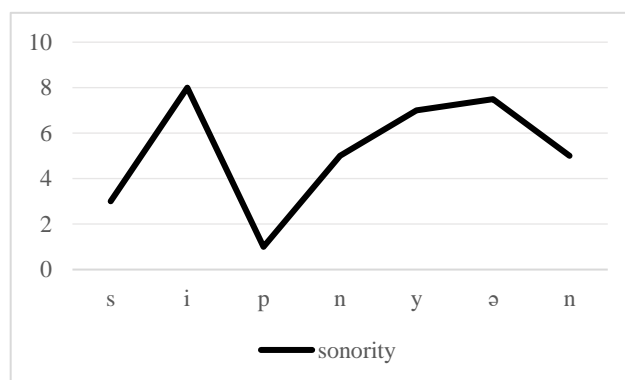
Figure 2.1. Sonority profile of /sip-nyən/
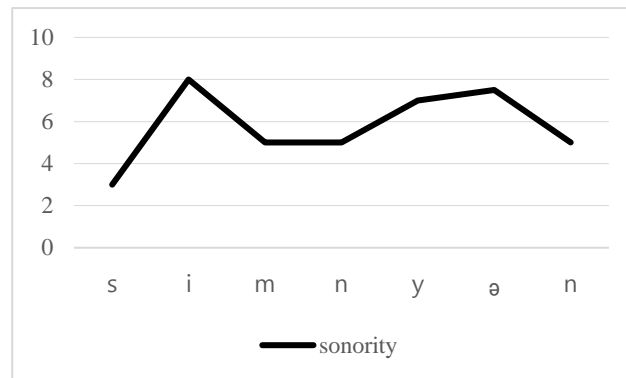
Figure 2.2. Sonority profile of [sim.nyən]

The present study presumed that Korean obstruent nasalization rule is very likely to be transferred to Korean high school EFL learners' English production due to this unconditional nature, and therefore chose this rule as one of the main subject of inquiry.

2.2.2. Vowel insertion

Another salient speech error made by Korean EFL learners is vowel insertion between consonant clusters. The cause of vowel epenthesis among L2 learners of English are attributed to various factors, but the explanation based on the gap of phonotactic constraints between Korean and English is the most widely accepted. A number of previous researches have suggested frequent epenthesis of Korean high vowel [ɨ] in various contexts including English learning situations and accepting loanwords (Lee 2004; Han, 2007; Shin and Paul, 2014; Kim and Lee, 2003; Kim, 2015).

Unlike English syllables where up to three and four consonants can be in

onset and coda position respectively (CCCVCCCC), Korean language only allows single consonants in onset and coda position ((C)V(C)) (Ahn, 2009). When Korean learners of English encounter English words with more than one onsets or coda (e.g. CCVC), they divide the consonant clusters into CVCVC structure that they are more familiar with. For example, a monosyllabic word [straik] is very likely to be read either as four or five syllable word (i.e. [sɨ.tɨ.ra.ik] or [sɨ.tɨ.ra.i.kɨ]) because [str] is not acceptable in Korean syllable structure. In other words, Korean English learners either consciously or unconsciously disassemble the foreign sound clusters and reassemble them based on their prior linguistic knowledge, the L1 system.

Vowel epenthesis is not one of the phonological rules of standard Korean. Yet, this pattern calls for close attention in that this has been pointed out by previous literatures as frequently observed pronunciation errors between a number of Korean EFL learners.

2.3. English as a Lingua Franca (ELF)

Among all the other models on different types of *Englishes,* Kachru's (1985) "circles" are widely accepted. Inner Circle includes countries where English is used as the inhabitants' first language (L1), while Outer Circle refers to those countries where the inhabitants have non-English mother tongue but use English in official settings. Expanding Circle is similar to Outer Circle, but English is not the official language. However, it is named "expanding" because the inhabitants are capable of producing and perceiving English to some degree.

According to Crystal (2003:61), the sum of Outer Circle and Expanding Circle outnumbers the Inner Circle, which obviously states that English is no longer limited to mother tongue of Anglophone countries. English is now used as a medium of communication between speakers from different "circles," or to say speakers with distinctive L1 backgrounds. Jenkins (2003) coins this phenomenon as "English as a Lingua Franca" (hereafter, ELF) and defines the term as "English being used as a lingua franca, the common language of choice, among speakers who come from different linguistic backgrounds." The speakers in ELF situation do not necessarily have to be from non-Anglophone countries. As Seidlhofer (2004) mentioned, ELF includes "any use of English among speakers of different first languages for whom English is the only option." In this sense, it can be said that a communication between two speakers from Inner and Expanding Circle respectively, for example, is a ELF situation.

Now that it is quite obvious that English has took its new, but undeniable status, a call for new approach in the field of teaching and learning English has been increasing. The process of communication in ELF situation is different by nature from that of English as a Native Language (ENL) situation or any type of language exchange between two speakers with common language background. While speakers with same mother tongue can either consciously or unconsciously refer to sociolinguistic information to understand the message during conversation, ELF speakers lack this common resource. Since they have no additional information at hand, the possibility of top-down processing is very slim. Rather, they initiate the data processing from individual segments (Walker, 2010). Therefore, the focus of

teaching and learning English pronunciation should be on reaching decent pronunciation, rather imitating than native-like pronunciation. The term *decent* has further to be discussed in regards with *intelligibility* in the following section.

2.4. Accuracy, Intelligibility and Comprehensibility

Often confused with the term "intelligibility" are "accuracy" and "comprehensibility." The distinction between the terms are not always clear-cut, and have been defined differently depending on the situation. In this section, the scope of definition of intelligibility for the present study will be set along with the line of previous literatures on each terminology.

2.4.1. Accuracy

Among the triads, accuracy is said to be the oldest, the clearest and the most consistent constructs (Housen and Kuiken, 2009). In the field of second language acquisition, the accuracy of (a) learner(s)' production – either oral or written – is defined in relation with the deviancy from a particular norm or standard of the target language (Hammerly, 1991; Wolfe-Quintero *et al*, 1998; Gass, 2013). By "the deviant use of the language" refers to *errors*, so the inaccurate productions may well refer to those with a lot of errors. Accuracy is not to be confused with *fluency,* in that *fluent* speech usually concerns the speed of delivery while the correctness of the message is of secondary concern (Brumfit, 1984).

Yet, accuracy can be an edgy term because for any L2 production to be "accurate', there should be a norm or standard of the correct form of the target

language. In ELF situations, however, deciding the "norm and standard" of English can be very hard due to the changed status of English. As mentioned earlier, in this modern era where the boundaries between the "circles" are blurring, it is of great controversy whether General American or Received Pronunciation can be considered as the sole case of *decent* English. This debate went on to invite another concept into scene, *intelligibility*, as a means to deal with the issue on where to put the standard of English learning and teaching.

2.4.2. Intelligibility and comprehensibility

Intelligibility and comprehensibility share certain features in that their primary interests lie in the perception of the discourse, rather than on the production of discourse itself. What distinguishes the two is the level or depth of perception.

When referring to intelligibility, it usually means the recognition of words and utterances in the surface level (Smith and Nelson, 1985). We can say that a person's locution is intelligible when we can give exact dictation or verbally repeat what he/she said (Munro and Derwing, 1995). However, a speech cannot be comprehensive through mere appreciation of segments. Rather, comprehensibility requires deeper processing of the speech. The term is usually defined as the "listeners' estimation of difficulty in understanding an utterance" (Derwing and Monro, 2005) which implies that not only the physical aspect of the word should be recognized but also the intended meaning of the speaker should be delivered as well. When combined, the definitions of intelligibility and comprehensibility denotes that intelligibility is the necessary condition for comprehensibility because one cannot

understand the meaning of the speech unless he/she identifies string of segments used. In other words, comprehensibility presumes intelligibility of the speech, while intelligibility does not guarantee comprehensibility because there are situations where the listener could dictate the speaker's verbal production but still could not understand the meaning of the speech he/she wrote down.

Even though the two concept appears to be distinct, a handful of studies often use the terms interchangeably and smears the boundary. For instance, Nelson (2012) defined intelligibility as "the appreciation of the message in the sense intended by the speaker," which directly corresponds to comprehensibility. So it is up to the researchers to limit the coverage of the term to the extent that best fits the research's need.

According to Jagdish (2018), it is more preferred in the field of ELF and World Englishes (WE) to keep intelligibility and comprehensibility as two different, but related concepts. Smith (1992) argues that intelligibility and comprehensibility can be seen as a continuum, where intelligibility is at the lower end and comprehensibility at the higher end. On top of that, Walker (2010) suggests intelligibility of the speech as more practical goal of teaching English pronunciation. Following this line of study, this study adopted the definition of intelligibility by Smith and Nelson (1985). Comprehensibility were put aside due to practical reasons. Intelligibility of Korean EFL learners' speech were to be measured as a precondition for more comprehensible speech in English communication in the future.

CHAPTER 3.
METHODOLOGY

This chapter demonstrates methodologies of the two main experiments of the current study.

3.1. Experiment Part 1

3.1.1. Participants

A total of 42 students (20 males, 22 females) from three different high schools in Gyeonggi and Chungcheong province in South Korea participated in this study. The participants were aged between full 16 to 18 with the mean age of 16.6. 35 out of 42 students reported to have no significant experience in English speaking countries but seven participants had stayed in either Inner or Outer Circle countries such as the United States (N=3), Philippines (N=3), and Singapore (N=1) respectively from minimum one month to maximum 36 months. This study did not control the length of residence (LOR) factor since all participant were classified into certain proficiency groups based on their recordings of read-aloud of an English passage selected by the investigator. Their English pronunciation were rated by eleven native speakers of English who volunteered to participate in the study, via online community "Mechanical Turk" (www.mturk.com). The only information provided by the participants was their place of residence and their first language, and other detailed information could not be collected according to the policy of the

website. The researcher aimed to gather participants from various linguistic backgrounds, but since the website was mostly accessed in the United States, the volunteers turned out to be all Americans.

Four participants were excluded from the whole study due to their poor quality of the recording, and eventually 38 participants (18 male, 20 female) were classified into three proficiency groups based on their preliminary English pronunciation scores rated by the native speakers. Information on each proficiency group is in Table 3.1.

Table 3.1. *Basic information on proficiency groups*

Proficiency	N	Male, Female	Mean Age	Trimmed Mean Score (10%)
Intermediate	12	6, 6	16.4	4.6
Upper intermediate	13	8, 5	16.8	6.0
Advanced	13	4, 9	16.8	7.4

*Both mean age and trimmed mean score are rounded off to two decimal places.

3.1.2. Materials

20 words and phrases were chosen as the main stimuli. All the words contained nearly identical sound sequences where transfer of two main L1 sound patterns (i.e. obstruent nasalization and vowel insertion) is expected to be in place. The common sound sequence of the study was an oral obstruent followed by either

homorganic (i.e. same place of articulation) or heterorganic (i.e. different place of articulation) nasal sound with a syllable boundary in between. Since English phonotactics does not allow velar nasal stop [ŋ] in any places other than syllable coda position, voiceless and voiced velar stops (/k/ and /g/) only precedes heterorganic nasal sounds.

Other suprasegmental features such as stress and morphological, syntactic features such as morpheme/word boundaries and grammatical categories were not, or could not be controlled for both theoretical and practical reasons: first of all, as mentioned above, any obstruent in front of a nasal sound in Korean nasalizes regardless of its rhythm, intonation, part of speech. Secondly, according to Park et al. (2016), presence of morpheme boundary does not cause significant difference on Korean English learners' production. Lastly, since the researches' foremost concern was on eliciting the most natural speech samples from the subjects, strict control of such factors was impossible. The stimuli, or the target words, should be of similar perceived difficulty so that intermediate leveled participants could read out the words with little or no performance variables. The full list of target words and phrases is presented in Table 3.2 below.

Table 3.2. *Target words/phrases list*

Voicing	Obstruent + /N/[2]	homorganic	heterorganic
voiceless	/p/ + /N/	stepmother, topmost	deepness, cheapness
	/t/ + /N/	sweetness, greatness	treatment, statement
	/k/ + /N/	blackmail, checkmate	
voiced	/b/ + /N/	submarine, submit	abnormal, jobname
	/d/ + /N/	good-night, good news	good-morning, good monkey
	/g/ + /N/	pregnant, big news	

3.1.3. Procedure

Upon their consent on participation, the high school students filled out a preparatory questionnaire for basic personal information including their grade, gender, year of birth, and length of residence in English speaking countries (if any). Afterwards, they moved on to the recording stage. Each student was given a list of 60 words, which was 20 target words repeated three times in random order (See Appendix A). Their task was to read those 60 words in a carrier sentence "I said _____, thank you." All instructions were given in Korean to prevent any misunderstanding of the task. The entire recording was done in empty classroom on one on one with the researcher and students could take certain amount of time to go

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[2] archiphoneme

through the list before the researcher recorded their read-aloud. Zoom APH-1 recorder was the tool used in this process and the files were later saved in either .mp3 or .wav format.

3.1.4. Data Analysis

Except for the 30 samples of total mispronunciation of the target word, 2,250 samples (38 participants * 20 words * three rounds – 30 excluded) were exclusively classified into three categories based on its the most salient feature. Speech samples with audible pause or glottal stop sound [ʔ] between the oral stop and the nasal sound were coded "G" as in "glottal stop". These samples were considered to be the correct pronunciation of the target words. On the other hand, samples where oral stop transformed to homorganic nasal sound and as a result were without any audible stop features (e.g. *checkmate* [tʃeŋmeit]) were coded "N" as in "nasalization." The third category was "V" as in "vowel insertion." When the speaker added a vowel between the stop and the nasal sound, moving the stop sound to the onset of the newly created syllable (e.g. *submarine* [sʌbɨmɑrin]), the sample fell into "V" category. Later on, Ns and Vs altogether pertained to "T" for "Transfer."

After classifying all samples upon their phonetic features, one-way ANOVA was run in order to see the relationship between the frequency of overall L1 transfer (dependent variable) and the subjects' English speaking proficiency (independent variable).

3.2. Experiment Part 2

3.2.1. Scope of Experiment Part 2

In the previous experiment regarding learner proficiency and frequency of transferring Korean sound patterns (i.e. obstruent nasalization, vowel insertion) onto L2 English speech, we were left with the question on whether Korean high school students' interlingual transfer is one of the factors that affect intelligibility of L2 speech. Following the rationale from the proceeding section on English as a Lingua Franca (ELF) and bottom-up processing of ELF speakers, this section mainly deals with the intelligibility of obstruent nasalized instances rather than vowel inserted samples. This is based on the reasoning that unlike vowel insertion, Korean obstruent nasalization rule alternates the entire phoneme and therefore is expected to be of a more serious cause of low intelligibility.

The key concept of the present experiment is "intelligibility." Even though the term is often used as a synonym for "comprehensibility" (see 2.4.2.), the two concepts are in strict distinction without any overlapping area in this study. The scope of intelligibility for experiment part II followed the definition by Munro and Derwing (1995a), where intelligible productions are what "we can dictate or verbally repeat what he/she said" upon listening. Therefore, only the samples that yielded exact dictation results from the raters who are all native speakers of English were accepted as the *intelligible*. More details on the participants and the data collecting process will continue in the following sections.

3.2.2. Participants

The Korean high-school participants of the study is identical to the ones from Experiment 1; the same recordings were used. Only the native speakers were different. For the Experiment Part 2, 46 native speakers of English volunteered to participate in the study via online community "Mechanical Turk" ([www.mturk.com)](www.mturk.com). As with the previous experiment, the only information provided by the native participants was their place of residence and their first language, and other detailed information could not be collected according to the policy of the website. Also, as with Experiment 1, all the volunteers were native speakers of America.

3.2.3. Materials

Out of 900 samples of obstruent nasalization, 128 samples were chosen as the material for intelligibility test. The samples were selected based on three standards: (1) the sample must show clear sign of obstruent nasalization, (2) the sample must be in good quality in terms of recording (i.e. appropriate volume, none or little background noise). and (3) the samples for each target word should be from speakers[3] of at least two different proficiency levels. Criteria (3), however, was difficult to be met at all times because there were a couple of target words where none of the speakers in certain participant groups

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[3] The ˝*speakers*˝ refers to the Korean EFL learner participants. This term is used to clarify this participant groups′ role in the second part of the experiment, which are the ones who recorded the samples. Therefore, the proficiency of the speaker or the sample exclusively refers to the proficiency of the very EFL learner who read the sentence.

transferred obstruent-nasalization rule and therefore had no "N" samples. In this case, criteria (1) and (2) were primarily considered.

The selected 128 samples were aligned in random order. The investigator grouped ten and eight samples (10*12, 8*1) from the top and connected the grouped samples into single .mp3 files and formed an online questionnaire for intelligibility test. There were 29 number of questions in total, and among them 13 questions were word dictation test and each question contained ten and eight sentences. Right below the dictation test were 13 questions asking the certainty of their answers, and last three questions were on the native listeners[4]' first language, their place of residence, and their English proficiency. Last item was added in case for non-native speakers participating in this online survey. Refer to Appendix B for the sample of this on-line questionnaire sheet.

3.2.4. Procedure

The investigator fabricated the intelligibility test sheet using Google Forms and later posted the link of the online survey on Mturk ([http://www.mturk.com)](http://www.mturk.com). The listeners individually accessed the survey link and carried out the task. They listened to 128 sentences in "I said _____, thank you." format and wrote down the appropriate word for the blank based on what they have heard. They were instructed in advance that the word for the blank can be either a proper word or a nonce word, and either a word or a

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[4] The *"native listeners"* refer to native speakers of English who participated in the intelligibility test online. The term is used to better contrast this group of participants with the *speakers*, and also to clarify the major task of this group: listening to the samples and dictating what they've heard.

phrase. Once they were done with the test, they individually submitted their answers. The investigator examined the results and only accepted those with 100% achievement of the task. The accepted listeners received $2 for their contribution to this study.

In the end, 46 listeners submitted their answers, but three unfinished answers and three answers from non-native listeners were not used in further study. The remaining 37 listeners fully completed the survey and identified themselves as resident of the United States of America with English as their mother tongue.

3.2.5. Data Analysis

As previously discussed, the standard of "intelligibility" for this experiment is on whether the listeners' dictation of the samples match the target word. That is, the sample was considered intelligible only when the listeners retrieved the transformed oral stop and precisely recognized the target word. Others were classified as unintelligible.

The intelligibility was numerated as the ratio of correct[5] answers to total number of samples. For example, if the target word *topmost* received 20 correct answers out of 259 samples, the intelligibility of obstruent nasalized *topmost* (i.e. [tammoʊst]) was 0.0772 (20/259). Intelligibility was rounded off at four decimal places. Subsequently, 3-way ANOVA was performed to examine the effect of certain features of the target words and the speakers on intelligibility. The dependent variable was intelligibility and the independent variables were (1) place of articulation (POA; bilabial, alveolar, velar), (1)

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[5] By "correct" means the that what listeners wrote down is identical to the target word in terms of standard English orthography.

stop voicing (voiceless, voiced) and (3) speaker proficiency (intermediate, upper

intermediate, advanced).

CHAPTER 4.
RESULTS

In this chapter, the results from the two experiments above are presented. Section 4.1 deals with the result of the experiment part I, and section 4.2. deals with experiment part II.

4.1. Experiment Part 1

4.1.1. Overall Frequency of Transfer

The primary focus of research question one was on the overall frequency of L1 transfer onto L2 English speech among Korean high school EFL students. Out of 2,250 samples, 881 samples (39.16%) were correctly pronounced without any traces of L1, while 1359 samples (60.4%) were seen as instances of transferring Korean sound patterns. Statistically said, six out of ten Korean EFL learners are not free from the influence of their L1 sound systems.

When vowel insertion and obstruent nasalization rules are compared, impact of the latter was greater than the former in that the oral stops transformed to homorganic nasal sounds 900 times (40%) out of 2,250 trials, while there were 459 samples (20.4%) of vowel epenthesis. Table 4.1 demonstrates the result of overall frequency of transfer.

Table 4.1. *Overall Frequency of L1 Transfer*

	G	V	N	T
N. of Samples	881	459	900	1,359
Total N.	2,230	2,230	2,230	2,230
Percentage	39.16%	20.40%	40.00%	60.40%

* The percentages are rounded off at two decimal place

4.1.2. Frequency of Transfer across Proficiency Levels

This section is related to the second research question where the focus is on the relationship between the frequency of L1 transfer in L2 English speech and the learners' English pronunciation proficiency level. Table 4.2. shows the average speaking score of each proficiency group, proportion of correctly pronounced forms (G), obstruent nasalized forms (N), vowel inserted forms (V) and their sum (T).

Table 4.2. *Degree of transferring L1 sound pattern onto L2 speech across proficiency levels*

Proficiency	Speaking score (Avr.)	G (%)	N (%)	V (%)	T (%)
Intermediate	4.6	12.27	53.64	34.09	87.73
Upper Intermediate	6.0	34.98	44.34	34.98	64.89
Advanced	7.4	68.59	23.46	7.95	31.41

The one-way ANOVA was run to verify whether the numbers are statistically significant. With the frequency of L1 transfer in L2 English speech as a dependent variable and the participants' English pronunciation proficiency as an independent variable, the results revealed that there was a significant main effect of proficiency on the frequency of rule transfer (df=2, *F*=13.127, p<.05).

Table 4.3. *Multiple comparison result of one-way ANOVA*

(I)	(J)	(I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	.2229564	.1107844	.147	-.060246	.506158
	3	.5618410*	.1107844	.000	.278639	.845043
2	1	-.2229564	.1107844	.147	-.506158	.060246
	3	.3388846*	.1085461	.014	.061405	.616365
3	2	-.5618410*	.1107844	.000	-.845043	-.278639
	1	-.3388846*	.1085461	.014	-.616365	-.061405

*. The mean difference is significant at the 0.05 level.

1=intermediate, 2=upper intermediate, 3=advanced

As predicted, L2 English learners' speaking proficiency did effect nasalized pronunciation and vowel insertion. While intermediate group and upper intermediate group failed to show statistically meaningful differences, Korean sound patterns were more frequently applied in English production by the two lower

proficiency groups (87.73%, 64.89% respectively) compared to the advanced group (31.41%) as shown in Figure 4.1.

To continue, the proportion of correctly pronounced productions revealed the opposite result. The advanced group subjects managed to follow English sound patterns rather than their L1s', and had glottal stop sound or pause between the obstruent and the nasal (68.59%), which is nearly double the result of upper intermediate students (34.98%) and five times more than that of intermediate students (12.27%).
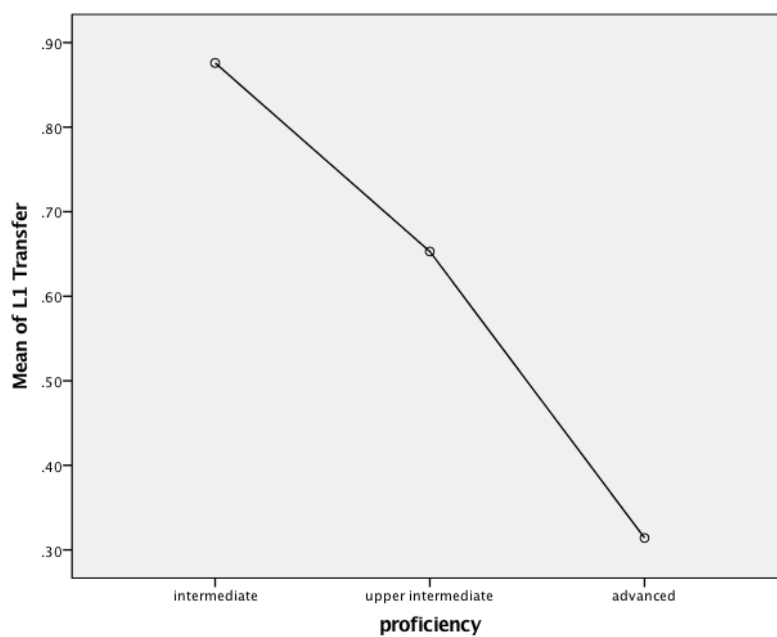
Figure 4.1. Effect of proficiency in L1 transfer frequency

4.2. Experiment Part 2

4.2.1. Homorganic Sequences

Among 128 samples in total, 56 contained homorganic oral stop – nasal stop sequences. The overall intelligibility of each word with different place of articulation (POA) and stop voicing (Voicing) are as in Table 4.4. The speaker's proficiency is not set as a separate factor in this table.

Table 4.4.

Intelligibility of words with different POA, stop voicing and proficiency: homorganic sequence

POA	Voicing	Word	Intelligibility (%)		
			Word	POA*Voicing	POA
bilabial	voiceless	to<u>pm</u>ost	7.72	34.17	36.49
		ste<u>pm</u>other	60.62		
	voiced	su<u>bm</u>it	21.24	38.8	
		su<u>bm</u>arine	56.37		
alveolar	voiceless	grea<u>tn</u>ess	71.6	58.72	71.18
		swee<u>tn</u>ess	45.95		
	voiced	goo<u>d n</u>ight	99.23	70.11	
		goo<u>d n</u>ews	67.95		

The word *topmost* was one of the most unintelligible utterances out of 128 samples used in this experiment, with only 20 correct dictations out of 259 trials. Native listeners rarely detected [p] sound nor could recover the oral stop in front of [m]. Consequently, their answers only had the [m] or in some cases [ŋ] or double m. The most frequent dictation for *topmost* ([tammoʊst]) were *Thomas* or *Tomas* (49.03%), followed by *the most* (6.28%) and *thermos* (3.09%). Compared to *topmost*, *stepmother* ([stemmoðəɹ]) was relatively more intelligible, with 157 correct dictations out of 259 trials. However, answers such as *the mother* (7.34%), *stem mother* (4.63%) and *stay mother* (3.48%) indicate that one out of six listeners misunderstood *stepmother* because of the altered oral stop sound.

The samples with [bm] cluster seemed more intelligible as a whole, but the intelligibility of each word was lower than that with [pm] sound. Out of 259 trials, the listeners were able recognize [sʌ(m)mit] as *submit* and [sʌmmarin] for *submarine* 55 times (21.24%) and 146 times (56.37%) respectively. *Submit* ([sʌ(m)mit] was largely confused with *soulmate* (9.27%), *summit* (8.1%), phrase *so me* (5.02%) and phrase *some meat* (5.02%). Majority of incorrect answers including these examples had no [b] or any other oral stop sounds, but had either a pause, single [m], geminate, or lateral sound between syllable boundary. Not much was different for *submarine* ([sʌmmarin])*,* where the word was commonly mistaken for *summary* (20.85%), *summer* (5.79%) and *some morning* (2.70%).

The samples with alveolar oral stop and nasal sound were intelligible at the percentage of 58.72% and 83.59% for voiceless and voiced stop sounds respectively. Voiced stop sounds seemed more retrievable than the voiceless stops, but this time

the gap was much wider. Out of 257 trials, *greatness* [greɪnnəs] was heard as *greatness* 184 times, and frequents error were *great news* (18.29%), *gray mist* (1.17%) and *greenness* (1.17%). For these cases as well, transformed [t] was recognized as [n] or glide [j]. On the other hand, *sweetness* ([swɪnnəs]) was less intelligible than *greatness*[greɪnnəs]. Approximately 119 samples out of 259 samples were intelligible while 24 samples (9.27%) were recognized as *sickness*, eight (3.09%) as *seen this* and six (2.32%) as *sameness.*

One note to be made here is that even though *great news* was not the exact input, we cannot conclude that the cause of unintelligibility of *greatness* [greɪnnəs] is primarily on Korean obstruent nasalization rule transfer, since the error is on the latter part of the word (i.e. [njuws]) rather than the [tn] sequence. Nearly 20% of the listeners who reported to have heard *great news* did manage to recover the missing [t]. We cannot say at this point that nasalized consonant did or did not play a role in recognizing the latter part of the word as [njuws] rather than [nəs], but this matter is outside the scope of the study and will not be further investigated.

Target words with [dn] sequence were all noun phrases starting with adjective *good*. *Good night* was well delivered to almost all the listeners in all cases, with only two mistaken samples out of 259 trials even though the samples were obviously pronounced as [gunnaɪt]. This can be attributed to the fact that *good* and *night* are highly colloquial in their use, so that the listeners could readily retrieve the transformed [d] sound. Similar phenomenon from *greatness* also occurred in case of *good news.* While 176 out of 259 utterances of *good news* [gun.njus] were proven to be intelligible, 31 cases (11.97%) were understood as *goodness* with [d]. If this

number is added up, it can be inferred that the listeners could retrieve [d] from 207 samples (79.92%) out of 259. As mentioned above, however, we will not go further in this matter and *goodness* was coded as unintelligible as was with *great news.*

Table 4.5. is a summarized list of incorrect dictations of the target word with homorganic sequence. The answers are in random order.

Table 4.5.

A summarized list of incorrect dictations of the samples: homorganic sequence

POA	Target word	Misrecognized answers
Bilabial	*topmost*	*Thomas (Tomas), tongue(tung)most, thermos, the most …*
	stepmother	*the mother, tell mother, stay mother, stem mother, some other …*
	submit	*summit, some may, some meat, soulmate, so me, zombie…*
	submarine	*summary, summering, summer, some morning, some are …*
Alveolar	*greatness*	*great news, gray mist, greenness, crayness …*
	sweetness	*sickness, seen this, same meat, sing this, dentist …*
	good night	*night*
	good news	*goodness, kudos, god news, quinyes, coonjus …*

The 3-way ANOVA was performed for those samples, with intelligibility as the dependent variable and (1) place of articulation (POA; bilabial, alveolar), (2) stop voicing (voiceless, voiced), and (3) English proficiency of the speaker (Proficiency; intermediate, upper intermediate, advanced) as three independent

variables. The result revealed a significant main effect of place of articulation (df=1, F=25.777, p<.05) and speaker proficiency (df=2, F=15.453) on intelligibility, but stop voicing alone turned out to have no statistically significant main effect on the degree of interlocutors' word recognition. Interestingly, however, stop voicing together with the place of articulation had a significant 2-way interaction effect (POA*Voicing) (df=1, F=11.603, p<.05). Table 4.6. is the summary of the results of 3-way ANOVA on homorganic sequences.

Table 4.6.

Summary of the results of 3-way ANOVA on homorganic sequences (The bold faces were significant in p<.05)

source	df	F	p
POA	1	16.623	**.000**
Voicing	1	.823	.369
Proficiency	2	24.365	**.000**
POA*Voicing**	1	10.212	**.003**
POA*Proficiency	2	1.707	.193
Voicing*Proficiency	2	2.082	.137
POA*Voicing*Proficiency	2	1.257	.294

Moving on to the detailed relationship between each factors, in both bilabial and alveolar sounds, voiceless stop plus nasal sequences (34.17%, 58.72%

respectively) were less intelligible than their voiced counterparts (38.8%, 70.11%

respectively) as illustrated in Figure 3.2.. Also, bilabial sound sequences were less

intelligible than alveolar sound sequences across all proficiency levels and voicing

feature. Especially, the post-hoc measurements demonstrated that in terms of

statistics, the difference in intelligibility between intermediate speakers and

advanced speakers was prominently significant, while intermediate and upper

intermediate speaker groups were not distinctive to such extent (see Figure 3.3).
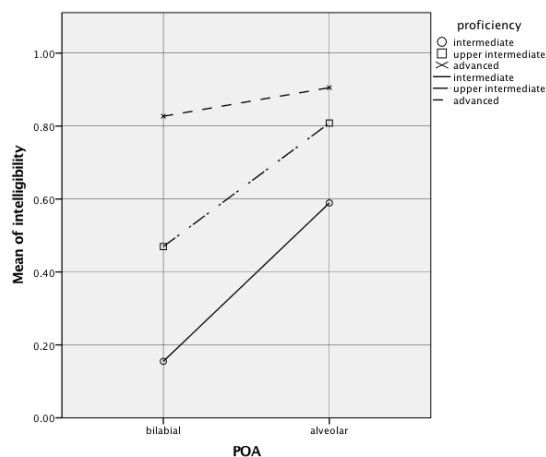

Figure 4.2. Mean of intelligibility for place of articulation and speakers'

proficiency: homorganic sequence
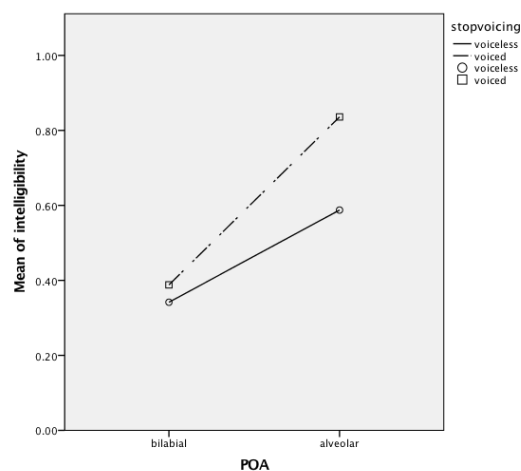
Figure 4.3. Mean of intelligibility for place of articulation and stop voicing: homorganic sequence

4.2.2. Heterorganic Sequences

72 out of 128 sample utterances contained heterorganic sound sequence, including velar stop plus nasal stop sounds. Due to phonotactic constraint on [ŋ], only heterorganic sequences were included in this study. Table 4.7. below is each word's intelligibility according to their place of articulation and stop voicing. The speakers' proficiency is not included in this table.

None of the 37 listeners recognized the words containing [pn] sequence. Except for four samples of *deepness* ([dimnis]) which were reported to be inaudible[6], zero out of 514 audible speech samples were intelligible to the native listeners. The

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[6] The listeners were instructed to mark "X" for samples that were impossible to dictate due to the quality of the recording. They wrote "?" when they could not write down the word even though there were no problem with the recording.

most frequent answer for *cheapness* [tʃɪmnis] was *chimneys,* which accounted for 108 out of 259 instances (41.7%). *Gymnast/gymnist* were second prominent misrecognition of the word, where 85 out of 259 utterances (32.82%) fell into this category. Other replies include *genius* (4.63%) and *Chinese* (2.32%) etc.

No listener recognized *deepness* ([dimnəs]) as well, and though they have heard *dimness* (35.29%), *gymnast/gymnist* (7.84%), *Denise*[dəníːs] (6.67%) or *dentist* (6.27%). That *chimneys* and *dimness* were one of the most frequently occurring errors for *cheapness* and *deepness* strongly advocates this study's main assumption, that Korean obstruent nasalization rule conveys severe segment changes and that this sound alternation effects word recognition of interlocutors.

Table 4.7.

Intelligibility of words with different POA, stop voicing and proficiency: heterorganic sequence

POA	Voicing	Word	Intelligibility (%)		
			Word	POA*Voicing	POA
bilabial	voiceless	chea<u>pn</u>ess	0.00	0.00	23.72
		dee<u>pn</u>ess	0.00		
	voiced	jo<u>b n</u>ame	30.12	21.71	
		a<u>bn</u>ormal	13.23		
alveolar	voiceless	trea<u>tm</u>ent	58.53	70.11	74.7
		sta<u>tem</u>ent	97.27		

	voiced	good morning	98.45	85.05	
		good monkey	71.60		
velar	voiceless	checkmate	30.91	31.52	43.63
		blackmail	31.78		
	voiced	big news	37.07	55.68	
		pregnant	99.10		

Compared to [pn] sequence, words with [bn] were slightly more intelligible to the native listeners. Yet, the chances were quite slim. Out of 259 samples of *jobname* [jomneɪm], only 70 samples were dictated as *job name* (30.12%). The samples were mostly recognized as *John name(d)/John may* (15.06%), and as nonce words such as *jom name* and *chow mein*. The other target word with [bm] cluster *abnormal* ([æmnoməl]) was even less intelligible than *job name* [jomneɪm]. The most common answer was *am/I'm nowhere,* which accounted for 10.51% of the total responses. Other misrecognized answers were in similar format, such as *I'm normal, and no more,* and *am no more* (3% each).

In case of alveolar sounds and [m], the overall intelligibility of [tm] and [dm] within a word were 70.11% and 85.05% respectively, which were noticeably bigger numbers than those of bilabial sounds. *Treatment* ([trinmənt]) were mostly recognized as *three month(s)* (28.29%), and other incorrect answers were *Tremont* and *tremens. Statement* ([steɪnmənt]) had not much perceptible dictation errors even

though the [t] in front of [m] clearly changed into [n] in the speaker's speech. This was the same with *good morning* [gunmornɪŋ], where 98.45% samples were intelligible. The last target word *good monkey* turned out to be fairly intelligible (71.6%). However, incorrect answers of *good monkey* bring us back to the previous issue on *greatness* and *good news* in the latter part of the word (i.e. *monkey* [gunm**ʌnki**]) rather than the target area (i.e. [gu**nm**ʌnki]) were mainly unintelligible. All the incorrect dictations included "*good*" which infers that [d] was retrievable in this context, but had *monk, month* and even *morning* instead of *monkey.*

Velar stop sounds followed by heterorganic nasal sound were also investigated in terms of its intelligibility. Counter to the expectation that velar stop sounds may be more easily retrieved compared to other places of articulation, intelligibility of [km] and [gm] word samples did not excel the others. Intelligibility of [km] and [gm] were 31.52% and 55.68% respectively, which were higher than bilabial sequences but lower than alveolar sequences. For *checkmate* [tʃeŋmeɪt], only 34 out of 110 samples were intelligible. A number of listeners marked "?" (16.36%) which indicated the samples was totally unintelligible to them, and nonce words such as *ching may, ching me, cheng may, jing may* and etc were frequently observed. The results were similar with *blackmail* [blæŋmeɪl], where only 31.78% of the samples were intelligible and "?" was the most common answer (21.71%). followed by *blank mail* (5.81%), *playmate* (3.88%), *windmill* (4.26%). and a number of nonce word answers such as *ling/lang mei/may. bring mayo, blang mayo,* and *blamayo.*

Target words with [gn] sequences pronounced as [ŋn] were more

intelligible compared to words with [kn]. Especially, *pregnant* exhibited near 100 percent of intelligibility, with only one "?" answer out of 111 samples. *Big news*, however, were far less intelligible than *pregnant*, with 96 accepted samples out of 259 (37.07%). The three most frequent for *big news* [biŋnjʊs] were *penis* (5.02%), *venues* (2.70%) and *painless* (2.32%). A number of nonce words accounted for the rest as were the case for *checkmate* and *blackmail*. The summary of misrecognized answers of the target words for heterorganic sequences is in Table 4.8. below. The answers are again in random order.

Table 4.8.

A summarized list of incorrect dictations of the samples: heterorganic sequence

POA	Word	Misrecognized answers
bilabial	*cheapness*	*chimneys, gymnast, genius, chinjus, Chinese ...*
	deepness	*dimness, thinness, genius, Denise, dentist ...*
	job name	*John name, some name, chum name, thumbnail...*
	abnormal	*am no more, I'm nowhere. am nowhere, I'm normal ...*
alveolar	*treatment*	*three months, Tremont, tremen ...*
	statement	-
	good morning	-
	good monkey	*good monk, good month, good morning ...*
velar	*checkmate*	*ching may, ching me, chain made, cheng mae ...*
	blackmail	*blank mail, bling mayo, windmill, playmate ...*

big news	*peños, baños, genius, venues, penis, being used …*
pregnant	-

To capture the statistical relationships between intelligibility and the three factors taken into account in this section 3-way ANOVA was performed. As with homorganic sequences, the dependent variable was intelligibility and three independent factors were (1) place of articulation (POA; bilabial, alveolar, velar), (2) stop voicing (voiceless, voiced) and (3) Speakers' proficiency (Proficiency; intermediate, upper intermediate, advanced). Table 4.9. below is the summary of 3-way ANOVA measurements for each factors.

Table 4.9.

Summary of the results of 3-way ANOVA on heterorganic sequences (The bold faces were significant in p<.05)

source	df	F	p
POA	2	59.306	**.000**
Voicing	1	21.617	**.000**
Proficiency	2	11.847	**.000**
POA*****Voicing	2	.691	.505
POA*****Proficiency	4	1.599	.187
Voicing***Proficiency**	2	4.857	**.011**
POA*Voicing*Proficiency	2	.911	.408

The result demonstrates that all three factors (POA: df=2, F=59.306, p<.05; Voicing: df=1, F=21.617, p<.05; Proficiency: df = 11.847, F=11.847, p>.05) have significant main effect on intelligibility. And among four possible combinations of three independent variables, only voicing * proficiency had significant 2-way interaction effect on intelligibility.

Subsequent post-hoc test revealed that the intelligibility of samples from bilabial, alveolar, and velar position were significantly different (p=0.000). As was previously demonstrated in Table 3.9., the bilabial sequence words were the hardest to recognize (23.2%) while the alveolar sequence words were the most intelligible (74.7%) in average. Also, Figure 3.4. demonstrates that this hierarchy was maintained across voicing features of oral stops.

When it comes to speaker proficiency and intelligibility, only advanced and upper intermediate groups' speech samples were significantly different (p=0.005) in their intelligibility while the distinction between intermediate / advanced (p=0.307) and intermediate / upper-intermediate (p=0.067) were not statistically significant. Figure 3.5. suggests a rather uneven hierarchy of three proficiency groups depending on the place of articulation. Even though the bilabial samples and alveolar samples were respectively the least and the most intelligible samples in each proficiency group, the degree of intelligibility across proficiency levels within each place of articulation is unstable. This is the same with the stop voicing, as Figure 3.6. reveals that while the advanced group's samples remain the most intelligible regardless of the voicing features, the upper intermediate group's samples with voiceless stop sounds were the least intelligible but were more

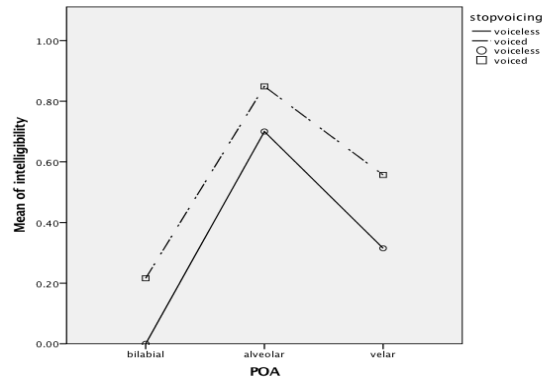intelligible in case of samples with voiced stops.

Figure 4.4. Mean of intelligibility for place of articulation and stop voicing:
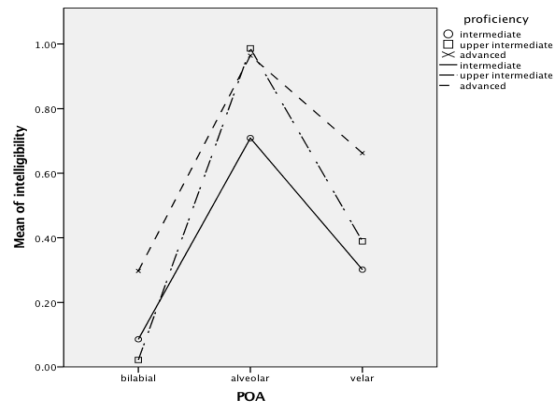
heterorganic sequence

Figure 4.5. Mean of intelligibility for place of articulation and speaker's English

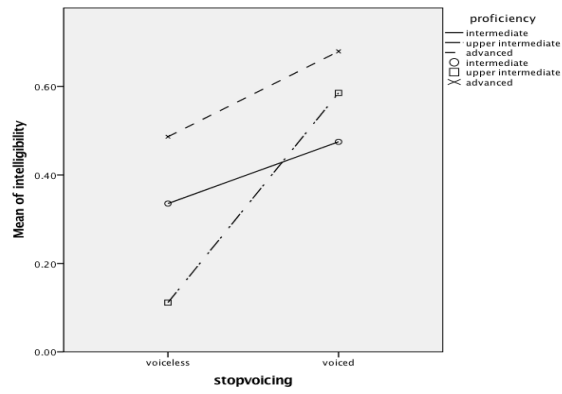*pronunciation proficiency: heterorganic sequence*

Figure 4.6.. Mean of intelligibility for stop voicing and speaker proficiency:

heterorganic sequence

CHAPTER 5.
DISCUSSIONS

In this chapter, brief summary of the results from the two experiments above and related discussion topics are presented. Section 4.1. gives deeper understanding of the findings from the experiment part I, and section 4.2. deals with experiment part II. This chapter ends in 4.3. where comprehensive final remarks of the two experiments and their contributions are demonstrated.

5.1. L1 Transfer in L2 Speech and Learner Proficiency

The findings from experiment part I can be interpreted regarding the first two research questions, which inquired (1) the overall tendency of Korean high school EFL learners for L1 transfer in L2 speech and (2) the assumed relationship between a learners' English speaking proficiency and L1 transfer in L2 speech. Out of 2,250 instances of oral stop plus nasal sound sequences, 900 samples had clear sign of obstruent nasalization where the obstruent preceding a nasal sound transformed into homorganic nasal sound (e.g. *topmost* [tɑm.moʊst]) across syllable boundary. On the other hand, vowel epenthesis accounted for approximately 20.4% of the entire speech. These findings are consistent with what has been found in the previous literatures (Kim and Min, 2003; Shin and Iverson, 2014), where vowel insertion is one of the major errors found in English speech of Korean EFL learners. Statistically, six out of ten learners regardless of their English proficiency can be

said to be under the negative influence of their L1 Korean.

Additional one-way ANOVA measurements proved that English speaking proficiency is one of the factors determining the degree of L1 transfer of the learners. There was stronger tendency among lower proficiency groups to postulate L1 sound patterns in when reading English words out loud, while advanced group learners were relatively less influenced by L1. This result left us with a question on whether the English production by lower speaking groups (i.e. English production with more Korean transfer) are less intelligible than those of the advanced groups (i.e. English production with comparatively less Korean transfer), and this became the motivation for experiment part II.

As mentioned above, in the era where non-native speakers of English from all over the globe (i.e. ELF speakers) and where it is nearly impossible to define what is "native" English at all (Abrahamsson and Hyltenstam, 2009), L1 transfer should be seen in different perspective. Taking into consideration that there is very slim possibility of adult (above puberty) learners acquiring authentic (or *native-like*) pronunciation (Ortega, 2009; Muñoz and Singleton, 2011), it will be more practical in terms of teachability and learnability if we reset the goal of speaking education from eliminating the traces of L1 at all cost to articulating the speech sounds of the target language to the degree which is intelligible to the interlocutor. Following this line of rationale, what the present investigator argues is not that L1 transfer is to be avoided at all cost, but that L1 influence should be looked at in a more objective perspective and should be corrected only when it defies speech intelligibility in communicative contexts.

5.2 Obstruent Nasalization and Intelligibility

The major concern of experiment part II was the intelligibility of the samples of Korean obstruent-nasalization. The rule required further investigation regarding intelligibility based on ELF perspective. When speakers from different first language background engage in conversation using English as their common language, they have no choice but to refer to individual segments to comprehend each other's utterances. In other words, verbal communication between ELF speakers are different from that of the speakers sharing certain linguistic background in that bottom-up processing is dominant where the sum of each segments eventually leads to the understanding of the whole speech. This being the case, Korean obstruent nasalization calls in for closer attention than vowel insertion in that oral stop sound in front of a nasal sound changes to the extent that a whole segment merge into the following nasal, sounding like geminates.

The findings from experiment part II provides evidence that L1 transferred English speech by Korean high school EFL learners are by and large less intelligible to the native speakers of English with at least three factors sophisticatedly intertwined. The 3-way ANOVA results demonstrated that the three independent variables of the experiment (i.e. place of articulation, stop voicing, speaker's English proficiency) had significant impact on the samples' intelligibility. Generally, speech samples containing bilabial stop sounds were the least intelligible while those with alveolar stops sounds were the best recognized by the native listeners. The same held true across the speakers' English pronunciation proficiency and voicing

features of the transformed oral stop. Also, voiced stop sounds turned out to be more retrievable compared to voiceless stop sounds in all place of articulation and all proficiency levels of the speaker. When it comes to the proficiency of the speaker, the last independent variable of experiment part II, advanced learners' samples were the most intelligible in all place of articulations and stop voicing. The samples from upper intermediate learners were next in line, but this hierarchy was overturned in case of heterorganic bilabial sounds where intermediate leaners' samples were slightly more intelligible.

This is an important finding in the understanding of the degree intelligibility of L1 transferred speech made by Korean EFL learners, and as far as this study is concerned, this has not been central in earlier literatures. The elicited answers from the listeners confirm that retrieving the missing oral stop sound is not always possible even for the native speakers of English.

5.3. Final Remarks and Pedagogical Implications

The findings of this thesis can come in handy especially when designing a lesson plan for English speaking classes, pronunciation teaching in particular. The overall outcome of the two experiments above hints that there is indeed no single solution for increased intelligibility of L1 transferred English production in part of Korean EFL learners. But this does not mean that we are left with no cure at all, because the other side of the coin suggests that there are various features that we can turn to and modify. Through objective and scrutinized diagnosis of the learners'

reliance on L1 sound patterns and setting a detailed plan will be beneficial for more intelligible speech. For instance, different learning and teaching tactics can be adopted depending on the learners' proficiency level. If a learner with low speaking proficiency struggles with unsatisfactory intelligibility of his/her speech, he/she may start by checking how often Korean sound patterns are overgeneralized in his/her English speech. If the learner turns out to be one of those heavy transferers, being conscious of transferred Korean features and trying to discard them with or without help from others (Kang and Lee, 2001) can be an efficient learning strategy. The same holds true for the teachers. The teacher can admit Korean rule transfer as one of the sources of decreased intelligibility and advise struggling students in this perspective. Consequently, the teacher can give individualized feedback in any format that seems plausible.

It is important to keep the balance between *native-like* pronunciation and intelligible pronunciation. This thesis is neither imposing Korean EFL learners nor the teachers to lose L1 sound patterns as much as possible. English speaking classes with this aim will permanently remain unsuccessful. Rather, the goal should be better on intelligible speech even though there are some remaining traces of Korean. Considering that one of the primary objectives in communicative language teaching classroom is being engaged in effortless and effective communication in the target language, any language learner should at least reach the point where the interlocutor, regardless of his/her nationality, understands and reacts accordingly. The present study believes that L1 transfer should be studied in the intelligibility context, rather than on accuracy or native-like-ness.

CHAPTER 6.
CONCLUSION

This is the final chapter of this thesis. In section 6.1., the overall summary of the thesis is presented. Section 6.2. is on limitations of this study and suggestion on how the future study should be done.

6.1. Summary of the Thesis

The present study was conducted for two main purposes. The first purpose was to diagnose Korean high school EFL learners' English pronunciation based on two most common source of error, which are obstruent nasalization and vowel insertion. The two rules were in common that they both regard the matter of different sound patterns of Korean and English. Especially, the former were discussed in more details through Syllable Contact Law. The second purpose of this paper was to further the scope of the previous studies on L1 transfer on L2 in Korean EFL context and examine to what degree those transferred productions are intelligible to native speakers of English. The three research questions based on these purposes were: (1) How frequently do Korean sound pattern-based L1 transfers (i.e. obstruent nasalization, vowel insertion) occur in English productions of Korean high school EFL learners? (2) Do students show different frequency of transfer depending on their English speaking proficiency levels? (3) Are the instances of Korean obstruent-nasalization transfer less intelligible to native speakers of English?

Research question one and two were answered through experiment part I, and the second part of the experiment mainly dealt research question number three. The key findings of the current study are as follows.

6.1.1. English proficiency and Frequency of Rule Transfer

As the present investigator assumed, Korean EFL learners' English speaking proficiency had meaningful influence on the frequency of rule transfer. The advanced group learners were more able to pronounce stop and nasal sound sequence more properly, either with audible pause between the two sounds or with glottal stop [?] sound. The ratio of correct pronunciation decreased as learners' mean English speaking proficiency score lowered, resulting in statistically significant difference between the performance of advanced learners and intermediate learners. It can be said that the lower level learners are more likely to be under Korean phonological rules, and that higher level learners have fairly consolidated English sound patterns separated from those of Korean. The findings from this first experiment is expected to be very helpful in designing English speaking classes and in giving individual feedback to the learners. Combined with the results from the second part of the experiment, the effect will be much greater.

The discussion will stop here and try not to make too hasty conclusions by saying that advanced learners can always pronounce stop plus oral sequences better than the lower level learners, because we are still left with unsolved matter of the direction of influence. That is, whether the ratio of L1 transfer in L2 speech serves

as one of the factors determining the learners' speaking proficiency or not.

6.1.2. Intelligibility of obstruent nasalized English speech samples

The results from experiment part II demonstrated the influence of place of articulation of the stop sound, the voicing of the stop sound and the proficiency of the speaker (i.e. the recorder of the speech sample) on intelligibility of the speech, and this was done for both homorganic and heterorganic sound sequences. The results showed that the factors did have significant impact on intelligibility of the learners but in a very sophisticated manner. In general, the samples with transformed bilabial stops were the least intelligible among three place of articulations (i.e. bilabial, alveolar, velar). Also, [–voice] oral stops were more retrievable than [+voice] stops. Lastly, the samples from advanced learner groups were the most intelligible compared to the samples from other proficiency groups. It is important to note, however, that that these relationships may yield very different results depending on the context of the study and speech production.

The broad implication of the present research is that reckless application of Korean phonological rule systems by EFL learners is indeed one of the factors that must be taken care of for more effortless communication in English. To our knowledge, the current research is one of the first studies which brought intelligibility to the center of the concern and verified how the L1 rule transferred L2 speeches are recognized by native speakers of English. The findings of this study will be one of the data that teachers and learners of English pronunciation education

can refer to when aiming for more intelligible English speech.

6.2. Limitations and Suggestions for Future Research

This is interesting topic for future work, and also future research is needed to prove whether the similar results are expected to come in other circumstances Since the process of language learning involves countless variables, further verification will be of value.

Even though the present investigation was meticulously designed, there are some limitations that the upcoming studies should take into account when conducting research regarding this topic. First of all, the target words used in the present study could have been more diverse with more sound sequences. The present study were left with limited options as stimuli because the expected English proficiency of the participants were fairly low. Since the prerequisite of this study was smooth and natural read-aloud of the target words, the perceived difficulty of the words had to be controlled for better recording. The present investigator recommends the future research to be conducted in a situation where wide arrange of vocabularies can be used, for instance to have Korean adult EFL learners as the main participants or to narrow the scope of study to certain proficiency groups and use diversify the methodology accordingly.

Another limitation in this study involves the issue of having only native speakers of English as raters. What have been repeatedly highlighted in this study was the changing status of English and its consequences in English learning and

teaching. Adopting non-native speakers of English, or English users from Outer- and Expanding circles, as raters for learners' pronunciation the samples' intelligibility could have yielded more in-depth analysis of the situation in ELF perspective. Therefore, the present investigator highly recommends the following researches to have non-native speakers as raters as a way to better reflect the status of English as Lingua Franca.

Lastly, the present study had some inevidently uncontrolled factors when selecting the sample items for the intelligibility test, and consequently were left with certain area that needs deeper investigation. Although the number of the students and the number of elicited data were not small, the overall diversity of the samples that could be used for intelligibility were fell short of initial expectation. Having more samples with strictly controlled factors in various ways may be helpful for disentangling the complex relationship between the three independent variables in experiment part II. The key findings of this present research is expected to be a good starting point for the follow-up studies regarding the topic.

Looking forward, further attempts to deal with influence of linguistic features and learner factors on L2 speech intelligibility with certain amendments of the above limitations will benefit this field of investigation.

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APPENDICES

APPENDIX A. The target word list used

Word List

다음 문장의 빈칸에 단어를 차례대로 넣어 자연스럽게 읽어 주세요.

"I said _____, thank you."

checkmate	treatment	statement	topmost	cheapness	blackmail
submarine	good news	greatness	abnormal	big news	stepmother
submit	deepness	pregnant	jobname	good-night	good-morning
sweetness	good monkey	greatness	checkmate	deepness	submarine
big news	statement	good-night	blackmail	good news	cheapness
stepmother	abnormal	sweetness	treatment	good monkey	topmost
good-morning	submit	pregnant	jobname	abnormal	treatment
good monkey	good-morning	big news	checkmate	topmost	pregnant
deepness	good news	statement	cheapness	submarine	jobname
sweetness	good-night	stepmother	greatness	blackmail	submit

APPENDIX B. The sample of on-line intelligibility test form

Transcription_short sentences

Instructions:

You will listen to the recording (press "play" of the video below, and remain it played till the end of the survey),
and write down what you've heard using standard English orthography.

-There will be 10 sentences per each question, and all sentences are in "I said _____, thank you." format.
  Please pay attention to the blank and please transcribe what you've heard.
    Example) Q1. I said _____, thank you.
              Your answer: apple / banana / carrot / dragon fruit / eggplant / fruit / grape / honey / ice-flakes / jam
The word/phrases for the blank may be either a proper word or a nonce word. Try to transcribe what you've heard, and your honest answer is much appreciated.
Put "?" in case you cannot recognize the word at all even though the quality of the recording is okay.
Put "X" in case you cannot transcribe due to the poor recording (too small volume, etc.)
After transcribing the text, please mark in a scale of 4 on how certain you are about your answers.
Thank you for your cooperation.

* Please note that your HIT will not be accepted if it is not done properly.

* Please put your Worker ID at the end of the survey and at the survey code box in Mturk site. This is to verify you and your reply.

* 필수항목

Number 1: 10 sentences, each repeated twice

http://youtube.com/watch?v=MzEg0MLQgm0

1. 1. I said _____, thank you. *

_____

_____

_____

_____

2. 1-1. How sure are you about your answers? *
한 개의 타원형만 표시합니다.

	1	2	3	4	
Very uncertain	◯	◯	◯	◯	Very certain

APPENDIX C. Recruitment document for participants

연구참여자 모집 문건

▶ 다음과 같은 연구에 참여하실 분을 모집합니다.

◆ **연구 과제명:**
   한국어의 소리 규칙이 한국 고등학생의 영어 발화에 전이되는 양상 연구

◆ **연구 책임자명: 이 서 현 (서울대학교 외국어교육과 영어전공 석사과정)**

▶ **연구 목적** : 이 연구의 목적은 한국 고등학교 학생들의 영어 발음 및 영어 듣기 수준이, 영어 발화에의 모국어 음운 규칙 적용에 미치는 영향을 알아보고, 전이 정도에 따른 발화의 명료도를 측정하는 것입니다.

▶ **참여자 선정조건** : 한국어를 모국어로 사용하며, 현재 서울, 경기, 충북 지역에 재학 중인 고등학교 1, 2학년 학생 40명을 참여자로 선정합니다. 이 중 **영어를 모국어/공용어로 사용하는 국가** (예. 미국, 캐나다, 호주, 필리핀 등) 에 **3개월 이상 거주한 경험**이 있는 학생들은 <u>실험 참여자에서 제외됩니다.</u>

▶ **참여 내용** :
1) 먼저, 실험 참여자는 학년과 성별, 출생년도, 해외 거주 경험, 2018 EBS 전국 고등학교 영어듣기능력평가 점수를 묻는 설문지에 답을 하게 됩니다. 이 과정은 약 2분정도 걸릴 것입니다.

2) 이후, 실험 참여자는 61개의 단어로 이루어진 영어 지문 한 문단을 소리 내어 두 번 읽게 됩니다. 이 때, 읽은 내용은 모두 녹음될 것이며 이 과정은 약 3분정도 소요됩니다.

3) 마지막으로 실험 참여자는 60개의 단어를 주어진 문장의 빈칸에 번갈아가며 넣어 읽습니다. 모든 과정은 녹음되며, 이 과정은 약 5-7분정도 걸립니다. 녹음은 연구자와 1:1로 이루어질 예정입니다.

▶ **참여기간 및 장소**
 1) **기간** : 연구자와 참여자가 사전에 약속한 날짜에 약 15분간 연구가 진행될 것입니다.
 2) **장소** : 교내 조용한 장소(빈 교실 등)에서 연구가 진행될 것입니다.

▶ **참여 방법** : 연구 참여 의사가 있는 분들에 한해, 동의서에 확인 서명을 해 주시면 됩니다.

▶ **참여 시 사례** : 귀하가 본 실험에 참여하는 경우 소정의 기념품이 증정됩니다.

본 연구의 내용에 관한 기타 문의는 연구 담당자에게 다음 연락처로 부탁드립니다.

서울대학교 사범대학 외국어교육과 영어전공 석사과정 이서현

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APPENDIX D. Preliminary Survey Sample

설문지 번호: 1

연구책임자 : 이서현
서울대학교 사범대학 외국어교육과 영어전공 석사과정

● **본 설문 결과는 안내된 연구 목적 이외에 어떠한 다른 용도로 사용하지 않을 것을 밝힙니다.**

- **학년:**

- **성별:**

- **출생년도:**

- **해외 거주 경험**: (영어를 사용하는 나라에서 지낸 시간을 적어주세요.)

    - 거주 국가:

    - 거주 기간:

    - 해당 사항 없음 ☐

- **2018 EBS 전국 영어듣기평가 성적: (20 개 중 _____개)**

감사합니다.

국 문 초 록

한국어의 소리 규칙이 한국 고등학생의 영어 발화에 전이되는 양상 연구

이 서 현

외국어교육과 영어전공

서울대학교 대학원

본 연구는 한국인 고등학교 영어 학습자를 대상으로 장애음 비음화와 모음 삽입 현상이 학습자들의 영어 발화에 전이되는 정도와 규칙이 전이된 발화의 명료도(intelligibility)를 살펴보고자 한다.

최근 영어의 지위가 영어권 화자들의 모국어에서 만국 공용어로 바뀌면서, 영어의 *원어민*의 개념이 흐려지고 있다. 이에 따라 영어 교육 환경에서도 영어 교육의 목표 및 기준으로서 영어 *원어민* 화자를 상정하는 것의 실효성을 재고하고 있는 추세이다. 영어 발음 교육에서도 마찬가지로, 영어 *원어민* 화자와 동일한 발음 습득하는 것의 의미가 흐려지고있는 가운데, 그렇다면 모국어의 영향을 어디까지 수용해야 하는가에 대한 의미가 함께 제기된다. 본 연구는 명료한 발화를 효과적인 의사소통의 필요조건으로 제시하며 모국어의 영향은 발화의 명료도를 저해하지 않는 선 까지만 허용해야 할 것을 주 전제로 하고 있다.

본 연구의 참여자인 42명의 고등학교 학생들은 한국어에서 장애음 비음화 규칙이 과잉 일반화되어 적용되거나, 모음 삽입이 일어날 것으로 소리 연속

을 포함한 20개의 단어를 반복하여 3번 읽는 과업을 수행하였다. 녹음 자료를 바탕으로 분석을 한 결과, 한국인 고등학생 영어 학습자들은 약 60.4%의 확률로 모국어의 음절 구조에 영향을 받아 비음 앞의 장애음을 비음화하거나 연속되는 자음 사이에 모음을 삽입하는 경향을 보였다. 또한, 학습자의 영어 능숙도가 높을수록 모국어의 영향을 적게 받는 것으로 나타났다. 한국어의 장애음 비음화 규칙이 전이된 영어 발화의 명료도를 살펴본 결과, 전체 발화 중 약 47.42%의 발화만이 본 의도대로 전달되었음을 알 수 있었다. 또한, 발화의 명료도는 장애음의 조음 위치, 유/무성 여부, 화자의 영어 능숙도에 따라 다르게 나타났다. 본 연구의 결과는 모국어의 영향이 발화의 명료도를 저해하는 큰 요인 중 하나임을 시사하며, 이를 바탕으로 보다 체계적인 영어 발음 교수 및 학습이 이루어 질 것을 결론부에 제시한다.

주요어: 모국어 전이, 명료도, 장애음 비음화 규칙, 모음 삽입, 음절 접촉 이론
학 번: 2016-29982