Phonetic and Phonological Accommodation in ELF Interactions: Interactional Intelligibility and Sufficiency from an English as a Lingua Franca Perspective and its Implications for English Pronunciation Pedagogy

George O'Neal

A thesis submitted for the degree of Doctor of Philosophy

Graduate School of Education
Waseda University

September 2018

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Abstract

This research investigates how English as a lingua franca (ELF) users maintain mutually intelligible pronunciation and co-construct sufficient pronunciation in natural and experimental settings. It particularly focuses on the efficacy of segmental repair and adjustment strategies (Matsumoto, 2011; O’Neal, forthcoming; O’Neal & Matsumoto, forthcoming) within ELF interactions. In the current era of globalization, the majority of English users are non-native English speakers (NNESs), and an increasing number of them use English to communicate trans-, intra-, and inter-nationally (Crystal, 2003; Graddol, 2006; Dewey, 2007; Jenkins, 2009; Seidlhofer, 2011). Furthermore, these kinds of interactions are largely successful (Mauranen, 2006; Björkman, 2014; Pietkäinen, 2018; Matsumoto, 2018) and utilize intelligible pronunciation that differs from native English speaker (NES) pronunciation in many cases (Jenkins, 2000; Kirkpatrick, 2010; Matsumoto, 2011; Deterding, 2013; O’Neal, forthcoming). However, despite these facts, NNESs are still frequently regarded as deficient in their knowledge of intercultural pragmatics (e.g., Celce-Muria & Olshtain, 2000; Wong & Waring, 2010) and NES pronunciation norms are still often the benchmark of success in pronunciation research (e.g., Saito & Akiyama, 2017; Crowther, Trofimovich, Isaacs & Saito, 2015), pronunciation testing (e.g., Celce-Murcia, Brinton & Goodwin, 2010; Harding, 2018; Ghanem & Kang, 2018), and pronunciation learning (e.g., Derwing & Munro, 2005; Celce-Murcia et al., 2010; Lindemann, 2017). As such, an urgent need exists to examine the pragmatic strategies that allow for the maintenance of mutually intelligible pronunciation and the co-construction of sufficient pronunciation among speakers from different first language backgrounds in order to account for the sociolinguistic reality of English use in today’s world.

In particular, this research examines the interactional management of intelligible and sufficient pronunciation. This is because observations of the research data from a conversation analytic perspective (e.g., Schegloff, 2007; Sidnell, 2010) reveal that both the maintenance of mutual intelligibility and the co-construction of sufficient pronunciation become the sequential goals of some interactions. This is contrary to current ELF research which focuses on the bilateral relationship between intelligibility and phonetics rather than the multilateral relationship between intelligibility, sufficiency, phonetics, and interaction (e.g., Jenkins, 2000; Deterding, 2013; Zhang, 2015; Walker & Zoghbor, 2015; Deterding & Nur Raihan, 2016; Low, 2016; Gardiner & Deterding, 2018; Zoghbor, 2018). Although some existing ELF research admits that accommodation exists among ELF users to maintain mutually intelligible pronunciation (e.g., Jenkins, 2000, pp. 167-194; Deterding, 2013, pp. 85-87), neither Jenkins (2000) nor Deterding (2013) provide any actual examples of accommodation processes to maintain mutual intelligibility (see Matsumoto, 2011 for an exception in ELF research). Furthermore, when it comes to the co-construction of sufficient pronunciation in ELF interactions, no ELF research explicitly deals with it. This research therefore focuses on the analysis of how speakers from different first language backgrounds interactionally manage intelligible and sufficient pronunciation, and further argues that a valid interaction-independent standard to assess mutual intelligibility does not exist; an interaction-dependent standard is the only valid means with which to evaluate mutually intelligible pronunciation and sufficient pronunciation.

This thesis has nine chapters. Chapter 1 introduces the entire thesis. Chapter 2 describes the theoretical framework for the whole project. Chapter 3 reviews existing ELF research and identifies the research gap that this study intends to fill. Chapter 4 explains the methodological background of this research, justifies the research design that this study adopts, and describes the main data collection procedures. Chapters 5, 6, 7, and 8 present the findings of this study, which discuss the sequential organization of segmental repair (Chapter 5), the sequential organization of the co-construction of sufficient pronunciation (Chapter 6), the relationship between phonetic segment adjustments and mutual intelligibility (Chapter 7), and the results of an experiment which assessed the efficacy of segmental repair on the diachronic development of mutual intelligibility (Chapter 8) respectively. Chapter 9 summarizes the key findings of this study and discusses the pedagogical implications of the conclusions, delineates the limitations of the research, and provides suggestions for further research.

To pursue the research aim, this study adopted two separate research designs. First, a conversation analytic approach (e.g., Schegloff, 2007; Sidnell, 2010) was combined with statistical analyses that are sensitive to the intricacies of turn change and sequential position (e.g., Stivers, 2015) and phonetic analyses that respect the emic perspective (e.g., Matsumoto, 2011; Szczepek Reed, 2012) to investigate how ELF users maintain mutually intelligible pronunciation (e.g., Matsumoto, 2011; O'Neal, forthcoming) and co-construct sufficient pronunciation (e.g., O'Neal & Matsumoto, forthcoming). Conversations among students from different first language backgrounds who were studying at a large public Japanese university were audio-recorded by the participants themselves. Eighty-five students from five different first language backgrounds participated in the recordings. A total of eleven hours and fifty-five minutes of spoken interactions were gathered. The data were listened to repeatedly and transcribed according to a modified conversation analytic transcription system that allows for phonetic analysis (e.g., Matsumoto, 2011; Szczepek Reed, 2012). The phonetic aspects of the interactions and their relevance to intelligible pronunciation and sufficient pronunciation were analyzed in detail (see Chapters 5, 6, and 7). Second, an experimental approach was adopted to investigate the multilateral relationship between segmental repair, interaction, and intelligibility. Ninety students from eleven different first language backgrounds participated in the experiment. The results of the experiment were evaluated through statistical and conversation analytic methods (see Chapter 8).

Both approaches reveal that ELF users in natural and experimental settings are interactionally successful in maintaining mutual intelligibility and co-constructing sufficient pronunciation. Chapter 5 discusses the sequential organization of segmental repair sequences, which are the primary means with which ELF users orient to specifically mutual intelligibility as the goal of sequence. For example, speakers could conduct *reactive segmental repair* on pronunciations that have been oriented to an unintelligible; they could also conduct *preemptive segmental repair* on pronunciations that are potentially unintelligible but not specifically oriented to as such. The existence of multiple organizations of segmental repair to maintain mutual intelligibility demonstrates that segmental repair is a multifaceted interactional phenomenon.

Chapter 6, on the other hand, discusses the co-construction of sufficient pronunciation. ELF users sometimes orient to states beyond the maintenance of mutual intelligibility of pronunciation as the phonetic goal of a sequence, which reveals that phonetic negotiations are not limited to the purpose of maintaining mutual intelligibility. This means that speakers can orient to *sufficiency* as the interactional issue at hand. For example, ELF users conduct phonetic adjustments on pronunciations even though mutual intelligibility has been maintained. Such instances reveal that speakers sometimes orient to pronunciations as insufficient even if mutually intelligible, which demonstrates that the sufficiency of pronunciation can be a central aspect of an interaction. This phenomenon has received no attention in ELF research at all, and Chapter 6 explores the phenomenon of the co-construction of sufficient pronunciation.

Chapter 7 catalogues the phonetic adjustments that are conducted on pronunciations so that they remain mutually intelligible and determines which phonetic adjustments are most common within segmental repair sequences. Within the corpus, phonetic adjustments appear in four different varieties: phonetic segment *modification*, phonetic segment *insertion*, phonetic segment *deletion*, and phonetic segment *resegmentation*. Statistical analyses that respect conversation analytic considerations (e.g., Stivers, 2015) of these four phonetic modifications reveal that *modification* is frequent and that *deletion* and *resegmentation* are rare to a statistically significant degree. The upshot of these facts demonstrate that even unintelligible pronunciation is usually phonetically close to a mutually intelligible variant, often differing by just one manner or place of articulation (O'Neal, forthcoming). This analysis suggests that even slight variations to phonetics can render a pronunciation unintelligible. Furthermore, this chapter assesses the extent to which functional load theory predicts the phonetic segment adjustments within the segmental repair sequences in the two corpora gathered for this study.

Chapter 8 describes an experiment that was designed to test the efficacy of segmental repair on the development of mutual intelligibility. Ninety students participated in an experiment and were divided into three conditions: an *unlimited interaction* condition, a *segmental repair* condition, and a *script* condition. Each of the three conditions had different restrictions placed on how participants could communicate during the experimental task. Mutual intelligibility was operationalized as the placing minimal pair word cards in the location described by one's partner. Statistical analyses of the results revealed that overall segmental repair was more effective than just script reading but less effective than unlimited interaction. Furthermore, a correlation analysis between segmental repair attempts and mutual intelligibility revealed a statistically significant relationship, which demonstrates that segmental repair is correlated with high mutual intelligibility.

Chapter 9 summarizes the key findings of the four chapters. It concludes that ELF users are largely intelligible to each other; that is, neither repair sequences nor segmental repair sequences are particularly frequent within the corpus gathered for this study. This finding reinforces the argument that ELF users are legitimate users of English in their own right (Matsumoto, 2018; Kohn, 2018; Pitzl, 2018). Indeed, even when mutual intelligibility does break down because of a phonetic trouble source, ELF users can conduct segmental repair on it in order to restore it. This in turn demonstrates that ELF users are fully capable of adjusting to current emergent contingencies within interactions (Widdowson, 2003, 2008; Seidlhofer, 2011; Matsumoto, 2011). Furthermore, the segmental repair strategies that speakers utilize can be divided into four categories: reactive, preemptive, reversion, and serendipitous non-segmental repair (O'Neal, forthcoming). Within segmental repairs, the phonetic segments of a trouble source pronunciation and the phonetic segments of a ratified candidate intelligible pronunciation are often very similar (O'Neal, forthcoming). However, not all phonetic adjustments are an indication that mutual intelligibility is being negotiated. ELF users sometimes adjust the phonetic segments of a pronunciation even though mutual intelligibility has not broken down (O'Neal & Matsumoto, forthcoming). Last, experimental evidence suggests that segmental repair is effective in maintaining and developing mutual intelligibility. In total, the evidence gathered by this thesis suggests that phonetic accommodation is a significant portion of communicative ability within ELF interactions (Jenkins, 2000; Matsumoto, 2011; Deterding, 2013; O'Neal, 2015a, 2016b, 2017, forthcoming).

However, all research has limitations and this research has several that could be addressed in future research. First, the limited sample size of heterogeneous L1 backgrounds in this study limits its generalizability. It is likely that a greater number of heterogeneous L1 backgrounds would have yielded a different frequency of segmental repairs, different types of segmental repairs, and different kinds of segmental adjustments. Second, another limitation of this research is what segmental repair analysis can detect. Segmental repair analysis can detect the breakdown and restoration of mutual intelligibility and the concomitant segmental adjustments, but it can only do this if one of the interactants specifically orients to a word or phrase as unintelligible (O'Neal, forthcoming). Therefore, segmental repair analysis can only detect what some scholars would call overt catastrophic intelligibility problems (i.e., intelligibility breaks down to the extent that the speakers have to stop the ongoing action to attend to specifically the restoration of mutual intelligibility). Third, this research has focused on the negotiation of mutually intelligible pronunciation, claiming that mutually intelligible pronunciation is greatly facilitated by interaction (O'Neal, forthcoming). However, with the exception of the experimental data, all of the data that was gathered for this study were audio-recordings, and the preponderance of audio-recordings may have left out non-auditory elements that affected the formation of mutually intelligible pronunciation (Thoms, 2014; Pennycook, 2016; Smotrova, 2017). It is likely that non-auditory elements that affected mutual intelligibility were undetected.

Despite these limitations, it is still hoped that this research provides some insights into the nature of the multilateral relationship among phonetics, ELF interactions, mutual intelligibility, and sufficiency.

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Acknowledgments

I would first like to thank my supervisor, Professor Kumiko Murata, for all her help, guidance, and patience. Without her help, I would never have been able to complete this thesis, nor would I have noticed the many holes in my own thinking on the topic. The writing of this thesis, the feedback sessions, the presentation of sections of my thesis at annual ELF and Waseda ELF conferences, and the seminars at Waseda University concerning ELF have been among the best academic experiences of my life.

I would also like to express my deep gratitude to Professor Tetsuo Harada for providing valuable feedback, and for walking me through some of the trickier implications of the post-hoc tests of the χ^2 test. I would also like to thank Professor Mariko Kondo and Professor Peter Backhaus for reviewing this thesis and providing valuable feedback.

A special thanks goes out to all the students who participated in the experiment and the students who allowed me to use their recorded conversation data. This research project would not have been possible without their help.

I'm also very thankful for friends who proofread my entire thesis or sections of my thesis in either thesis chapter or journal article format: Yumi Matsumoto (my ELF Obi Wan Kenobi), Gareth Kay "课文龙", Leah Gilner (smart smart smart smart), Kazuo Fukuda (my Linguistics Obi Wan Kenobi), Wan Jumani Fauzi, Zsusanna Németh, Zhan Xuan, and Yan Yan. You guys are awesome and I love you all.

I would also like to thank my colleagues at Niigata University who made enrolling in a PhD program at Waseda possible while also working a full-time job. I hope that I can pay you guys back someday, somehow. A special thanks to Gregory Hadley for being someone at Niigata University with whom I could talk about PhD stuff.

I am very grateful to the Japan Society of the Promotion of Science as this research was partially supported by JSPS KAKENHI Grant Number JP17K17734.

Last, but not least, I would like to thank my wife, Terumi, ω μεγιστε βασιλευ, who is *sine qua non*. 言葉で表せないほどだよ。

George O'Neal

September 2019

List of Abbreviations

ANOVA	Analysis of Variance
ASEAN	Association of Southeast Asian Nations
CA	Conversation Analysis
CI	Confidence Interval
CLF	Chinese as a Lingua Franca
CoP	Community of Practice
EFL	English as a Foreign Language
ELF	English as a Lingua Franca
ENL	English as a Native Language
FPP	First Pair Part
GA	General American English
L1	First Language
L2	Second Language
LFC	the Lingua Franca Core
NES	Native English Speaker
NNES	Nonnative English Speaker
NNS	Nonnative Speaker
NS	Native Speaker
RP	Received Pronunciation
SE	Standard English
SLA	Second Language Acquisition
SPP	Second Pair Part
SR	Standardized Residual
TCU	Turn Constructional Unit
TIG	Transient International Group
TRP	Transition Relevance Place
VOT	Voice Onset Time
WE	World Englishes

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Chapter 1
Introduction

1.1 Background, Purpose of, and Rationales for this research

This thesis resulted from my growing concern with how ELF users[1] negotiate phonetics to maintain mutually intelligible pronunciation and co-construct sufficient pronunciation in English as a lingua franca (ELF) interactions. The inexorable spread of globalization means that opportunities for contact among ELF users is concomitantly increasing, maybe exponentially so (Firth, 1996; Seidlhofer, 2011; Kohn, 2018). This means that it is quite likely that ELF users will communicate with others who articulate English in very different ways. This is because ELF users communicate in English in different ways at the community level, dialogical level, and the ideolectal level (Mauranen, 2012; Thompson, 2017). However, second language acquisition (SLA) research still assumes that native English speaker (NES) pronunciation is the standard by which all English pronunciation should be assessed (e.g., Saito, Trofimovich & Isaacs, 2015; Saito & Akiyama, 2017). In effect, SLA claims that effective pronunciation approximates NES pronunciation standards and ineffective pronunciation deviates from it. Underlining this belief is the assumption that NES pronunciation is the most internationally intelligible. Although it is never stated as baldly as

[1] An "ELF user" is defined as a speaker of English who uses English with someone from a different first language background (Seidlhofer, 2011). The term "ELF user" is not meant to imply that "ELF" is a variety of English, nor is it meant to suggest that everyone uses English in the same way in such interactions (Seidlhofer, 2011). Furthermore, "ELF user" does not connotate interactions that are mutually supportive and consensus-oriented either (Jenks, 2012; Matsumoto, 2018; Konakahara, 2015, 2017); ELF interactions can be as confrontational as any other human interaction. Indeed, "ELF user" does not imply that any linguistic or pragmatic characteristics are made more relevant or likely; factors other than the heterogeneous first language backgrounds are more likely to make a linguistic or pragmatic characteristic more relevant and likely (Mortensen, 2013). Thus, the term "ELF user" only implies that heterogenous first language backgrounds might be relevant to the progression of an interaction, but not necessarily. I would personally rather use the much more cumbersome term "speaker in an ELF interaction" because I think it is far more accurate, but for the sake of orthographic economy, I have elected to use the term "ELF user".

that in SLA research, this stance can be seen in a host of SLA research methodologies that only use NESs to assess pronunciation (e.g., Munro & Derwing, 2006; Isaacs & Trofimovich, 2012; Winke, Gass & Myford, 2013; Crowther, Trofimovich, Saito & Isaacs, 2015; Saito et al., 2015; Saito & Akiyama, 2017). The pedagogical implications derived from such research tend to equate NES pronunciation with good pronunciation and pronunciation that deviates from NES pronunciation with deficient pronunciation. This ideology has extensive implications for language teaching, testing, and learning.

For ELF users who seek to or need to communicate with NESs, a pronunciation standard that utilizes a NES benchmark is imminently justified on utilitarian grounds. Furthermore, for ELF users who want to approximate NES pronunciation standards as a personal goal, a pronunciation standard that equates NES pronunciation to good pronunciation is also warranted and sufficient (Jenkins, 2000). No argument there. However, from an ELF perspective, the notion that NES pronunciation should be the benchmark by which successful pronunciation is assessed misses an extremely important point: intelligible pronunciation need not be the same as NES pronunciation (Jenkins, 2000, 2002; Walker, 2010; Matsumoto, 2011; Deterding, 2013; O'Neal, forthcoming). This is because in a world in which ELF users communicate with people from varied linguacultural backgrounds, NES pronunciation might not be the most intelligible (Jenkins, 2000; Matsumoto, 2011; Deterding, 2013; O'Neal, forthcoming). Indeed, using NES pronunciation does not even guarantee effective communication in some cases (O'Neal, 2015b). But that begs the following question: what pronunciations are oriented to as relevant for communication in ELF interactions? It is primarily with this question in mind that the necessity for this research has emerged. The general aim of this thesis is, therefore, to explore how ELF users from diverse linguacultural backgrounds negotiate pronunciation, focusing on the maintenance of mutually intelligible pronunciation and the co-construction of sufficient pronunciation.

It must be acknowledged that this question is not a new one. ELF research attempted to answer this question from the genesis of ELF. Indeed, early ELF research suggests that a core of segmental and suprasegmental pronunciations better ensures mutually intelligible pronunciation, which was called the Lingua Franca Core, or the LFC (Jenkins, 2000, 2002). However, existing research on mutual intelligibility among ELF users from a conversation analytic perspective reveals that mutually intelligible speech in ELF contexts do not always conform to the predictions of the LFC, and the nature of intelligible pronunciation is far more variable than a delimited set of features would suggest (Matsumoto, 2011; Kim, 2018; O'Neal, forthcoming). These findings are particularly interesting because the phonetic requirements for the maintenance of mutually intelligible pronunciation are virtually unknown. Although a host of research claims to have discovered the necessities for intelligible pronunciation, very few studies are based on segmental repair analysis, which is the study of phonetics from an emic perspective (Local, 2003; Brouwer, 2004; Matsumoto, 2011), so how ELF users adjust pronunciations to maintain mutual intelligibility is nigh unknown. One of the focuses of this research is, therefore, the interactional management of mutually intelligible pronunciation. To pursue this aim, this research conducts a qualitative inquiry using a conversation analytic approach (Sacks, Schegloff & Jefferson, 1974; Hutchby & Wooffitt, 2008; Sidnell, 2010) that is combined with assessments from phonetics that respect the emic perspective (Local, 2003; Brouwer, 2004; Matsumoto, 2011) and statistics (Stivers, 2015).

In addition, this research is particularly interested in ELF interactions among undergraduates and exchange students in Japanese university settings. There are three main reasons for this. First, my own experience with Mandarin Chinese as a Lingua Franca (CLF) helped me imagine the experience my students have with English as a Lingua Franca. During a study abroad program at Beijing Language and Culture University, I learned Mandarin Chinese in a highly international class, which was teeming with Japanese, French, Australians, South Koreans, North Koreans, British, Thai, Sri Lankans, Kazakhstanis, and Vietnamese. We used Mandarin Chinese not only for academic purposes (e.g., lectures, classwork, homework, seminars, etc.), but also for social purposes (e.g., parties, lunch breaks, short trips, and the weekly gathering at the French students' apartment). But one striking point of CLF communication was that I was much more comfortable speaking Mandarin Chinese with other nonnative Mandarin Chinese speakers. In fact, the pronunciation that I had the most difficulty understanding was from the Beijingers—the superlative models of pronunciation for Mandarin Chinese. Everyone and anyone was easier to understand than the Chinese born and raised in Beijing (see Matsumoto, 2011 for similar arguments among

NNESs). The other NNSs were the easiest to understand. Chinese who moved to Beijing from other areas of China were the next easiest to understand. The born and bred locals were the most difficult. I do not think that this experience was limited to me, and it is a Lingua Franca experience like this that leads one to an appreciation of ELF phenomena. This observation motivates me to examine how NNESs in ELF interactions achieve mutually intelligible pronunciation in spite of heterogeneous linguacultural backgrounds.

The second reason emerged from a revelatory moment during homework marking. After I graduated with a master's degree in TESOL from San Francisco State University, I thought that I was well trained and informed about how to teach pronunciation and what aspects of pronunciations to teach. My teacher training emphasized suprasegmental aspects of pronunciation as the most important and consequential for effective communication. Contemporary SLA research articles from prestigious journals like *TESOL Quarterly*, *Studies in Second Language Acquisition*, and *Modern Language Journal* further enforced the notion that suprasegmental pronunciation was most important (see e.g., Derwing & Munro, 1997; Hahn, 2004; Trofimovich & Baker, 2006). Accordingly, it came as quite a shock to me that during the homework marking of my first course dedicated to pronunciation that my students did not orient to suprasegmentals as either particularly important or significant. The first bit of evidence I found that contradicted both my training and beliefs came from a conversation homework assignment within which I discovered my first segmental repair sequence (see Chapter 4, Section 4.2.). A Japanese student articulated "hockey" as [hɔke] during his interaction with a Chinese exchange student. I understood what he said; I assumed that the Chinese interlocutor would also understand the pronunciation as well. It was quite surprising to me that the Chinese student indicated that she did not understand, but after a few rounds of repair, the two speakers, adjusting the vowel qualities within the word, settled on [haki] as a mutually intelligible pronunciation for "hockey" (O'Neal, 2015c). Not only were suprasegmentals an unlikely cause of the miscommunication, but my own intuitions as a NES were unhelpful in predicting the behavior in this encounter. What is more, I started to find more segmental repair sequences similar to the first. It was not a unique instance; it happened fairly frequently. At the time, there was no recent research on this phenomenon. Contemporary SLA research claimed that suprasegmentals were important to effective communication—but they weren't in my data (cf. Derwing, Munro & Wiebe, 1998; Field, 2005; Hahn, 2004). Contemporary ELF research claimed that vowel quality was not important to effective communication—but they were in my data (cf. Jenkins 2000). This observation motivated me to examine how NNESs in ELF interactions achieve mutually intelligible pronunciation in spite of heterogeneous linguacultural backgrounds.

The third reason is a philosophical one, and it has to do with my own conception of justice and its relationship with language pedagogy. In a word, I think ELF is one manifestation of justice. John Rawls (1971), an American philosopher, provides a procedure to answer the question "what is a just society?" that is so compelling that I believe it can be applied to language pedagogy, not just social institutions. Rawls claims that a society is only just if members of the society would agree to the framework of the society before any one individual knew how their actual place in the society would benefit himself or herself. Rawls invites us into his thought experiment, which he calls the Veil of Ignorance. Under the Veil of Ignorance everyone is allowed to vote for the society and laws that they want, but no one is allowed to know their actual societal position. Under the Veil of Ignorance, no one knows their economic, social, health, ethnic, linguistic, or age status in the society before they vote for the framework of the society. The idea is that no one will vote for societies or laws that advantage some groups and disadvantage others if nobody knows to which groups they will belong beforehand; no one can use the knowledge of their own individual circumstances to vote to benefit themselves. The result, according to Rawls, is that everyone will vote for a just society.

As an example of the Veil of Ignorance, imagine the following situation. Imagine that you are in situation in which you must choose one society in which to reside. In society one, some people are native speakers (NSs) of a prestigious language, and as NSs of the prestigious language, they are given privileged access to publications, jobs, and other concomitant benefits. The benefits of using the prestigious language do not accrue to non-native speakers (NNSs) nearly as easily. In this society, twenty-five percent of the population of the language speakers will be NSs, and seventy-five percent will be NNSs. In society two, however, NS status of the prestigious language retains no special benefits; anyone who can use the prestigious language successfully gains the benefits of the language. If you choose society one, you do not know if you will be a NS or a NNS. You might be a NS and benefit greatly from the luck of birth; you might be a NNS and be disadvantaged because of the misfortune of birth. If you choose society two, then the NS/NNS dichotomy is irrelevant; capability that is not equated to NS usage patterns is what matters to success. Which society would you choose? The Veil of Ignorance says that you will choose society two because if you do not know if you are a NS or a NNS of the prestigious language, you would not vote for a society that validates and rewards such a dichotomy.

Although Rawls (1971) never mentioned ELF, I believe he would support the philosophy behind the paradigm. And I believe Rawls would support ELF because it better addresses the linguistic cause for justice than any alternative. There is something fundamentally unfair about advantaging one group of people, in this case NES, because of the accident of birth, and disadvantaging another group of people, in this case NNES, again because of the accident of birth. ELF is a small attempt to redress the distribution of linguistic advantage and disadvantage in English pedagogy (Oda, 1999, 2017; McBride, 2016; Toh, 2016; Hino, 2018; D'Angelo, 2018).

Having clarified the purpose of the research and its rationales, I will now review research on intelligibility, contrasting the research utilizing a psycholinguistic view of intelligibility with the research taking a sociocultural view of intelligibility. This is to further support the necessity of reconsidering intelligibility from an ELF perspective.

1.2 Research on Intelligibility

Research on both the intelligibility of pronunciation and its teaching date back to the beginning of the previous century, and revolves around two incompatible ideas: the intelligibility principle and the nativeness principle (Levis, 2005). Phoneticians of the English language have long distinguished between the goal of developing English pronunciation that is indistinguishable from native speakers—the nativeness principle—and the goal of developing English pronunciation that is intelligible, irrespective of how native it sounds—the intelligibility principle (Levis, 2005). Indeed, the idea that students of English should strive for intelligible pronunciation rather than native pronunciation is not at all new, and has been proposed long ago (see e.g., Abercrombie, 1949). But this does not mean that there were no competing views. In the 1940s and 1950s, audiolingualism in America and the oral method in England proscribed native pronunciation as the superlative goal of pronunciation instruction (Celce-Murcia et al., 2010, p. 4). This view was not challenged until psycholinguists demonstrated that attaining native pronunciation after the critical period, or the sensitive period, was unrealistic (Lenneberg, 1967; Scovel, 1969, 1988, 2000; Flege, Yeni-Komshan & Liu, 1999; Abrahamsson & Hyltenstam, 2009; Muñoz, 2014).

However, the current sustained and intense focus on intelligibility in SLA started in the 1990s with seminal research on the topic (e.g., Munro & Derwing, 1995). While the current approaches to intelligibility vary according to theoretical and methodological orientations, they mainly fall into two main types. The first is the psycholinguistic approach, which is particularly strong in SLA (e.g., Field, 2005; Munro & Derwing, 1995, 2006; Munro, Derwing & Morton, 2006; Derwing & Munro, 2015; Moyer, 2015) but also appears in a few ELF studies (e.g., Osimk, 2009; Deterding, 2013; Zhang, 2015; Low, 2016). In keeping with "the social turn" in applied linguistics (e.g., Firth & Wagner, 1997; Block, 2003), the second approach to intelligibility is the sociolinguistic approach, which adopts methodological perspectives from ethnography and sequential analysis, and is used in CA studies (e.g., Firth, 1996; Brouwer, 2004; Carroll, 2004, 2005), ELF studies (e.g., Jenkins, 2000, 2002; Matsumoto, 2011; Schaller-Schwaner, 2015; O'Neal, 2015a, 2015b, 2015c, 2015d, 2016a, 2016b, 2017, forthcoming; O'Neal & Matsumoto, forthcoming), and SLA studies (e.g., Firth & Wagner, 1997; Szczepek Reed, 2006, 2011, 2012).

Before delving into the differences between the two approaches to intelligibility, it is helpful to first highlight what the two approaches agree on as significant. First, both approaches define intelligibility in roughly the same way, adopting some variant of the classic Munro & Derwing (1995) definition of intelligibility: "[i]ntelligibility may be broadly defined as the extent to which a speaker's message is actually understood by a listener" (p. 76). Therefore, at least nominally if not in practice, both approaches associate intelligibility with the ability of an interlocutor to understand a speaker's message. Of course, "interlocutor" does not inevitably presuppose a NES, and as such, this definition of intelligibility is at least nominally compatible with ELF. Furthermore, both approaches also agree that pronunciation can be divided into different aspects. But no matter how many different aspects of pronunciation are identified, both approaches state that intelligibility is the most important aspect of pronunciation (Jenkins, 2000; Levis, 2005; Szczepek Reed, 2012; Derwing & Munro, 2015). Proponents of both approaches even agree with the following statement that concerns the assessment of intelligibility, which would seem axiomatic to many: "the most valuable information about whether a particular speaker is intelligible is likely to come from the people with whom the speaker seeks to interact" (Munro et al., 2006, pp. 114-115). Thus, both approaches at least nominally claim that intelligibility need not necessarily be tied to notions of NES pronunciations. Furthermore, both approaches doubt the notion that there is a demonstrable relationship between accent and intelligibility and reject the suggestion that anyone should have to change their accent to be more intelligible[2]. Munro & Derwing (1995) empirically demonstrate that speech could be both intelligible and accented; being highly accented does not mean that the same speech is less intelligible. ELF researchers also reject the idea that accent and intelligibility have a significant relationship in ELF interactions (Jenkins, 2000; Kirkpatrick, 2010; Deterding, 2013). Accordingly, each approach does share some ideological territory with the other.

However, there are significant differences between the approaches with regard to intelligibility. In general, the psycholinguistic approach regards intelligibility as an individual receptive achievement rather than as a dyadic interactional achievement. Further, according to psycholinguistic research, intelligibility is a cognitive state, rather than an interactional one. Indeed, the methodologies that are utilized by psycholinguistic studies to assess intelligibility force researchers to conceive of it as receptive. Listeners in experiments assess the intelligibility of speech in laboratory conditions in which they cannot ask for clarification or repetitions from the speaker (e.g., Munro & Derwing, 1995, 2006; Crowther et al., 2015; Saito & Shintani, 2016; Saito et al., 2015; Kibishi, Hirabayashi, & Nakagawa, 2015). In psycholinguistic research, the scientific method and laboratory experiments preclude the

[2] There are of course (surprising) exceptions to this. Moyer (2015) essentially equates accentedness to intelligibility in multiple locations in her monograph. This is tantamount of a claim that speakers with accents should change their accents if they want to be more intelligible.

assessor of intelligibility (the listener) from interacting with the creator of the recording (the speaker)[3].

Furthermore, although Munro et al. (2006) claim that, "the most valuable information about whether a particular speaker is intelligible is likely to come from the people with whom the speaker seeks to interact" (pp. 114-115), which seems to nominally include NNESs if the speaker seeks to interact with them, in methodological practice, a lot of psycholinguistic research excludes NNESs from assessments of intelligibility, a point rightly criticized by Setter & Jenkins (2005). A host of psycholinguistic research, particularly in SLA psycholinguistic research, utilize only NESs to assess the intelligibility of speech samples during the experiments, which demonstrates that many SLA researchers still believe that NESs should be the benchmark for intelligibility (see e.g., Munro & Derwing, 1995, 1998, 2001, 2006; Isaacs & Trofimovich 2012; Crowther et al., 2015; Saito et al., 2015; Kibishi et al. 2015; Saito & Hanzawa, 2016)[4]. As Cook (2016) has suggested, "second language acquisition researchers' reliance on the native speaker is now more covert" (p. 187), and although SLA is a long way away from bald statements in support of native-speakerism like Long's (1981) quip that, "participation in conversation with [NESs]…is the necessary and sufficient condition for SLA" (p. 275, brackets added), it is still there in the methodological shadows, lurking like a zombie-idea that will not die. Experimental methodology is one way in which native-speakerism, or in other words the belief that NES pronunciation is "better" simply because it is native, can be obfuscated (Holliday, 2006). Although SLA researchers who rely on psycholinguistic methodologies would not state it explicitly, in practice SLA psycholinguistic research tends to promote intelligibility based on NES pronunciation as its benchmark, and the intelligibility of NNESs' speech is determined by NESs.

The segmental repair analysis approach, on the other hand, adopts an emic stance toward intelligibility and regards its maintenance or restoration as an interactional

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[3] The justification for this is the attempt to reduce the number of independent variables in experiments so that the experiment singles out causative variables and validly assesses the phenomenon of interest.

[4] This is not to say that SLA pronunciation researchers are not aware of the issue: Saito & Shintani (2016) empirically demonstrates that speakers from different linguistic backgrounds have differing assessments of the same speech.

achievement (Brouwer, 2004; Matsumoto, 2011; Kim, 2018; O'Neal, forthcoming). As such, intelligibility is less an individual cognitive state and more a dyadic interactional state. Within this approach, the orientation of an interlocutor to a pronunciation as intelligible or unintelligible is the basis for the determination of the intelligibility of a pronunciation, not whether the pronunciation deviates from or approximates to NES pronunciation standards. In order to qualify as an intelligible pronunciation, an interlocutor has to orient to the pronunciation as intelligible; on the other hand, in order to qualify as an unintelligible pronunciation, an interlocutor has to orient to the pronunciation as unintelligible (Brouwer, 2004; Matsumoto, 2011; Kim, 2018; O'Neal, forthcoming). Schaller-Schwaner (2015) specifically calls this "emic intelligibility" (p. 76) and O'Neal (2015a, 2015b) calls this "interactional intelligibility." By using a conversation analytic approach that examines the status of intelligibility during interactions, these scholars examine the interactional processes through which intelligibility is maintained and restored, which is locally managed and accomplished by the interactants *in situ*.

As such, researchers who promote a conversation analytic approach better appreciate Munro et al.'s (2006) claim that, "the most valuable information about whether a particular speaker is intelligible is likely to come from the people with whom the speaker seeks to interact" (pp. 114-115). According to a sociolinguistic approach, and especially to a conversation analytic approach, NES pronunciation standards are not occluded behind methodological tricks—they are rejected outright. The only sufficient reason for claiming that a pronunciation is intelligible is the orientation of the interlocutor—the NES/NNES status of the interlocutor is irrelevant—to the pronunciation as intelligible. A NES pronunciation that is oriented to as unintelligible is unintelligible; a NNES pronunciation that is oriented to as intelligible is intelligible—no exceptions.

In short, while the psycholinguistic approach views intelligibility as a cognitive process and as an indication of the interlocutor's receptive listening abilities, the sociolinguistic approach views intelligibility as an interactional process and as an indication of both the interlocutor's and the speaker's use of shared resources that are emergent from the interaction itself, which enable them to successfully achieve mutual intelligibility (see Matsumoto, 2011; this point will be extensively discussed in Chapters 5, 7, and 8 of this thesis).

However, it would be irresponsible to not mention that some researchers have attempted to combine elements of both approaches. For example, Deterding (2013) attempted to use psycholinguistic methods to assess intelligibility in an emic manner. He used a dictation method to evaluate the intelligibility of a speech sample, but had the speakers who made the recordings dictate their own speech. In a strict, technical sense, this is emic because the intended recipients of the recordings are determining the intelligibility of the speech. However, Deterding's methodology is controversial among ELF scholars, some asserting that the ability to transcribe speech does not equate to an indexing of intelligibility (Schaller-Schwaner, 2015, p. 77) and others insisting that the fact that reported misunderstandings were not addressed in the interaction itself belies the claim that the method is actually emic (Pietkäinen, 2018, p. 193). Furthermore, within Deterding's definition of "emic," the determination of intelligibility is asynchronous with the production of the data itself[5], a decision which seriously attenuates the claim that his method is in fact "emic" (Seedhouse, 2005).

It is also worth mentioning that the "social turn" that is evident in intelligibility research is also present in SLA research more broadly. Researchers advocating a psycholinguistic perspective on language acquisition and learning (e.g., Kasper, 1997; Gass, 1998; Long, 1997; Gass, Lee & Roots, 2007) have had a garrulous, rancorous, and decades-long debate with proponents of interactional and sociolinguistic perspectives on language acquisition and language use (e.g., Firth & Wagner, 1997, 1998, 2007; Liddicoat, 1997; Larsen-Freeman, 2007; Canagarajah, 2007; Larsen-Freeman & Cameron, 2008). Researchers adopting a psycholinguistic approach to SLA describe language acquisition as an individual phenomenon, its locus in the mind of the "learner," and its progress marked on an interlanguage continuum whose end-state is NES competence, which leads to a "deficit model" of language acquisition (Firth & Wagner, 1997, p. 290). These scholars prioritize

[5] Seedhouse (2005) states, the emic perspective in CA is more than just the perspective of the participants: "what CA means by an emic perspective…is not merely the participants' perspective, but the perspective from within the sequential environment in which the social actions were performed" (p. 252). Unfortunately, Deterding's (2013) definition of emic does not match this.

research practices that code data, quantify data, and replicate data, which in itself prioritizes explanations of phenomenon in terms of cognitive processes. This leads to a view of communication as a process in which information passes from one mind to the other. It leads to a view of the subject as a learner, and this is an omnipresent and omnirelevant social identity. It also promotes etic (analyst-relevant) concerns and categories over what was relevant to the subjects themselves. On the other hand, scholars promoting a sociolinguistic view of language acquisition and language use emphasize the negotiation process inherent in both (Firth & Wagner, 1997; Canagarajah, 2007; Larsen-Freeman & Cameron, 2008). Communication is regarded as a collaborative and interactional achievement rather than an individual event. Furthermore, communication problems are attributed to the interactants rather than the individual. In this study, it is argued that the notion of intelligibility should be reconsidered as "interactional intelligibility" from a sociolinguistic, segmental repair analytic perspective so that the idea of intelligibility better matches the reality of English use.

1.3 Outline of the Thesis

This thesis comprises nine chapters. The present chapter (Chapter 1) introduces the thesis. Chapter 2 describes the theoretical framework of this research, which consists of two parts: the first part introduces theories of intelligibility; the second part introduces some of the basic concepts of CA. Chapter 3 reviews existing research on mutual intelligibility among ELF users, and identifies the research gap. Chapter 4 gives the methodological background to this research, which depends on conversation analysis as a research methodology informed by both segmental repair analytic and statistical analysis. Chapter 4 also justifies the research design. This includes an examination of the naturalness of conversation data and a discussion of the validity, reliability, and falsifiability of this research. Chapter 4 then describes the main data collection procedures, including participants, procedures, corpus, and transcription conventions. Chapters 5, 6, 7, and 8 present the main findings of this research. In particular, Chapter 5 investigates the segmental repair strategies that are used to maintain mutual intelligibility among ELF users. Chapter 6 focuses on the co-construction of sufficient pronunciation, which manifests itself in sequences in which phonetic segments are adjusted even though mutual intelligibility has not faltered. Chapter 7 examines the types of segmental adjustments that are conducted within segmental repair sequences and sufficiency adjustments. Chapter 8 presents the results of an experiment that was designed to test the efficacy of segmental repair on the development of mutual intelligibility. Finally, the concluding chapter (Chapter 9) summarizes the research findings and revisits the notion of interactional intelligibility and the co-construction of sufficient pronunciation from an ELF perspective. In addition, this chapter discusses the pedagogical implications and limitations of this research, and provides suggestions for further research.

Having stated the objectives of this research, I will now move on to Chapter 2, which reviews the theoretical framework for this research.

Chapter 2
Theoretical Framework

2.1 Introduction

As stated in chapter 1, this research employs an segmental repair analytic approach to investigate the praxis of ELF interactions, but at the same time, it incorporates perspectives from two theories that can be applied to intelligibility research, namely King's (1967) *functional load theory* and Long's (1996) *interaction hypothesis* in order to create a new amalgam approach to the understanding of the relationship between phonetics, intelligibility, sufficiency and ELF interactions. I call this approach *segmental repair analysis* (see Chapter 4, Section 4.2.). This chapter reviews and discusses both the analytical framework for this approach and its theoretical underpinnings.

In what follows, the theories of intelligibility (Section 2.2) will first be reviewed. This includes a discussion of some definitions of intelligibility (e.g., Munro & Derwing, 1995; Smith & Nelson, 1985; Section 2.2.1) as well as a description of the *interaction hypothesis* (e.g., Long, 1996; Section 2.2.2) and *functional load theory* (e.g., King, 1967; Catford, 1987; Brown, 1991; Gilner & Morales, 2010; Sewell, 2017; Section 2.2.3). I will argue that it is necessary to take an *segmental repair analytic* perspective into account when analyzing intelligibility because it is an inherently interactive phenomenon that includes the negotiation of phonetic segments (e.g., Brouwer, 2004; Matsumoto, 2011) just as much as the negotiation of action (e.g., Schegloff, 2007). Based on the discussion of this point, a definition of interactional intelligibility (e.g., Smith & Nelson, 1985; Levis, 2005; Munro, 2008; Section 2.3) will be reviewed and discussed. On the basis of Smith & Nelson's (1985), Munro's (2008), and Matsumoto's (2011) arguments, it will be reasoned that intelligibility should be defined and assessed in an emic manner rather than an etic manner; furthermore, interactive resources that are presumed, discovered, or created during the interaction will be considered part of the interactants' shared repertoires to maintain mutual intelligibility (Matsumoto, 2011; O'Neal, forthcoming). After that, a rationale for conversation analysis (CA) as a means with which to assess intelligibility will be explained (Section 2.4). CA will first be defined and then the reasoning behind its emic perspective will be provided (Section 2.4.1), followed by an explanation of the basic organization of turn-taking in interaction (Sacks, Schegloff, & Jefferson, 1974; Schegloff, 2007; Section 2.4.2). Next, the basic features of interaction will be introduced (Liddicoat, 2007; Section 2.4.3). Furthermore, an extensive discussion of repair will be offered because the concept is of central concern to this thesis and the *interaction hypothesis* (Section 2.4.4). Last, an argument will be advanced that contends that CA's aversion to quantification and coding needs to be abandoned in favor of a more eclectic approach that combines quantitative and qualitative analysis while also subordinating quantification to conversation analytic concerns (Németh, 2012; Stivers, 2015; Section 2.4.5).

2.2 Theories of Intelligibility

This section reviews the definitions of intelligibility and two theories that can be applied to intelligibility research, namely the *interaction hypothesis* (Long, 1996), and *functional load theory* (King, 1967; Catford, 1987; Brown, 1991; Gilner & Morales, 2010; Sewell, 2017). Intelligibility can be defined from multiple theories and perspectives. These theories and perspectives will be discussed in the next section.

2.2.1 Defining Intelligibility

Human cognition has evolved to seek out optimal relevance from environmental stimuli (Sperber & Wilson, 1996; Tomasello, 2003, 2009, 2014). One means with which optimal relevance can be helped along is through intelligible pronunciation. However, because intelligibility has been operationalized through a multiplicity of techniques and defined in a variety of ways, it is important to specify exactly what intelligibility signifies in this research. There are three important aspects that one must refer to when considering the meaning of intelligibility: *scope*, *directionality*, and *responsibility*. Each aspect of intelligibility will be explained in turn in its own subsection below.

2.2.1.1 The Scope of Intelligibility

The first aspect of intelligibility is *scope*, or in other words, the extent of the phenomenon to which intelligibility refers. Although intelligibility can reference any mode of communication, whether spoken, written or signed, the following discussion limits itself to the spoken mode of communication (Murata, 1994) because this is the central concern of this research. The easiest way to define intelligibility is to equate it to understanding the utterance of a speaker, as Nelson (1982) does, stating that, "being intelligible means being understood by an interlocutor" (p. 59). Munro & Derwing (1995) offer a similar definition and describe intelligibility as "the extent to which a speaker's message is actually understood by the listener" (p. 76). Thus, although the phrasing is a little different, the scope of both the Nelson (1982) and Munro & Derwing (1995) definitions is to equate intelligibility to the listener's ability to understand the speaker's message.

However, a significant ambiguity resides within the scope of these definitions of intelligibility. Whether the speaker's message presumes pronunciation as a central means of intelligibility is debatable (see e.g., Field, 2005). Neither Nelson's (1982) nor Munro & Derwing's (1995) definitions explicitly exclude non-phonetic means from contributors to intelligibility. Indeed, Munro & Derwing's (1995) definition of intelligibility could potentially include any means that promote the understanding of the message to the listener: frequent vocabulary could raise intelligibility (see e.g., Saito et al., 2015); gestures could raise intelligibility (see e.g., Smotrova, 2017); speaking rate could affect intelligibility (see e.g., Munro & Derwing, 1998). For scholars interested in the phonetics of intelligible pronunciation, the expansive scope of the Nelson (1982) and Munro & Derwing (1995) definitions could confound multiple contributors to intelligibility.

Citing specifically such criticisms, Field (2005) modified the scope of Munro & Derwing's (1995) definition of intelligibility to remove such confounds and to focus on what phonetic aspects of pronunciation contribute to intelligibility. Field (2005) redefines intelligibility as, "the extent to which the acoustic-phonetic content of the message is recognizable by a listener" (p. 401), which narrows the scope of both the Nelson (1982) and the Munro & Derwing (1995) definitions and refocuses the definition on the phonetic aspects of pronunciation. While all aspects of understanding are of interest to linguists, this research focuses particularly on the triangular relationship among phonetics, intelligibility, and interaction. As such, Field's (2005) scope of intelligibility is particularly relevant to this study, which attempts to identify the contribution of the phonetic signal to intelligibility over the course of an interaction (see Section 1.1).

However, other scholars claim that the scope of the Field (2005) definition of intelligibility is too narrow, and indeed claim that definitions of intelligibility should include subjective assessments of how difficult or easy phonetic stimuli are to understand rather than just actual understanding (see e.g., Kennedy & Trofimovich, 2008; Isaacs & Trofimovich, 2012; Saito et al., 2015). According to these scholars, highly intelligible pronunciation is subjectively easy to understand, but less intelligible pronunciation is subjectively difficult to understand. However, there is good evidence that these two phenomena are in fact different things. Some scholars specifically distinguish actual understanding from the subjective sense of how difficult or easy pronunciation is to understand in order to narrow the scope of intelligibility. Munro & Derwing (1995, 1999) and Derwing & Munro (1997) classify the extent of genuine understanding as *intelligibility*, but the subjective sense of how difficult or easy a pronunciation is to understand, regardless of how much of the pronunciation was actually understood, is classified as an aspect of *comprehensibility* instead.

Furthermore, Munro & Derwing (1995) and Derwing & Munro (1997) have empirically demonstrated that intelligibility and comprehensibility are different phenomena. In their experiments, intelligibility and comprehensibility were only moderately correlated, and this supports the notion that these two phenomena can and should be kept separate. Scholars have investigated the relationships between comprehensibility and a multitude of factors, many of which have nothing to do with the phonetic aspects of a message. While some scholars claim that very specific phonetic segments contribute more to determinations of comprehensibility (e.g., Derwing & Munro, 2006; Saito, 2011), which is of course directly connected to the phonetic signal of speech, other scholars have discovered that the type of speaking task can have a demonstrable effect on comprehensibility ratings (Crowther et al., 2015), that raters who have learned the L1 of the speaker are more likely to assign higher comprehensibility ratings to the speaker (Winke et al., 2013), that exposure to many different types of Englishes is likely to lead to higher comprehensibility ratings (Saito & Shintani, 2016), and that certain L1 backgrounds are more likely to receive higher comprehensibility ratings even when communicative ability is controlled (Crowther et al., 2015). All of this research suggests that what scholars call comprehensibility is actually a superordinate term that covers many different aspects of the subjective perception of understanding rather than actual understanding, and thus the scope of intelligibility should exclude comprehensibility. Although legitimate reasons exist to investigate both intelligibility and comprehensibility, this research limits itself to the former rather than the latter to focus on the relationship between the pronunciation of speakers and the understanding of interlocutors.

Having discussed the scope of intelligibility, I will next discuss the directionality of intelligibility in the next subsection.

2.2.1.2 The Directionality of Intelligibility

The second aspect to be considered in any definition of intelligibility is the *directionality* of intelligibility, or in other words, the location within the interaction at which intelligibility is determined. Although Field's (2005) definition of intelligibility is more precise than the Nelson (1982) and Munro & Derwing (1995) definitions in the sense that it connects the phonetic signal to intelligibility in a direct way, it is nonetheless true that all three definitions share the distinction of defining intelligibility in a unidirectional fashion, claiming that determinations of intelligibility are made from the standpoint of the listener. The Munro & Derwing (1995) and Field (2005) definitions can be considered a direct outgrowth of the psycholinguistic tradition of SLA to view language from the perspective of individual speakers with information transfer seen as the goal of communication (see e.g., Levelt, 1989; Field, 2003). As such, these definitions of intelligibility define it as a one-way phenomenon—from the speaker to the listener.

But this is a limited and one-sided way to view intelligibility, which many scholars argue should be conceived of as bidirectional rather than as unidirectional. The idea that intelligibility should be considered a bidirectional phenomenon emerged from the World Englishes (WE) tradition when Smith & Nelson (1985) rightly stated, "intelligibility is not speaker or listener-centered but is interactional between speaker and hearer" (p. 333). Many WE, SLA, and ELF scholars have also argued that intelligibility is not a one-way phenomenon, and that intelligibility is better seen as a negotiated property among interactants who are constantly trading speaker and interlocutor roles (see e.g., Rajadurai, 2007; Watterson, 2008; Munro, 2008; Nelson, 2011; Matsumoto, 2011; Saito & van Poeteren, 2012; Björkman, 2014; Kimura & Canagarajah, 2018). But the idea that intelligibility is dependent on the interaction between the speaker and the listener is true not just in some abstract theoretical sense, but is literally an accurate description of the phenomenon. Scholars working within a conversation analytic framework to examine the relationship between interaction and intelligibility demonstrate that speakers and listeners can co-construct intelligible pronunciation, modifying an unintelligible pronunciation into a mutually intelligible variant (see e.g., Brouwer, 2004; Matsumoto, 2011; O'Neal, 2015a, 2015b, 2015c, 2015d, 2016a, 2016b, 2017, forthcoming; Kim, 2018).

And it is here, in the reconceptualization of intelligibility as bidirectional rather than unidirectional, that the notion of *interactional intelligibility* has a proper place. Interactional intelligibility, rather than just intelligibility, emphasizes the notion that intelligible pronunciation must be intelligible to both the speaker and the interlocutor, and is indeed negotiable between the two (Brouwer, 2004; Matsumoto, 2011; O'Neal, forthcoming). Interactional intelligibility is a negotiable phenomenon, and it specifically includes the notion that intelligibility is bidirectional rather than unidirectional, and thus interactional intelligibility is a better descriptor for the target phenomenon of this research.

Having discussed the directionality of intelligibility, I will now discuss the responsibility for intelligibility in the next subsection.

2.2.1.3 The Responsibility for Intelligibility

The third aspect of any definition of intelligibility is *responsibility* for intelligibility, or in other words, the participant who is responsible for maintaining intelligibility. Not only do the Field (2005) and Munro & Derwing (1995) definitions of intelligibility define intelligibility in a unidirectional manner, with determinations of intelligibility being made from the standpoint of the listener, the definitions also place responsibility for intelligibility on the speaker. That is, these definitions claim that intelligibility succeeds or fails based on the pronunciation of the speaker (Rajadurai, 2007). The locus of responsibility for intelligibility on the speaker is evident across many decades of WE, SLA and ELF research on intelligibility that explicitly claims that intelligibility is based on the articulatory performance of the speaker or that experimentally operationalize intelligibility as a product of the speaker's pronunciation (see e.g., Smith & Rafiqzad, 1979; Smith & Bisazza, 1982;

Perlmutter, 1989; Suenobu, Kanazaki & Yamane, 1992; Munro & Derwing, 2006; Osimk, 2009; Saito, 2011; Kibishi et al., 2015; Orikasa, 2016).

However, while focusing on the speaker's pronunciation to determine intelligibility is helpful, indeed maybe unavoidable, in laboratory settings in which interaction between speaker and interlocutor is purposely designed to be impossible, it is less helpful in actual interactions. Again, the notion of *interactional intelligibility* can be helpful here for distributing responsibility for maintaining intelligibility among all the participants to the interaction. As many scholars rightly claim, overcoming misunderstandings is the responsibility of both the speaker and the listener (e.g., Smith & Nelson, 1985; Rajadurai, 2007; Canagarajah, 2007, 2013; Watterson, 2008; Matsumoto, 2011; Kimura & Canagarajah, 2018). After all, as conversation analytic studies of repair continually demonstrate, the faltering of intelligibility could result from either speaker factors or listener factors (Schegloff, 2000b, 2007). It is so with pronunciation as well. An implication of this is that, as Canagarajah (2007) rightly suggests, "if there is a case of failed communication, we cannot blame an individual for lack of proficiency" (p. 929).

Intelligibility is negotiable between the speaker and the listener, and is the responsibility of all parties to the interaction. These facts suggest that it is imperative to pay attention to the relationship among the speaker's phonetic stimuli, the listener's orientation to the phonetic stimuli, and the *in situ* negotiation of intelligibility between the two. This line of argument leads to two theories of intelligibility: the *interaction hypothesis* (Long, 1996) and *functional load theory* (King, 1967; Catford, 1987; Brown, 1991; Gilner & Morales, 2010; Sewell, 2017). The *interaction hypothesis* predicts the degree of intelligibility on the basis of the degree of interaction among speakers, and *functional load theory* predicts the degree of intelligibility on the basis of phonological contrast frequency in vocabulary. As such, these two theories provide a means with which to examine intelligibility from the perspective of both the interaction and the pronunciation. These theories of intelligibility will now be discussed in the next two sections.

2.2.2 The Interaction Hypothesis

This section explains one of two theories that can be applied to intelligibility research and that will appear in this thesis, namely Long's (1996) *interaction hypothesis*. First, it is important to note from the beginning that the interaction hypothesis is actually a misnomer. The interaction hypothesis is a theory[6]. Although the focus of the interaction hypothesis is wide enough to encompass any aspect of language development, it can also predict the level of intelligibility based on the degree to which speakers interact and repair miscommunications. As such, this theory allows the analyst to make falsifiable predictions about the intelligibility of pronunciation based on the extent to which speakers miscommunicate because of unintelligible pronunciation and subsequently repair the unintelligible pronunciation into an intelligible one. The current research will incorporate aspects of this theory when analyzing the negotiation of mutual intelligibility in ELF interactions. This is because, as discussed in Section 2.2.1.3, interactional intelligibility is inherently dependent on both the speaker and the listener and the negotiation between the two (e.g., Brouwer, 2004; Matsumoto, 2011; O'Neal, forthcoming), and as such a theory that focuses specifically on interaction is necessary. In what follows, the interaction hypothesis will be explained.

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[6] The interaction hypothesis shares two of the major characteristics of "theory": 1) it is "an explanation of observed regularities" (Bryman, 2016, p. 18); 2) it can create falsifiable hypotheses (Bryman, 2016, pp. 18-24; Popper, 1959, pp. 17-19). In spite of being named "the interaction hypothesis", it is an explanation for observed regularities in the sense that a host of research has demonstrated that interaction leads to the scaffolding of language learning (see e.g., Gass & Varonis, 1994; McDonough & Kim, 2009; Saito & Akiyama, 2017). Furthermore, it can create numerous falsifiable hypotheses. For example, "interaction with NES leads to language use that is more approximate to NES linguistic praxis", and "interaction among NNESs leads to language use that is more mutually intelligible among the NNESs". I know of no other hypothesis that makes further hypotheses. Theories are often judged according to how well they explain observed regularities in data and how many falsifiable predictions they make. The interaction hypothesis both explains a great deal of observed regularities and makes many falsifiable predictions, and thus it fulfills two of the prime requirements of the definition of a theory. "The interaction hypothesis" should be called "the interaction theory". Recent interaction hypothesis scholars, recognizing that "hypothesis" is not an accurate name for this idea, have begun to refer to the interaction hypothesis as the "interaction approach" instead (e.g., Mackey, 2012).

Long (1981, 1983) hypothesizes that adult SLA can be facilitated through conversational interaction with NESs because such interactions provide many opportunities to notice so-called incorrect and correct linguistic forms when NES-NNES dyads encounter communication breakdowns. Long (1996) claims that during the collaboration to overcome such communication breakdowns, interactants first notice which linguistic forms are not successful, which yields negative feedback that an unsuccessful linguistic form is both ineffective and not correct, and then the interactants negotiate a more successful linguistic form, which yields positive feedback that the successful linguistic form is both effective and correct. That is, Long (1996) claims that both negative and positive evidence synergistically combine to scaffold learning through explicit signals of what to do and what not to do, which helps NNESs progress along the interlanguage continuum and better approximate NES forms (Selinker, 1972; Long, 1996). As such, the original formulation of the interaction hypothesis is very much a traditional SLA theory.

Numerous studies have validated the predictions of the interaction hypothesis. Gass & Varonis (1994) conducted a study that supported the predictions of the interaction hypothesis: dyads who were allowed to interact during the experiment learned more than the dyads who were not allowed to interact. Both Mackey (1999) and Mackey & Philp (1998) experimentally investigated the relationship among interaction, recasts, and question syntax formation. Both studies yielded positive and significant results, and thus, Mackey & Philp (1998) concluded, that "there does appear to be evidence for a significant relationship between [interaction and] development, as measured by question production and exposure to recasts" (pp. 347-348, brackets added). Other studies have revealed that interaction scaffolds syntactic development (see e.g., McDonough, 2006; McDonough & Kim, 2009), lexical development (see e.g., Ellis & Sheen, 2006), and pronunciation (see e.g., Saito, 2013; Saito & Lyster, 2012; Loewen & Isbell, 2017). Thus, in the aggregate, these studies all provide evidence from an experimental point of view to support the interaction hypothesis.

However, other research into the relationship between the interaction hypothesis and language development is more ambiguous, and unfortunately this research is directly related to pronunciation. To date, only two studies have investigated the extent to which interaction helps a speaker's pronunciation become more comprehensible[7] from an experimental perspective. Akiyama & Saito (2016) examined the extent to which American speakers of Japanese became more comprehensible as a result of eight weekly interactions with Japanese interlocutors. Although Akiyama & Saito (2016) discovered that the Americans improved to a statistically significant degree on lexical and syntactical indices, the Americans' pronunciation did not become more comprehensible, which is a result that does not support the interaction hypothesis. Saito & Akiyama (2017), on the other hand, did discover that interaction led to more comprehensible pronunciation. Saito & Akiyama (2017) examined the extent to which Japanese speakers of English became more comprehensible as a result of eight weekly interactions with American interlocutors. Not only did the Japanese speakers of English become more comprehensible over the eight weeks, they showed improvement on several different indices of linguistic ability. In the aggregate, the Akiyama & Saito (2016) and Saito & Akiyama (2017) studies are difficult to explain. One study demonstrated that interaction led to higher comprehensibility, but the other one does not. Thus, these studies can only be taken as tentative evidence that interaction scaffolds the development of pronunciation.

Interaction hypothesis research has demonstrated that interaction is a powerful scaffold for language development, but from an ELF perspective (see Chapter 3) it has two serious flaws. The first flaw is an ideological one that permeates a lot of SLA research: all of the research previously cited is premised on the idea that interaction between NESs and NNESs are the catalysts for the positive and negative feedback that leads to linguistic development (see e.g., Gass & Varonis, 1994; Mackey, 1999; Akiyama & Saito, 2016; Saito & Akiyama, 2017). However, no one has bothered to check whether interaction among NESs is actually *sine qua non* for linguistic improvement, however defined; it is often just assumed and taken for granted as a convenient concept (Widdowson, 2012; Cook, 2016; Kohn, 2018). But, in

[7] To be sure, comprehensibility is not the same as intelligibility (see e.g., Munro & Derwing, 1995). Thus, these two studies do not directly address the relationship between interaction and intelligibility. But as far as I know, these two studies come the closest to examining the extent to which interaction scaffolds the development of intelligibility from an experimental vantage point.

fact, ELF users can also provide positive and negative evidence as to the efficacy of linguistic forms, and this efficacy does not even necessarily need to be equated to NS linguistic forms (see e.g., Kaur, 2010, 2012; Matsumoto, 2011; O'Neal, 2015c, 2016b, forthcoming; Pitzl, 2016, 2018; Iino & Murata, 2016; Kappa, 2016).

The second flaw is that only a few aspects of the relationship between interaction and language development have been assessed. Although the relationship between interaction and syntax has been extensively studied (see e.g., Mackey & Philp, 1998; Mackey, 1999; McDonough, 2006; McDonough & Kim, 2009), research on the relationship between interaction and aspects of pronunciation is much rarer. Even when this relationship is assessed, pronunciation development is often operationalized as approximation to NESs pronunciation norms (see e.g., Akiyama & Saito, 2016; Saito & Akiyama, 2017). Not only is the operationalization of improvement to approximation to NES pronunciation norms objectionable from an ELF perspective, but this operationalization also makes no distinction between intelligible pronunciation, which is required for an interaction to continue, and sufficient pronunciation, which is just what one interactant thinks the pronunciation should be regardless of its intelligibility (O'Neal & Matsumoto, forthcoming). This is a problem for research that assesses the relationship between interaction and pronunciation because the experimental designs do not control for sufficient pronunciation, and thus the experiments confound sufficient pronunciation with intelligible pronunciation. Therefore, the relationship between experimental results and intelligible pronunciation is less than clear (see e.g., Horgues & Scheuer, 2014; O'Neal & Matsumoto, forthcoming) and the claims of interaction hypothesis research that assess the relationship between interaction and pronunciation should be approached with some doubt.

However, if the interaction hypothesis can shed its ideological baggage, there is no good reason that it cannot be applied to ELF phenomena. The core idea of the interaction hypothesis is that interaction leads to the production of negative and positive feedback as to the efficacy of language use. As long as the teleological[8] orientation of the interaction

[8] "Teleological" refers to the idea that things have innate purposes. Many SLA scholars have a teleological orientation to English education in the sense that many of them believe that the innate purpose of English education is to "help" students

hypothesis to NES language use as the goal of an interaction is abandoned, then it becomes fairly obvious that ELF interactions also contain negative and positive feedback as regards the efficacy of language use if one considers repair sequences (see Section 2.4.4) as a manifestation of negative and positive feedback (see e.g., Kaur, 2010, 2012; Matsumoto, 2011; O'Neal, 2017, forthcoming; Kim, 2018). Furthermore, it is equally obvious that ELF users utilize the negative and positive feedback inherent within repair sequences to update their language use in subsequent sequences within the same interaction (Matsumoto, 2011; O'Neal, 2015a, 2015c, forthcoming). However, contrary to the original formulation of the interaction hypothesis (Long, 1996), the negative and positive feedback within repair sequences that ELF users utilize to update their language does not necessarily lead to language forms that are more approximate to NES language (see e.g., Matsumoto, 2011; Pitzl, 2016; O'Neal, 2016b). Accordingly, the core idea of the interaction hypothesis—that interaction yields information to the participants as to the efficacy of language use—is applicable to ELF interactions as well. Indeed, the interaction hypothesis has a lot of intuitive appeal, and if it can be accommodated to ELF phenomena, then it can be used in ELF research as well. However, no research to date has yet explored the relationship between the predictions of the interaction hypothesis and the intelligibility of pronunciation. Accordingly, this study intends to test the predictions of the interaction hypothesis on the intelligibility of ELF interactions.

The interaction hypothesis allows the analyst to make falsifiable predictions concerning the relationship between interaction and intelligibility. However, as discussed in the previous paragraph, the interaction hypothesis must be amended to exclude the teleological orientation to NES language use and forms as the goal of an interaction. With that modification, the interaction hypothesis as applied to ELF interactions specifically predicts:

1) ELF users will utilize segmental repair sequences as both negative and positive evidence to update their linguistic repertoires so that their pronunciation will become more intelligible.

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along the interlanguage continuum to better approximate NES linguistic forms and usage.

2) The degree to which ELF users become more intelligible to each other will correlate to the number of segmental repair sequences that they collaboratively complete.

Having discussed the interaction hypothesis as it can apply to ELF interactions, I will next discuss functional load theory in the next subsection.

2.2.3 Functional Load Theory

This section explains the second of the two theories to appear in this thesis, King's (1967) *functional load theory*, which is a theory that predicts the relationship between segmental phonemes and intelligibility, or in other words, the relationship between phonetic stimuli and intelligibility. As such, this theory allows the analyst to make falsifiable predictions about the intelligibility of pronunciation from the standpoint of the phonetic stimulus. The current research will incorporate aspects of this theory when analyzing the negotiation of intelligibility. This is because, as discussed in Section 2.2.1.2, interactional intelligibility is inherently dependent on both the speaker and the listener and the interaction between both (Brouwer, 2004; Matsumoto, 2011; O'Neal, forthcoming). In other words, intelligibility is dependent on both the properties of the phonetic stimulus and the listener's orientation to the phonetic stimulus (Munro, 2008), and as such, a theory from the standpoint of the phonetic stimulus is also necessary. In what follows, the functional load theory will be explained.

While the interaction hypothesis can predict the intelligibility of speech based on the degree to which speakers have repaired their speech, it cannot predict why the different phonetic stimuli might have a different degree of intelligibility. For that, I turn to functional load theory. Functional load theory did not start out as an explanation of the relationship between intelligibility and phonetic stimuli. Rather, functional load theory began as a means to explain diachronic segmental phoneme change in all languages, or in other words, how and why the segmental phoneme inventories of languages change over time. King (1967) hypothesized that diachronic segmental phoneme change is inversely proportional to the functional load of the segmental phonemes[9]. King (1967) defines functional load as "a

[9] Sewell (2017) and Gilner & Morales (2010) claim that the origins of functional load theory go all the way back to

measure of the work which two phonemes (or a distinctive feature) do in keeping themselves apart" (p. 831). In other words, a phonemic opposition that distinguishes more vocabulary, has a higher functional load (King, 1967; Meyerstein, 1970; Stokes & Surendran, 2005; Rischel, 2007; Gilner & Morales, 2010). For instance, many English words are distinguished by the /l/ and /n/ phonemic contrast (e.g., "light" /laɪt/ vs. "night" /naɪt/), and thus the /l/ and /n/ phonemic contrast has a high functional load. Nilsen & Nilsen (2010) list over one hundred English minimal pairs that are distinguished by just these two phonemes (p. 101). In comparison, the /ð/ and /d/ phonemic contrast does not distinguish nearly as many minimal pairs in English, and thus this phonemic contrast has a lower functional load. Nilsen & Nilsen (2010) only list about fifty English minimal pairs that are distinguished by this phonemic contrast (p. 99). Furthermore, many of the words that do contrast between /ð/ and /d/ seem to be low frequency or antiquated words. Because of factors such as this, some scholars argue that functional load should include other considerations such as the frequency with which the minimal pairs appear and whether the minimal pairs belong to the same word class (see e.g., Brown, 1988, 1991; Rischel, 2007; Gilner & Morales, 2010). Nonetheless, all scholars agree that functional load is primarily an index to which two phonemes keep vocabulary in a language separate.

King (1967) never intended functional load theory to be a pedagogical theory, nor did he claim that functional load theory applied to intelligibility in any way. His theory was meant to explain diachronic phoneme change in languages. It was a universal theory. The application of functional load theory to research on intelligibility, however, began in the 1980s and 1990s when applied linguists utilized the notion of functional load to rank the potential contribution of segmental phoneme contrasts to the intelligibility of English pronunciation. Both Catford (1987) and Brown (1988, 1991) created lists of phoneme contrasts and ranked them from high functional load contrast to low functional load contrast in accord with King's (1967) criteria, and claimed that this ranking of phoneme contrasts

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Trubetzkoy (1935/1968), but it is King (1967) who first proposes a full-fledged theory based on functional load. Indeed, I find it very difficult to believe that Trubetzkoy (1935/1968) was referencing functional load theory, or anything resembling it, when they discussed phonology in their respective works.

corresponded to the contribution that the phoneme contrasts make to intelligibility. Both Catford (1987) and Brown (1988, 1991) have recommended that pronunciation teachers focus on teaching phonemes with a higher functional load because they claim that high functional load phonemic contrasts contribute more to intelligibility and that low functional load phonemic contrasts contribute less to intelligibility.

Catford's (1987) and Brown's (1988, 1991) reformulation of King's (1967) functional load theory hypothesizes two significant phenomena: 1) segmental phoneme contrasts that have a high functional load contribute more to the intelligibility of phonetic stimuli, and phonetic changes to high functional load segmental phoneme contrasts will greatly harm intelligibility; 2) segmental phoneme contrasts that have low functional load contribute less to the intelligibility of phonetic stimuli, and phonetic changes to low functional load segmental phoneme contrasts will not greatly harm intelligibility, if at all. Thus, for example, both Catford (1987) and Brown (1991) predict that pronouncing a /l/ phoneme in a location that a pronunciation dictionary citation form specifies as a /n/ phoneme will greatly harm intelligibility because this phoneme contrast has a high functional load. They further predict that articulating a /d/ phoneme in a location that a pronunciation dictionary citation form specifies as a /ð/ will not greatly harm intelligibility because this phoneme contrast has a low functional load. Accordingly, this theory makes falsifiable predictions about the potential intelligibility of a phonetic stimulus based upon its functional load.

Functional load theory as applied to intelligibility has only received a small amount of scholarly attention, but some WE, SLA, and ELF studies tangentially provide evidence for the efficacy of its first prediction that phonemes that have a high functional load contribute more to the intelligibility of phonetic stimuli, and thus changes to high functional load phoneme contrasts will greatly harm intelligibility. For example, Jenkins (2000), Riney, Takagi, & Inutsuka (2005), and Tsuzuki & Nakamura (2009) claim that the distinction between the /r/ and /l/ phonemes is critical for mutual intelligibility. Functional load theory would also predict that this distinction is critical for mutual intelligibility because the /r/ and /l/ phoneme contrast distinguishes a large amount of vocabulary (see e.g., Nilsen & Nilsen, 2010, p. 109). Although none of these studies claims that the /r/ and /l/ phoneme contrast is important because it distinguishes similar vocabulary items, they nonetheless match the predictions of functional load theory.

On the other hand, some WE, SLA, and ELF studies tangentially provide evidence for the efficacy of the second prediction of functional load theory, which is that phonemes that have low functional load contribute less to the intelligibility of phonetic stimuli, and thus changes to low functional load phoneme contrasts will not greatly harm intelligibility. For instance, in Jenkins's (2000) original study of the relationship between pronunciation and intelligibility, she claims that the /θ/ phoneme and the /ð/ do not contribute very much to intelligibility, and thus they could be replaced by the /f/ phoneme and the /v/ phoneme respectively without attenuating intelligibility (p. 137). Wells (1982) claims that the same thing is true of London speakers of English (p. 328), and Deterding, Wong & Kirkpatrick (2008) claim exactly the same for Hong Kong speakers of English. These findings are consistent with the predictions of functional load theory because the /θ/ and /f/ contrast and the /ð/ and /v/ contrast are low functional load contrasts (see e.g., Nilsen & Nilsen, 2010, p. 88 and p. 93 respectively). Both Suenobu (2010) and Deterding (2006) claim something very similar for Japanese speakers of English and Mainland China speakers of English respectively, both stating that the /θ/ phoneme and the /ð/ phoneme can be replaced with the /s/ phoneme and the /z/ phoneme. Although neither Suenobu nor Deterding refer to functional load theory in their studies, their statements concerning which phonemes are not important to the maintenance of mutual intelligibility accord with the predictions of functional load theory because the /θ/ and /s/ phoneme contrast as well as the /ð/ and /z/ phoneme contrast are low functional load contrasts; these contrasts do not distinguish a lot of vocabulary (see e.g., Nilsen & Nilsen, 2010, p. 97 and p. 100 respectively). Accordingly, many studies tangentially concur that changes to low functional load phoneme contrasts do not harm intelligibility.

An especially illustrative example of the convergence of ELF pronunciation research and functional load theory is the relationship of mutual intelligibility to the [ɫ] phone, which is an allophone of the /l/ phoneme in many varieties of English (Well, 1982). Both Jenkins (2000) and Deterding (2013) claim that the [ɫ] phone is not critical for intelligibility and that it can be freely replaced with the [l] phone without any harm to mutual intelligibility. Jenkins

(2000) goes as far as to say the replacement is unproblematic (p. 139). Functional load theory predicts the very same thing because the [ɫ] phone and the [l] phone contrast distinguishes absolutely no words in English at all. After all, the difference between [ɫ] and [l] is a phonetic contrast, not a phonemic contrast, and thus functional load theory and some ELF studies agree on its lack of importance.

Although it is fair to say that a lot of ELF and WE research tangentially supports functional load theory, very little research that directly examines functional load theory exists. While the theory is plausible and makes intuitive sense, it needs to be tested. The only research that experimentally tests the predictions of functional load theory is Munro & Derwing (2006). Munro & Derwing (2006) played twenty-three recorded speech samples of Cantonese speakers of English that contained high functional load phoneme substitutions (e.g., /l/→/n/ /ʃ/→/s/ /n/→/l/ /s/→/ʃ/ /d/→/z/), speech samples with low functional load phoneme substitutions (e.g., /ð/→/d/ /θ/→/f/), speech samples with both high and low functional load phoneme substitutions, and speech samples without any phoneme substitutions to thirteen judges, who were all NESs. The judges then assessed the intelligibility and accentedness of the speech samples. Confirming the predictions of functional load theory, the results demonstrated that speech samples with high functional load phoneme substitutions were judged to be less intelligible than speech samples with low functional load phoneme substitutions. Furthermore, speech samples with just one high functional load phoneme substitution were judged to be less intelligible than speech samples with several low functional load phoneme substitutions. In fact, a few speech samples with several low functional load phoneme substitutions were as intelligible as speech samples without any phoneme substitutions at all. Munro & Derwing (2006) concluded that high functional load phoneme substitutions had a greater impact on intelligibility assessments among NESs than did low functional load phoneme substitutions, a finding which supports functional load theory.

As one can see, functional load theory has withstood experimental verification, and a host of other research tangentially supports its predictions. However, there are problems with this theory that need to be addressed. This theory is silent on the issue of whether the lack or addition of a phoneme is a real phonemic contrast. Although functional load theory accepts that /ð/→/d/ represent a real phonemic contrast that can be subjected to theoretical predictions and testing, it says nothing about the contrast between ø → /d/ and /d/ → ø. The difference between a lack of a requisite phoneme and the presence of an extraneous phoneme is important because some ELF and WE research indicates that the lack of a phoneme can cause mutual intelligibility to break down while the presence of an additional phoneme is not as harmful (Jenkins, 2000; Tsuzuki & Nakamura, 2009; O'Neal, 2015a, 2015b, 2015d, 2016b). Furthermore, functional load theory is rather static and incapable of explaining or incorporating the negotiable nature of intelligibility during an actual interaction. As pointed out earlier, as Brouwer (2004), Matsumoto (2011), and O'Neal (2017), rightly claim, intelligible pronunciation can be negotiated into a more intelligible variant regardless of the functional load of a phonemic contrast.

Nonetheless, functional load theory allows the analyst to make falsifiable predictions concerning the potential intelligibility of phonetic stimuli with some modifications. As discussed in the previous paragraph, the theory must be amended to include predictions concerning the relationship between phoneme elision, phoneme epenthesis, and intelligibility. As is, the theory makes no predictions about this at all. But if the lack of a requisite phoneme or the presence of an extraneous phoneme is automatically considered a high functional load contrast, then the theory allows for predictions based on the phoneme elision and epenthesis. With these modifications, functional load theory specifically predicts:

3) Changes to high functional load contrast phonemes will harm intelligibility more than changes to low functional load contrast phonemes.
4) The lack of requisite phonemes (elision) and the presence of extraneous phonemes (epenthesis) will harm intelligibility.

Furthermore, a combination of the interaction hypothesis and functional load theory allows the analyst to make further, more specific, falsifiable hypotheses concerning the potential intelligibility of phonetic stimuli during interactions. A combination of both the interaction hypothesis and functional load theory specifically predicts the following about the three-way relationship between phonetic stimuli, mutual intelligibility, and interaction:

5) Unintelligible phonetic stimuli that contain modifications to high functional load contrasts will require more interaction to restore mutual intelligibility than

unintelligible phonetic stimuli that contain modifications to low functional load contrasts.

2.3 Defining Interactional Intelligibility

In section 2.2, I pointed out that intelligibility is dependent on both the speaker and the interlocutor, and indeed is the responsibility of both. If this is the case, then any definition of intelligibility should also cover these two roles. Intelligibility refers to the capacity for the speaker and the interlocutor to understand the semantic intent of the phonetic stimulus of each other's utterances, but the responsibility for maintaining intelligibility lies with both the speaker and the interlocutor. *Interactional intelligibility* is defined as an index of the extent to which the both speaker and the interlocutor orient to the semantic intent of the phonetic content as mutually recognizable through interaction.

However, it needs to be emphasized that interactional intelligibility is very different than SLA conception of intelligibility (see e.g., Derwing & Munro, 2015). The SLA conception of intelligibility is defined as the extent to which the interlocutor understands the message that the phonemes within the phonetic stimuli contain. Interactional intelligibility, on the other hand, is the extent to which the participants are able to orient to the phonetic stimuli as indexing the same semantic content through negotiation. The example below[10], between Pan, a Taiwanese exchange student, and Chihiro, a Japanese undergraduate, demonstrates that speakers can orient to each of these concepts separately, which shows that these concepts are not the same.

Example 2.1. Recognizing phonemes and recognizing semantics are not the same

1	Pan:	may I ask you::r.
2		(0.8)
3		you::r.

[10] This example is taken from a corpus of interactions that is not included in the data for this research. But because it illustrates a very rare emic perspective into the difference between intelligibility and interactional intelligibility, I have decided to include it.

4		(0.5)
5		uhm.
6		(0.8)
7		your travel [plei̯n]?
8		(1.7)
9	Chihiro:	sorry?
10		(0.4)
11	Pan:	your [plei̯n].
12		(1.2)
13	Pan:	{in: : : }
14	Chihiro:	{[plei̯n]} ah yeah airplane.
15		(0.4)
16	Pan:	yeah. the [plei̯n].
17		(0.8)
18		your travel [plei̯n].
19		(2.0)
20	Chihiro:	ah. m- my travel [plæn]?
21		(0.9)
22	Pan:	hm.
23		(0.3)
24	Chihiro:	[plæn]?
25		(0.4)
26	Pan:	yeah.
27		(0.7)
28	Chihiro:	ah ah ah. yes.
29		(.)
30		uh the
31		(0.2)
32		first day is we are going to observe the factory.
33	Pan:	uh hm.

Extracted and modified from O'Neal, 2016c, pp. 350-351

This example demonstrates that the SLA conception of intelligibility (i.e., Munro & Derwing, 1995) is clearly inadequate from an segmental repair analytic standpoint. Within this example, Chihiro initially oriented to the semantic intent of the trouble source as "airplane", and thus according to the SLA conception of intelligibility, the pronunciation was intelligible to the interlocutor because Chihiro was able to recognize the phonemes of the phonetic stimuli [plei̯n] and associate it with a meaning. Furthermore, because Chihiro was able to associate the phonemes with a semantic meaning in line 14, the trouble source is intelligible according to the SLA conception of intelligibility. Thus, from the standpoint of the SLA definition of intelligibility, an analyst would have to claim that Pan's phonetic stimuli [plei̯n] was intelligible. However, "airplane" was not at all the intended semantics of the trouble source, as can be seen by the Pan's resistance to that interpretation in lines 16 and 18. Indeed, the pronunciation is not yet interactionally intelligible from a segmental repair analysis perspective because Pan has not oriented to Chihiro's interpretation as the intended one. It is not until lines 26 and 28 that both Chihiro and Pan mutually agree that the meaning of the trouble source is "plan" rather than "airplane", and thus it is not until line 28 that an segmental repair analytic perspective ratifies the pronunciation as *interactionally intelligible*. Thus, as one can see, from an segmental repair analytic point of view, a distinction needs to be drawn between intelligibility and interactional intelligibility.

Therefore, interactional intelligibility is dependent on far more than just the listener orientation to the pronunciation as intelligible. Interactional intelligibility is literally dependent on the orientation of both the speaker and the listener and the agreement between both that a pronunciation is intelligible. Of course, a word on what "orientation" means is warranted here, because "orientation" does not refer to mental states. Conversation Analysis (CA; see Section 2.4) has a long tradition of being agnostic about mental life (see e.g., Potter & Edwards, 2013, pp. 1469-1474). A speaker or listener orientation to a pronunciation as intelligible is not a claim that the pronunciation is cognitively intelligible in the mind of either the speaker or the interlocutor. Rather, orientation is a reference to the intersubjective status of mutual intelligibility, that is, whether the speaker or listener publicly manifest that the pronunciation is intelligible, or at least not a trouble source requiring mediation or repair. Of course, this is not always a working solution in actual interactions, as research on the "let-it-pass" phenomenon demonstrates (see e.g., Firth, 1996). The "let-it-pass" phenomenon is evidence that the orientation to a facet of an interaction as unproblematic is not equivalent to a claim that the same facet was also cognitively unproblematic. But nonetheless, *interactionally intelligible pronunciation* as publicly manifest among the interactants and *intelligible pronunciation* to the mind of the interlocutor are separate phenomena, and this thesis focuses on the former rather than the latter.

The difference between the concept of orientation and mental states and its import to this thesis nicely segues into a discussion of CA, for which the distinction between orientation and mental states is critical. I now turn to a discussion of CA.

2.4 Conversation Analysis

This section will review the methodological[11] groundwork of a conversation analytic approach. In the following, a brief description and definition of CA will be provided (Section 2.4.1). Then the basic organization of turn-taking as it relates to turn construction, turn allocation, and precision timing will be introduced (Section 2.4.2). After that, a review of the basic features of interaction, sequence organization and preference organization, will be offered (Section 2.4.3). Next, because of its central importance to this thesis, an extensive discussion of repair and its relationship with turn allocation and preference organization will also be offered (Section 2.4.4). Last, an argument will be advanced for the quantification of data based on CA principles (Section 2.4.5).

2.4.1 The Foundation of Conversation Analysis

[11] Although this chapter covers the theoretical background of this thesis, because CA researchers would reject the idea that a theory underpins CA (e.g., Schegloff, 1996a, 2007; Seedhouse, 2005; Nishizaka, 2015), this section does not actually delve into theory. This thesis does not attempt to describe CA as a theory of interaction but rather as a methodology through which interaction can be assessed.

CA is defined as the study of how "social interaction is informed by…structural organizations of practices to which participants are normatively oriented" (Heritage & Clayman, 2010, p. 13), and is a unique approach to analyzing and assessing interaction that has its roots in the sociology research of both Erving Goffman and Harold Garfinkel. Goffman's (1955, 1967, 1981, 1983) and Harold Garfinkel's (1967) fundamental insights were that interaction has an underlying organization and that interactants use a complex body of presuppositions and methods of inference to analyze one another's conduct (Clayman & Maynard, 1995). Building on the foundation created by Goffman and Garfinkel, Harvey Sacks, Emanuel Schegloff, and Gail Jefferson developed CA, which assumes that talk-in-interaction can be studied as a phenomenon in its own right and that shared methods of reasoning are involved in the production and recognition of contributions to interaction (Schegloff & Sacks, 1973; Schegloff, Jefferson & Sacks, 1977; Sacks, 1992). Interaction is not a set of rules through which actions are achieved, but rather the production of interactional effects that are accomplished through the use of talk as actions in a particular context (Schegloff, 1992a). According to Schegloff et al. (1977), interaction is orderly and this order is manifest at all locations within an interaction. As such, the main goal of the CA enterprise is to describe and explain the practices that speakers can deploy to achieve actions in particular contexts and which will be recognized as achieving that action by other interactants (Schegloff & Sacks, 1973; Heritage & Atkinson, 1984; Schegloff, 2007; Heritage & Clayman, 2010). Each of the main components of CA methodology will be explained below.

2.4.1.1 Naturally Occurring Data

The first major component of CA methodology is an insistence on *naturally occurring data* as the only legitimate type of data to be examined. In CA, naturally occurring data is defined as either an audio or video recording of an interaction in which the purpose of the interaction was not the creation of the recording (Heritage & Atkinson, 1984; Schegloff, 2007). Within CA, there is an insistence on the examination of materials collected from naturally occurring everyday interactions. But "naturally occurring" has a specific meaning within CA methodology, and does not necessarily only entail informal chit-chat. Naturally occurring data can include highly formal interactions such as legal proceedings, police interrogations, medical interviews, and classroom interactions (see e.g., Atkinson & Drew, 1984; Heritage & Greatbatch, 1986; Olsher, 2004; Heritage & Robinson, 2011).

CA's insistence on naturally occurring data means that it eschews interactional data derived from experiments and ethnographic interviews[12]. This is because CA considers interaction to be a situated achievement rather than a product of factors that can be manipulated and controlled in a laboratory. Indeed, knowledge of interactional behavior is implicit among the participants and for this reason cannot really be elicited by the analyst, nor can one really expect an interactant to explicitly explain the reasons for their actions (Duranti, 1997; Schegloff, 2007; cf. Gass & Mackey, 2003). Instead, the praxis of social interaction can only be understood through an examination of actual examples of social interaction. Any familiarity with data derived from interactional data reveals that naturally occurring data is far more complex than either the invented or experimental kind. Experimental data are dependent on controlling all variables except the independent variable of interest, and as such, the data is far from naturally occurring. Furthermore, the experimenter must determine a priori which variable is most relevant before the experiment begins so that other variables can be weeded out of the operationalization of the independent variable (see e.g., Punch, 2009). CA researchers tend to present findings by showing regular forms[13] of organization in a large variety of materials produced by a range of speakers, but this form of argumentation would be impossible under the strictures of the experimental method.

2.4.1.2 The Emic Perspective

The second component of CA methodology, and indeed maybe the most important component of CA as a methodology, is a requirement that the analyst approach naturally

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[12] This thesis will blatantly violate this provision in Chapter 8. However, this violation will be defended on the basis of Eskildsen's (2008, 2012) arguments that a CA approach can be augmented by an experimental approach.

[13] There are now CA scholars who claim that the use of frequency adverbs in CA research is basically meaningless (see e.g., Eskildsen, 2008, 2012; Stivers, 2015). Accordingly, the argument that CA scholars show "regular patterns" is very weak because they do not quantify data.

recorded data from an *emic perspective*, which CA researchers claim is distinct from an *etic perspective*[14]. Kenneth Pike (1967) first defined the emic perspective as the use of the perspective of the participants to assess the interactional significance of a phenomenon: "the emic viewpoint results from studying behavior as from inside the system" (p. 37). Sacks & Schegloff (1973) first utilized the term in a CA study a few years later, but used it in a much stricter sense. Sacks & Schegloff (1973) referred to the emic perspective as the perspective of the participants inside an interaction. However, as Seedhouse (2005) states, the emic perspective in CA is more than just the perspective of the participants: "what CA means by an emic perspective…is not merely the participants' perspective, but the perspective from within the sequential environment in which the social actions were performed" (p. 252). In other words, the emic perspective in CA is the use of the perspective of the participants to evaluate an interactional phenomenon at the sequential turn in which the phenomenon occurs.

The *emic perspective* is quite different from the *etic perspective*. Pike (1967) defined the *etic perspective* as the use of the perspective of the analyst to assess the interactional significance of a phenomenon: "the etic viewpoint studies behavior as from outside of a particular system" (p. 37). CA researchers reject the etic perspective because it subordinates the perspective of the participants to the perspective of the analyst (ten Have, 2007)[15]. Because CA methodology superordinates the perspective of the participants over the perspective of the analyst, CA research mandates the emic perspective and eschews the etic perspective.

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[14] It is worth mentioning that the terms "emic" and "etic" are back-formations of the terms "phonemic" and "phonetic". That is, one of the core components of CA is directly borrowed from phonology.

[15] It must be pointed out that some ELF scholars claim to assess intelligibility from an emic perspective already (see e.g., Deterding, 2013; Schaller-Schwaner, 2015). However, while the way in which Deterding (2013) and Schaller-Schwaner (2015) define "emic" within their studies does concord with Pike's (1967) definition of "emic", it does not conform to Seedhouse's (2005) definition of "emic." According to Seedhouse (2005), the emic perspective is the participants' perspective within the sequential context of the utterance itself, not the perspective of the participants in a post-interaction recall interview (p. 252). I believe that Seedhouse (2005) would argue that Deterding (2013) seriously misunderstands to what "emic" refers.

A particularly cogent example of analysis from an emic perspective follows. In this example, three interactants miscommunicate and then resolve the miscommunication. An etic analysis and then an emic analysis of the interaction will be offered to cross-compare the difference between the two perspectives toward the analysis of a miscommunication.

Example 2.2. Who is to blame for miscommunication?

1	Chie	I like ↑[ho.ɾe̞] movies.
2		(0.2)
3	Zhan	[o]?
4	Chie	kh:.
5	Zhan	[o]?
6		(0.2)
7	Chie	[ho.ɾe̞].
8		(0.4)
9	Zhan	{[o.ɾe̞]?}
10	Mashu	{yeah. }
11	Zhan	[o]? [o]? [o.ɾe̞]?
12	Chie	[ho.ɾe̞]. hh.
13		(0.2)
14	Mashu	s:- sca{ry : : : . }
15	Zhan	{[ho.ɾe̞]?} ↑ah.=
16	Chie	=scary. scary.
17	Zhan	yeah got it. ha{hahaha.}
18	Chie	{hahaha.}

An etic analysis of the above interaction could proceed in any number of ways because it manifests what is important to the analyst. As a pronunciation teacher, I could claim that Chie was attempting to articulate the word “horror”, but Zhan does not understand “horror” because Chie is using a pronunciation that deviates from the citation form of the pronunciation. Thus, this miscommunication is Chie’s fault because she misarticulated “horror” as [ho.ɾe̝] rather than as [hɔ.ɹɚ]. However, an emic perspective would reject such an analysis. An emic perspective only warrants an analysis according to what the interactants themselves oriented to as significant within the praxis of the interaction. An emic perspective would support the claim that the unit composed by the four phones in [ho.ɾe̝] is unintelligible because Zhan specifically orients to that unit as unintelligible in lines 3, 5, 9, and 11. However, the phonetic reasons as to why Zhan orients to the pronunciation as unintelligible are beyond what in this case an emic analysis allows because the interactants used circumlocution to resolve the miscommunication. An emic analysis would support the claim that [ho.ɾe̝] was unintelligible to Zhan, but it would not support the claim that Chie’s pronunciation is the cause of the miscommunication. Furthermore, an emic analysis would reject the idea that the miscommunication was caused by Chie using a pronunciation that deviates from citation form pronunciations. As one can see, an emic analysis is constrained by the orientations of the interactants to the phenomena within the interaction, but an etic analysis is relatively unconstrained and is often only limited by the interpretation of the analyst.

A subcomponent of the *emic perspective* is the notion of *orientation*, which is defined as the participants’ display of *intra-contextual factors* as relevant to the progression of the interaction (Schegloff, 1992a; Egbert, 2005). The notion of orientation is premised on the emic distinction between *external* and *intra-interactional* contexts (Schegloff, 1992a). *External context* includes many aspects through which humans can be differentiated such as class, religion, ethnicity, gender, power, and sexuality, etc. But unless these features are oriented to as relevant to the interactants’ displayed understanding of the interaction, then these external factors are not considered relevant to an interpretation of data (see e.g., Egbert, 2005). On the other hand, *intra-interactional contexts* are invoked by the participants themselves as relevant to the interaction, or as Schegloff (1992a) states, “if some…context can be shown to be…intra-interactionally…relevant to the participants, then its external status is rendered besides the point; and if it cannot be shown, then its external status is rendered equivocal” (p. 197). All of this is to say that CA strictly adheres to the principle that assessment, interpretation, and explanation of interactional phenomena must be made with reference to the *orientations* of the interactants themselves.

Another subcomponent of the *emic perspective* is the prohibition against *a priori assessments of data*. As Heritage & Atkinson (1984) rightly claim, "nothing that occurs in interaction can be ruled out, a priori, as random, insignificant, or irrelevant" (p. 4). This eyes-wide-open stance toward data is a prerequisite for CA research. "CA has worked to avoid premature and idealized theory construction in favor of the empirical identification of diverse structures of practices" (Heritage & Clayman, 2010, p. 14). A CA emic perspective mandates that the analyst reject any theory that *a priori* presupposes how interaction should work (cf. Eggins & Slade, 2005; Burke, 1993). As such, CA rejects *the interaction hypothesis* and *functional load* theory as a priori explanations of interactional phenomenon. However, these theories can be coupled with CA to explain behavior at the aggregate level of analysis, as will be explained in Section 2.4.5.

The last subcomponent of the *emic perspective* is a rejection of *mental states as an explanation for interactional phenomena*. Unlike most approaches to language that borrow heavily from psycholinguistics, CA makes no attempt whatsoever to explain the patterning of interaction according to underlying cognitive structures, mental processes, or neurological functioning. Thus, CA denies the primacy of *theory of mind* explanations of interactional practices that are so prevalent in psycholinguistic research (see e.g., Hamann, Warneken, & Tomasello, 2012; Behne, Carpenter, Call, & Tomasello, 2005). Although psycholinguists would deem interactional practices to be the *epi*phenomenon which is only a window into the real target phenomenon, the cognition of the individual, CA would claim the opposite and argue that the real target phenomenon are the interactional practices and that the cognition of the individual is the *sub*phenomenon[16]. Indeed, as Heritage & Clayman (2010) state, in such a way that it would make a psycholinguist blanche, "these organizations of practices—as the conditions on which the achievement of mutually intelligible and concerted interaction depends—are fundamentally independent of the motivational, psychological or sociological characteristics of the participants" (p. 14). Accordingly, the emic perspective rejects psychological analysis in favor of examining the features of interaction and how interactions unfold.

[16] CA does share a disturbing number of traits with behaviorism (Skinner, 1976).

2.4.1.3 Sequential Analysis

The first two major components of CA methodology lead to the third: *sequential analysis*. CA methodology contends that interaction is orderly and analyzably proceeds on a turn-by-turn basis, and therefore analysis must also proceed on a turn-by-turn basis. All utterances in naturally occurring data are contextually understood, and analyzed, by reference to their location vis-à-vis other utterances. As Liddicoat (2007) rightly claims, "what participants say is shaped by and for the context in which it occurs and each next bit of talk is understood in light of what has preceded it" (p. 7). In other words, sequential analysis is based on the recognition that the production of some utterance is related to the context within which it is produced. Furthermore, because each next turn is oriented to a prior turn, the producer of the current turn will display some analysis and understanding of the prior turn. This is what Schegloff (1996) means when he states that, "talk is constructed and is attended by its recipients for the action or actions it may be doing" (p. 5). Thus, the recipient of an utterance analyses the utterance and displays his or her analysis in their next turn, and therefore the sequential next-position utterance is a resource by which analysts can assess the interactional significance of the previous utterance (Liddicoat, 2007). Schegloff (1984) rightly warns that, "no analysis, grammatical, semantic, pragmatic, etc., of these utterances taken singly and out of sequence, will yield their import in use, will show what co-participants might make of them and do about them" (p. 31). But it is this orientation of the interactants themselves to the action performed by the utterances at hand that makes analysis from an emic perspective possible. As Heritage & Atkinson (1984) claim, "just as a second speaker's analysis and treatment of the prior is available to the first speaker, so it is also available to overhearers of the talk, including social scientists" (p. 9). Thus, an analyst can make use of the participants' orientations to previous utterances as an emic window into the interactional significance of turns-at-talk.

The way in which sequential analysis should proceed is related to the answer to an overarching question that analysts must continually ask themselves: "why that now?", or in other words, "what action is an utterance accomplishing at the time of its production?" CA claims that this question must be answered from three different perspectives simultaneously:

what the current action demonstrates about the interpretation of the previous action, what the production of the current action does, and what the production of the current action projects about the next action (Liddicoat, 2007). To answer these questions, analysts must recognize that speakers understand an utterance through reference to its position in a sequence, or a paired unit of action related utterances. By the production of next turns, speakers display an understanding of the action performed by a prior utterance. Turns at talk are context-bound and context-understood. They are usually produced with an orientation to preceding talk, commonly the immediately preceding talk (Sacks, 1987; Schegloff & Sacks, 1973). Speakers also design their turns to project the relevance of a next action, or a range of next actions, to be done by the subsequent speaker (Schegloff, 1972), and in this sense, "turns at talk are context-renewing" (Heritage & Clayman, 2010, p. 14).

Having defined and explained the basic principles of CA, I will next explain the specific characteristics of the turn-taking system, starting with an explanation of its basic features.

2.4.2 The Basic Organization of Turn-Taking in Interaction

One of the most salient characteristics of interaction is that speakers take turns, and this commonsense fact is critical to sequential analysis. In most cases, only one person speaks at a time and the transition time between speakers often measures in the millisecond timeframe (Schegloff, 2000a; de Ruiter, Mitterer, & Enfield, 2006; Stivers, Enfield, Brown, Englert, Hayashi, Heinemann, Hoyman, Rossano, De Ruiter, Yoon, & Levinson, 2009). This does not mean that silences and overlaps never happen, but even when these do occur, they can be analyzed as doing something of interactional significance (Drew, 1997).

Speaker turn change is a normative process which must be achieved by the interactants. Turn change, or turn-taking, behavior is publicly constructed behavior, and is not the result of an inevitable process. In seeking to describe turn-taking behavior, therefore, it is important to emphasize that these turn-taking rules are interactionally performed by the participants. Any explanation of turn-taking needs to be sensitive to each turn in talk rather than prescriptive over a whole interaction. In order to account for the ways in which speaker turn change occurs, Sacks et al. (1974) proposed three separate but interrelated components of turn-taking: a *turn construction*, *turn allocation*, and *precision timing*.

2.4.2.1 Turn Construction

Sacks et al. (1974) claim that turns are made of up *Turn Constructional Units* (TCUs), which are defined as one "recognizably possibly complete" contribution to an interaction within its context (Liddicoat, 2007, p. 56; Schegloff, 1996b, 2007, 2011). If a piece of talk is not recognized by an interactant as recognizably possibly complete, then it is not a TCU. Therefore, the first characteristic of a TCU is possible completeness. And the notion of possible completeness is inalienably connected to the emic perspective. The analyst must closely examine the details of an interaction to determine what the interactants themselves orient to as possibly complete (Schegloff, 2011).

Both Sacks et al. (1974) and Ford & Thompson (1996) posit that a TCU can signal possible completion in three different ways: syntactic completion, intonational completion, and pragmatic completion. Syntactic relations between already produced grammatical units and yet to be produced grammatical units can signal when a grammatical unit could possibly finish, and interlocutors monitor the grammar in construction for clues as to when the TCU will finish (see e.g., Fox, 1987; Lerner, 1991; Ford, Fox, & Thompson, 2001; Wooffitt, 2005, p. 28). Intonational cues can also signal when a TCU will finish, and indeed cooperate with syntactic cues to signal possible completeness (Ford & Thompson, 1996; Selting, 1998; Szczepek Reed, 2006). Pragmatics can foreshadow possible completeness as well, with some non-verbal elements, such as eye-gaze, gestures, and laughter, combining with syntactic and intonational signals to adumbrate a TCU's possible completeness (see e.g., Goodwin, 1981; Rossano, Brown, & Levinson, 2009; Matsumoto, 2014; Smotrova, 2017; Konakahara, 2017). This seems to be because non-verbal elements typically precede the linguistic units to which they are semantically connected (Kelly, 2001). Indeed, Ford & Thompson (1996) hint that all three factors can synergistically cooperate to simultaneously signal a TCU's possible completion.

The second component of a TCU is *projectability* (Sacks et al., 1974; Liddicoat, 2004), or the foreshadowing of when the next speaker can begin. As stated previously, a TCU adumbrates roughly when it could be complete. But it is important to emphasize that interactants signal possible completion, not actual completion (Sacks et al., 1974). Interactants do not know beforehand when a turn will end, only where it could end (Liddicoat, 2004). They only need to orient to the locations at which the TCU could be complete rather than the location at which the TCU is actually complete to begin their own turns. In this sense, possible completion is more important than actual completion for turn change. In many interactions, speakers are waiting for the point of possible completion to begin their turns; they are not waiting for actual completion. The notion of possible completion is fundamentally connected to the idea of *Transition Relevance Places* (TRPs), which are defined as a location at which speaker change is a possible next action, and thus speaker change could be appropriate. This means that TRPs are not locations within an interaction at which speaker change does occur; rather, TRPs are sites at which speaker change can be an appropriate next action (Sacks et al., 1974; Liddicoat, 2004; Schegloff, 2011). Speaker change that does not occur at a TRP can be oriented to as an interruption; indeed, speaker change at a point other than a TRP is interactionally accountable as such (Drew, 1997). In cases in which speaker change does not occur at a TRP, the original speaker can even continue to build on the previous TRP, expanding the original contribution to a new TRP (Fox et al., 2001).

2.4.2.2 Turn Allocation

The second component of the organization of turn-taking is *turn allocation*, which is defined as the ways in which a next speaker can come to have a turn at talk. There are two possible options: the current speaker can select the next speaker or a next speaker can self-select (Sacks et al., 1974). But these two alternatives are not equally present at each TRP (Liddicoat, 2004). If a current speaker is to nominate the next speaker, then the TCU must be designed to do so. This is one aspect of *recipient design*. Current speakers can make speaker change highly relevant and nominate a next speaker through a plethora of strategies (see e.g., Sacks et al., 1974; Goodwin, 1981; Lerner, 1996, 2003; Schegloff, 2011; Matsumoto, 2014). Self-selection, on the other hand, occurs when an interactant becomes the next speaker, but nothing in the previous TCU nominated the next speaker. Self-selection can occur at a location at which the prior TCU is designed to obligate someone else to speak next, but does not constrain which person that should be (Liddicoat, 2007). Furthermore, other forms of talk can be designed to abdicate speaking rights and show that a speaker is not taking the interactional floor. Discourse markers such as yes, hm, uh huh, etc., can show that an interlocutor demonstrates an understanding that an extended turn is underway, and as such is allowing a current speaker to pass through multiple TRPs (Schegloff, 1982).

Sacks et al. (1974) outlined a small set of turn-taking rules that relate to turn allocation and turn construction. These rules explicitly connect turn allocation to the TRPs that TCUs project, and provide for the two possible options:

(1) At any TRP of a TCU:

a) if the TCU uses one of many "current speaker selects the next speaker" techniques, then this action creates a right and an obligation for the selected interactant to take the next turn to speak. No other participant to the interaction has an obligation to take the next turn to speak. (next-selection)

b) if the TCU does not use a technique to select a next speaker, then self-selection can occur. The first interactant to begin speaking gains the right to a produce the next TCU. (self-selection)

c) if the TCU does not use a technique to select a next speaker, then the current speaker can produce another TCU. (continuation)

(2) If the current speaker continues beyond the TRP, these rules apply again at the next TRP, and at each subsequent TRP until next speaker change occurs.

(Based on Sacks et al., 1974, p. 704; Liddicoat, 2007, p. 68)

Furthermore, these rules are hierarchical; that is, self-selection (rule 1(b)) applies if next-selection (rule 1(a)) has not been applied, and continuation applies if neither self-selection nor next-selection has been applied (Sacks et al., 1974). Thus, these rules constrain each other in the sense that the lower ranking rules can only apply in the absence of the invocation of a higher-ranking rule (Liddicoat, 2007). Furthermore, these rules have both a context-free and a context-sensitive status. It is context-free in the sense that the rules are operative regardless of the particular situation within which the interactants operate; it is context-sensitive in the sense that each interactant is designing their TCUs in response to what has come before in the particular situation (Sacks et al., 1974). As Wooffitt (2005) states, "speaker transfer is taken to be an accomplishment, achieved as a consequence of mutually coordinated speaker sensitivity to those procedures or conventions for effecting such changes" (p. 29). As such, these turn-taking rules become relevant at the TRP of each TCU.

2.4.2.3 Precision Timing

Timing refers to the amount of time between a TRP and the beginning of the next TCU. The unmarked value for the time lapse is a beat of silence, and this indicates that nothing special or salient is being done in the TRP, which is a manifestation of what CA researchers call *precision timing* (Jefferson, 1973; Wooffitt, 2005). However, it is possible that the length of the TRP may be longer than normal, for example in the case of a silence, or shorter than normal, as in the case of an overlap. Both possibilities have a salient effect on interactions and are often accountable as such.

An elongated TRP results in a silence in the interaction. When a silence is not attributable to any particular speaker, it may become quite long and can even result in a lapse in the interaction. Although silence is literally the lack of speaking from any interactant, silence is often not oriented to as a lack of speaking from all the interactants. In fact, from an emic perspective, silence can often be attributed to single participants, and other participants can orient to silence as either problematic or even repairable (Schegloff, 2007; Liddicoat, 2007). But when a silence is attributable to a particular speaker, that speaker is likely to be held accountable for the silence.

On the other hand, a shortened TRP or simultaneous self-selection by two speakers results in an overlap in the interaction. Although overlap is literally the simultaneous speaking of two or more interactants, it is not necessarily oriented to as either an interruption or a problem. This is because overlap can signal different things. Some overlap occurs at TRPs that bridge TCUs in which the second TCU was designed to be an expansion on the previous TCU; they are often not oriented to as problematic (Schegloff, 2000a, 2011).

However, some overlap is oriented to as especially salient, and indeed can presage problematic aspects of interaction such as disagreement or even rejection (Pomerantz, 1984; Liddicoat, 2004), or highlight celebratory aspects of interactions such as interest or enthusiasm (Liddicoat, 2007; Matsumoto, 2014; Kappa, 2016; Kim, 2018).

Having explained the basic organization of turn-taking, I will next explain the specific characteristics of ordinary interaction, starting with an explanation of the basic features associated with interaction.

2.4.3 The Basic Features of Interaction

Once speaker change occurs, interaction begins. It soon becomes obvious that TCUs from different participants are systematically linked together and that interaction is just as organized as turn-change. CA methodology claims that this is possible because of two interrelated phenomena: *sequence organization* and *preference organization*.

2.4.3.1 Sequence Organization

Sequence organization refers to the fact that within interactions, TCUs tend to manifest as related action pairs: a greeting is followed by another greeting; a question is followed by an answer; a telling is followed by a receipt. Schegloff & Sacks (1973) refer to the pairing of two complementary actions as *adjacency pairs*. Adjacency pairs have a number of core characteristics: 1) they consist of at least two TCUs in two separate turns; 2) the TCUs are produced by at least two different speakers; 3) the TCUs are adjacent in the sense that they are deployed next to each other in their minimal form; 4) the TCUs are ordered and differentiated into first pair parts, which recognizably initiate some exchange, and second pair parts, which recognizably respond to the action of the prior TCU; 5) they are pair-type related to each other in the sense that not every second pair part can legitimately follow a first pair part (Liddicoat, 2007, p. 106; Schegloff, 2007, p. 13). First, it is normally the case that where adjacency pairs occur, the two turns occur immediately next to each other. Second, the two turns which make up an adjacency pair are ordered so that the initiating turn of the pair always occurs first and the responding turn of the pair always occurs second. This manifests as turns that are designed to initiate actions and other turns that are designed to respond to certain actions. The basic assumption of adjacency pairs is that once an action is ascribed to a first pair part, then upon its completion, its speaker should stop and a next speaker should start and produce a second pair part from the pair type of which the first is recognizably a member (Schegloff & Sacks, 1973; Sacks et al., 1974; Liddicoat, 2007). Third, the relationship between the initiating action and the responsive action is constrained by the initiating action. The responsive action must match the constraints placed on it by the initiating action, or if it does not, it must account for this.

Turns that initiate actions are called *first pair parts* (FPPs), and those that respond to initiating actions are called *second pair parts* (SPPs). The pairing of an FPP with an SPP is called a *sequence*. Interactants orient to sequence structure as a normative force which sets up expectations about how the interaction will proceed. If these expectations are not met, then the interaction can be oriented to as problematic in some regard (Heritage, 1984a). Or, as Heritage & Clayman (2010) claim, "the procedures that inform these activities are normative in that actors can be held morally accountable for both departures from their use and for the inferences which their use, or departures from their use, may engender" (p. 15). This basic linkage of FPPs to SPPs is closely related to the turn-taking system because FPPs make speaker change a relevant and possible next action. That is, FPPs are especially projectable. The practice of producing an adjacency pair requires that once a recognizable FPP has been produced, then at the TRP, the current speaker should stop and the next speaker should start and produce the matching SPP. Thus, FPPs are a primary vehicle through which a subsequent action is made a relevant next action; it projects some SPP (Schegloff, 1990, p. 59).

2.4.3.2 Preference Organization

Preference organization refers to the fact that the actions done in a SPP slot are highly constrained by the projective power of the FPP (Pomerantz, 1984). But even within constraints, there are a range of options to produce a SPP. An interactant can choose among alternatives to match the FPP with a SPP, and these alternatives are often not equivalent and even have differing interactional effects. The term *preference* has been adopted to describe the difference between non-equivalent SPP alternatives (Sacks & Schegloff, 1979; Atkinson

& Heritage, 1984; Pomerantz, 1984)[17]. The basic premise of *preference organization* is that some actions are normally performed directly and without delay while other actions are to be avoided or delayed, or accounted for in their absence (Pomerantz, 1984; Wooffitt, 2005; Schegloff, 2007). Actions which are routinely performed immediately and which are oriented to as quotidian are called *preferred* actions, but actions which are not performed immediately and are oriented to as exceptional are called *dispreferred* actions. These two actions are social in nature in the sense that they manifest the fact that some actions are conducive to social relationships while others are problematic to social relationships.

Sacks (1987) argues that there is, first, a preference for agreement and, second, a preference for contiguity. First, in many cases, speakers design their turns in such a way that the expected next action is obvious. These turns project an approximate trajectory for the next contribution to the talk of which they are a part. Sacks (1987) argues that there is an overwhelming preference for SPPs to concord with the FPP. That is, SPPs that are conducive to quick and successful completion of the sequence that the FPP projects are preferred: questions should be answered without a prominent delay; information-relay should be receipted without a salient pause, etc. In this way, there a preference that SPPs follow the same interactional trajectory that the FPPs project. In fact, SPPs that manifest a preferred response to an FPP are often not expanded and explained, but SPPs that manifest a dispreferred response are often delayed, expanded, and explained; that is, dispreferred SPPs require more interactional work (Pomerantz, 1984; Coates, 1987). In a word, preferred actions are produced without delay. Second, there is a preference for FPPs and SPPs to be contiguous, or in other words to appear next to each other. This contiguous placement is of course not an inevitable feature of interaction but is rather the result of the coordination of the actions of the participants, and as such the absence of contiguous FPPs and SPPs can be

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[17] It is important to note at this point that preference does not refer to the personal desires of the interactants, and as such preference is a misnomer for this phenomenon (see Section 2.4.1.2). Indeed, other CA researchers have begun to refer to the same phenomenon as *expectations* (see e.g., Wong & Zhang Waring, 2010; Wooffitt, 2005, p. 6) to remove the psychological implications of the term preference. Again, CA generally denies psychological explanations for interactional phenomena.

oriented to as a manifestation of dispreference, and those who withhold SPPs can be held accountable for doing so. In fact, dispreferred actions are routinely delayed, leading to longer TRPs, and prefaced, qualified, or mitigated in some form. Furthermore, dispreferred actions are routinely accounted for as well (Liddicoat, 2007).

So far, I have discussed the basic features that compose the sequence organization and preference organization in interaction. In addition to these features, repair also plays an important role in maintaining mutual intelligibility, and as such repair will be a major component of this thesis. It warrants special mention, and I will now discuss it.

2.4.4 Repair

Repair refers to a large set of practices through which speakers orient to some aspect of a current or prior action as implicitly or explicitly problematic to the continuation of the interaction and thus temporarily stop the current action to deal with the problem (Schegloff et al., 1977, pp. 363-369). All levels of interaction can be oriented to as potentially problematic (Schegloff, 1987), and thus repair takes many forms. Anything can be oriented to as a *trouble source*, which is defined as the entity to which the participants orient as either problematic or potentially problematic (Schegloff et al., 1977, p. 363).

But from the outset, it is important to note that repair is much more than the replacement of erroneous forms with correct forms, although repairs that do exactly that certainly do exist (Jefferson, 1987; Schegloff, 1997b; O'Neal & Matsumoto, forthcoming). Nonetheless, correction and repair are not the same thing (see Schegloff et al., 1977, p. 363; Jefferson, 1987; Schegloff, 1997b). Repair is the reestablishment of *intersubjectivity*, which within ELF studies can be nearly identical to the concept of mutual intelligibility (O'Neal & Matsumoto, forthcoming). A sequence of talk can only be described as a repair if one or more of the participants to the interaction orient to the talk as necessitating the repair of *intersubjectivity* (Schegloff et al., 1977; Schegloff, 2007). And here again the emic perspective is extremely important. The analyst cannot determine what is problematic without reference to what the participants themselves orient to as problematic. Schegloff (1987) mentions that "the parties themselves address the talk as revealing a misunderstanding in need of repair" (p. 204). As such, repair is the collaborative restoration of mutual intelligibility through the negotiation of linguistic resources, while correction is the negotiation of linguistic resources without the faltering of mutual intelligibility (Jefferson, 1987, p. 90).

Schegloff et al. (1977) proposed an explanation for repair that makes a critical distinction between who identifies the trouble source and who performs the repair. Repair can be made by the speaker of the TCU that contains the trouble source, which is called *self-repair*, and it can be performed by the recipient of the TCU that contains the trouble source, which is called *other-repair* (Schegloff et al., 1977; Schegloff, 1992b, 1997a, 1997b, 2007). Furthermore, Schegloff et al.'s (1977) model includes another important dichotomy. Repair is also related to who initiated the repair sequence, or in other words, who identified the trouble source: the speaker of the trouble source or the recipient of the trouble source. Repair can be performed by the speaker who both produced and identified the trouble source, which is called *self-initiated repair*, and it can be performed by recipient who also identifies the trouble source but did not produce it, which is called *other-initiated repair* (Schegloff et al., 1977; Schegloff, 1992b, 1997a, 1997b, 2007). In combination, these two dichotomies allow for four different types of repair[18]:

1. Self-initiated, self-repair: the producer of the trouble source both identifies the trouble source and repairs the trouble source.
2. Self-initiated, other-repair: the producer of the trouble source identifies the trouble source, but the recipient repairs the trouble source.
3. Other-initiated, self-repair: the recipient of the trouble source identifies the trouble source, but the producer of the trouble source repairs the trouble source.
4. Other-initiated, other-repair: the recipient of the trouble source both identifies

[18] There are a growing number of CA scholars who propose that a third category needs to be added to descriptions of repair practices: same-turn or other-turn repair. For example, Németh (2012) argues that the addition of a same-turn/other turn dichotomy to descriptions of repair allows for greater illustrations of interactional practices. Indeed, the addition of the same-turn/other turn dichotomy expands the four descriptions of repair strategies to eight descriptions. As such, the description of repair practices that is offered in this thesis is already somewhat out of date.

and repairs the trouble source.

(Based on Liddicoat, 2007, p. 173 and Schegloff et al. 1977, pp. 363-364)

A large body of research suggests that certain types of trouble sources are more often associated with one of the four types of repair (Schegloff et al., 1977; Németh, 2012). These associations, however, are the result of the distribution of the types of repair in interactions, not a rule of the repair system. This is just another aspect of preference organization, which exists within repair as well. The preference organization of repair extends to positioning. The initiation of repair on a potential misunderstanding typically occurs in the turn immediately following the identification of the trouble source, and even seems to have a time-limit in the sense that repair needs to be proximate to its trouble source (Schegloff, 1979, p. 267). But other positions for repair are possible, and the types of repair tend to interact with the sequential positions at which repair is deployed. Some types of repair are typically found in the same sequential position; that is, the sequential position of repair is related to the type of trouble source and the type of repair. Accordingly, it is possible to identify the following positions for repair:

1. *Same turn repair*: repair is conducted within the same turn as the trouble source but before the next TRP.
2. *Transition space repair*: repair is conducted within the same turn as the trouble source but after the next TRP.
3. *Second position repair*: repair is conducted in the turn after the turn with the trouble source.
4. *Third position repair*: repair is conducted two turns after the turn with the trouble source.
5. *Fourth position repair*: repair is conducted three turns after the turn with the trouble source.

(Based on Schegloff et al., 1977; Schegloff, 1979; Liddicoat, 2007, p. 174)

Each of these repair positions interact with repair initiation in such a way that each position is specialized to provide space for an interactant to initiate repair (Schegloff et al., 1977). This means that self-initiation of repair and other-initiation of repair are also organized in terms of preference organization and sequential position. Furthermore, the two types of repair initiation are ordered so that self-initiated repairs precede and preclude the possibilities for other-initiated repair (Schegloff, 1997b, 2000b). Thus, they are a set of ordered possibilities for repair, with the speaker who produces the trouble source having the first opportunity to initiate repair. However, it is important to note that repair is not complete until the producer of the trouble source accepts the proposed repair (Liddicoat, 2007, p. 175).

2.4.5 Quantification and Statistical Analysis in CA

Recent debates among CA practitioners have reopened the question of the appropriateness of quantitative approaches to and statistical analyses of interactional data. Some CA researchers have been deeply skeptical of the quantification of interactional data, reflecting the standpoint of one of the founders of the field (e.g., Schegloff 1993). Schegloff (1993) claims that any quantification of data obfuscates what is important in the study of interaction, stating that, "we can be led seriously astray if we allow the possibility of quantitative studies to free us from the need to demonstrate the operation of what we take to be going on in singular fragments of talk" (p. 102). According to many CA researchers, any coding and quantification of interactional data inevitably represents a reduction and simplification of complex human behavior and will inevitably show a lack of sensitivity to turn design and sequential position. Indeed, Schegloff (1993) condemns both quantification and statistical analysis, claiming that, "quantification is no substitute for analysis" (p. 114). Such sentiments are still operative in current CA research as well (see e.g., Steensig & Heinemann, 2015; Nishizaka, 2015).

However, other CA researchers are more open to the possibility of quantifying interactional data, arguing that under certain conditions it adds aggregate information that single case analysis could never accomplish (see e.g., Heritage & Greatbatch 1986; Heritage 1999; Heritage, Robinson, Elliott, Beckett, & Wilkes 2007; Stivers & Majid 2007; Németh, 2012; Stivers 2015; O'Neal, forthcoming). Indeed, Stivers (2015) suggests that quantification and statistical analysis can be fruitfully applied to sequential analysis, suggesting that, "when CA results are strong and the reach of the findings could be enhanced by quantitative methods, formal coding can easily be built on a strong CA foundation" (p. 16). Accordingly, an increasing number of CA scholars argue that CA studies would be strengthened through the incorporation of quantification and statistical analyses.

I argue that qualitative sequential analysis should be the foundation of any study of mutual intelligibility. I contend that only an interaction-dependent means of assessing mutual intelligibility is valid. This is in accord with the beliefs of many traditional CA scholars. However, I argue that any research into mutual intelligibility needs to proceed one step further, into the beyond that Schegloff (1993) warned against so long ago. Any study of mutual intelligibility will be strengthened by the addition of quantitative and statistical analyses. Of course, as CA methodology rightly claims, any analysis of any phenomena, whether phonetic or not, needs to be sensitive to turn design and sequential position. Indeed, this should be primary. But the addition of a CA-based coding system that is sensitive to turn design, sequential position, and the emic perspective, is not only possible, but actually very beneficial to an analysis of mutual intelligibility (O'Neal, forthcoming).

2.5 Summary

In this chapter, I have argued that communication is designed to be mutually intelligible, and that this involves listener factors, speaker factors, and the negotiation between both. An explanation of two theories, namely *the interaction hypothesis* (Long, 1996) and *functional load theory* (King, 1967; Catford, 1987; Brown, 1991; Munro & Derwing, 2006; Gilner & Morales, 2010; Sewell, 2017) have been given. One is a theory of interaction, and the other is a theory of intelligibility. Both theories are needed to explain the relationship between interaction and intelligibility. Based on these observations, the notion of interactional intelligibility was defined. After that, a definition and rationale for CA, as well as an explanation of the basic organization of turn-taking has been given. This was followed by a discussion of the phenomenon known as repair, which will feature prominently throughout this thesis. Last, it was argued that this study needs to incorporate quantitative research into its design to account for behavior at the aggregate level.

This chapter has clarified the theoretical standpoint of the current research, which combines a conversation analytic approach to phonetics with *the interaction hypothesis* and *the functional load theory*. This approach is called *segmental repair analysis*. This approach and these theories provide us with powerful insights when analyzing the phonetic praxis of ELF interactions. Before analyzing actual ELF interactions, Chapter 3 will review the theoretical background of ELF research as regards the concept of interactional intelligibility.

Chapter 3
Overview of Research on English as a Lingua Franca

3.1 Introduction

This chapter reviews research on ELF, and it consists of two major parts. The first part explores the theoretical background of the ELF paradigm and provides a definition of ELF that is grounded in the emic perspective of CA (Section 3.2). The second part details eighteen years of ELF research (Section 3.3). It is also divided into two sections: Section 3.3.1 describes the general findings of ELF research, while Section 3.3.2 reviews research on the phonology of ELF interactions and the phonological praxis of ELF interactions. Based on the review, I will identify the research gap in the existing ELF research on the phonology of ELF interactions (Section 3.3.3).

3.2 The Theoretical Foundation of the ELF Paradigm

This section reviews the theoretical background to the ELF paradigm. This includes the nature of the spread of English through the world and its concomitant ownership (Section 3.2.1), a brief comparison of the World Englishes (WE) and the ELF research paradigms (Section 3.2.2), a discussion of the relevance of notions of community to ELF research (Section 3.2.3), an argument that variation is the core characteristic of ELF (Section 3.2.4), and a definition of ELF grounded in the emic perspective (Section 3.2.5). I will begin by reviewing the relationship between the spread of English and its relationship to the ownership of English.

3.2.1 The Spread of English and its Ownership

Many languages have few speakers and thus the ownership of such languages is largely unquestioned. However, the wide diffusion of English raises the question of who owns English (Widdowson, 1994, 2003, 2012; Oda, 1999, 2017; Yano, 2009; Haberland, 2011; Toh, 2016; Kohn, 2018; Hino, 2018). In the current era of globalization, English plays a prominent role among the world's languages in global communications, and it is used for a wide range of diplomatic, academic, professional, and economic reasons (see e.g., Crystal, 2003; Graddol, 2006; Yano, 2009; Hino, 2012; Jenkins, 2009, 2014; Konakahara, Murata & Iino, 2017; Björkman, 2017). Because of the plethora of such uses, English has become a major lingua franca for communication amongst a range of people, for most of whom English is not their first language. But, as other scholars have noted, other languages have also become major lingua francas and then later died out (see e.g., Ostler, 2011 for a discussion of the lives and deaths of lingua francas throughout history), so English is just one of many languages that has become a major lingua franca, and in that sense, it is not at all unique. What makes English a unique lingua franca is the unprecedented fact that most users of English are NNSs of English, and the fact that English has spread to all corners of the globe, which makes it the first truly global lingua franca (Ferguson, 1982, p. ix; Jenkins, 2009, p. 20).

English initially spread throughout the world as the result of British colonization efforts, and then even more subsequently as a result of American political, economic, technological, cultural, and military might (Crystal, 2003). According to Kahane (1982), British colonization resulted in the spread of English in the Outer Circle, and American influence resulted in the spread of English in the Expanding Circle (pp. 230-233). This spread of English sounds unidirectional, in the sense that English emanates from England or America and is passively accepted by other populations as a means of communication. That is, one might think that English was transplanted from England and America to other parts of the world like a metaphorical plant. But, of course, this description of the diffusion of English is entirely too simplistic because once a language is metaphorically planted somewhere else, it inevitably changes as its new users adjust it to meet their communicative needs and whims (Widdowson, 1994, 2012; Mufwene, 2001, 2008; Yano, 2009; Bybee, 2015; Pitzl, 2016; Thompson, 2017).

One argument that has been offered in answer to the language ownership question is that members of a new community own the language (e.g., Gumperz, 1972; Kachru, 1982; Schneider, 2007, 2014). This line of argument proceeds as follows: using a language in a new community inevitably and inexorably changes a language, and this also changes the locus of the ownership of that language to the new community. As Widdowson (1997) rightly claims, "[language] is not transmitted without being transformed" (p. 136), and thus once a language is used by a new community, it begins to change (Mufwene, 2001, 2008; Bybee, 2015; Thompson, 2017). One only need to look at the example of Hawaiian English Creole to see this. According to Sakota & Siegel (2011), who are Hawaiian English creole syntax and lexicon scholars, Hawaiian English Creole was the creation of a new variety of English as the result of its use among the children of immigrant sugar plantation workers, many of whom were from southern Japan (Roberts, 1998). Hawaiian English Creole has a novel syntax that utilizes constructions that are entirely different than Standard English to indicate the progressive, habitual, and future tenses. Furthermore, its phonology has fewer phonemic contrasts, and its vocabulary is an eclectic mélange of English, Portuguese, Cantonese, and Japanese words. Hawaiian English Creole demonstrates that new users can form a new community language, and this new community retains ownership over the new community language.

However, the argument that new communities who speak their own language variety own their own language cannot explain ownership of a language in ELF interactions. This is because it is difficult to describe ELF users as forming anything resembling a stable community or even a Community of Practice (CoP) (see e.g., Widdowson, 2012; Jenkins, 2015; Pitzl, 2018). At the same time, it is likewise difficult to exclude ELF users from the status of owners of the language because ELF users can exhibit the same level of linguistic creativity that speakers of varieties of English demonstrate (Widdowson, 2012; Pitzl, 2016; Thompson, 2017). Accordingly, an alternative answer to the language ownership question is possible: it is the creative use of a language that confers ownership on speakers (Widdowson, 2012; Pitzl, 2016; Kohn, 2018). Furthermore, as the creative use of English—the lingua franca factor—seems to be a defining feature of ELF interactions (see e.g., Firth, 2009; Section 3.2.4), it is entirely feasible to equate language ownership to the users of a language because the use of a language necessitates creative flexibility that is very evident in ELF interactions (see e.g., Iino & Murata, 2016; Pitzl, 2016; Thompson, 2017; Kohn, 2018).

3.2.2 World Englishes and English as a Lingua Franca Juxtaposed

The fields of WE and ELF have much in common: both fields of inquiry "give voice to previously invisible groups of English users through linguistic description" (Pitzl, 2016, p.

295). Kachru (1985) described English users in the outer circle in terms that did not designate their Englishes as deviations from a norm, but rather portrayed them in their own terms. Firth (1996), Jenkins (2000), and Seidlhofer (2001) described English users from different first language backgrounds in contact with one another in their own terms, rather than as deviations from a linguistic norm. Thus, as one can see, both WE and ELF describe and defend previously marginalized English users through endogenous descriptions.

However, this does not mean that there are no significant differences between WE and ELF. The extent to which the notion of language *variety* can and should play in descriptions of English using communities constitutes the most salient difference between each paradigm (Seidlhofer, 2009; Widdowson, 2012, 2015; Jenkins, 2015; Pitzl, 2016, 2018). Many scholars within the WE paradigm utilize the concept of language *variety* to describe the linguistic characteristics of local English varieties in order to justify the notion that local English varieties are legitimate versions of the English language (for phonetic descriptions of English varieties from a WE perspective, see e.g., Deterding, 2000, 2003, 2005; Low, 2012; Hung, 2000; Bilal, Mahmood, & Saleem, 2011; Tan & Low, 2010; Maxwell & Fletcher, 2009, 2010; Deterding et al., 2008). As such, the field of WE is a research paradigm that is devoted to describing the linguistic features of individual varieties of English (Schneider, 2007, 2011, 2014; Kirkpatrick, 2007b). In contrast to this, many ELF researchers—although certainly not all—reject the applicability or even utility of the concept of language variety in linguistic descriptions of English usage. Rather than identifying fixed linguistic norms, which are central and requisite for a claim to language variety status, many ELF scholars focus instead on language processes and their concomitant variation (Seidlhofer, 2009, 2011; Widdowson, 2012; Pitzl, 2016). In fact, although considerable disagreement exists as regards the applicability and validity of many of the following concepts, ELF studies increasingly rely on concepts from a multitude of fields, such as complexity theory (Larsen-Freeman & Cameron, 2008; Baird et al., 2014; Baker, 2015; Thompson, 2017), superdiversity (Vertovec, 2007; Cogo, 2012a), interculturality (Zhu, 2015), and translanguaging (Canagarajah, 2013; Matsumoto, 2014; Kimura & Canagarajah, 2018) to accurately describe the vicissitudes inherent in ELF interactions, each of which describes language usage as an inchoate process of becoming without end. In a word, a host of ELF research claims that variety status is neither necessary nor important to the description of language use in ELF interactions and settings.

Another salient difference between WE and ELF is the extent to which the period of contact among the speakers is important. Although the WE paradigm assumes extensive linguistic contact among community members (Schneider, 2004, 2007), the ELF paradigm makes no assumptions as to the length of linguistic contact among ELF users, and indeed explicitly includes short-term and ephemeral contact as instances of ELF interactions (Mortensen, 2013; Pitzl, 2018). Furthermore, ELF scholars are more likely to refer to English use in ELF settings as language contact, as Cogo & Dewey (2012) do when they assert that ELF settings constitute "language contact…in which English is spoken as the primary medium of communication" (p. 12). However, language contact among the ELF users is often temporary and usually brought about through the formation of what Pitzl terms *transient international groups*, or TIGs, who do not maintain long lasting and extensive contact with each other after the summation of the interaction (Pitzl, 2016, 2018). WE research, on the other hand, often assumes a much longer period of language contact between the speakers that appear in its studies (see e.g., Schneider, 2011; Kirkpatrick, 2007b). Thus, another difference between WE and ELF is that transient or short-term language contact is assumed in ELF interactions, whereas it is not in WE[19]. That is, ELF does not assume the existence of a linguistic community in the same way as WE.

3.2.3 Notions of Community and ELF

Despite promethean changes to the world due to globalization and its concomitant effects on English, many linguists cling to older concepts to ratify beliefs about language that are less operable in today's globalized world. Seidlhofer (2001, 2011) argues that a *conceptual gap* exists among linguists as to the descriptive validity and utility of notions such as language, culture, speech community, and communicative competence. Seidlhofer (2001) contends that

[19] Although linguistic contact can be transient within interactions among people who speak the same variety, as far as I know, WE scholars do not take this fact as evidence that the WE paradigm includes transient contact as evidence for the ontological status of a language variety.

the idea of a speech community, which is defined as a linguistically homogeneous group of people who use the same variety of a language (Gumperz, 1972), and the idea of communicative competence which presupposes the idea of a speech community (Hymes, 1986), should be reconsidered in light of the changing relationship between the reality of extensive English use in TIGs (see Section 3.2.2) and linguistic description of language use in ELF interactions.

Many linguists argue that a notion of a group of users is critical to descriptions of language and language use (Mufwene, 2008; Schneider, 2011; Bybee, 2015). That is, many linguists argue that descriptions of language usage necessitate the identification of a speech community to identify sufficient and insufficient language use. Gumperz (1972) defined a speech community as "any human aggregate characterized by regular and frequent interaction by means of a shared body of verbal signs and set off from similar aggregates by significant differences in language use" (p. 219). Of course, if one accepts this as the definition of speech community, then ELF clearly falls short: ELF interactions do not presuppose "regular and frequent interaction" nor do they assume a homogeneous "body of verbal signs" (Widdowson, 2012; Jenkins, 2015; Pitzl, 2018). Indeed, one criticism leveled against ELF studies is that ELF interactions lack a speech community (see e.g., Mollin, 2007 for this line of argument) and some WE scholars doubt that ELF users have a meaningful speech community at all (Mufwene, 2012, p. 365). In response to such criticisms, Seidlhofer (2009), Dewey (2009), and Jenkins (2011) argued that ELF needed to redefine its notion of speech community. For example, Seidlhofer (2009) states, "a much more appropriate concept is that of communities of practice characterized by 'mutual engagement' in shared practices, taking part in some jointly negotiated 'enterprise,' and making use of members' 'shared repertoire'" (p. 238). However, later ELF research rightly counter-argues that ELF interactions cannot really be described as communities of practice either (Mortensen, 2013, pp. 39-40; Baird et al., 2014, pp. 176-177; Jenkins, 2015, p. 61). Indeed, Pitzl (2016) proposes the notion of "transient international group," or TIG, as a meaningful unit with which to describe the community within ELF interactions (p. 298). As one can see, these responses are attempts to fill the void of an "ELF speech community."

But while a term to define a speech community is important to the conceptions of a language or a variety, ELF is neither a language nor a variety, but is rather language use among people from different first language backgrounds who use English as a contact language (Jenkins, 2009), and as such the idea that ELF interactions require a speech community to be a legitimate linguistic entity worthy of study is misplaced. As Jenkins (2015) states, "participants in ELF communication are not necessarily either 'communities' or engaging in something that could be described as 'shared practice'" (p. 64). Furthermore, Baird et al. (2014) rightly point out that there are dangers in assuming and assigning community membership as *a priori* entities, a criticism of speech community to which CA methodology would argue is correct. Indeed, Canagarajah (2013) goes as far as rejecting the idea that community can be *a priori* assumed. As such, the notion that ELF needs to define its speech community before it can fully define itself is the biggest non-problem in ELF research. An ELF speech community cannot be defined a priori, and like many features of ELF interactions, the ELF speech community emerges from the interaction. The definition of ELF does not hinge on an a priori definition of a speech community, nor does it need a definition of speech community.

Regarding communicative competence, Seidlhofer (2011) rightly argues that Hymes's (1986) original idea of communicative competence, which consists of the linguistically possible, the feasible, the appropriate, and the actually performed, presupposes a scalar judgment system that is based on NS norms (pp. 281-282). That is, Hymes's (1986) original formulation of communicative competence presupposes a speech community in which, "a normal member of a community has knowledge…of the communicative systems available to him" (p. 282). However, several ELF researchers argue that a more appropriate measure of communicative competence is less the ability to mimic the language praxis of a speech community and is more the ability to utilize and adjust linguistic resources according to the needs of the interaction, regardless of whether these linguistic resources conform to speech community practices (e.g., Seidlhofer, 2011; Canagarajah, 2013; Widdowson, 2016; Kimura & Canagarajah, 2018). As Widdowson (2016) rightly states, "NS competence is necessarily tied in with the contexts of use and the communicative purposes of NS communities, so it must follow that if English is used by other people in different contexts and for different purposes, this competence no longer corresponds with their social and personal needs" (p. 220). Thus, according to some ELF scholars, communicative competence is not the ability to mimic linguistic features, but rather the ability to creatively utilize language to suit the requirements of mutually intelligible communication. Whether the creative utilization of language matches or differs from NS language praxis is irrelevant to ELF research.

3.2.4 Variation as a Core Characteristic of ELF

Deciding which aspect of ELF interactions is the core characteristic of ELF as a linguistic phenomenon is no easy task. Although it is possible to differentiate ELF interactions from other types of interactions based solely on linguistic form (see e.g., Jenkins, 2000; Seidlhofer, 2004; Ranta, 2006, 2009, 2018; Breiteneder, 2005, 2009; Mauranen, 2012; Cogo & Dewey, 2012 for attempts to do this), the most salient, and indeed the most significant, feature of ELF interactions is the amount of variation that permeates the interactions. A multitude of scholars have identified variability, hybridity, and negotiation of linguistic form and function as core characteristics of ELF interactions (Canagarajah, 2007, p. 926; Mauranen, 2007, p. 244; Firth, 2009, p. 162; Jenkins, Cogo & Dewey, 2011, p. 297, 303; Seidlhofer, 2011, p. 95; Kimura & Canagarajah, 2018, p. 296). For example, according to Firth (2009), what makes ELF unique is the *lingua franca factor*, which he defines not as a cleanly delineable set of linguistic forms and functions but rather as the inherent variability of emergent linguistic forms that are interactionally negotiated for the purposes of the interaction (p. 162). As Canagarajah (2007) rightly states, "variation is at the heart of this system, not secondary to a more primary common system of uniform norms" (p. 926). Furthermore, as Firth (2009) states, "adaption, local accommodation, and attunement…appear to underpin successful lingua franca interactions" (p. 163). And it is the underpinnings of successful ELF interactions that should characterize, indeed define, ELF. These underpinnings are the willingness to negotiate linguistic form and function in each interaction as the need arises.

3.2.5 Defining ELF in an Emic Manner

Having referenced the notion of ELF several times across three chapters, I will now finally define the entity to which this thesis continually refers: *ELF is defined as an interaction* *conducted in English among speakers from heterogeneous first language backgrounds in which the heterogeneous first language backgrounds are emically relevant to the progression of the interaction*. This definition takes as axiomatic that the praxis of an interaction is determined by multiple aspects simultaneously, and that the aspect of heterogeneous first language backgrounds is just one among many that may affect an interaction (Mortensen, 2013, pp. 38-39). Indeed, the praxis of an interaction can be affected by the setting of the interaction, the purpose of the interaction, the relationship between the interactants, the mode of the communication, and the prevalent cultural norms, and as such heterogeneous first language backgrounds need not necessarily be a determinative factor in interactional praxis among people from different first language backgrounds (Mortensen, 2013, pp. 38-40; Baird et al., 2014, p. 186; Kennedy, 2017, pp. 7-8; Kohn, 2018, p. 19). As such, this is a weak definition of ELF in the sense that this definition does not assume that the heterogeneous first language backgrounds are necessarily determinative of linguistic form or behavior; a lot of things that happen within an interaction among speakers from different first language background might have absolutely nothing to do with the fact that the speakers are from heterogeneous first language backgrounds (see Mortensen, 2013, pp. 38-40 and Baird et al., 2014, pp. 186-188 for discussion of this very important point in relation to ELF research). According to this definition, the claim that the ELF aspect of a situation affects the interaction must be supported by emic evidence that the interactants orient to the heterogeneous first language backgrounds as a relevant aspect of the interaction.

This definition rejects the notion that ELF can be defined according to syntactical, morphological, phonological, or interactional characteristics (see e.g., Jenkins, 2000 for an attempt to do so). As Mortensen (2013) rightly states, "it is simply difficult, if not impossible, to claim with any certainty that a specific language scenario will necessarily generate specific speech forms and lead to the adoption of specific norms of interaction and interpretation" (p. 39). Although it is entirely appropriate, and indeed entirely true, to claim that ELF interactions can display a wide array of syntactical, morphological, phonological, and interactional variation (see e.g., Ranta, 2006, 2009, 2018; Breiteneder, 2005; Matsumoto, 2011; Dewey & Cogo, 2012; Mauranen, 2012; O'Neal, 2015a, 2016b; Thompson, 2017), this cannot be a defining characteristic of ELF because not all ELF interactions include such variation (Mortensen, 2013; Baird et al., 2014; Jenkins, 2015)[20]. Indeed, some ELF interactions conform to NES practices, and when this happens, this should be analyzed with the same rigor that ELF researchers apply to interactions that do not conform (Baird et al., 2014, p. 187 for arguments for this position). In fact, Thompson (2017) goes as far as to state that, "[ELF research] does not make the presumption that ELF practice will diverge from some standard or prevalent variety. There seem to be…solid reasons why prevalent 'standard' varieties might be preferred in unstable multicultural situations" (p. 210). Thus, ELF cannot be defined as difference from NES practices, and indeed NES practices within ELF interactions also have a legitimate, even if not a superordinate, place (Kohn, 2018).

The statement that the ELF aspect of a situation affects the interaction must be supported by emic evidence that the interactants orient to the heterogeneous first language backgrounds as a relevant aspect of the interaction deserves special mention. An emic definition of ELF must be able to claim that the participants to the interaction orient to their interactions as an ELF interaction. However, this is difficult to do with interactional data because as Murata (2016) rightly notes, people involved in ELF interactions are often not "aware that their interactions…are in fact taking place in ELF" (p. 3). Other ELF scholars have noted much the same. MacKenzie (2014) states that, "of course ELF is [just] an applied linguists' term; most users probably just think they are speaking English" (p. 23 brackets added). Firth (2009), a CA scholar who is fully aware of CA's stance against the etic perspective and support for the emic perspective, states that, "the term 'lingua franca' has no obvious endogenous, emic relevance, in that the interactants themselves are not likely to refer to their interactions as 'lingua franca' encounters" (p. 161). The problem is that it is difficult

[20] Although some ELF scholars (e.g., Jenkins, 2015) claim that associating ELF with certain linguistic forms is the hallmark of ELF1, an earlier conception of ELF, I think it is more than fair to claim that some ELF researchers have not abandoned ELF1 ways of examining ELF interactions. This is obviously the case with ELF researchers who came from a WE background (see e.g., Deterding, 2013; Deterding & Nur Raihan, 2016; Low, 2016), but this is also true amongst scholars who have always been associated with the ELF paradigm (see e.g., Ranta, 2018). The claim that ELF researchers have abandoned ELF1 conceptualizations of ELF is only true for some ELF scholars. Indeed, some new scholars (e.g., Laitinen, 2016; Zoghbor, 2018) explicitly self-identify as ELF1 scholars.

to define something in an emic way if the participants to the interaction do not orient to the characteristic in question (i.e., the heterogeneous first language backgrounds) as relevant to the progression of the interaction.

Although this definition of ELF mandates that an orientation to the heterogeneous first language backgrounds of the participants as relevant to the progression of the interaction be shown, this is not an impossible task. Interactants can and do orient to heterogeneous first language backgrounds as relevant to the progression of the interaction, as the example below will demonstrate. In the example, Hathai, a Thai exchange student, and Ryosuke and Misa, who are Japanese undergraduates, are interacting, but the speakers will encounter a miscommunication over the word “turtle”. In order to overcome the miscommunication, the heterogeneous first language backgrounds will become relevant even from an emic perspective.

Example 3.1. Emic orientation to heterogeneous first language backgrounds as relevant

1	Ryosuke	ando I have:
2		(0.3)
3		[tẹ̞.tl̩].
4		(0.5)
5	Hathai	[tẹ̞t]. oh{: : : }
6	Ryosuke	{yeah}
7		(0.2)
8	Hathai	whats- what is that?
9		(0.3)
10		[tẹ̞].
11		(0.3)
12		[tẹ̞.tl̩].
13		(0.3)
14	Ryosuke	[tẹ̞.tl̩]. uh::. .ssssh. hm::. .hhh
15		(0.2)
16		[tẹ̞.tl̩]. is::: uh:.

17		(0.3)
18	Hathai	is that japanese word?
19		(0.5)
20	Misa	no. {no. no. eng}lish.
21	Ryosuke	{>no. no. no.<}
22		(0.2)
23		english. uh. [tɐ̝.tl̩]. is uh::
24		(0.2)
25		sss.
26		(0.1)
27		hm::=
28	Hathai	=↑ah [tɜ˞.tl̩].
29	Ryosuke	[tɜ˞.tl̩].
30	Hathai	>I know. I know. {okay. okay.}<
31	Misa	{hahahahaha}
32	Ryosuke	{hahahahaha} okay. okay. yeah.

In the above example, the participants orient to the heterogeneous first language backgrounds as relevant to the progression of the interaction in two ways: first, Hathai explicitly makes heterogeneous first language backgrounds directly relevant to the praxis of the interaction during her attempt to ascertain the etymology of the trouble source in line 18; second, the vowel with which Ryosuke articulates "turtle" is approximate to the low central Japanese vowel /あ/, which phonetically corresponds to [ɐ̝] (Vance, 2008, p. 54)[21]. This vowel is specifically oriented to as a relevant in this interaction because it is the only phone within the trouble source that is oriented to as problematic and subject to segmental repair (see Chapter 6). Both actions manifest that heterogeneous first language backgrounds were emically relevant to the progression of an interaction. Accordingly, this interaction can legitimately

[21] Most scholars of Japanese phonetics would transcribe あ as [a̠] or [ɑ̟] (Saito, 1997; Vance, 2008). The [ɐ̝] transcription is no less accurate, but it is a departure from standard practice.

be described as an ELF interaction from an emic perspective; the participants oriented to the heterogeneous first language backgrounds as relevant to the progression of the interaction.

Accordingly, within this thesis, ELF will be defined as follows: *ELF is defined as an interaction conducted in English among speakers from heterogeneous first language backgrounds in which the heterogeneous first language backgrounds are emically relevant to the progression of the interaction*. This definition does not assume that all aspects of an interaction among speakers from different first language backgrounds can be attributed to the fact that the speakers have heterogeneous first language backgrounds. In fact, this definition mandates that heterogeneous first language backgrounds be demonstrated as relevant to the progression of the interaction from an emic perspective. Unless the participants orient to heterogeneous first language backgrounds as relevant to the progression of the interaction, then ELF is just an applied linguist's concept with little ecological validity. This definition rejects this and insists that ELF research must and can demonstrate that the aspect of an interaction that makes it an ELF interaction—the different first language backgrounds—is relevant to the participants.

To this point I have reviewed the theoretical background of ELF research, which included the relationship between globalization processes and the English language, the similarities and differences between WE and ELF research, the conceptual gap concerning the notions of speech community and communicative competence and the validity and utility of such notions to ELF research, the lingua franca factor as the defining feature of ELF interactions that sets it apart from other types of interactions conducted in English, and a definition of ELF grounded in the emic perspective from conversation analysis. With these descriptions of ELF in mind, I now review the empirical findings of ELF research with a focus on the relationship between ELF research and phonology.

3.3 A Review of ELF Research

This section will first review the general findings of more than eighteen years of ELF research (Section 3.3.1), and then it will review ELF research on phonology and the phonological praxis of ELF interactions (Section 3.3.2). Based on this review, the research gap within the existing studies of ELF research will be identified and examined (Section 3.3.3).

3.3.1 The General Findings in ELF Research

A plethora of research studies has described the characteristics of ELF interactions from the turn of the mellinium, and the volume of ELF studies is steadily growing every year (see e.g., Jenkins et al., 2011; Jenkins, 2015, 2018 for a comprehensive review of the development of and the future direction of ELF research). The foci of these studies range from people's *attitudes* toward ELF as a phenomenon (see e.g., Jenkins, 2007; Ishikawa, 2017; Pietkäinen, 2018; Kohn, 2018; D'Angelo, 2018), people's *identity* as ELF users (see e.g., Iino & Murata, 2016; Jenkins, 2007, 2015; Suzuki, 2011; Jenks, 2013; Matsumoto, 2014; Ishikawa, 2017; Pitzl, 2018; D'Angelo, 2018), the *phonology* of ELF interactions (see e.g., Jenkins, 2000, 2002; Tsuzuki & Nakamura, 2009; Osimk, 2009; Oda & Tajima, 2010; Kashiwagi, Snyder, & Craig, 2006; Deterding & Kirkpatrick, 2005; Deterding, 2013; Deterding & Nur Raihan, 2016; Kirkpatrick, 2010; Matsumoto, 2011; O'Neal, 2015a, 2015b, 2015c, 2015d, 2016a, 2016b, 2016c, 2017, forthcoming; O'Neal & Matsumoto, forthcoming; Zhang, 2015; Matsuura, Rilling, Chiba, Kim, & Rini, 2016; Kim, 2018; Zoghbor, 2018; Kim & Billington, 2018), the *lexis* and *morphosyntax* of ELF interactions (see e.g., Seidlhofer, 2004; Breiteneder, 2005, 2009; Pitzl, 2005, 2010, 2016; Ranta, 2006, 2009, 2018; Mauranen, 2012; Cogo & Dewey, 2012; Gilner, 2016; Laitinen, 2016; Pitzl, 2016), the *pragmatics* of ELF interactions (see e.g., Firth, 1996; House, 2003, 2008; Mauranen, 2006; Kirkpatrick, 2010; Kaur, 2011, 2012; Jenks, 2012; Murray, 2012; Cogo & Dewey, 2012; Björkman, 2014, 2017; Tsuchiya & Handford, 2014; Matsumoto, 2014; O'Neal, 2015a, 2016b, 2017, forthcoming; Hanamoto, 2016; Kappa, 2016), ELF's relationship with theory (see e.g., Seidlhofer, 2011; Hino, 2012; Widdowson, 2012; Baird et al., 2014; Vetchinnikova, 2015; Jenkins, 2015; Larsen-Freeman, 2018), and the applicability and viability of ELF concepts to English education (Sifakis & Sougari, 2005; House, 2008; Murata & Jenkins, 2009; Walker, 2010; Hino, 2012; Honna, 2012; Walker & Zoghbor, 2015; Iino & Murata, 2016; McBride, 2016; Leung & Lewkowicz, 2017; Kohn, 2018; Hino, 2018; D'Angelo, 2018).

Corpus linguistics has assumed a prominent place in ELF research as well. Large ELF corpora have been collected over the course of the previous two decades. These corpora include the Vienna-Oxford International Corpus of English (VOICE, 2013), the Corpus of

English as a Lingua Franca in Academic Settings (ELFA, 2008), and the Asian Corpus of English (ACE, 2013). The general aim of corpus linguistics is to gather enough data to make valid claims about systematicity in language use. Indeed, corpus linguistics was the preferred methodology for the initial focus of ELF research (see e.g., Mauranen, 2012; Cogo & Dewey, 2012) and continues to be used in current ELF research as well (see e.g., Laitinen, 2016).

Jenkins et al. (2011) describe the initial focus of ELF research as the attempt to discover "emerging patterns of lexical and grammatical forms" (p. 289) within ELF interactions. This focus equated ELF to emerging linguistic forms, and as such, the initial conceptualizations of ELF were very Saussurean: ELF was a system of emerging linguistic signs with which people convey meanings to and from each other (Vetchinnikova, 2015). A consequence of the search for emerging linguistic signs was the attempt to codify the signs of ELF. Although codification is not a claim of variety status, these findings come close to the claim that ELF is a variety of English. To be sure, no scholar has specifically claimed that ELF is a variety of English, but some researchers did use expressions that come close to such claims in the past. In fact, Seidlhofer (2006) once explicitly stated that it is "an open question" as to whether ELF is a variety or not (p. 46).

As Jenkins (2015) describes, the second focus of ELF research emerged from the initial scholarship on ELF interactions. This second focus of ELF research examined the linguistic processes that make interaction possible rather than the linguistic patterns that are the product of the interactions (Seidlhofer, 2009; Jenkins et al., 2011). This does not mean that the initial focus of ELF—the focus on linguistic patterns—was ever subsumed or superseded by the second focus (see e.g., Deterding & Nur Raihan, 2016; Ji, 2016; Low, 2016; Laitinen, 2016; Zoghbor, 2018 for examples of current ELF research that is focused on language systematicity). This research, however, is better situated within the second focus of ELF research (i.e., ELF2)[22]. That is, from the CA perspective that this research adopts,

[22] Jenkins (2015) argues that ELF research can be divided into three distinctive epochs: ELF1, ELF2, and ELF3. ELF1 focused on linguistic systematicity in ELF interactions. ELF2 focused on the pragmatics and variation of ELF interactions. ELF3 focused on the relation between ELF interactions and multilingualism. Most ELF researchers can be grouped into one of the three categories of ELF research. Unfortunately, it has become very difficult to explain what ELF is to non-specialists,

interactional intelligibility within ELF interactions can be considered an achievement among speakers in particular social contexts (Matsumoto, 2011; O'Neal, 2015a, 2016b, forthcoming). Maintaining intelligibility necessitates a process of utilizing linguistic resources, which can include phonetic resources. This is the perspective taken by this research, and as such, it is much more in line with the second focus of ELF research than the first or the third. Yet, because most research on ELF phonology explicitly references the first focus of ELF research, and because this research focuses on the second strand of ELF research, the next section will review the research on the phonology of ELF interactions (e.g., Jenkins, 2000; Deterding, 2013; Low, 2016; Zoghbor, 2018) as well as the pragmatic strategies that utilize phonetics to maintain intelligibility (e.g., Brouwer, 2004; Matsumoto, 2011; O'Neal, 2015a, forthcoming).

3.3.2 Core Phonology in ELF Interactions

It is not too much to say that one of the prime catalysts for ELF research was the desire to elucidate the relationship between phonetics in ELF interactions and intelligibility. Within ELF research, a plethora of studies examine the complex relationship between intelligibility and phonetics in ELF interactions from a number of methodological angles (see e.g., Jenkins, 2000, 2002; Tsuzuki & Nakamura, 2009; Osimk, 2009; Oda & Tajima, 2010; Kashiwagi et al., 2006; Deterding & Kirkpatrick, 2005; Deterding, 2013; Deterding & Nur Raihan, 2016; Kirkpatrick, 2010; Matsumoto, 2011; O'Neal, 2015a, 2015b, 2015c, 2015d, 2016a, 2016b, 2017, forthcoming; Zhang, 2015; Matsuura et al., 2016; Kim, 2018; Gardiner & Deterding, 2018; Zoghbor, 2018). A few ELF studies actually claim that some aspects of phonetics are far more significant for the maintenance of intelligibility in ELF interactions, and thus these segmental and suprasegmental features are core contributors to intelligibility, whose presence thus better ensures intelligibility and whose absence endangers intelligibility. The first such proposal was Jenkins's (2000) *Lingua Franca Core*.

3.3.2.1 Jenkins's Lingua Franca Core

unlike the situation in SLA and WE, which both have clear focuses.

Jenkins's Lingua Franca Core (LFC) is a seminal study in ELF research, and has had a huge influence on subsequent ELF research as well as SLA pronunciation research. Through an examination of miscommunications among students who were studying for English tests in England, Jenkins (2000, 2002) claimed to find that a large proportion of miscommunications were due to phonology problems. Furthermore, within the subset of miscommunications that could be attributed to phonology problems, Jenkins (2000) argued that articulatory deviation from certain phonetic features caused miscommunications to occur in her corpus; that is, certain segmental and suprasegmental characteristics were more critical for the maintenance of mutual intelligibility among the speakers in her corpus, while at the same time other deviations from certain segmental and suprasegmental phonetic features did not cause miscommunications. On the basis of such evidence, Jenkins (2007) claimed that there is "a core of pronunciation features which occur in successful NNS-NNS communication and whose absence leads to miscommunication" (p. 25). Jenkins (2000, 2002) called these segmental and suprasegmental characteristics that she argued to be more critical for the maintenance of mutual intelligibility the *Lingua Franca Core* (LFC). Accordingly, the phonetic features that are considered "core" within the LFC are claimed to better maintain intelligibility in ELF interactions and deviation away from the "core" features will attenuate intelligibility in ELF interactions.

According to Jenkins (2000), the original formulation of the LFC is as follows:

1) The entire consonant inventory of English is important for intelligibility, except for [θ] and [ð], which can be replaced with [f] and [v] respectively without any significant loss of intelligibility. Thus, for example, "thigh" articulated as [faɪ̯] would be as intelligible as [θaɪ̯] (pp. 137-138).
2) Word final vowel rhotacization is important for intelligibility, which means that rhotacized vowels in syllable coda position should not be articulated as the non-rhotacized variant of the same vowel. Thus, for example, "car" articulated as [kɑ˞] would be more intelligible than [kɒ] (pp. 138-139).
3) The full articulation of [t] rather than as flap [ɾ] is important for intelligibility. Thus, "water" articulated as [wɑtɚ] would be more intelligible than [wɑɾɚ] (p. 140).

4) Approximation of consonant sounds without the complete matching of the distinctive features of Received Pronunciation (RP) or General American (GA) consonants is sufficient as long as they are heard as different sounds; that is, phonemic distinctions must be maintained. Thus, "subway" articulated as [ʃʌb.weɪ̯], in which the [s] phone is articulated as [ʃ] is sufficient to the extent that the interlocutor still hears it as "subway." However, if the articulation of "subway" as [ʃʌb.weɪ̯] does not allow the interlocutor to hear "subway," then this approximation is not sufficient (pp. 143-144).
5) Aspiration after word initial voiceless stops is important to intelligibility. Thus, for example, "pin" articulated as [pʰɪn] would be more intelligible than [pɪn] (p. 140).
6) Deletion of consonants in word initial consonant clusters harms intelligibility, and thus should be avoided. Thus, for example, "string" articulated as [stɹiŋ] would be more intelligible than [sɹiŋ] or [stiŋ] (pp. 141-142).
7) Deletion of consonants in word medial and word final consonant clusters consistent with inner circle English rules helps intelligibility. Thus, for example, "facts" articulated as [fæks] would be more intelligible than [fækts] (pp. 142-143).
8) Vowel insertion is preferable to vowel deletion for the purposes of maintaining intelligibility. Thus, for example, "product" articulated as [pəɹɑdəkʊtə] would be more intelligible than [pɹɑdkt] (p. 142).
9) Vowel length contrasts between so-called long and short vowels are important for intelligibility[23]. Thus, for example, the vowel differences between [si̯ːd] and [sɪd],

[23] Jenkins (2000) relies on an outdated definition of vowel quantity. The definition of vowel quantity is the duration of the vowel, and a difference in vowel quantity denotes a difference in the duration of the vowel (Vance, 2008, p. 7-8). In many older phonetics textbooks, the difference between the [i] and [ɪ] vowels and the [u] and [ʊ] vowels is described as a difference in vowel length. However, modern phonetics has abandoned this distinction as an appropriate way to distinguish these sets of vowels. The difference between these vowels is a difference in vowel quality (Deterding, 2015, p. 72). Many SLA scholars also have abandoned the idea that vowel quantity distinctions are vowel articulation length distinctions (Derwing & Munro, 2015).

between [kṳ:d] and [kʊd], and between [kɔ:d] and [kɑ:d] are important to the maintenance of intelligibility (pp. 140-141, 144-145).

10) The lone vowel quality that is important to the maintenance of intelligibility is [ɜ:]. Other vowel quality distinctions are not important to the maintenance of intelligibility as long as they are consistent (pp. 145-146).

11) Vowel shortening before voiceless consonants and lengthening before voiced consonants is important to intelligibility. Thus, for example, "sat" and "sad" should be articulated as [sæt] and [sæ:d] respectively in order to better maintain intelligibility (pp. 140-141).

12) Placement of nuclear stress and its concomitant vowel lengthening effect to indicate contrastive meanings is important to intelligibility (pp. 153-155).

13) The segmentation of speech into manageable word groups, or tone units, is important to intelligibility (pp. 155-156).

Although the word "core" might conjure images of an inviolable set of phonetic features, Jenkins (2000) did not argue that all aspects of phonetics are critical to intelligibility, and thus a large amount of phonetic variation is possible within the LFC. The aspects of pronunciation that are not core pronunciation features "represent areas free for NNS variation" (Jenkins, 2007, p. 25). Thus, for instance, vowel quality variation is an area in which extensive variation is possible within the LFC because the only vowel quality that is critical to intelligibility within the LFC is [ɜ:]. Furthermore, consonant variation that maintains phonemic distinctions is also sufficient, and thus consonant pronunciation could also vary widely in different ELF interactions. Nonetheless, it is still more than fair to describe the LFC as a set of phonetic features that are claimed to better maintain mutual intelligibility and whose absence in pronunciation attenuates mutual intelligibility.

Jenkins's (2000, 2002) LFC proposal has been heavily criticized from any number of angles (see e.g., Sobkowiak, 2005 for a critique of the LFC and Jenkins, 2007, pp. 22-28 for a defense of the LFC), but this section examines only the substantial critiques of the LFC that focus on the methodology that Jenkins employed and the generalizability of the findings. First, many scholars who focus on issues of intelligibility critiqued the validity of Jenkins's methodology, claiming that Jenkins's evidence is much too limited to warrant her claims.

Indeed, the LFC is based on an analysis of only twenty-seven instances of miscommunication due to pronunciation that were gathered over the course of three years (Jenkins, 2000, pp. 85-86). In an initially moderate critique of the LFC, pointing directly to the poverty of the evidence for Jenkins' claims, Derwing (2008) states that, "the available evidence is very limited, based on a small sample of communication breakdowns" (p. 352). However, later the critique becomes stronger, and in a recent monograph Derwing & Munro (2015) state that, "Jenkins' approach…is based on very little evidence" (p. 114). This is a valid critique of the LFC: more data is needed to assess the efficacy of the LFC.

Furthermore, other scholars doubt whether the LFC applies to all ELF interactions, critiquing the generalizability of research that is based solely on an analysis of twenty-seven miscommunications due to pronunciation in ELF interactions among speakers from a limited number of language backgrounds. After all, Jenkins only examined interactions among Japanese speakers of English and Swiss speakers of English (Jenkins, 2000, pp. 84-87). As Dauer (2005) rightly points out, "it is not clear whether these results can be generalized to a larger population" (p. 549). As with the critique of the amount of evidence, this critique is also valid: much more data is needed to assess the efficacy of the LFC among speakers from various L1 backgrounds in ELF interactions. In fact, this is a critique that Jenkins (2000) herself affirms: "another problem is the need for empirical evidence from different international groupings to confirm (or not) the detailed claims of the LFC" (p. 235).

However, there is one more criticism that needs to be made of the LFC that I have not encountered in any research literature. The way in which Jenkins has described the LFC in certain instances renders it unfalsifiable, and as such, this makes it an unscientific idea (see e.g., Popper, 1959). To be sure, the original formulation of the LFC is falsifiable: either the discovery of a core feature that attenuated intelligibility or the discovery of a non-core feature that strengthened intelligibility would falsify the claims of the LFC. As such, the original formulation of the LFC is a scientific idea. However, in her defense of the LFC, Jenkins (2007) crossed a line between falsifiability and unfalsifiability when she stated that, "the point of the LFC is that the pronunciation norms in any given interaction are determined by the ELF users themselves" (p. 26). But if pronunciation norms in any given interaction are determined by the ELF users themselves, then nothing can be determined to be core and non-core outside of the interaction. Any instance of non-core LFC feature that strengthens intelligibility or any instance of a core feature that attenuates intelligibility would not be taken as evidence of falsification if Jenkins's (2007, p. 26) claim is taken at face value. Rather, it would be taken as further evidence that the LFC is correct. Although CA scholars would applaud this emic stance toward evidence for intelligibility, those who argue for empiricism would claim that Jenkins' statement renders the LFC impossible to falsify, and thus unscientific.

The original formulation of the LFC and its claims of a core set of intelligible features has been extensively tested through a variety of methodologies over the years (see e.g., Deterding & Kirkpatrick, 2006; Rajadurai, 2006; Osimk, 2009; Deterding, 2012, 2013; O'Neal, 2015c, 2015d; Gardiner & Deterding, 2018; Zoghbor, 2018). Both Rajadurai (2006) and Osimk (2009) support the claim that the aspiration of word initial voiceless stops is important to intelligibility. On the basis of evidence from segmental repair analysis, O'Neal (2015d) supported the LFC claim that the deletion of consonants in word initial clusters attenuates intelligibility. Deterding (2012) and Deterding & Kirkpatrick (2006) both support the notion that the consonant inventory of inner circle English, with the exception of the dental fricatives [θ] and [ð] is important to intelligibility, which also supports one of the claims of the LFC. Accordingly, some aspects of the LFC have been supported in ELF interactions among other types of speakers in other types of situations.

However, other studies contradict the claims of some aspects of the LFC. In the case of dental fricatives [θ] and [ð] substitutions, Deterding & Kirkpatrick (2006) found that the "frequent use of [t] in place of /θ/…does not cause much of a problem for listeners from ASEAN countries" (p. 395), a finding which does not support the LFC. Rajadurai (2006), in a study of intelligibility in ELF interactions in Malaysia, found that using dental plosives [t̪] and [d̪] in place of dental fricatives [θ] and [ð] were no less intelligible, but using labiodental fricatives [f] and [v] in place of dental fricatives [θ] and [ð] was actually less intelligible, which directly contradicts one of the core features of the LFC. O'Neal (2015a) discovered one instance in which a word that was articulated with a [s] phoneme was later segmental repaired to [θ] to restore mutual intelligibility, a finding which contradicts the claims of the LFC. Experimental research conducted in Europe according to psycholinguistic methods found that listeners "recognized the words that contained a non-rhotic pronunciation of /r/ more often than those which contained a rhotic pronunciation of /r/" (Osimk, 2009, p. 82), which suggests that rhotacized vowels are not as important to intelligibility as the LFC claims. Deterding (2012) found that variation away from several vowel qualities impeded intelligibility, and thus argued that the vowel qualities of [ɛ] and [æ] should also be considered core pronunciations (p. 188). O'Neal (2015c, 2016c) goes a little further and based on evidence derived from segmental repair analysis that many vowel qualities can be conditionally relevant to the maintenance of mutual intelligibility, which is a conclusion that overturns the LFC claim that vowel quality is not very important to the maintenance of intelligibility.

The original formulation of the LFC has also been adjusted over the years (see e.g., Jenkins, 2007; Walker, 2010; Kirkpatrick, 2010; Deterding, 2013; Deterding & Nur Raihan, 2016; Ji, 2016; Low, 2016; Zoghbor, 2018). Whether the first revision to the LFC was conducted in response to the above criticisms cannot be known, but the first revision to the LFC was made quite covertly, when Jenkins (2007) slightly altered the formulation of the LFC and included no deletion of consonants in word medial consonant clusters as part of the core features of the LFC (p. 23). In the original formulation of the LFC, medial consonant cluster simplification is unimportant to intelligibility if the word medial consonant cluster simplification conformed to inner circle consonant elision rules (Jenkins, 2000, pp. 142-143). In the revised LFC, however, any word medial consonant cluster simplification is claimed to attenuate intelligibility, and this minor alteration is reflected in later descriptions of the LFC even though it was not in the original formulation (see e.g., Walker, 2010, p. 62; Walker & Zoghbor, 2015). Although Jenkins's (2007) revision of the LFC is the very definition of slight change, other modifications have been more extensive. Walker (2010) proposed an additional suprasegmental component to the LFC: word stress (p. 40). According to Walker (2010), including word stress in a modified LFC is warranted by some psycholinguistic studies that suggest that word stress misplacement can attenuate intelligibility in ELF interactions (e.g., Field, 2005).

3.3.2.2 Deterding's Amendments to the LFC

Deterding (2013) amendments are the first major changes to the LFC and reflects the position of some ELF scholars from a WE background that ELF research too quickly moved away from ELF1 conceptualizations of language use in ELF interactions (see e.g., Jenkins, 2015 for a discussion of ELF1, ELF2, and ELF3). But before proceeding to the amendments to the LFC that Deterding (2013) proposed, it is important to delineate the method through which Deterding (2013) claimed to justify his findings, and thus the proposed changes. It is not too much to say that Deterding (2013) and Jenkins (2000) employed very different methodologies to ascertain which aspects of phonetics are most significant to the maintenance of intelligibility in ELF interactions. Deterding (2013) examined 6.5 hours of interviews in the Asian Corpus of English (ACE). The participants themselves were invited to transcribe their own interviews and clarify misunderstandings. This process resulted in the identification of 147 misunderstandings. Deterding (2013) furthermore argues that these misunderstandings are the result of insufficient vocabulary knowledge and atypical pronunciation. On the basis of these 147 misunderstandings, Deterding (2013) proposed the following phonetic characteristics as core pronunciations, whose presence better ensures intelligibility and whose absence attenuates intelligibility:

1) The entire consonant inventory of English is important for intelligibility, except for [θ] and [ð]. In fact, [θ] can be replaced with [s] and [f] without attenuating intelligibility, and [θ] can be replaced with [t] to increase intelligibility. Thus, for example, "thigh" articulated as [taɪ̯] would be more intelligible than [θaɪ̯] (p. 39).
2) Word initial [h] deletion harms intelligibility, and therefore [h] deletion should be avoided (pp. 40-41). Thus, for example, "has" articulated as [hæz] would be more intelligible than [æz]. This matches the original formulation of the LFC.
3) /n/ /l/ /r/ /w/ must be phonemically different, and thus approximation in the case of these four phonemes is not recommended (p. 44). Thus, the word "not" approximated to [lɑt] is not recommended, even though [l] and [n] share many distinctive features. While the claim that the pronunciation of /n/ /l/ /r/ /w/ is important to intelligibility is consistent with the original formulation of the LFC, it

is different in the sense that approximation among these four phonemes is not recommended.

4) Deletion of consonants in word initial consonant clusters, especially [ɹ] and [l] harms intelligibility, and thus should be avoided. This matches the original formulation of the LFC (p. 46).

5) The vowel qualities [ɜː] [ɛ] [eɪ] are important to intelligibility (pp. 65-68). As with the LFC, vowel quality variation other than the previously mentioned vowels is sufficient.

A comparison of the original formulation of the LFC with Deterding's proposals reveals that there is considerable overlap. Both Jenkins (2000) and Deterding (2013) question the significance of suprasegmentals to intelligibility. Both argue that weak form pronunciations attenuate intelligibility. Both argue that speech rhythm is not important to intelligibility. Jenkins (2000) goes as far as to question whether speech rhythm even really exists (pp. 149-150). Last, while not doubting the semantic significance of intonation, both question the strength of the relationship between intonation and intelligibility and argue that intonation is not crucial.

However, there are some salient differences between the original formulation of the LFC (e.g., Jenkins, 2000) and Deterding's (2013) proposals as well. Deterding's (2013) proposal does not claim that vowel quantity is critical to intelligibility (p. 73). Thus, whereas Jenkins (2000) claims that the difference between, for example, [i] and [ɪ] is critical to the maintenance of intelligibility, Deterding (2013) is less certain that this is true. Furthermore, Deterding (2013) claims that misplaced nuclear stress does not seem to cause misunderstandings in his data, and thus it is unlikely to be critical to intelligibility (p. 78). Thus, some divergence between the original formulation of the LFC and Deterding's (2013) proposals are evident.

Deterding's (2013) proposals for a new LFC have not been vetted to the extent that Jenkins's LFC proposals have been, but that does not mean that Deterding's (2013) proposals have not been critiqued. As with the discussion of the critiques of Jenkins's LFC, this section will only cover the substantive critiques of Deterding's (2013) proposals. Pietkäinen (2018) critiques Deterding's proposals from a CA angle, and also argues that Deterding (2013) fails to distinguish between misunderstandings and mishearings. First, Pietkäinen (2018) contends that many of the reported misunderstandings were not addressed during the actual interactions, which could indicate that some of the pronunciations later identified as causing misunderstandings did not do so during the actual interaction. Furthermore, Pietkäinen (2018) claims that upon closer examination several of the misunderstandings in Deterding's (2013) data resemble mishearings rather than clear misunderstandings as Deterding claims. However, another more serious critique could be leveled at Deterding's proposal. It is extremely difficult to accurately gauge exactly which segmentals or suprasegmentals caused intelligibility to falter when the methodology employed to detect intelligibility problems is a dictation task. As Matsuura et al. (2016) argue, the "complexity of phonological variation makes it difficult to pinpoint which specific features affect intelligibility [in a dictation task]" (p. 10, brackets added). As Deterding (2013) continuously points out, multiple issues at the same time affect intelligibility, and thus it is hazardous with Deterding's methodology to pinpoint which segmentals and/or suprasegmental features are causing intelligibility problems.

3.3.3 Phonological Praxis in ELF Interactions

A superficial reading of the above research would indicate that each scholar agrees with the idea that a set of phonetic features are more important for the maintenance of mutual intelligibility. In that respect, they argue for something similar to what a SE pronunciation teacher would also contend is true: some distinctive features of phonetic segments make pronunciation more intelligible than other distinctive features. The difference lies in which distinctive features are considered more intelligible, not that there is a core set of features. However, considerable variation is possible within the above proposals. First, I will detail the underdeveloped notion of accommodation as it applies to the phonological praxis of ELF interactions (Section 3.3.3.1), and then I will differentiate accommodation from a more important process, segmental repair (Section 3.3.3.2).

3.3.3.1 Accommodation

There is an oft ignored section of the LFC proposals that has to do with online adjustments to pronunciation during an interaction. This phenomenon is called *accommodation*, which is defined as the extent to which speakers approximate the speech patterns of their interlocutors. Giles (1973) demonstrated that speakers from backgrounds of different varieties of English would converge towards each other's accent over the duration of an interview. The process of converging on the phonetic aspects of each other's accent over the course of an interaction is called speech convergence (Giles, Coupland, & Coupland, 1991; Giles & Coupland, 1991). But the opposite phenomenon also exists: speech can diverge away from the phonetic aspects of the other over the course of an interaction, and this phenomenon is called speech divergence (Giles et al., 1991; Giles & Coupland, 1991).

Both Jenkins (2000, pp. 167-175) and Deterding (2013, pp. 85-87) refer to accommodation theory within their discussions of the LFC, and both claim that phonetic accommodation is important to ELF interactions. Specifically, Deterding (2013) claims that "there are two ways that phonetic accommodation can occur: listeners can adapt to the pronunciation of speakers, by getting accustomed to their patterns of pronunciation; and speakers can adjust their pronunciation to the needs to their listeners" (p. 85). Deterding identifies two aspects of phonetic accommodation, which are often conflated in ELF research as *accommodation*. Nonetheless, Deterding (2013) identifies using pronunciation that is more reminiscent of the interlocutor's speech patterns as one aspect of phonetic accommodation, and adjusting pronunciation to the needs of the interlocutor, presumably so that mutual intelligibility can be maintained, is another aspect of phonetic accommodation. Thus, on a close reading of the LFC proposals of Jenkins (2000) and Deterding (2013), one can claim that both scholars validate the notion of phonetic adjustments during interactions to maintain mutual intelligibility.

However, it is very difficult to argue that either scholar detailed this notion or even examined it very closely. Jenkins (2000) does not examine any examples of accommodation in her study. Deterding (2013) mentions some instances of listeners adapting to the pronunciation of the speaker, but he specifically states that "there is very little evidence of [speaking accommodation]" in ELF interactions (p. 87, brackets added). In other words, Deterding claims that what this study will call segmental repair is not common in his corpus.

Therefore, while one must admit that both Jenkins (2000) and Deterding (2013) included elements of interactional variability within their LFC proposals, it is difficult to claim that they detailed these notions or even studied them very intently.

3.3.3.2 Segmental Repair

Luckily, some ELF scholars did not believe that accommodation is as rare as Deterding (2013) claims. Matsumoto (2011) is the first ELF scholar that specifically focused on the phonetic negotiation processes of maintaining intelligibility in ELF interactions, or on what Jenkins (2000) and Deterding (2013) call speaker accommodation[24]. Specifically, Matsumoto (2011) found that ELF users do accommodate to the needs of the interlocutor and adjust their pronunciation in situ so that the interlocutor can understand. In fact, adjustments to pronunciation over the course of an interaction were fairly common, although they were not any more common than other types of repair strategies. Nonetheless, the Matsumoto (2011) study is seminal in the fact that it demonstrated that ELF users orient specifically to phonetic segments as trouble sources and repair them.

An example of segmental repair is warranted at this point. In the following example, taken from O'Neal (forthcoming), Jia, who is a Chinese exchange student, and Mako, who is a Japanese undergraduate, are discussing the lack of public transportation in Niigata, which leads to the pronunciation of "subway" being oriented to as a trouble source. In order to overcome this miscommunication and achieve mutual intelligibility, Jia and Mako will adjust the phonetic segments of the pronunciation of "subway" into a more mutually intelligible variant.

Example 3.2. Phonetic accommodation in ELF interactions

1	Jia	since beijing- since ↑peking has a: [ʃʌb.weɪ̯].

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[24] Brouwer (2004) also details what can be considered the mechanism of segmental repair, but the interactions within that study are between speakers of the same first language background, and thus those interactions would not be considered ELF interactions according to the definition of ELF that is offered in this study. The interactions within the Brouwer (2004) study would be considered ELF interactions according to the ELF 3 definition, however (see e.g., Jenkins, 2015; Ishikawa, 2017).

2		(0.4)
3	Mako	[ʃʌb.we]?
4	Jia	[ʃʌb.weɪ̯].
5		(1.2)
6		niigata don't have,
7		(0.6)
8		didn't have,
9		(0.3)
10		don't have,
11		(0.1)
12		[ʃʌb.weɪ̯],
13		(0.3)
14	Mako	[ʃɑ.ɰɯ]?
15		(1.8)
16	Jia	[sʌb.weɪ̯].
17		(0.3)
18	Mako	[sʌb.weɪ̯]?
19		(0.2)
20	Jia	hm.
21	Mako	↑oh >yeah yeah< ah. >I know I know<.

(Extracted from O'Neal, forthcoming)

In the above interaction, Jia realizes that her pronunciation of "subway" is not intelligible to Mako, and adjusts the segmentals of her pronunciation from [ʃʌb.weɪ̯] to [sʌb.weɪ̯] so that it would become more intelligible. In spite of Deterding's (2013, p. 87) doubts about the existence of speaker accommodation, it does exist, as this thesis will demonstrate again and again. It is likely that the methodology that Deterding (2013) utilized to examine pronunciation made it unlikely that he would notice the negotiation of mutually intelligible pronunciation [25]. Nonetheless, it is the process of negotiating mutually intelligible pronunciations that enables mutually intelligible communication to flourish, and it is an essential skill for ELF users.

3.3.4 A Research Gap

While a fairly large body of ELF research claims that certain aspects of phonetics are critical to the maintenance of intelligibility in ELF interactions, research on the strategies for negotiating the maintenance of mutual intelligibility in ELF interactions is very scarce. In particular, there seems to be very few existing studies that extensively explore what ELF users do once they encounter an intelligibility problem that is caused by some aspect of phonetics. As of now, Matsumoto (2011) is the only ELF research that examines the processes by which ELF users overcome intelligibility problems which are identified as pronunciation issues by the participants themselves. In other words, little ELF research to date has examined what ELF users do to overcome an intelligibility problem whose source is oriented to as a segmental or suprasegmental issue.

To be sure, both Jenkins (2000, pp. 167-175) and Deterding (2013, pp. 85-87) claim that phonetic accommodation is a part of ELF interactions, and even an important aspect of the maintenance of mutual intelligibility. However, neither Jenkins (2000) nor Deterding (2013) extensively describe the processes of accommodation that enable ELF users to maintain mutual intelligibility. Furthermore, both Jenkins (2000) and Deterding (2013) conflate two different processes into accommodation phenomena: using a pronunciation that is more reminiscent of the interlocutor and utilizing what in this study will be referred to as segmental repair are both described as accommodation processes. However, these two processes should be kept separate, and the justification for this separation is that ELF users orient to these two processes as different things (see O'Neal & Matsumoto, forthcoming). Moreover, O'Neal (2015b, 2016b) has discovered some instances in which ELF users use

[25] Pietkäinen (2018) makes a valid critique of Deterding's (2013) methods when she claims that Deterding's methodology could have reduced the pressure on the interactants to negotiate more intelligible pronunciation during the interaction because the interactants knew that they could listen to recordings of their interactions again at a later time.

segmental repair to restore mutual intelligibility, but do not necessarily use pronunciations that are more reminiscent of the interlocutor's articulations as a result, which is emic evidence that ELF users do indeed orient to these two accommodation processes as separate. In a word, the speakers did one aspect of accommodation but not another. It is unclear whether this is still accommodation as Jenkins (2000) and Deterding (2013) describe it. Thus, what Jenkins (2000) and Deterding (2013) refer to as accommodation is better thought of as two different phenomena. Furthermore, it is quite likely that segmental repair is far more significant to the maintenance of mutual intelligibility in ELF interactions than using a pronunciation reminiscent of the interlocutor's speech patterns, and thus these processes are not equally important either.

Accordingly, this research will investigate how segmental repair is utilized among ELF users. In particular, this research will focus on how speakers organize phonetic negotiations within segmental repair sequences to maintain mutual intelligibility (Chapter 5). Some phonetic negotiations, however, have little to do with the maintenance of mutual intelligibility, and thus this research will also focus on how and why speakers conduct phonetic negotiations on pronunciation for purposes other than maintaining mutual intelligibility (Chapter 6). On the basis of the data gathered from the examinations in Chapter 5, the adjustments to phonetic segments as well as the frequency of each will be quantified and the predictions of functional load theory will be assessed (Chapter 7). Last, through the experimental method, the efficacy of segmental repair as a communication strategy to develop mutual intelligibility will be assessed (Chapter 8).

3.4 Summary

This chapter reviewed the theoretical foundation of the ELF paradigm (Section 3.2), and the findings of the current body of ELF research (Section 3.3). First, I have delineated the views of many ELF scholars as regards the key notions of ELF. This includes the ownership of English, the general differences between the WE research paradigm and the ELF research paradigm, the relevance of the notion of community to ELF research, and the possibility of defining variability as the core characteristic of ELF. This chapter also argued for a definition of ELF that is based on the emic perspective. Second, I have focused on the ELF research on intelligibility in ELF interactions. Based on the review of ELF research on intelligibility, I have identified a research gap that concerns phonetic accommodation in ELF interactions and specified what will be examined in the rest of this thesis.

Having clarified the theoretical groundwork of the ELF research paradigm and the research gap, I will now explain the research design that has been adopted for this study and offer information on the main data collection procedures in order to explore answers for the general research purpose proposed in Section 1.1. That is, how do ELF users overcome an intelligibility problem whose source is oriented to as an issue concerning phonetic segments?

Chapter 4
Research Design

4.1 Introduction

This chapter describes the research methodology that is utilized to answer the general research questions from Section 1.1: How do ELF users maintain mutually intelligible pronunciation and co-construct sufficient pronunciation? How does interaction relate to mutual intelligibility? But this chapter also discusses the fundamental epistemological questions of science as they relate to this study: How does one know that anything is true? What is legitimate evidence of a phenomenon? How much evidence is required to justify a claim to know something?

In the following sections, I will present an outline of the research methodology of this research, segmental repair analysis (Section 4.2). Then I will provide a justification for the research methodology and the techniques that are used in this research (Section 4.3). This will include a discussion of the integrity of phonetic transcription of ELF interactions (Section 4.3.1), the naturalness of conversational data subjected to segmental repair analysis (Section 4.3.2), the validity and reliability of segmental repair analysis as a research methodology (Section 4.3.3), the relationship between quantification and segmental repair analysis (Section 4.3.4), and the falsifiability of results based on segmental repair analysis (Section 4.3.5). This will be followed by a discussion of the specific procedures through which data collection was conducted (Section 4.4), which will include an explanation of the research sites (Section 4.4.1), the participants (Section 4.4.2), the procedures for the data collection (Section 4.4.3), a description of the entire corpus that has been gathered for this research (Section 4.4.4), and the transcription conventions used in this thesis to illustrate the examples (Section 4.4.5).

4.2 Segmental Repair Analysis

The research methodology that is adopted by this research is segmental repair analysis (see e.g., Brouwer, 2004; Matsumoto, 2011; O’Neal, 2015a, 2015b, 2015c, 2015d, 2016a, 2016b, 2017, forthcoming), which is defined as the examination of the turn by turn negotiation of phonetic segments so that pronunciation remains mutually intelligible or sufficient. All subsequent justification of segmental repair analysis as a legitimate means with which to conduct a scientific inquiry into the research questions posed in Section 1.1 will be much easier to follow after an actual example of segmental repair analysis. Accordingly, an example is provided below: Mitsu, a male Japanese undergraduate, Mashu, another male Japanese undergraduate, and Bumbyn, a female Mongolian exchange student, are in the middle of a discussion of their club activities, but both Mitsu and Mashu orient to the pronunciation of "chess" as a trouble source, which catalyzes a segmental repair sequence that leads to the modification of the phonetic segments within the trouble source and the subsequent restoration of mutual intelligibility.

Example 4.1. An example of segmental repair

1	Mitsu	how about you?
2		(0.4)
3	Bumbyn	uh:: my club?
4		(0.2)
5		uh: I don.
6		(0.1)
7		Im not a member of.
8		(0.2)
9		any club {in niigata uni}versity ↑but? .hhh
10	Mitsu	{ahh: : . oh}
11		(0.3)
12	Bumbyn	I::: like to participa:te.
13		(0.6)
14		uh international student clubz: {event. events.} .hhh
15	Mitsu	{ohw:. uh hm.}
16		(0.1)
17	Bumbyn	an:de.
18		(0.5)

19		in my home university I am a member of [t͡ʃiz] cl- [t͡ʃɪs] club?
20		(0.6)
21	Mashu	°[t͡ʃe]°?
22	Bumbyn	[t͡ʃɛs] club.
23		(0.2)
24	Mitsu	[t͡ʃɛs]?
25		(0.4)
26	Bumbyn	you know {[t͡ʃɛs]?}
27	Mitsu	{oh:. } [t͡ʃɛs]. oh.
28		(0.1)
29	Bumbyn	yea::h.

In line 19, Bumbyn articulates “chess” once as [t͡ʃiz], and then self-repairs [t͡ʃiz] to [t͡ʃɪs]. In line 21, however, Mashu articulates [t͡ʃe] in low volume and with rising intonation, which orients to [t͡ʃɪs] as a trouble source and thus also as unintelligible. At this point, all that can be said from an emic perspective is that Mashu has oriented to [t͡ʃɪs] as unintelligible. Whether the cause of the unintelligibility is unfamiliarity of pronunciation, lack of word knowledge, or some other problem cannot be determined.

In line 22, in an effort to restore mutual intelligibility, Bumbyn self-repairs [t͡ʃɪs] to [t͡ʃɛs], changing the vowel quality of the trouble source from [ɪ] to [ɛ]. In line 27, Mitsu first deploys the discourse marker “oh”, which displays a claim that intelligibility has been restored, then repeats [t͡ʃɛs], which specifically orients to [t͡ʃɛs] as intelligible, and last deploys the discourse marker “oh” a second time, which emphasizes the claim that intelligibility has been restored. In the aggregate, Mitsu’s actions in line 27 orient to [t͡ʃɛs] as a mutually intelligible pronunciation.

From an example such as the above, I would claim on the basis of segmental repair analysis that both Mitsu and Mashu oriented to [t͡ʃɪs] as unintelligible and to [t͡ʃɛs] as intelligible. The basis for the claim that [t͡ʃɪs] is unintelligible is Mitsu and Mashu’s orientation to it as unintelligible; the basis for the claim that [t͡ʃɛs] is intelligible is Mitsu and Mashu’s orientation to it as intelligible. Furthermore, a comparison of the pronunciation that was oriented to as unintelligible to the pronunciation that was oriented to as intelligible reveals the phonetic causes of unintelligibility and the phonetic catalysts of the restoration of mutual intelligibility. Because the lone phonetic difference between [t͡ʃɪs] and [t͡ʃɛs] is vowel quality, I would claim on the basis of segmental repair analysis that the [ɪ] phone was the cause of the unintelligibility of the trouble source, and that the [ɛ] phone was the catalyst that restored intelligibility. In other words, the self-repair of [t͡ʃɪs] to [t͡ʃɛs] allowed these speakers to negotiate an intelligible pronunciation out of an unintelligible one.

Having demonstrated an example of segmental repair analysis, which is the examination of the turn by turn negotiation of intelligible or sufficient pronunciation, and the conclusions that can be made based on one example of it, I will now justify and defend segmental repair analysis as a means with which to answer the research questions that were posed in Section 1.1.

4.3 The Methodological Considerations

This research adopted a two-method design (Eskildsen, 2008, 2012; Stivers, 2015). The first method that this research uses is a qualitative conversation analytic approach to examine segmental repair sequences in transcripts of data (Brouwer, 2004; Matsumoto, 2011; O'Neal, 2017) followed by quantitative coding and statistical analyses of interactional trends across all the segmental repair sequences in the corpus gathered for this study (Stivers, 2015; O'Neal, forthcoming). The second method that this research utilizes is an experimental method to examine the relationship between segmental repair, mutual intelligibility, and interaction (Gass & Mackey, 2015; Saito & Akiyama, 2017). The main data for the first method were audio-recordings of interactions among Japanese university undergraduates; non-Japanese university undergraduates; Chinese, Thai, and Mongolian exchange students; and Chinese graduate students, all of whom were studying at the same large public Japanese university. The main data for the second method were video-recordings of experimental interactions among recruited Japanese students and non-Japanese students at the same large public Japanese university. The following section will discuss the degree to which the phonetic details of an interaction can be accurately transcribed according to the currently available IPA transcription system.

4.3.1 The Integrity of Phonetic Transcriptions of ELF Interactions

This section will discuss the degree to which phonetic transcription can actually represent the phonetic reality of pronunciation in ELF interactions, the reasons as to why accurate phonetic transcription is difficult to attain, and the way in which threats to the accuracy of phonetic representation can be contained. Segmental repair analysis heavily depends on the integrity of the phonetic transcriptions and the ability of the transcriber to accurately render the phonetic details of an interaction. If the phonetic transcription is inaccurate, then all subsequent analytical claims would be very misleading, and thus in a very real sense the integrity of the phonetic transcription is of paramount importance; everything else within the methodology that this study adopts depends on it. Accordingly, threats to the integrity and accuracy of the phonetic transcriptions must be vigilantly guarded against.

Phonetic transcription has two major problems: 1) using phonetic transcription to capture the subtle articulatory differences has practical limits; 2) the human tendency to hear speech and associate it with phonemes rather than phones can attenuate the accuracy of phonetic transcription. First, the representation of gradient phonetic phenomena is not always possible with just the symbolic units of the International Phonetic Alphabet (IPA) (Bybee, File-Muriel & De Souza, 2016). As a consequence of adopting symbolic units, the researcher has to choose a symbol and many possible diacritics to represent the temporal, spectral, and energy characteristics of speech, but many of these characteristics are actually quite gradient, and thus difficult to represent accurately. Therefore, even narrow IPA transcription is not as representative of speech as one may hope (Bybee et al., 2016). Second, humans have an innate tendency to hear phonemic categories rather than phonetic categories; that is, human beings will often hear phonetically different phones as phonemically the same phoneme (Jusczyk, 1997; Bybee et al., 2016). The transcriber is not immune to this. Thus, the transcriber may perceive phonetically different phones as phonemically similar phonemes, which is one aspect of two phenomena known as *categorical perception* (see e.g., Repp & Liberman, 1987; Garlock, Walley & Metsala, 2001; Liberman & Whalen, 2000; Garlock, Walley & Metsala, 2001; Ellis, 2006; Eckman & Iverson, 2013) and the *phonemic restoration effect* (see e.g., Warren, 1970; Pisoni, 1973; Samuel & Frost, 2015). Categorical perception refers to the human capacity to perceive phonetically different phones as phonemically the same phoneme: for example, the three articulatory realizations of the [k] phone in the phrase "keep quiet kid!" are phonetically different (i.e., [k] with spread lips, [k] with rounded lips, and [k] with neutral lips respectively), but all three are perceived to be phonemically similar (i.e., three /k/ phonemes). On the other hand, the phonemic restoration effect refers to the human capacity to hear sounds that are not phonetically present in speech stimuli; human brains are amazingly good at perceiving statistically likely phonemes rather than actual phones (Samuel & Frost, 2015).

Categorical perception and the phonemic restoration effect can make phonetic transcription difficult because many languages contain phones that might be perceived as the same phoneme to speakers of other languages. For example, the Japanese language has a flap /ɾ/ phoneme that can affect how Japanese people articulate English phonemes (Vance, 2008; Labrune, 2012). Thus, when some Japanese people intend to articulate [ɹ] or [l], they may instead articulate a flap [ɾ] phone that nonetheless may be phonemically perceived as either /ɹ/ or /l/ (Riney, Takada & Ota, 2000; Riney, Takagi & Inutsuka, 2005; Kondo, 2016). Something similar can happen with Chinese speakers of English. The Mandarin Chinese language contains a retroflex approximant [ɻ] that can affect how Chinese people articulate English phonemes (Duanmu, 2007; Sigi & Sewell, 2012). Thus, when some Chinese people intend to articulate [ɹ], they may instead articulate a retroflex approximant [ɻ] that nonetheless may be phonemically perceived as /ɹ/ (Siqi & Sewell, 2012). Furthermore, Mongolian contains a velar [x] and an uvular [χ] and [ɴ] that can affect how Mongolian people articulate English phonemes (Svanteson, Tsendina, Karlsson & Franzen, 2005). Accordingly, when some Mongolian people intend to articulate [k], they may instead articulate velar [x] or an uvular [χ], and when some Mongolian people intend to articulate [ŋ], they may instead articulate uvular [ɴ] that may be nonetheless be phonemically perceived as /k/ and /n/ respectively (Cohen, 2005). None of this is meant to suggest that Japanese speakers of English categorically articulate phonemic /ɹ/ and /l/ as phonetic [ɾ], that Chinese speakers of English will always articulate phonemic /ɹ/ as phonetic [ɻ], nor is this meant to imply that Mongolian speakers of English will always articulate phonemic /n/ as [ɴ] or phonemic /k/ as velar [x] or an uvular [χ]. Neither does this imply that these articulations will necessarily cause an intelligibility problem in ELF interactions. Yet it does need to be emphasized, however, that the human capacity to perceive speech sounds as phonemic categories rather than phonetic categories makes phonetic transcription more difficult than one may think (Liberman & Whalen, 2000; Bybee et al., 2016).

The transcriber of the phonetic details of an ELF interaction can attenuate the human penchant to perceive sounds in a phonemic way and strengthen the phonetic accuracy of transcription through three methods. The first means with which the transcriber can increase the accuracy of the phonetic transcription of an ELF interaction is to be aware of the phonetic categories that may appear in the recordings. Japanese speakers of English may bring many phonetic categories to play in an ELF interaction: [dʑ] [ç] [ɕ] [ʑ] [ɐ̞] [e̞] [o̞] [tɕ] [ɸ] are all phones that may make an appearance (Vance, 2008; Labrune, 2012; Riney et al., 2000, 2005). Different Voice Onset Times (VOT) (Harada, 2006, 2007) and vowel articulations could also make an appearance (Lee, Guion & Harada, 2006; Short, Hirose, Kondo & Minematsu, 2015). Chinese speakers of English may also bring other phonetic categories to bear on an ELF interaction, such as retroflex segments: [ɻ] [ʈʂ] [ʂ] (Duanmu, 2007; Sigi & Sewell, 2012). ELF interactions can be super-diverse in the sense that multiple phonetic systems can be at play at the same time (e.g., O'Neal, forthcoming), and just being aware of this can increase the possibility of accurate phonetic transcriptions. The second means with which the transcriber can increase the phonetic accuracy of the transcription is to use PRAAT software (Boersma & Weenink, 2016) to create spectrograms that allow for the visual inspection of sounds to check for phonetic characteristics that are often not very salient: aspiration, roundedness, retroflection, and degree of plosion[26]. The third means with which the transcriber can increase the phonetic accuracy of the transcriptions is to request that another listener transcribe the same material. If another listener can transcribe the same material in the same way, then interrater-reliability (see Section 4.3.4) can be ascertained. Through these methods, the integrity of the phonetic transcription of ELF interactions can be increased, although it is

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[26] I must admit at this point that I have never taken acoustic phonetics as a course. All of my knowledge of acoustic phonetics comes from reading Johnson (2012).

more than fair to say that phonetic transcriptions can never be perfect facsimiles of phonetic reality.

Each of the three methods of safeguarding the phonetic transcription of the ELF interactions under examination in this thesis have been used. The transcriber has studied both Japanese and Chinese language and lived in both Japan and China for extended periods of time. The transcriber has taken courses on English, Japanese, and Chinese phonetics and phonology[27], and is thus very aware of the phonetic segments that might appear within the ELF interactions under study in this thesis. Furthermore, the transcriber is able to use PRAAT software to identify subtle acoustic phonetic features of speech. Last, the transcriber has asked friends and colleagues to check the transcription of particularly problematic sections of dialogue, which has resulted in more accurate phonetic transcriptions[28].

Having explained how the integrity of the phonetic transcription of the ELF interactions is maintained in this research, I will now discuss the controversial issues concerning the “naturalness” of recorded conversational data.

4.3.2 The Naturalness of Conversational Data

This section will discuss the degree to which the data that is phonetically transcribed as part of this research can be considered natural. First, I will discuss the definition of “naturally occurring data” (ten Have, 2007) in CA methodology. Second, I will discuss Labov’s (1972) “Observer’s Paradox” and the degree to which it applies to this research. Last, I will argue that the conditions of the data collection in this research render both CA’s data collection requirements and Labov’s “Observer’s Paradox” irrelevant.

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[27] I am indebted to Professor Jain and Professor Whalley of San Francisco State University and Professor Kondo of Waseda University for their wonderful phonetics and phonology classes.

[28] I am incredibly indebted to my three amigos, Leah Gilner, Yumi Matsumoto, and Gareth Kay, for listening to some of my corpus examples for the purposes of maintaining high internal reliability of the phonetic transcriptions. However, it must be admitted that the entire set of IPA transcriptions was not double-checked by another transcriber. Some of the IPA transcriptions were double-checked, but not all of them. This fact is another limitation of this study.

CA research methodology mandates that any data collected for analysis must be "naturally occurring" (e.g., Atkinson & Heritage, 1984; Liddicoat, 2007; Schegloff, 2007). Within CA research methodology, data is "naturally occurring" if it meets two criteria. According to ten Have (2007), the first criterion of "naturally occurring" is that the recorded interactional data should be neither experimental nor researcher-initiated. This means that data gathered from experiments in which the researcher attempts to control all variables so as to reduce the possibility of alternative explanations for the dependent variable is automatically considered invalid from a CA perspective. Furthermore, this criterion also means that the researcher cannot initiate the interaction in the recording, so ethnographic interview data that the researcher conducts is also automatically considered invalid for analysis from a CA point of view. The second criterion of "naturally occurring" is that the interaction within the data should have occurred whether the interaction would be recorded or not (Sacks et al., 1974; ten Have, 2007; Liddicoat, 2007). Therefore, for a recording of an interaction to be considered legitimate data for analysis within CA methodology, the interaction would have occurred with or without the presence of the recording equipment or with or without the instigation of the researcher. If the recordings meet the requirements of both criteria, then CA methodology affirms the legitimacy of the data.

However, even if one accepts that the data meets the criteria that CA methodology mandates for legitimate data, one could still contend that such data is invalid because the way that the data is collected creates an Observer's Paradox. Labov (1972) describes the Observer's Paradox in the following way: "the aim of linguistic research in the community must be to find out how people talk when they are not being systematically observed; yet we can only obtain these data by systematic observation" (p. 209). A considerable number of assumptions are packed into Labov's (1972) famous aphorism, each of which is highly debatable: 1) people interact differently when they are being observed and when they are not being observed; 2) the difference between interactions among people who are being observed and who are not being observed is great enough to warrant the removal of the former from linguistic research copra and to justify the inclusion of the latter into linguistic research corpora; 3) the data from the latter can only be obtained in a way that necessitates the intrusion of the researcher; 4) thus, the intrusion of the researcher inevitably attenuates the value of the data, which creates the Observer's Paradox.

However, upon examination, each assumption of the Observer's Paradox is questionable. First, people who are being recorded still need to communicate in mutually intelligible ways, and this will still reveal the underlying practices through which mutual intelligibility is maintained. Accordingly, the presence of recording equipment does not create an environment in which the maintenance of mutually intelligible pronunciation is any easier or harder than before. Second, it has not been empirically demonstrated that segmental repair is any more or less common among people who know that they are being observed than among people who do not know that they are being observed. Although many assume that people act differently when they are being recorded, this does not necessarily mean that this is true to any statistically significant degree. Third, the Observer's Paradox anachronistically assumes that the researcher must set up the recording equipment and thus be present in some form at the interaction to be recorded. This is no longer true with the advent of smart-phones with built-in recording equipment of great quality. The participants to an interaction can now record themselves with ease, and the researcher never has to be present at all. Thus, as one can see, many of the assumptions of the Observer's Paradox are highly questionable.

The data gathered for this study conflicts with both CA's mandate for "naturally occurring" data and Labov's (1972) Observer's Paradox, but this study attempts to obviate these conflicts through the manner in which the data for segmental repair analysis was collected. First, in accord with CA data collection requirements, the interactional data gathered for the present study was not gathered for the purpose of gathering data. Rather, the data recordings were created for another purpose related to the pedagogical setting, which is in keeping with the data collection processes of a host of other CA studies that use recordings of homework assignments as interactional data (e.g., Olsher, 2004; Markee, 2005; Carroll, 2005; Hauser, 2013; Hanamoto, 2016; Kim, 2018). That is, the data was collected so that the teacher of the course could assess the change in fluency of students' speech over the course of the semester. These conversation homework assignments would have been assigned to the students whether the researcher was conducting a study into the interactional nature of mutual intelligibility or not. Second, the way in which the recording equipment is set up for this research avoids one of the anachronistic assumptions of the Observer's Paradox. The students in the interactions recorded themselves on their cellphones. The researcher was not present during the recordings; the researcher did not set up any recording equipment. Presumably, the recordings did not start until the students were comfortable doing so. Accordingly, although it is true that the educational setting may have affected the interactions in some way, the data gathered for this research is within the range of data used for other CA studies, and many of the assumption of Labov's (1972) Observer's Paradox do not apply.

Having explained how the naturalness of the recordings of the ELF interactions is maintained in this research, I will now discuss the validity and reliability of segmental repair analysis in the next section.

4.3.3 The Validity and Reliability of this Research

In this section, I will first discuss the quantitative research origins of the notions of validity and reliability, and then elaborate on where this research falls on the qualitative/quantitative research continuum. Next, I will review the definitions of different aspects of validity and reliability. Then, I will argue that because this research straddles the quantitative/qualitative research continuum at several points, the notions of validity and reliability are only applicable to this research if they are modified to accord with conversation analytic methodology. Last, I will justify segmental repair analysis as a highly valid and highly reliable means with which to detect and assess the maintenance of mutually intelligible pronunciation and the co-construction of the sufficient pronunciation within ELF interactions.

Before discussing the validity and the reliability of this research, it is necessary to point out that the notions of validity and reliability are derived from quantitative research paradigms, and as such, this concept might not be directly applicable to partially qualitative research (see e.g., Bryman, 2016, p. 391). Accordingly, before evaluating the validity and reliability of this research, this research must claim its own position along the quantitative-qualitative continuum. It must also assert how relevant the notions of validity and reliability are to that position.

As regards the quantitative-qualitative continuum and this research's position along it, Bryman (2016) lists several dichotomies that illustrate the difference between quantitative and qualitative research, of which only the most relevant will be discussed here (pp. 400-401). The first dichotomy relevant to this research design is the divide between numbers and words: quantitative research is focused on measurement and numbers to describe a phenomenon while qualitative research uses words as a representation of a phenomenon. The second dichotomy is the divide between the point of view of the researcher and the point of view of the participants: the concerns of the researcher drive quantitative research, but the perspective of those being studied drives qualitative research. The third dichotomy is the distinction between research as theory testing and theory as emerging from research: quantitative research tests theories but qualitative research allows theory to emerge from the data. The fourth dichotomy is the distinction between structured research and unstructured research: quantitative research attempts to control all variables but qualitative research does not attempt to control variables. The fifth dichotomy is the distinction between generalization and contextual understanding: quantitative research attempts to generalize findings from a sample to a population, but qualitative research seeks an understanding of the behavior and beliefs of the sample at the time at which the research was conducted. The last dichotomy is between artificial and natural research settings: quantitative research is conducted in contrived contexts while qualitative research is conducted in natural environments.

This research straddles some of these dichotomies and positions itself definitely on one side of other dichotomies, and thus it is neither purely quantitative nor qualitative. As regards the first dichotomy, this research will use words to describe the negotiation of intelligible and sufficient pronunciation, but then will quantify the segmental adjustments. Thus, this research straddles the first dichotomy. This research upholds an emic perspective, however, and thus definitely positions itself on the qualitative side of the second dichotomy: it concerns itself with the perspective of the participants towards intelligible and sufficient pronunciation. This research intends to test the predictions of both the interaction hypothesis and functional load theory, and therefore positions itself on the quantitative side of the third dichotomy. However, as regards the fourth, fifth, and sixth dichotomies, this research positions itself on the qualitative side. As one can see, this research spans the quantitative and qualitative research divide at several points.

It is the contention of this research that the concepts of validity and reliability can be used to evaluate the scientific nature of segmental repair analysis, but the fact that it straddles the quantitative and qualitative research divide presents special problems for any defense of the validity and reliability of segmental repair analysis as a research method. This is because some scholars claim that the notions of validity and reliability should be applied to qualitative research with as little adaption as possible (see e.g., LeCompte & Goetz, 1982; Kirk & Miller, 1986; Mason, 1996). Other scholars claim that the efficacy of qualitative research should be judged according to completely different standards, and thus the notions of validity and reliability should be abandoned in favor of alternative criteria (see e.g., Lincoln & Guba, 1985; Yardley, 2000). However, the concepts of validity and reliability can be used to evaluate the scientific nature of segmental repair analysis, and thus neither redefinitions of validity and reliability nor wholesale abandonment of these two concepts is necessary. Accordingly, this research sides with scholars who argue that the concepts of validity and reliability, although derived from quantitative research paradigms, can be applied to qualitative research.

Validity is an essential component of any objective and credible research. In general, research is "valid if it measures what it is designed to measure" (Goodwin & Goodwin, 2014, p. 112). Bryman (2016) further argues that the superordinate concept of validity contains subordinate components: internal validity and external validity (pp. 383-384). Internal validity is the extent to which the interpretation of the results is appropriate and the extent to which the results are not subject to another possible interpretation (Bryman, 2016, p. 384; Goodwin & Goodwin, 2014, pp. 112-113; Payne & Payne, 2004, p. 234). External validity, on the other hand, which is often also referred to as generalizability, refers to the degree to which research findings can be generalized from the sample that was studied to the population from which the sample was drawn (Bryman, 2016, p. 384; Payne & Payne, 2004, p. 234). Each type of validity and its relationship with segmental repair analysis as a means with which to assess the intelligibility and sufficiency of pronunciation in ELF interactions will be discussed below.

First, concerning internal validity, this research claims that segmental repair analysis has high internal validity because the procedures through which segmental repair analysis determines the orientations of the participants to the unintelligibility, intelligibility, insufficiency, and sufficiency of pronunciation demonstrate what the analyst claims. The interpretation of a pronunciation as unintelligible/intelligible or insufficient/sufficient is based on the orientation of the participants to the pronunciation as such, and thus segmental repair analysis maintains high internal validity. This is because an analyst can access the orientation of the participants to many aspects of the interaction—including phonetic aspects—through an emic perspective of the details of the interaction. As Seedhouse (2005) states, "the participants document their social actions to each other in the details of the interaction by normative reference to interactional organizations…We as analysts can access the emic perspective in the details of the interaction and by reference to those same organizations" (p. 255). Thus, the details of the interaction and the orientations of the participants themselves to the details of the pronunciation from a CA perspective provide the evidence for the interpretation of the data.

Second, concerning external validity, this research claims that the results of segmental repair analysis also maintain high external validity under certain conditions. The concept of external validity invokes two subordinate notions: samples and populations. To be able to accurately describe the target population is the ultimate goal of most social science (Bryman, 2016, p. 375). In the case of ELF research, the target population is all ELF users. This is a large population, with some scholars estimating the number of ELF users on any one day to be perhaps in the billions (see e.g., Crystal, 2003; Ostler, 2011). Because assessing the linguistic praxis of the population is infeasible, scientists use a sample of the population, a smaller and more manageable subset of the population, to conduct scientific analyses. External validity is specifically the extent to which the research results that are garnered from the sample are representative of the population. It is the contention of this research that segmental repair analysis maintains high external validity under two conditions: 1) the number of segmental repair and sufficiency sequences that are analyzed in this research is high, and thus likely generalizable to the population; 2) the conclusions of this study will only argue that the results are applicable to the kinds of students at the Japanese university where the data was gathered, a decision which substantially reduces the target population to be estimated. First, this study will gather enough samples of segmental repair and sufficiency to generalize to the population. Second, this study reduces the population from all ELF users to just ELF users at Japanese universities. Thus, it does not intend to argue that its results are generalizable to all ELF users across the planet. The end result of these two decisions is to render this research generalizable to the population under study.

However, a valid means with which to assess the intelligibility and sufficiency of pronunciation alone is not sufficient to claim that a methodology is scientific; a means of assessment also needs to be reliable. In general, a means of assessment is said to be reliable "if its results are repeatable when the behaviors are remeasured" (Goodwin & Goodwin, 2014, p. 110). Bryman (2016) further argues that the superordinate concept of reliability contains two subordinate components: internal reliability and external reliability (pp. 383-384). According to Nunan (1992), internal reliability refers to "the consistency of data collection, analysis, and interpretation" (p. 14). External reliability, on the other hand, "refers to the extent to which independent researchers can reproduce a study and obtain results similar to those obtained in the original study" (Nunan, 1992, p. 14). Each type of reliability and its relationship with segmental repair analysis as a means with which to assess intelligibility and sufficiency will be discussed below.

First, concerning internal reliability, this study claims that the methodology of this research, segmental repair analysis, has high internal reliability because the procedures through which segmental repair analysis determines the orientations of the participants to the unintelligibility, intelligibility, insufficiency, and sufficiency of pronunciation are open to other analysts for verification, which can demonstrate the consistency of interpretation from an emic perspective. That is, any reader can analyze the same transcripts as the researcher to verify that the interpretation of the data from an emic perspective is accurate. It is standard practice for CA studies to include transcripts of the data and detailed analyses of the data. This means that an independent reader can observe the same data and render their own conclusions. As Seedhouse (2005) states, "because CA studies…display their analyses, they make transparent the process of analysis for the reader. This enables the reader to analyze the data themselves, to test the analytical procedures which the author has followed" (p. 254).

CA studies thus are internally reliable; CA studies include all primary data in transcript form and append detailed written analyses of the interactions after the transcripts. This study is especially internally reliable because each segmental repair sequence or sufficiency adjustment is either in the relevant chapter (Chapter 5 or Chapter 6) or in Appendix F.

Second, concerning external reliability, it is the contention of this research that it is highly externally reliable because the results of the study are both repeatable and replicable. But within this study, repeatable and replicable does not mean that someone else can gather similar speakers and expect them to perform in exactly the same way. It would be highly unlikely that even highly similar speakers would create similar segmental repair sequences and sufficiency adjustments. Rather, what this study means with the terms repeatable and replicable is that independent readers can repeat the analysis of the same transcripts and thus replicate the original interpretation. All transcripts and analyses of transcripts that are used to justify the results of this research are available for independent readers to scrutinize. This enables independent readers to analyze the same primary data and ascertain the extent to which the participants in the data are orienting to pronunciation as intelligible and sufficient. In this way, all of the analyses of the data in this research are rendered both repeatable and replicable. Therefore, this research claims that segmental repair analysis meets the criteria of external reliability.

Having explained the validity and reliability of segmental repair analysis, I will now discuss the extent to which segmental repair analysis lends itself to the quantification of results.

4.3.4 The Quantifiability of this Research

In this section, I will review the relationship between CA and quantification, and then argue that a convergence between segmental repair analysis and quantification is possible and indeed beneficial. First, I will review the reasons that mainstream CA scholars put forth to argue that CA methodology should not adopt any quantification. After that, I will present the counterarguments of a growing number of CA scholars who claim that CA methodology can and should incorporate quantification. Last, I will argue that CA studies need to incorporate both quantification and statistical analysis in order to be a more robust research methodology.

This study quantifies data that is analyzed in a qualitative manner, but the quantification of qualitative data goes against the standard conventions of CA, which has traditionally eschewed quantification, much less statistical analysis, in any way. This point of view is exemplified in the arguments of one of the founders of CA, Emmanuel Schegloff (1993), who states that, "we can be led seriously astray if we allow the possibility of quantitative studies to free us from the need to demonstrate the operation of what we take to be going on in singular fragments of talk" (p. 102). According to many CA researchers, any coding and quantification of interactional data represents a reduction and simplification of complex human behavior and will inevitably show a lack of sensitivity to turn design and sequential position (see e.g., Steensig & Heinemann, 2015; Nishizaka, 2015). Indeed, Schegloff (1993) condemns quantification, claiming that, "quantification is no substitute for analysis" (p. 114). Such sentiments are still operative in current CA research as well (see e.g., Seedhouse, 2005, pp. 259-260). Thus, as one can see, segmental repair analysis, which is a subgenre of CA, is not necessarily amicable to quantification, and indeed some CA scholars are actively hostile to it, claiming that quantification is a synonym for reductionism (see e.g., Nishizaka, 2015).

However, other CA researchers are more open to the possibility of coding and quantifying interactional data, arguing that under certain conditions it adds aggregate information that single case analysis could never accomplish (see e.g., Stivers & Majid, 2007; Stivers, 2015). Stivers (2015) argues that coding and quantification can be fruitfully applied to sequential analysis, suggesting that, "when CA results are strong and the reach of the findings could be enhanced by quantitative methods, formal coding can easily be built on a strong CA foundation" (p. 16). By this, Stivers (2015) means that as long as coding and quantification are sensitive to turn design and sequential position, then they actually support CA findings, rather than attenuating the rigor of the entire methodological enterprise. Stivers (2015) claims that, "CA's insistence on clear characterizations of the phenomena being studied creates a solid foundation from which to build formal coding schemes" (p. 5). Indeed, Stivers (2015) is not the first proponent of this position. Other CA researchers have long argued that some quantification is necessary for CA scholarship, although it is fair to say that this continues to be a minority position (see e.g., Heritage & Greatbatch, 1986; Heritage, Robinson, Elliot, Beckett & Wilkes, 2007; Heritage & Robinson, 2011; Németh, 2012).

This study claims that coding and quantification of segmental repair sequences, sufficiency adjustments, and segmental adjustments in both segmental repair and sufficiency adjustments are necessary to strengthen any claims to the frequency of phonetic negotiations in ELF interactions. Although CA studies frequently make use of wording that implies frequency of behaviors, without coding and quantification, then the reader just has to believe what the writer says (Stivers, 2015, p. 5). In fact, frequency adverbs in most CA studies are tantamount to meaningless. This study, however, intends to describe in specific numbers how frequent two types of behavior are in the corpus. Through coding and quantification of segmental repair sequences, sufficiency adjustments, and segmental adjustments in both, this study will go beyond the meaningless frequency adverbs of most CA studies and arrive at numerical values that represent an accurate frequency of phonetic negotiations in ELF interactions within the corpus.

Having taken and justified a position as regards coding and quantification that some CA scholars would consider antithetical, even heretical, to CA methodology, I will next consider how any conclusions based on segmental repair analysis comport with the ultimate criterion of all science: falsifiability.

4.3.5 The Falsifiability of this Research

In this section, I will review the dividing line between a scientific statement and an unscientific statement. Then, I will present Popper's (1959) arguments that falsifiability, rather than verifiability, is the boundary between science and non-science. Last, on the basis of Popper's (1959) argument that statements are only scientific to the extent that they can produce falsifiable results and statements that lead to further falsifiable hypotheses, I will argue that the results of this research are falsifiable, and thus scientific.

The common-sense criterion of a scientific statement is that it can be conclusively verified. Seeking the truth requires the experimentation and testing of statements and hypotheses, and if such experimentation and testing verifies the statements and hypotheses, then one can claim that they are true. That is, for a statement to be considered scientific, it must be capable of being verified in some manner. According to this way of thinking, scientific statements are only scientific to the extent that they can be proven to be true. The inverse also holds true: if there is no way to verify a statement, then it has no scientific value whatsoever. Thus, under this paradigm, the line of demarcation between science and pseudo-science is the possibility of verification.

However, other scholars argue that the idea that the line of demarcation between scientific and non-scientific statements resides at verifiability is of limited utility. Popper (1959) claimed that the criterion of verifiability is of highly dubious utility and stated that scientific statements are "*never* empirically verifiable" (p. 18, italics in original). Popper (1959) argued that all evidence that verifies a scientific statement is tentative at best because any single repeatable piece of evidence could falsify the statement, rendering it untrue (p. 66). Taking this stance to its logical conclusion, Popper (1959) argued that science must accept that all scientific knowledge is tentative at best and can never really be verified to the point of the removal of all doubt; that is, absolute truth can never be attained in science, and thus the criterion of verifiability cannot serve as the line of demarcation between science and non-science.

In place of verification as the line of demarcation between science and non-science, Popper (1959) argued that, "the falsification of a [statement] is to be taken as a criterion of demarcation" between scientific and non-scientific statements (p. 18, brackets added). Falsification is the ability to demonstrate that a statement or a hypothesis is not true; it is a negative rather than a positive criterion. Popper (1959) argued that because scientists can never conclusively demonstrate the absolute truth of an idea through science, a scientist can never claim that discovering the truth alone amounts to the validation of an idea. Rather, Popper (1959) argued, all hypotheses and claims should be formulated in such a way that they can be falsified through a single repeatable disconfirming piece of evidence. Formulating hypotheses and ideas in a falsifiable way allows for the testing of ideas and the overall progression of science. On the other hand, claims of absolute truth, or even just claims that cannot be falsified, shut off further inquiry and the progression of science. For such reasons, Popper (1959) argued that the progression of science relies on the notion of falsifiability and rightly claimed, "*it must be possible for an empirical scientific system to be refuted by experience*" (p. 18, italics in original).

Accordingly, it is the contention that the claims that can be derived from the conclusions of this study are scientific statements; they are falsifiable. The results of this research are scientific statements: 1) certain segmental repair strategies are more frequent than others; 2) certain segmental adjustments are more frequent than others; 3) a distinction can be made, even from an emic perspective, between segmental adjustments concerned with intelligible pronunciation and those concerned with sufficient pronunciation; 4) ELF users conduct segmental adjustments more often for issues related to intelligibility than sufficiency. These results are falsifiable because if another researcher examines a similar sample from a similar population of ELF users and discovers a different frequency of segmental repair sequences, a different frequency of segmental adjustments, or a different ratio of segmental adjustments related to intelligibility and sufficiency, then the claims of this study will have been falsified. Accordingly, this research fulfills Popper's (1959) criterion for science.

In line with the above discussion, this research adopts a qualitative and quantitative research design. Having justified segmental repair analysis as a research method, I will next explain how the main data collection for this study was carried out.

4.4 Main Data Collection

This section will first introduce the research sites (Section 4.4.1) and the participants (Section 4.4.2) in this research. After that, the procedures through which data collection was conducted will be described (Section 4.4.3). This is followed by a explanation of the corpus that was gathered for this studt (Section 4.4.4) and an description of the CA and phonetic transcription conventions that are used throughout this thesis (Section 4.4.5).

4.4.1 Research Sites

The main data sets for this research project were collected from early 2016 to late 2017 at a large public Japanese university. Data collection for the conversation analytic portion of this research was conducted in two different phases over a year and a half of time: during phase one, conversation homework assignment sound files were collected once a week via email from students attending an academic listening and oral communication course and from students attending a segmental pronunciation course in the spring semester of 2016 (April-

July); during phase two, conversation homework assignment sound files were collected once a week via email from students attending a suprasegmental pronunciation course in the fall semester of 2016 (October-February)[29]. This was done primarily due to ease of access: the students were taking the researcher's courses[30], who is intently focused on adapting the segmental and suprasegmental pronunciation courses to account for phonetic features that the students orient to as relevant to the maintenance of mutual intelligibility rather than for phonetic features that are assumed to be relevant because they match the characteristics of prestigious varieties of English. Furthermore, conversation homework assignments have been demonstrated to have a positive impact on a range of oral communication skills (Saito & Akiyama, 2017).

Data collection for the experimental portion of this research was conducted during early 2017 and mid 2018. Experimental subjects were recruited through fliers at a large public Japanese university, and thus any student at the university could potentially participate in the experiment. Recruitment efforts continued until April 2018 until the researcher attained the required sample size (N = 90).

It can be justified that the research sites that were chosen are suitable for the purpose of investigating how ELF users negotiate mutual intelligibility and sufficiency, as well as determining the relationship between pronunciation, mutual intelligibility, and interaction (see Section 1.1 on this point).

4.4.2 Participants

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[29] The data gathered for the chapters 5, 6, & 7 is audio-only conversation recordings. However, it must be admitted that audio-only conversation recordings do obfuscate aspects of the interaction that might have been relevant to the interactants, and as such this is less than perfect data. Indeed, there is some evidence that gestures, which are unavailable when analyzing audio-only recordings, are important to the progression of the interaction even when pronunciation becomes the trouble source (Smotrova, 2017).

[30] This is of course another limitation of this research. The fact that some of the students who contributed to the data set were taking pronunciation courses may have affected the production of the data. This limitation is addressed in section 9.4.

The description of the participants will be divided into two categories: *Japanese students*, which includes Japanese undergraduates and Japanese graduate school students, and *non-Japanese students*, which includes non-Japanese undergraduates, non-Japanese exchange students, and non-Japanese graduate school students. Furthermore, the description of the Japanese and non-Japanese students will be divided along the three phases of the data collection as well.

For the conversation analytic portion of this research, the Japanese and non-Japanese participants during phase one of the data collection (April-July 2016) were from two classes. The first group of Japanese participants were first year undergraduate students from the Engineering faculty who were enrolled in an academic listening & oral communication course (10 females and 9 males; N = 19). The second group of Japanese participants were Japanese undergraduate and graduate students from a variety of faculties who were enrolled in a segmental pronunciation course (17 females and 12 males; N = 29). The non-Japanese participants were four non-Japanese students: two female students from Mandarin Chinese L1 backgrounds (pseudonyms: Jia and Zhan), one female student from a Mongolian L1 background (pseudonym: Bumbyn), and one female student from a Thai L1 background (pseudonym: Hathai). The Chinese students were graduate students in the segmental pronunciation course, and the Thai and Mongol students were exchange students enrolled in the university's Japanese language program but were also hired by the university as English tutors for the academic listening & oral communication course.

Table 4.1. The Participants' Profiles for the Conversation Analytic Portion of the Research: Oral Communication and Academic Listening Course & Segmental Pronunciation Course

Nationality	**First Language**	**Student Faculty**	***N* (N of male)**
Japanese	Japanese	Engineering	15 (9)
Japanese	Japanese	Humanities	12 (2)
Japanese	Japanese	Education	6 (3)
Japanese	Japanese	Law	2 (1)
Japanese	Japanese	Economics	2 (2)
Japanese	Japanese	Medical	4 (2)

Japanese	Japanese	Agriculture	3 (2)
Mongolian	Mongolian	Exchange Student	1 (0)
Thai	Thai	Exchange Student	1 (0)
Chinese	Mandarin Chinese	Graduate Student	2 (0)
Total	Undergraduate: 47	Graduate: 1	48 (21)

The Japanese and non-Japanese participants during phase two of the data collection (October-February 2016-2017) were from the same class. The Japanese participants were undergraduate students from a multitude of faculties who were enrolled in a suprasegmental pronunciation course (26 females and 11 males; N = 37). The non-Japanese participants in the class were one male student from a Mandarin Chinese L1 background (pseudonym: Wu) and one female student from Mandarin Chinese L1 background (pseudonym: Xiang). The male Chinese student was an undergraduate, and the female Chinese student was a graduate student.

Table 4.2. The Participants' Profiles for Conversation Analytic Portion of the Research: Suprasegmental Pronunciation Course

Nationality	**First Language**	**Student Faculty**	***N* (N of male)**
Japanese	Japanese	Humanities	12 (3)
Japanese	Japanese	Education	7 (0)
Japanese	Japanese	Law	2 (0)
Japanese	Japanese	Economics	2 (0)
Japanese	Japanese	Science	4 (2)
Japanese	Japanese	Medical	1 (0)
Japanese	Japanese	Engineering	2 (2)
Japanese	Japanese	Agriculture	5 (3)
Chinese	Mandarin Chinese	Economics	1 (1)
Chinese	Mandarin Chinese	Graduate Student	1 (0)
Total	Undergraduate: 36	Graduate: 1	37 (11)

It is unknown how often the participants used English in their daily lives at the university. No official English test scores that could serve as proxies of proficiency were systematically collected as part of this study. However, a lower level of English proficiency can be estimated with the help of university course entrance requirements. In order to enter any of the classes which the student participants were taking, the students would be required to have TOEIC scores equal to or higher than 470. Of course, some of the students would have scores that far exceed a TOEIC score of 470. But it is always worth remembering that although the participants can be categorized in numerous ways, this does not mean that all categories actually pertain to the praxis of an interaction in any viable way (Schegloff, 1991). Therefore, English proficiency level as assessed through a test might not actually measure how well participants perform in ELF interactions (Firth, 2009).

Last, although the participants are described in prosaic terms such as “Japanese”, “Chinese”, and “Mongolian” in this section, this same nomenclature will not be used in the transcripts. In the transcripts and the analyses of the transcripts, the participants’ names were changed to pseudonyms that were meant to be representative of the linguaculture and biological gender of the speaker. Accordingly, all participants will be assigned a consistent pseudonym that will differentiate them from any other participant in the same corpus. This was done to avoid depersonalizing the participants in the ELF interactions.

For the experimental portion of this research, the experiment participants were recruited through fliers at a large public Japanese university. The participants in this study (N = 90) ranged in age from 18 to 25 with an average age of 19.84 years (SD = 2.39) and had begun English study at an average of 10.2 years of age (SD = 2.3 years). The participants are all from expanding circle countries: Japanese (N = 45), Chinese (N = 33), Korean (N = 5), French (N = 1), Russian (N = 2), German (N =1), Sri Lanka (N = 1), Nigeria (N = 1), and Lithuanian (N = 1)[31]. A large majority of the participants were female (female N = 67; male

[31] These numbers do not include the data gathered from two ELF dyads who were assigned to the interaction condition: the data from one ELF dyad was removed from analysis because they did not follow instructions; the data from another ELF dyad was excluded because of experimental error—the experimenter fogot to turn the cameras on for the first trial of the

N = 23). Many of the participants reported some experience traveling or living away from their home countries (N = 62). All participants reported that they did not know their partners before the first trial of the experiment.

Table 4.3. The Participants' Profiles for the Experimental Portion of the Research

Nationality	**First Language**	**Student Faculty**	***N* (N of male)**
Japanese	Japanese	Humanities	15 (4)
Japanese	Japanese	Education	8 (1)
Japanese	Japanese	Law	3 (1)
Japanese	Japanese	Economics	5 (1)
Japanese	Japanese	Science	4 (2)
Japanese	Japanese	Engineering	4 (2)
Japanese	Japanese	Agriculture	6 (2)
Chinese	Mandarin Chinese	Exchange Student	28 (7)
Chinese	Mandarin Chinese	Graduate Student	5 (1)
Korean	Korean	Exchange Student	5 (1)
French	French	Exchange Student	1 (0)
Russian	Russian	Engineering	1 (0)
Russian	Russian	Exchange Student	1 (1)
German	German	Exchange Student	1 (0)
Sri Lanka	Sinhalese	Exchange Student	1 (0)
Lithuania	Lithuanian	Exchange Student	1 (0)
Nigeria	Yoruba	Exchange Student	1 (1)
Total	Undergraduate: 73	Graduate: 5	90 (23)

experiment.

Having provided the information on the research sites and participants, I will now explain the procedures for the main data collection for both portions of this research in the next section.

4.4.3 Procedures

This section describes the procedures through which the main data collection was conducted. It explains what documentation was prepared for the participants before to the data collection (Section 4.4.3.1) and provides information on how the data collection was organized (Section 4.4.3.2). Last, an explanation of the procedures for the audio and video recordings will be offered (Section 4.4.3.3).

4.4.3.1 Preparation for the Data Collection

This section discusses the documentation that was prepared as part of the data collection. For the conversation analytic portion of this research, a research information sheet (see Appendix A: Conversation Analytic Research Information Sheet) was made prior to the recruitment of participants. The research information sheet was designed in order to allow the participants to make an informed choice as to whether to participate in this research or not; that is, the sheet was written to be informative enough with respect to the intention and scope of the research for any participant to understand what would happen if they agreed to be part of the research. In addition to my name, affiliation, and contact details, the research information sheet contained the information summarized in table 4.4.

Table 4.4. A Summary of Information Provided on the Research Information Sheet for the participants in the conversation analytic portion of this research

Items of Information	Content
Aims of this research	To ascertain how students from different L1 backgrounds maintain mutual intelligibility
Preconditions for the participation	Any student who is taking a course that requires conversation homework assignments

Types of conversations to be recorded	Conversation homework assignments that are part of regular coursework
Confidentiality	Anonymity guaranteed
Participants' rights	A right to not participate and to repossess data at any time
Scholastic Usage of Recordings	Recordings will be played at academic conferences and written into academic papers
Pedagogical Usage of Recordings	Recordings will be used to create educational materials for subsequent classes

The research information sheet is one page of A4-sized paper. The information on the sheet was written in a minimalistic manner so as to reduce the possibility of misunderstanding. Furthermore, all language in the information sheet is non-technical. The research information sheet was distributed during the first class of the semester, and the content of the sheet was further explained by the researcher during the class. It is worth mentioning that the students were offered absolutely nothing for participating in the research—no remuneration, no bonus points, no anything—and that this was explicitly explained to the students before they made their decisions to participate or not.

It is also important to obtain informed consent from participants before their association in the research (Iphofen, 2009, pp. 66~67). In relation to the experimental research information sheet, an informed consent form (see Appendix B: Conversation Analytic Research Informed Consent Form) was also created. The information on the informed consent form includes all of the following: confirmation that the participant understood the conversation analytic research information sheet, confirmation that the participant understood that handing over conversation recordings meant that they would be used for research purposes, confirmation that participants agreed to allow the researcher to transcribe and use the conversation recordings for research purposes, and confirmation that participation in this project was unpaid. Locations for the participant's name and signature and for the date of giving consent were provided at the bottom of the form[32].

For the experimental portion of this research, an experimental research information sheet and recruitment flier (see Appendix C: Experimental Research Information/Recruitment Flier) was made prior to the recruitment of participants. The research information sheet/recruitment flier was designed in order to allow the participants to make an informed choice as to whether to participate in the experiment or not. In addition to my name, affiliation, and contact details, the research information sheet contained the information summarized in table 4.5.

Table 4.5. A Summary of Information Provided on the Research Information Sheet for the Participants in the Experimental Portion of this Research

Items of Information	Content
Aims of this research	To ascertain the relationship between intelligibility between speakers from different first language backgrounds and interaction
Preconditions for the participation	Any participant must agree to be filmed for the duration of the experiment
Remuneration	All participants will be paid 3000 yen for participating in three trials of one experiment.
Confidentiality	Anonymity guaranteed
Participants' rights	A right to not participate and to repossess data at any time
Scholastic Usage of Recordings	Recordings will be played at academic conferences and written into academic papers

[32] It is worth mentioning at this point that one Japanese student and four French exchange students refused to participate in the research in phase one of the data collection, and one Russian graduate student refused to participate in phase two of the data collection. They nonetheless registered for the classes, but any recording in which these six students appear was not included in the data collection.

In relation to the experimental research information sheet, an experimental research informed consent form (see Appendix D: Experimental Research Informed Consent Form) was also created. The items in the informed consent form include the following: confirmation that the participant understood that each of the three trials of the experiment would require thirty minutes of his or her time, confirmation that the participant understood that he or she would be video-recorded during the experiment, confirmation that the participants understood that the recordings might be transcribed and played at academic conferences, a guarantee that the participants' anonymity would be protected, and confirmation that participants understood that they would be paid 3000 yen as remuneration. Locations for the participant's signature for giving consent were provided at the bottom of the form.

The experimental research information sheet/recruitment flier and the experimental research consent form are both on one page of A4 paper. The experimental research information form and consent form were written in a minimalistic manner in both English and Japanese so as to reduce the possibility of misunderstanding. The research information sheet and consent form were distributed to all participants before the first experiment. It is worth mentioning that the participants were offered remuneration for participation in the experiment, unlike the participants in the conversation analytic portion of this research.

4.4.3.2 Arrangement of the Recordings

As stated in Section 4.4.1, for the conversation analytic portion of this research, I gathered conversation homework assignment recordings from three different classes, and then subjected conversation homework assignments from among speakers from different L1 backgrounds to segmental repair analysis (see Chapter 3). This was done through the following procedures. First, at the beginning of each class, the teacher randomly assigned students to two or three-person conversation groups. Each conversation group was relatively small to increase the overall amount of time that any one student would speak. Smaller groups of students lead to a greater amount of conversational contributions in an interaction from each student (Egbert, 1997). At the end of each class, the students themselves arranged a time to meet and record their conversation assignments on their cellphones. Although the students were allowed to record themselves whenever and wherever they wanted to, the deadline for submission of the conversation homework assignments via email was always before the next class, and therefore most student groups submitted their recordings within several days of the end of each class. Feedback was given to each conversation group in the form of a group grade. The group grade was determined according to how well the students fulfilled the criteria of the assignment (see Section 4.4.3.3).

For the experimental portion of this research, the researcher randomly assigned two participants to one dyad. Student dyads were allowed to decide when they would participate in the experiment. Once a mutually agreeable time was determined among the two students and the researcher, the students would come to the researcher's office to read the experimental research information sheet and the consent form. After signing the experimental research informed consent form, the student pair was led to the experiment room. All experimental interactions were recorded with four video-cameras.

4.4.3.3 Procedures for the Recordings

For the conversation analytic portion of this research, prior to the conversation homework assignment recordings, students referred to the conversation homework assignment explanation within the course textbook. Each class had thirteen conversation homework assignments, but students were not permitted to discuss anything they wanted. Each conversation homework assignment had three major requirements, and if any one of the requirements was not fulfilled, the students were told that the assignment would not be accepted as complete. The following three requirements had to be fulfilled for each assignment: 1) the students had to discuss the three required questions for each assignment; 2) the students had to converse for at least ten minutes, and in the case that the discussion of the three required questions did not exceed ten minutes, the students had to continue conversing on other topics that they chose; 3) the students were directed to use English as much as possible, but usage of other languages to help everyone understand the discussion was permitted, and thus some code-switching and translanguaging permeates in the corpus (Kimura & Canagarajah, 2018). The three required questions for each assignment differed according to which class the students were taking and which of the thirteen assignments the students were attempting to complete. The three required questions for each conversation homework assignment are listed below in Tables 4.6., 4.7., and 4.8. All of the information required to answer the questions was provided during the class.

Table 4.6. A Summary of Required Questions for the Academic Listening & Oral Communication Course during Phase One of the Data Collection

Conversation Assignment Number	Question Number	Question Content
Conversation 1	Question 1	Do you think Japanese え and English [ɛ] are the same sound?
	Question 2	Do you think Japanese あ and English [æ] are the same sound?
	Question 3	Do you think Japanese い and English [i̝ː] are the same sound?
Conversation 2	Question 1	Did you know about rhotacization before this class?
	Question 2	Can you hear the difference between [ɛ] and [æ]?
	Question 3	Can you hear the difference between [i̝ː] and [ɪ]?
Conversation 3	Question 1	Do you think that any pronunciations in Japanese are labialized?
	Question 2	Did you know about labialization before this class?
	Question 3	What is the difference between Japanese う/[ɯ] and English [u̝ː]?
Conversation 4	Question 1	What is the difference between Japanese し and English [ʃi̝ː]?
	Question 2	[k] in “key” and “coo” are different. Is this true in き and く?
	Question 3	Where is your tongue when you pronounce the [t] in た? Is it dentalized?
Conversation 5	Question 1	Do you think that Japanese ん changes like the English “m” and “n”?
	Question 2	Do Japanese vowels nasalize? Are あ and the あ in あん the same?
	Question 3	Do you think Japanese に and English [niː] are the same or different?
Conversation 6	Question 1	What would you do in the Trolley Situation?
	Question 2	What would you do in Trolley Situation (Push the fatman situation)?
	Question 3	Which is better? Utilitarian or Kantian Ethics?
Conversation 7	Question 1	If you had a robot that could only do one job, what would it do? Why?
	Question 2	Do you want a Roomba? Why?
	Question 3	Do you want an automatic-driving car? Why?
	Question 1	Do you believe that aliens exist? Why?

Conversation 8	Question 2	Do you think SETI is right about the number of alien civilizations? Why?
	Question 3	Did you watch Contact? Did you like it? Why?
Conversation 9	Question 1	What is English as a Lingua Franca? Describe this in your own words?
	Question 2	Do you think ELF standards are better than Native standards? Why?
	Question 3	What people do you think you will use English with in the future?
Conversation 10	Question 1	Do you think the world is getting less violent? (Steven Pinker does...)
	Question 2	Do you think Steven Pinker's measurement of violence is accurate?
	Question 3	Do you think that the past was more violent? (Steven Pinker does...)
Conversation 11	Question 1	Do you think DNA accounts for 50% of personality and intelligence?
	Question 2	Do you think that how your parents raised you only accounts for 5%?
	Question 3	Do you think that your culture accounts for 45%?
Conversation 12	Question 1	Do you think people cheat more if they have more opportunities to cheat?
	Question 2	Do you think people cheat more if the reward for cheating is greater?
	Question 3	Do people cheat less if the punishment for cheating is greater?
Conversation 13	Question 1	If someone did the Milgram Experiment here, what % would comply?
	Question 2	If you were in the Milgram Experiment, would you comply?
	Question 3	Why do you think so many people comply in the Milgram Experiment?

Table 4.7. A Summary of Required Questions for the Segmental Pronunciation Course during Phase One of the Data Collection

Conversation Assignment Number	Question Number	Question Content
Conversation 1	Question 1	Do you think Japanese え and English [ɛ] are the same sound?
	Question 2	Do you think Japanese あ and English [æ] are the same sound?
	Question 3	Do you think Japanese い and English [i̞ː] are the same sound?
Conversation 2	Question 1	Did you know about rhotacization before this class?
	Question 2	Can you hear the difference between [ɛ] and [æ]?
	Question 3	Can you hear the difference between [i̞ː] and [ɪ]?

Conversation 3	Question 1	Do you think that any pronunciations in Japanese are labialized?
	Question 2	Did you know about labialization before this class?
	Question 3	What is the difference between Japanese う/[ɯ] and English [u̟ː]?
Conversation 4	Question 1	Does Japanese have diphthongs?
	Question 2	Does Japanese have a triphthong?
	Question 3	Does Japanese have off-glides?
Conversation 5	Question 1	Do you think that Japanese has an [ŋ] sound?
	Question 2	Do you think Japanese distinguishes between long and short vowels?
	Question 3	How can you describe the difference between [ɸ] and [f]?
Conversation 6	Question 1	What is the difference between Japanese し and English [ʃi̟ː]?
	Question 2	[k] in "key" [ki̟ː] and "coo" [ku̟ː] are different. Is this true in き and く?
	Question 3	Where is your tongue when you pronounce the [t] in た? Is it dentalized?
Conversation 7	Question 1	Do you think the Japanese ん changes like the English "m" and "n"?
	Question 2	Do Japanese vowels nasalize? Are あ and the あ in あん the same?
	Question 3	Do you think Japanese に and English [niː] are the same or different?
Conversation 8	Question 1	To which sound does Japanese ら seem closer? [la] or [ɹa]?
	Question 2	What is the difference between Japanese ら and English [la]?
	Question 3	What is the difference between Japanese ら and English [ɹa]?
Conversation 9	Question 1	Do you think that the Japanese language has word stress?
	Question 2	How many syllables do you think てんぷら has? Is it 3 or 4?
	Question 3	How many syllables do you think 好き has? Is it 1 or 2?
Conversation 10	Question 1	What do you think the loudest vowel is?
	Question 2	What do you think the quietest vowel is?
	Question 3	Can you think of some exceptions to syllable rule 4?
Conversation 11	Question 1	Do you think that the Japanese language has syllabification?
	Question 2	Did you know about syllabification before this class?
	Question 3	Does "sudden" pronounced as [ˈsʌ.dən] sound better than [ˈsʌ.dn̩]?
Conversation 12	Question 1	Do you think the first sound in ラーメン is the same sound as a tap [ɾ]?
	Question 2	Does Japanese has glottal stops [ʔ]?
	Question 3	Which pronunciation is easier to understand? [ˈwɑ.ɾɚ] or [ˈwɑ.tɚ]?

	Question 1	Do you think the Japanese language aspirates ぱ、ば、and か?
Conversation 13	Question 2	Do you have any suggestions about how to improve this course?
	Question 3	Do you feel like your pronunciation has improved this semester?

Table 4.8. A Summary of Required Questions for the Suprasegmental Pronunciation Course during Phase Two of the Data Collection

Conversation Assignment Number	Question Number	Question Content
	Question 1	How many syllables are in 好き? 1 or 2? In 天ぷら? 3 or 4?
Conversation 1	Question 2	Do you know an English word with six syllables?
	Question 3	Does Japanese count syllables in a way that is different from English?
	Question 1	Do you think that the Japanese language has word stress?
Conversation 2	Question 2	Did you know that English has two-syllable word stress patterns?
	Question 3	Can you think of any words that do not conform to the word stress rule?
	Question 1	Does your Japanese distinguish between 雨 and 飴?
Conversation 3	Question 2	Does your Japanese distinguish between 橋 and 端?
	Question 3	Does your Japanese distinguish between 橋 and 箸?
	Question 1	What English compound words do you use most often?
Conversation 4	Question 2	Did you know that French words have word stress on the last syllable?
	Question 3	What English word do you know that has the most syllables?
	Question 1	Do you think that Japanese uses the schwa vowel?
Conversation 5	Question 2	What do you think the loudest vowel is?
	Question 3	What do you think the quietest vowel is?
	Question 1	Do you know other words with neighboring vowels in different syllables?
Conversation 6	Question 2	How many other two syllable compound English words do you know?
	Question 3	What other words do you know that don't conform to the schwa rule?
	Question 1	What Japanese phrases can change depending on the Intonation Units?
Conversation 7	Question 2	Does the Japanese language have Nuclear Stress?
	Question 3	Did you know about Nuclear Stress before this class?

Conversation 8	Question 1	Does the Japanese language use intonation to highlight new information?
	Question 2	Does nuclear stress does more than just highlight new information?
	Question 3	Does the Japanese language highlight new information? (If yes, how?)
Conversation 9	Question 1	Does Japanese use nuclear stress on あなた in repeated questions?
	Question 2	Does the Japanese language use nuclear stress on intensifiers?
	Question 3	Does the Japanese language use nuclear stress on superlatives?
Conversation 10	Question 1	Does the Japanese language use nuclear stress for repairs?
	Question 2	What do you do to signal that you don't understand someone?
	Question 3	What are some ways to repair other than using nuclear stress?
Conversation 11	Question 1	What other weak forms does English have?
	Question 2	What weak forms does the Japanese language have?
	Question 3	Are weak forms more common in formal or informal language?
Conversation 12	Question 1	What palatalization does Japanese have?
	Question 2	Is palatalization more common in formal or informal language?
	Question 3	Did you know about palatalization before this class?
Conversation 13	Question 1	Do plosives ever disappear in Japanese like they do in English?
	Question 2	Has your pronunciation improved as a result of this course?
	Question 3	Do you have any suggestions about how to improve this course?

For the experimental portion of this research, one Japanese participant was assigned to one non-Japanese participant to create a dyad (N = 45). Therefore, according to the definition of ELF under use in this thesis (see Section 3.2.5), each dyad is an ELF dyad (Osimk, 2009; Kennedy, 2017). The pairing of a Japanese participant to a non-Japanese participant was done by convenience (i.e., according to the times that the participants were available to do the experiment). However, each ELF dyad was randomly assigned to one of three conditions: the unlimited interaction condition, the segmental repair condition, and the scripts condition (see Chapter 8). Accordingly, a third of the ELF dyads were assigned to the unlimited interaction condition (ELF dyad N = 15; Participant N = 30), a third of the subjects to the segmental repair condition (ELF dyad N = 15; Participant N = 30), and a third of the subjects were assigned to the scripts condition (ELF dyad N = 15; Participant N = 30).

4.4.4 Corpus

Only conversation homework assignments among speakers from different L1 backgrounds will be included in the corpus for examination. Conversation assignments among speakers from the same L1 background were not included in the corpus because these conversations could not be ELF interactions according to the definition of ELF that is offered in this thesis (see Section 3.2.5). Accordingly, only a portion of the interactions gathered from the conversation homework assignments of the three classes will be examined. The result of this winnowing is that the corpus to be analyzed in this research consists of sixty-three separate audio-recorded interactions among ELF users at a Japanese university. The individual recordings each lasted approximately ten minutes to fifteen minutes. A total of eleven hours and fifty-five minutes of spoken interactions were gathered.

4.4.5 Segmental Repair Analysis Transcription Conventions

This study uses the transcription conventions of CA to transcribe the interactions within the corpus (Schegloff, 2007), but modifies the conventions so as to accurately represent the phonetic praxis of the interactions. This is because the purpose of this study is to examine the interface between phonetics, intelligibility, sufficiency, and interactions. As discussed earlier (Sections 4.3.1 & 4.3.3), the transcripts should be as accurate as possible to ensure the validity and reliability of segmental repair analysis. However, the standard transcription conventions of CA do not accurately reflect phonetic details, with analysts often transcribing, for example, the schwa vowel in several different ways. Therefore, some modifications are made to the CA transcription system in order to represent the phonetic details of the interaction, especially within segmental repair sequences and sufficiency adjustments.

First, each intonation unit is transcribed as its own line (Szczepek Reed, 2011). This is to ensure that the transcripts better represent the prosodic nature of speech and its natural continuities and discontinuities. Furthermore, words or utterances that are oriented to as problematic and then subjected to segmental repair, or oriented to as insufficient and then subjected to a sufficiency adjustment, will be transcribed in the narrow transcription of the International Phonetic Alphabet (hereafter, IPA) (Matsumoto, 2011). This is to ensure an accurate rendition of the phonetic details of an interaction, which are much too impressionistic in the standard transcription conventions of CA. However, the introduction of the IPA to the CA transcription system causes a problem. Both the IPA and CA transcription systems use brackets, but CA transcription and IPA transcription use them to indicate different things. In order to avoid any transcription ambiguity, this study uses braces to designate simultaneous speech (i.e., { }), brackets to indicate phonetic notation in narrow transcription in the IPA (i.e., [ ]), and brackets enclosed by braces to indicate simultaneous speech that has been transcribed into the IPA (i.e., {[ ]}). The font used for the transcription also deviates from standard CA practice: the transcription of the dialogue is rendered in Times New Roman font, but the IPA characters are rendered in Arial font (O'Neal, 2016c). IPA characters are rendered in Arial font to clearly distinguish them from the characters in Times New Roman font. Otherwise, this study utilizes orthodox CA transcription standards (see Appendix E: Segmental Repair Analysis Transcription Conventions).

Example 4.2. Segmental Repair Analysis Transcription Example

1	Bumbyn	so: what is the difference between japanese u and english u?
2		(1.1)
3	Mitsuhiro	hm::.
4		(0.4)
5	Bumbyn	maybe::.
6		(0.2)
7	Mitsuhiro	hm:.
8		(0.1)
9	Bumbyn	I think it's almost,
10		(0.6)
11		[θɹoʊ̯]
12		(1.0)
13	Masashi	ah{: : : . }
14	Bumbyn	{[θɹuː]}. [θɹoʊ̯t].
15		(0.2)

16		because
17		(0.2)
18	Masashi	hm:.
19		(0.1)
20	Bumbyn	when you say japanese u:.
21		(0.6)
22		your [θɹoʊ̯t].
23		(0.4)
24		doesn’t participate.

(Extracted from O’Neal, forthcoming)

4.5 Summary

This chapter described the research design that this research adopts in order to explore the research questions that were set out in Section 1.1. This research explores how ELF users negotiate mutually intelligible pronunciation and co-construct sufficient pronunciation through the usage of segmental repair sequences and sufficiency adjustments and it quantifies the segmental adjustments within both. The chapter has also discussed the integrity of the phonetic transcriptions, the naturalness of the data, the validity and reliability of segmental repair analysis, the relationship between conversation analysis and quantification, and the falsifiability of the results and conclusions of this research. After that, the main data collection procedures, the present corpus, and the transcription conventions used in this thesis have been described.

I will next continue to the chapters comprise the analytical portion of this thesis. As explained in Chapter 1, I will focus on phonetic negotiations for interactional intelligibility (Chapter 5), phonetic negotiations for sufficient pronunciation (Chapter 6), and the segmental adjustments that appear in both segmental repair sequences and sufficiency adjustments (Chapter 7). Last, I will discuss an experiment that assesses the relationship between segmental repair and the development of mutual intelligibility (Chapter 8). I will next proceed to Chapter 5 that discusses the organization of phonetic negotiations for interactional intelligibility.

Chapter 5
The Sequential Organization of Interactional Intelligibility

5.1. Introduction

This chapter both examines how mutual intelligibility is interactionally achieved through the organization of segmental repair sequences and assesses the statistical significance of the frequency of each organization of segmental repair[33]. A host of ELF, WE, and SLA research has examined the phonetic characteristics of mutually intelligible pronunciation among speakers from different L1 backgrounds (Jenkins, 2000; Field, 2005; Munro et al., 2006; Tsuzuki & Nakamura, 2009; Suenobu, 2010; Oda & Tajima, 2010; Kirkpatrick, 2010; Tokumoto & Shibata, 2011; Saito, 2011; Deterding, 2013; Zhang, 2015; Deterding & Nur Raihan, 2016; Orikasa, 2016; Kim, 2018; Zoghbor, 2018). Ethnographic (see Jenkins, 2000; Kirkpatrick, 2010; Suenobu, 2010; Tokumoto & Shibata, 2011; Orikasa, 2016; Kim, 2018; Zoghbor, 2018) or psycholinguistic (see Field, 2005; Munro et al., 2006; Tsuzuki & Nakamura, 2009; Oda & Tajima, 2010; Saito, 2011; Deterding, 2013; Zhang, 2015; Deterding & Nur Raihan, 2016) evidence is frequently cited as support for the nature of mutually intelligible pronunciation among speakers from different first language backgrounds. All of this research has been valuable for the insights it has provided into the characteristics of mutually intelligible pronunciation among ELF users. However, little to no attention has been paid to the vicissitudes of mutually intelligible pronunciation within ELF interactions, nor has the idea that mutually intelligible pronunciation is a negotiable and variable phenomenon been taken very seriously (but see Brouwer, 2004; Matsumoto, 2011; O'Neal, forthcoming).

In light of the aforementioned points, this chapter examines how the negotiation of mutually intelligible pronunciation is organized within ELF interactions. As such, this chapter particularly explores the interactional organization of segmental repair sequences

[33] This chapter is based on papers that have already been published in *Asian Englishes* (O'Neal, 2015a), *Journal of Pragmatics* (O'Neal, 2015b), *Journal of English as a Lingua Franca* (O'Neal, 2015c), *Pragmatics and Society* (O'Neal, 2015d), *Pragmatics at its interfaces* (O'Neal, 2017), and *Journal of Second Language Pronunciation* (O'Neal, forthcoming).

with a focus on self- and other-repair-initiation as well as self- and other-segmental-repair. Combining a segmental repair analytic approach (Couper-Kuhlen & Selting, 1996; Local, 2003), which is itself a combination of a conversation analytic approach (Firth, 1996, 2009; Wagner & Firth, 1997; Schegloff, 2007) and a phonology approach (Derwing & Munro, 2005; Munro et al., 2006; Derwing & Munro, 2015), with an ELF perspective (Mortensen, 2013; Baird et al., 2014; Jenkins, 2015), this chapter examines how ELF users successfully organize segmental repair sequences, as well as assesses the statistical significance of the frequency of each organization of segmental repair.

In the following sections, I will first introduce the two sequential aspects that make segmental repair analysis possible (Section 5.2), which are actions that publicly display mutually manifest unintelligibility (Section 5.2.1) and mutually manifest intelligibility (Section 5.2.2). Next, I will introduce the organizations of segmental repair sequences (Section 5.3) through which ELF users can maintain and restore mutual intelligibility through segmental adjustments: reactive segmental repair (Section 5.3.1), which can be further subdivided into other-initiated, self-segmental-repair (Section 5.3.1.1) and other-initiated, other-segmental repair (Section 5.3.1.2); and preemptive segmental repair (Section 5.3.2), which can be further subcategorized into self-initiated, self-segmental-repair (Section 5.3.2.1), and self-initiated, other-segmental-repair (Section 5.3.2.2). After that, in order to determine whether the sequential organization of certain segmental repair sequences are more frequent than other sequential organizations to a statistically significant degree, I will quantify the sequential organizations of segmental repair sequences that appear in the corpus (Section 5.4). The last section will summarize the entire chapter (Section 5.5).

5.2. Segmental Repair

This section will introduce the interactional organization of segmental repair and the taxonomic system that makes its categorization possible. First, this section will describe the two main interactional events that make segmental repair analysis possible. In order for segmental repair analysis to be a valid research methodology, ELF users must adjust the phonetic segments within trouble sources to conclude a repair sequence. Segmental repair consists of two concatenating stages: first, speakers must make unintelligibility publicly manifest; and then subsequently, speakers must make intelligibility publicly manifest. *Mutually manifest unintelligibility* refers to the practices with which ELF users publicly display that mutual intelligibility has faltered, and these practices will be examined in Section 5.2.1. Furthermore, *mutually manifest intelligibility* refers to the practices with which ELF users publicly display that mutual intelligibility has been maintained or restored, and these practices will be explored in Section 5.2.2. From a theoretical perspective, segmental repair is believed to play an important role in language development because it provides negative feedback[34] in the form of signals that intelligibility has faltered and positive feedback in the form of models of intelligible phonetic form (see e.g., Long, 1996; Goo & Mackey, 2013; Saito & Akiyama, 2017). It is the sequential combination of these two practices that allows an emic perspective into the unintelligibility or intelligibility of pronunciation among ELF users.

5.2.1. Mutually Manifest Unintelligibility

This section will explore the practices that constitute the ways in which ELF users publicly display mutually manifest unintelligibility, or in other words, how they can demonstrate that a trouble source has emerged. Indications of mutually manifest unintelligibility are the catalysts of segmental repair sequences, and an analyst cannot claim that a segmental repair sequence has begun from an emic perspective unless the speakers themselves orient to something within the interaction as an indication of mutually manifest unintelligibility.

ELF users can indicate that mutual intelligibility has faltered in many different ways. However, a basic distinction can be made between public indications that mutual intelligibility has faltered because of a specific trouble source or because of an unspecified

[34] This thesis avoids the terms "corrective feedback" or "error correction" because both imply a pedagogical intention to correct, but this is often not the case in the examples within the corpus gathered for this thesis. Furthermore, this thesis avoids the term "negative evidence", which is often used in discussions about which kinds of information would be needed to reset certain parameters within Universal Grammar (UG). This thesis does not operate under the belief that UG exists at all (see e.g., Tomasello, 2003 for arguments against UG), and thus "negative evidence" is not a relevant term for this phenomenon.

trouble source. This dichotomy corresponds to the distinction that conversation analysts make between *open class repair initiation* and *closed class repair initiation* (Schegloff et al., 1977; Schegloff, 1987; Drew, 1997). Open class repair initiation does not specify what element of a turn is problematic and thus is much more ambiguous, but closed class repair initiation specifies an element of a turn as problematic and thus is much more targeted (Drew, 1997; Wong, 2000; Schegloff 2007). Furthermore, the means that speakers use to indicate open class repair initiation and closed class repair initiation are different, as the following examples will demonstrate.

In the first example of mutually manifest unintelligibility, the recipient of the trouble source orients to potentially the entire previous turn rather than a single element within the previous turn as the trouble source. As such, the recipient of the trouble source does not specify the location of the trouble source. In the following example, Zhan, a female Chinese graduate student, is asking Teruki, a male Japanese undergraduate, what grade he is in, but Teruki orients to Zhan's entire turn as a potential trouble source, and thus this example represents an instance of an *open class repair initiation*.

Example 5.1. Open class repair initiation and mutually manifest unintelligibility

1	Zhan	so whi-
2		(0.2)
3		which [gɻeɪ̯ː]?
4		(0.4)
5		so,
6		(1.3)
7		which [gɻeɪ̯ː].
8		(0.6)
9		I mean.
10		(0.6)
11	Teruki	uh? sorry?

In lines 1~9, Zhan formulates the first pair part of a question-answer-receipt sequence, which creates an obligation for the recipient of the question to formulate a matching second pair part. However, in line 11, Teruki deploys the open class repair initiator "uh? sorry?", which orients to potentially, but not necessarily, the entire previous turn as a trouble source. The open class repair initiator does not specify a problematic element in the previous turn. Rather, it manifests that something about the previous turn is problematic, but whether this is because of the entire turn or just a section of the turn is unclear. Accordingly, through the deployment of the open class repair initiator, Teruki manifested that mutual intelligibility had faltered, which publicly displays that Teruki does not understand something and signals to Zhan that he does not understand something. This is a strong indication of mutually manifest unintelligibility.

However, not all indications of mutually manifest unintelligibility are as open-ended as the previous example. Sometimes ELF users orient to specific elements within the previous turn as a trouble source. In the second example, the recipient of the trouble source orients to a specific word within the turn as the trouble source rather than potentially the entire turn, and thus this example represents an instance of a *closed class repair initiation*. In the second example, Hathai, a female Thai exchange student, is asking Kumi, a female Japanese undergraduate, if she eats Osechi, a traditional Japanese New Year's food, during the New Year holiday season.

Example 5.2. Closed class repair initiation and mutually manifest unintelligibility

1	Hathai	do japanese people usually eat [seɪ̯d͡ʒi].
2		(0.2)
3		like
4		(0.3)
5		normally?
6		(0.8)
7	Kumi	{hm.}
8	Hathai	{not.} or only ea:t.
9		(0.2)

10		[seɪ̯d͡ʒi] only:.
11		(0.3)
12		when its come to be new year?
13		(1.2)
14	Mitsu	uhm::.
15		(1.5)
16		I.
17		(1.0)
18		I eat
19		(1.0)
20		new year.
21		(0.6)
22	Hathai	ah: you eat only {new year}.
23	Mitsu	{only: }.
24		(0.3)
25	Hathai	only new year.
26		(0.6)
27		how about you?
28		(0.7)
29	Kumi	[se]- [seɪ̯d͡ʒi]?
30		(0.1)
31	Hathai	yeah.
32		(0.5)
33	Kumi	[seɪ̯d͡ʒi]?
34		(0.1)

In line 27, Hathai redirects a question about Osechi-eating practices within which she articulates "osechi" as [seɪ̯d͡ʒi] from Mitsu to Kumi. This question represents the first pair part of a question-answer-recipient sequence, and it produces an obligation on the recipient of the question, Kumi, to produce a matching second pair part (Schegloff, 2007). However, Kumi does not do this; rather, Kumi articulates [seɪ̯d͡ʒi] with rising intonation in line 29, which orients to specifically [seɪ̯d͡ʒi] as a trouble source. This manifests that mutual intelligibility has faltered: Kumi publicly displays that she does not understand [seɪ̯d͡ʒi]. But in contrast to the previous example, in this example, Kumi orients to a specific word as a trouble source rather than potentially an entire turn, which is a *closed class repair initiation* (Schegloff et al., 1977; Drew, 1997). Accordingly, through the deployment of the closed class repair initiator, Kumi manifested that mutual intelligibility had faltered, which shows that Kumi does not understand something and signals to Hathai that she does not understand a specific element of the previous turn. This is a strong indication of mutually manifest unintelligibility.

Mutually manifest unintelligibility can be demonstrated through a multiplicity of devices. Other examples of open class repair initiators within the corpus of this study include "what?", "huh?", "uh?", "hm?", and "ha?" Examples of closed class repair initiators within the corpus are only limited by the items to which the speakers orient as unintelligible and are thus as multiplicitous as trouble sources are varied.

Having discussed the ways in which ELF users can orient to some element of the interaction as mutually manifest unintelligibility, I now introduce the ways in which speakers can publicly display mutually manifest intelligibility.

5.2.2. Mutually Manifest Intelligibility

This section will explore the practices that constitute the ways in which ELF users publicly display mutually manifest intelligibility, or in other words, how they can demonstrate that they understand something to their interlocutors whereas they once did not. Indications of mutually manifest intelligibility are the interactional practices that allow for an examination of the culmination of segmental repair sequences, and as such, an analyst cannot claim that a segmental repair sequence has been concluded from an emic perspective unless the speakers themselves orient to something within the interaction as an indication of mutually manifest intelligibility.

Although numerous devices can be utilized to indicate mutually manifest unintelligibility through open and closed class repair initiators, the means through which ELF users publicly display mutually manifest intelligibility seems to be much more restricted. Within the corpus, mutually manifest intelligibility is publicly displayed through the deployment of one of two discourse markers: “ah” or “oh” (Heritage, 1984; Aijmer, 2002; Trester, 2009; O’Neal, 2015a). Although other devices, such as the affirmation discourse marker “yeah”, can appear along with the discourse markers “ah” and “oh”, these two discourse markers seem to specifically display mutually manifest intelligibility in a public manner.

In the first example of mutually manifest intelligibility, the participant who oriented to the trouble source as problematic publicly displays that he understands whereas he once did not. In the following example, Jia, a female Chinese graduate student, is talking with Ryu, a male Japanese undergraduate, about her hobbies, which includes playing video games on her cellphone. The extract begins in the middle of the interaction, but Ryu publicly displays mutually manifest intelligibility when he intuits the meaning of the trouble source through the deployment of the discourse marker “ah”.

Example 5.3. Discourse marker “ah” as a signal of mutually manifest intelligibility

1	Jia	playing::,
2		(0.3)
3		play [bad.mɪ.ʃʌnz].
4		(0.7)
5		playing [pa.mɪ.ʃonz].
6		(0.5)
7		[ˈpa.mɪ.ʃonz].
8	Ryu	>ah.<
9		(0.6)
10		[pe.ɾe.mɪ.ʃən]. ((“permission” is the name of the video game.))

Between lines 1~7, Jia adjusts the pronunciation of the trouble source. In line 8, Ryu deploys the discourse marker “ah”, which functions as a public display of his ability to intuit the semantic intent of [ˈpa.mɪ.ʃonz]. That is, Ryu publicly displays that he now understands to what [ˈpa.mɪ.ʃonz] refers. Accordingly, through the deployment of the discourse marker "ah", Ryu manifested that mutual intelligibility has been restored, which signals to Jia that he understands something whereas before he did not. This is a strong indication of mutually manifest intelligibility.

The discourse marker "ah" is not the only publicly displayed indication of mutually manifest intelligibility. The other discourse marker that also demonstrates mutually manifest intelligibility is "oh" (Heritage, 1984; Trester, 2009; O'Neal, 2015a). In the following example, Bumbyn, a female Mongolian exchange student, and Matsu and Mitsu, who are male Japanese undergraduates, are discussing their university club activities, but the interaction briefly becomes mutually unintelligible. However, Mitsu clearly demarcates the location at which the interaction returns to a mutually intelligible state through the deployment of the discourse marker "oh".

Example 5.4. Discourse marker "oh" as a signal of mutually manifest intelligibility

1	Bumbyn	an:de.
2		(0.5)
3		in my home university I am a member of [t͡ʃiz] cl- [t͡ʃɪs] club?
4		(0.6)
5	Mashu	°[t͡ʃe]°?
6	Bumbyn	[t͡ʃɛs] club.
7		(0.2)
8	Mitsu	[t͡ʃɛs]?
9		(0.4)
10	Bumbyn	you know {[t͡ʃɛs]?}
11	Mitsu	{oh:. } [t͡ʃɛs]. oh.
12		(0.1)
13	Bumbyn	yea::h.

In lines 1~3, Bumbyn formulates the first pair part of a question-answer-receipt sequence, but Mashu and Mitsu manifest that mutual intelligibility has faltered through the deployment of closed class repair initiators in lines 5 and 8 respectively. After a clarification, however, Mitsu deploys the discourse marker “oh” twice in line 11, which publicly displays mutually manifest intelligibility. Accordingly, through the deployment of the discourse marker “oh”, Mitsu manifested that mutual intelligibility has been restored, which signals to Bumbyn that he understands something whereas before he did not.

It is through the combination of detecting a repair initiation through the deployment of open and closed class repair initiators and a repair culmination through the deployment of the discourse markers “oh” and “ah” that segmental repair analysis is possible. Having described both mutually manifest unintelligibility and intelligibility, I will now illustrate the variation among the organization of segmental repair strategies.

5.3. Segmental Repair Organization

This section will examine the interactional organization of segmental repair sequences. Segmental repair sequences are defined as repair sequences in which speakers orient to trouble sources as pronunciation problems and rearrange, modify, delete, or insert phonetic segments in order to restore or maintain mutual intelligibility (Brouwer, 2004; Matsumoto, 2011; O’Neal, 2017, forthcoming). However, the organization of segmental repair sequences is highly dependent on the exigencies of the interaction, and as such, a framework with which to categorize the interactional organization of segmental repair sequences is in order so that this thesis can offer a meaningful taxonomy.

Various taxonomies have been offered within ELF research to categorize the interactional phenomena with which speakers conduct exchanges. For instance, Kirkpatrick (2007a) provides a comprehensive list of communication strategies that appear within ELF interactions, which are neatly divided into “speaker” and “listener” categories. The “speaker” categories are strategies that the “speaker” initiates, and the “listener” categories are strategies that the “listener” initiates. However, as pointed out by both Mauranen (2012) and Björkman (2014), it is problematic to categorize participants as just “speakers” and “listeners” within interactions for several reasons. First, as Mauranen (2012) states, “speaker and listener roles alternate constantly between participants, sometimes very quickly, and always in real time; participants must relate to each other actively all the time, making their contributions relevant to the changing states of the discourse" (p. 173). Thus, it is difficult to categorically assign a "speaker" or "listener" identities to a participant as these roles quickly change. Second, as Björkman (2014) argues, "as soon as a 'listener' responds to the speaker with the previous turn, the 'listener' takes the additional role of the 'speaker'" (p. 127). Therefore, a strategy that is assigned to "speakers" does not include the interactional notion of turn change in any serious way. Furthermore, Kirkpatrick's (2007a) dichotomy is silent as regards the culmination of a sequence, but the way in which participants organize the conclusion of a sequence is just as important as the way in which participants organize its initiation (see e.g., Schegloff, 2007).

A taxonomy of interactional phenomena that divorces the categories of "speaker" and "listener" from the taxonomy and accommodates the CA notion of turn change is necessary to catalogue the vicissitudes of segmental repair organization and the protean nature of mutually intelligible pronunciation. In order to do so, this study adopts Björkman's (2014) arguments for categorizing strategies into "self-initiated" and "other-initiated" strategies, but this study also argues that the CA distinction between "self-repair" and "other-repair" is required to adequately categorize all segmental repair sequences (Drew, 1997; Schegloff, 1997b, 2007; Schegloff et al., 1977)[35]. Therefore, this study offers a tetrachotomy to categorize segmental repair sequences that includes both the distinction between self- and other-initiation as well as self- and other-repair. The tetrachotomy with which to categorize segmental repair sequences includes the following four categories: 1) other-initiated, self-segmental-repair; 2) other-initiated, other-segmental-repair; 3) self-initiated, self-segmental-repair; and 4) self-initiated, other-segmental-repair. Each category of segmental repair strategy will be elucidated below.

5.3.1. Reactive Segmental Repair

The first category of segmental repair to be examined is *reactive segmental repair*, which is a superordinate term that covers other-initiated, self-segmental-repair and other-initiated,

[35] More recent examinations of repair sequences also include a third dichotomy: same-turn and other-turn repair (Németh, 2012). It can be said that even the tetrachotomy that is offered in this thesis is already out of date.

other-segmental-repair (O'Neal, 2017, forthcoming). The single unifying feature of all reactive segmental repair sequences is other-initiation, or in other words, the identification of the trouble source is not conducted by the producer of the trouble source. Rather, it is the recipient of the trouble source that identifies it as such. Thus, in a reactive segmental repair sequence, the recipient of the trouble source overtly reacts to the presence of an interactional problem after it has emerged with either an open or closed class repair initiator.

5.3.1.1. Other-Initiated, Self-Segmental-Repair

Within other-initiated, self-segmental-repair sequences, the producer of the trouble source does not identify the trouble source, but he or she does use segmental repair to resolve it. In other words, the recipient of the utterance which contains the trouble source identifies it as such, and then the producer of the trouble source conducts segmental repair so as to create a more mutually intelligible variant of the original iteration of the pronunciation. In the following extract, Jia, a female Chinese graduate student, and Mako, a female Japanese undergraduate, are discussing public transportation in Beijing, but Mako orients to Jia's articulation of "subway" as a trouble source, which catalyzes an other-initiated, self-segmental repair sequence.

Example 5.5. An example of other-initiated, self-segmental repair

1	Jia	since beijing- since ↑peking has a: [ʃʌb.weɪ̯].
2		(0.4)
3	Mako	[ʃʌb.we]?
4	Jia	[ʃʌb.weɪ̯].
5		(1.2)
6		niigata don't have,
7		(0.6)
8		didn't have,
9		(0.3)
10		don't have,
11		(0.1)

12		[ʃʌb.weɪ̯],
13		(0.3)
14	Mako	[ʃɑ.ɰɯ]?
15		(1.8)
16	Jia	[sʌb.weɪ̯].
17		(0.3)
18	Mako	[sʌb.weɪ̯]?
19		(0.2)
20	Jia	hm.
21	Mako	↑oh >yeah yeah< ah. >I know I know<.

In line 1, Jia is continuing a story within which she articulates "subway" as [ʃʌb.weɪ̯]. However, the lack of uptake in line 2 adumbrates the onset of interactional trouble, and in line 3, Mako deploys the closed class repair initiator [ʃʌb.we] with rising intonation, reacting to specifically [ʃʌb.weɪ̯] as a trouble source. This both catalyzes a repair sequence and publicly displays that mutual intelligibility has faltered. Accordingly, the story is on temporary hiatus until after the resolution of the repair sequence and the restoration of mutual intelligibility (O'Neal, forthcoming). Jia attempts to repair through repetition (Murata, 1995; Kaur, 2012), but the lack of uptake in line 5 seems to indicate that this was unsuccessful. Next, in lines 6~12, Jia attempts to repair through explanation, but Mako again orients to specifically [ʃʌb.weɪ̯] as unintelligible in line 14, which shows that the explanation was ineffective in restoring mutual intelligibility. In line 16, Jia abandons the previous repair strategies and attempts segmental repair, modifying the initial sibilant consonant from [ʃ] to [s]. Mako attempts to confirm the pronunciation in line 18, and after Jia affirms the pronunciation with a quick "hm" in line 20, Mako first deploys the discourse marker "oh" with high upstep, and then makes many explicit claims to understand "subway" through various lexical and phrasal devices. This demonstrates that these two speakers restored mutual intelligibility and that other-initiated, self-segmental-repair allowed these two speakers to do so.

Thus, Example 5.5. represents an extended other-initiated, self-segmental-repair sequence because the speakers attempt multiple repairs before finally using segmental repair to resolve the trouble source. The catalyst of the sequence is that Mako orients to Jia's articulation of "subway" as unintelligible. In other words, the recipient of the trouble source, not the producer of the trouble source, identifies the trouble source as problematic, and thus this sequence begins with other-initiation. However, Mako does not repair the trouble source; Jia does. In other words, the producer of the trouble source, not the recipient of the trouble source, segmentally repairs the trouble source pronunciation into a more intelligible phonetic form, and therefore this sequence concludes as self-segmental-repair. Therefore, the way that the participants organize this repair sequence is other-initiated, self-segmental-repair.

Other segmental repair sequences within the corpus reveal the same kind of interactional organization of segmental repair but are nonetheless more complicated. The following example is more complex because two segmental repair sequences will be embedded between the first and third components of a question-answer-receipt sequence. In the following extract, Misa, a female Japanese undergraduate, Riku, a male Japanese undergraduate, and Bumbyn, a female Mongolian exchange student, are discussing their university club activities, but both Misa and Riku orient to Bumbyn's articulation of "club" as a trouble source, which catalyzes an other-initiated, self-segmental-repair sequence. But even after the restoration of mutual intelligibility, both Bumbyn and Misa orient to Riku's articulation of "volleyball" as a trouble source, which catalyzes a second other-initiated, self-segmental-repair sequence.

Example 5.6. An example of a complicated other-initiated, self-segmental repair

1	Bumbyn	so.
2		(0.5)
3		do you hav-
4		(0.2)
5		do you- are you a member of,
6		(0.2)
7		some [klʌ]?

8		(0.8)
9	Misa	hm?
10		(0.7)
11	Riku	uh:::.
12		(0.6)
13	Bumbyn	[klʌb]?
14		(0.3)
15	Misa	[kl]-. ↑ah yeah yeah.=
16	Bumbyn	=oh. [klʌb].
17		(0.1)
18		>sorry<.
19	Misa	{I-}
20	Riku	{I-}
21		(0.2)
22		I belon::ged
23		(0.4)
24		to::
25		(0.5)
26		[be̩ribe̩l] club.
27		(0.5)
28	Bumbyn	what?
29		(0.4)
30	Riku	[be̩ribe̩l] club.
31		(0.3)
32	Bumbyn	[baɹ]?
33		(0.2)
34		{[baɹ]}?
35	Misa	{[be̩ri]}- [be̩ribo]?
36		(0.2)
37	Riku	[be̩ribol].

38	Bumbyn	↑ah:::.
39	Misa	[be̝ribol].
40		(0.2)
41	Bumbyn	[valibol].
42		(0.2)
43		okay.
44	Riku	hn:.

In lines 1~7, Bumbyn formulates the first pair part of a question-answer-receipt sequence within which she articulates “club” as [klʌ]. However, neither Misa nor Riku produce the requisite second pair part to the question. Rather Misa deploys the open class repair initiator “hm?” with rising intonation in line 9, which orients to the entire previous turn as a potential trouble source; similarly, Riku deploys the open class repair initiator “uh:::.” with flat-lining intonation in line 11, which also orients to Bumbyn’s entire previous turn as a potential trouble source (Drew, 1997; Ike, 2016). The superordinate question-answer-receipt sequence is on hiatus until the completion of the repair sequence, which will require the identification and treatment of the trouble source in some fashion. However, as yet the specific trouble source within Bumbyn’s turn has not been identified.

In line 13, however, even though both Misa and Riku nominally oriented to Bumbyn’s entire previous turn as potentially unintelligible, Bumbyn does not orient to Misa’s and Riku’s open class repair initiators as an indication that the entire previous turn was unintelligible. Rather Bumbyn just self-segmental-repairs her pronunciation of “club”, inserting a [b] phone to the end of the pronunciation and proffering it as a candidate repair pronunciation for either Misa or Riku to affirm or reject as the next relevant action (O’Neal, 2015a, 2017). In line 15, Misa articulates the first two phones of “club” and then deploys the discourse marker “ah” with very high upstep, which publicly displays that mutual intelligibility has been restored, and then dual “yeah”, which publicly display further affirmation. This turn furthermore acts as an acceptance of Bumbyn’s candidate repair pronunciation, which completes the segmental repair sequence.

After a sequence closing third apology (Schegloff, 2007) in lines 16 and 18, both Misa and Riku simultaneously self-select as next speaker (Sacks et al., 1974; Schegloff, 2007) and begin to formulate the second pair part to the question-answer sequence that was launched between lines 1~7[36]. Misa drops out, abandoning the conversational floor, and Riku formulates the second pair part of the question-answer-receipt sequence, within which he articulates "volleyball" as [bḛribḛl]. Although the next action due is a formulation of the receipt of the answer, neither Bumbyn nor Misa provide it. Rather, Bumbyn deploys the open class repair initiator "what" in line 28, which nominally orients to Riku's entire previous turn as a trouble source (Drew, 1997), and thus the culmination of the question-answer-receipt sequence is on temporary hiatus again. This shows that another repair sequence has begun, and that the production of the receipt portion of question-answer-receipt sequence is not due until at least after the completion of the repair sequence and the restoration of mutual intelligibility.

Riku does not orient to Bumbyn's open class repair initiator "what?" as an indication that his previous turn was unintelligible; rather, he limits his attempt to repair to just the phrase "volleyball club", repeating "[bḛribḛl] club" a second time (Murata, 1995; Kaur, 2012). However, Bumbyn manifests that repair has failed through the deployment of closed class repair initiators that orient to specifically [bḛribḛl] as a trouble source in lines 32 and 34. This also demonstrates that mutual intelligibility has not been restored. In line 35, however, Misa deploys a candidate repair pronunciation for Riku to affirm or reject as the next relevant action, and thus is attempting to co-construct a mutually intelligible pronunciation for "volleyball" with him[37]. However, Riku does not affirm Misa's candidate repair pronunciation.

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[36] Although Riku never overtly displays mutually manifest intelligibility, the fact that he attempts to produce the second pair part of this sequences demonstrates that Bumbyn's pronunciation was intelligible again by at least line 20.

[37] Further evidence that Misa is co-constructing a mutually intelligible pronunciation rather than proffering a candidate repair pronunciation is evinced in the fact that Misa does not deploy an "ah" or "oh" discourse marker later in the sequence. In other words, the subsequent actions do not seem to indicate that Misa re-enters a state of intelligibility, which suggests that the Riku's articulation of "volleyball" was never unintelligible to her at all.

In order to restore mutual intelligibility, Riku attempts a new repair strategy in line 37: segmental repair. Riku articulates "volleyball" as [be̞ribol], modifying the vowel quality of the third syllable of the trouble source, and proffers this pronunciation as a candidate repair pronunciation for either Bumbyn to affirm or reject as intelligible as the next relevant action (O'Neal, 2015a, 2017). In quick response, in line 38, Bumbyn clearly demonstrates that mutual intelligibility has been restored: she deploys the discourse marker "ah" with very high upstep, which both affirms Riku's candidate repair pronunciation and manifests that mutual intelligibility has been restored. However, although Bumbyn orients to Riku's candidate repair pronunciation as an intelligible pronunciation, this does not mean that she orients to it as a sufficient pronunciation (see Chapter 6). This is manifest in the fact that Bumbyn rearticulates "volleyball" as [valibol] in line 41[38], modifying the onset consonant and the vowel quality of the first syllable as well as the onset consonant of the second syllable, even though she has already oriented to [be̞ribol] as intelligible once in line 38.

Thus, Example 5.6. contains two serial other-initiated, self-segmental-repair sequences, each of which contends with a different trouble source. The catalyst of the first sequence is that both Misa and Riku orient to Bumbyn's turn as interactionally problematic. In other words, the recipients of the trouble source, not the producer of the trouble source, orient to Bumbyn's turn as unintelligible, and thus this sequence begins with other-initiation. However, neither Misa nor Riku repair the trouble source; Bumbyn does so through segmental repair. Thus, the producer of the trouble source, not the recipients of the trouble source, segmentally repairs the trouble source pronunciation into a more mutually intelligible phonetic form, and thus this sequence concludes as self-segmental repair. The catalyst of the second other-initiated, self-segmental repair sequence is that Bumbyn orients to Riku's articulation of "volleyball" as unintelligible. Once again, a recipient of the trouble source, not the producer of the trouble source, orients to one of Riku's words as unintelligible, and thus this sequence

[38] Bumbyn's action in line 41, the deployment of [valibol], is not an other-initiated repair. Repair is the reestablishment of mutual intelligibility (Schegloff, 1993, 2000). In line 41, however, the mutual intelligibility of "volleyball" has already been reestablished. This [valibol] represents a pronunciation change even after mutual intelligibility has been restored. This phenomenon will be examined extensively in chapter 6.

also begins with other-initiation. However, Bumbym does not repair the trouble source; Riku does so through segmental repair with a little collaborative help from Misa. Thus, the producer of the trouble source, not the recipient of the trouble source, segmentally repairs the trouble source pronunciation into a more mutually intelligible phonetic form, and thus this sequence also concludes as self-segmental repair. Therefore, the way in which the participants interactionally organized these two repair sequences is as other-initiated, self-segmental repair.

Although other-initiated, self-segmental-repair is one way to organize a segmental repair sequence, there is considerable variation possible even within just other-initiated, self-segmental-repair sequences. The following subsections will examine the variation inherent within such sequences.

5.3.1.1.1. Reversion Segmental Repair

The common pattern of other-initiated, self-segmental repair is that the recipient of the trouble source identifies it as problematic, after which the producer of the trouble source ameliorates the pronunciation in some way that is conducive to the restoration of mutual intelligibility. However, not all other-initiated, self-segmental-repairs conform to such a pattern. Indeed, however rare they may be (O’Neal, forthcoming), some of the other-initiated, self-segmental repair sequences do not involve any amendment of the trouble sources at all. In fact, one subtype of other-initiated, self-segmental repair involves the rejection of candidate repair pronunciations and the reversion to pronunciations that were already once oriented to as unintelligible trouble sources. I call such segmental repair sequences *reversion segmental repairs sequences* (O’Neal, forthcoming).

In the following extract, Takeshi, a male Japanese undergraduate, and Zhan, a female Chinese graduate student, are discussing Takeshi’s proclivity to hunt down and eat up small amphibians, but Zhan orients to Takeshi’s articulation of “fish” as a trouble source, which catalyzes an other-initiated, self-segmental-repair sequence. However, Takeshi rejects Zhan’s candidate repair pronunciation and reverts back to the original pronunciation in the process of restoring mutual intelligibility.

Example 5.7. An example of reversion segmental repair

1	Takeshi	do you eat.
2		(0.5)
3		often,
4		(0.5)
5		do you eat often:.
6		(0.6)
7		[fɪʃ] in niigata?
8		(0.4)
9	Zhan	[fɪt͡ʃ]?
10		(0.5)
11	Takeshi	[fɪʃ].
12	Zhan	ah [fɪʃ]=
13	Takeshi	=[fɪʃ].
14		(1.0)
15	Zhan	.hhh

Between lines 1~7, Takeshi launches a question-answer-receipt sequence, which obligates a response from Zhan. Within his question, Takeshi articulates “fish” as [fɪʃ]. However, in line 9, Zhan does not answer the question. Rather, she articulates [fɪt͡ʃ] with rising intonation as a closed class repair initiator, which manifests both that Zhan orients to [fɪʃ] as unintelligible and that Zhan proffers [fɪt͡ʃ] as a candidate repair pronunciation for Takeshi to affirm or reject as the next relevant action as part of an attempt at clarification (O’Neal, forthcoming). Thus, by at least line 9, mutual intelligibility has faltered. But in line 11, Takeshi reverts to the original pronunciation, repeating his first articulation of “fish” a second time, which functions both as a rejection of Zhan’s proffer of [fɪt͡ʃ] as a candidate repair pronunciation and as a proffering of [fɪʃ] as a candidate repair pronunciation for Zhan to affirm or reject as the next relevant action. In response in line 12, Zhan deploys the discourse marker “ah”, which publicly displays a claim that mutual intelligibility has been restored, and then articulates [fɪʃ], both affirming Takeshi’s candidate repair pronunciation and accommodating to his pronunciation of the word. This demonstrates that mutual intelligibility has been restored, and the interaction can continue apace.

According to the tetrachotomy utilized in this study to categorize segmental repair sequences, Example 5.7. is an other-initiated, self-segmental repair sequence. This is because the recipient of the trouble source, not the producer of the trouble source, identifies the trouble source as problematic, and thus this sequence begins as other-initiation. However, the producer of the trouble source, not the recipient of the trouble source, segmentally repairs the trouble source, and thus this sequence concludes as self-segmental repair. But what makes this example different from the canonical examples of other-initiated, self-segmental repair is that the producer of the trouble source reverts back to the pronunciation that was originally oriented to as a trouble source; that is, the producer of the trouble source rejects the notion that the trouble source is in fact problematic.

5.3.1.1.2. Segmentation Segmental Repair

The canonical pattern of other-initiated, self-segmental repair is that the recipient of the trouble source identifies the problem, and then the producer of the trouble source modifies, deletes, or inserts phonetic segments into the trouble source in the effort to create a more mutually intelligible variant of the problematic pronunciation. However, other-initiated, self-segmental repair sequences in which interactants do not modify, delete, or insert phonetic segments to restore mutual intelligibility but rather reorganize the syllabic order of the phonetic segments exist, as the next example will demonstrate.

Within phonology, the organization of phonetic segments into words is referred to as segmentation, which is defined as the parsing of the phonetic segments in the stream of speech into words (Jusczyk, 1997). For example, if the utterance “Where do you get your crazy ideas?” is articulated without salient pauses between the words, its phonetic realization is not [wɛɚ] [du] [ju] [gɛt] [jɔɹ] [kɹeizi] [aɪdiəz], but rather [wɛɚdujugɛtjɔɹkɹeiziaɪdiəz]. In the stream of speech, salient pauses are not omnipresent indications of a word boundary, and therefore interlocutors often have to use cues other than pauses to segment [wɛɚdujugɛtjɔɹkɹeiziaɪdiəz] into [wɛɚ] [du] [ju] [gɛt] [jɔɹ] [kɹeizi] [aɪdiəz].

Instances in which the segmentation of the phonetic segments is oriented to as a trouble source, or in other words, the organization of the phonetic segments rather than the distinctive characteristics of the phonetic segments is oriented to as a trouble source, do exist, albeit they may be quite rare (O'Neal, forthcoming). I call such sequences *segmentation segmental repair sequences* (O'Neal, 2016a). Segmentation segmental repair covers all segmental repairs in which the reorganization of the segmentation of the phonetic segments within the trouble source provides an unintelligible and intelligible variant of the same pronunciation with which an analyst can make comparisons.

The first example of segmentation segmental repair will follow the other-initiated, self-segmental repair pattern of segmental repair sequence organization. The recipient of the trouble source will orient to something in the previous turn as problematic, and then the producer of the trouble source will repair the problem. But an analysis of the repair sequence reveals that one of the phonetic segments of a word was missegmented as part of the next word, and thus the repair will entail the resegmentation of the trouble source rather than the adjustment of the phonetic segments within the trouble source. In this extract, which is taken from a recorded conversation that is not included in the corpus gathered for this research[39], Xue, a female Chinese exchange student who majors in Japanese, and Ayaka, a female Japanese undergraduate who majors in legal studies, are talking about Ayaka's mother, which leads to the following exchange within which the segmental boundaries of "likes" and "gardening" are subject to repair and are resegmented.

Example 5.6. An example of segmentation segmental repair

1 Ayaka ah:::

[39] This example and the next example are taken from a corpus of conversation homework assignments gathered the year before formal data collection for this research project began. The assignments were exactly the same as the assignments described in Chapter 4 for the segmental pronunciation course (see Table 4.6). This extract is used to exemplify segmentation segmental repair sequences because they are extremely rare (O'Neal, forthcoming). No examples of segmentation segmental repair appeared in the corpus gathered for this study, but I felt that it would be irresponsible to not include an example of it in a thesis that is devoted to explicating segmental repair.

2		(0.5)
3		I don know::↑ah.
4		(0.7)
5		but
6		(0.8)
7		ah. she::
8		(0.5)
9		she- uh- maybe she [laɪ̯ks] [ˈga.dɛn.iŋ].
10		(0.6)
11	Xue	[ˈskaɹ.dɛn.iŋ]?
12		(0.2)
13	Ayaka	[ˈga.dɛn.iŋ].
14	Xue	↑ah [ˈga.dɛn.iŋ]. oh. {okay. }
15	Ayaka	{[ga]- } yeah.
16		(0.3)
17		so in spring she::.
18		(0.7)
19		she grows some flowers.
20	Xue	↑hn:::.
21	Ayaka	yeah.

In lines 1~9, in response to a question, Ayaka states “maybe she likes gardening” within which Ayaka articulates “likes gardening” as [laɪ̯ks] [ˈga.dɛn.iŋ]. The next action due that will complete the question-answer-receipt sequence is the receipt of the answer to the question. However, after a 0.6 second silence, in line 11, Xue articulates [ˈskaɹ.dɛn.iŋ] with high rising intonation as a closed class repair iniator, which demonstrates that Xue orients to the last three syllables of the previous utterance as both unintelligible and as a trouble source. Xue’s action in line 11 also manifests a number of interactionally significant facts: 1) intelligibility has faltered; 2) a repair sequence that will have to restore intelligibility has begun; 3) the production of the receipt to the answer will be delayed until the restoration of intelligibility; 4) Xue missegmented Ayaka's utterance. That is, Xue's reaction in line 11 manifests that Xue orients to the syllable boundaries not as [laɪ̯ks.ga.dɛn.iŋ] but rather as [laɪ̯k.skaɹ.dɛn.iŋ]. Furthermore, it is significant to recognize that Xue oriented to the syllable boundaries as indicative of word boundaries: Xue orients to [ˈskaɹ.dɛn.iŋ] as a single word, albeit an unintelligible word in need of repair.

Sensing that mutual intelligibility has faltered, Ayaka begins to segmental self-repair. In line 13, Ayaka utilizes a lone deployment of "gardening," or in other words just says "gardening" by itself within its own turn. Lone deployments make the beginning and end of word boundaries much more salient; in other words, they make the segmentation very salient (O'Neal, 2016a). Furthermore, the lone deployment of "gardening" is articulated as [ˈga.dɛn.iŋ], which represents a proffer of a candidate repair pronunciation. The next action due is an affirmation or rejection of Ayaka's candidate repair pronunciation. In line 14, Xue deploys the discourse marker "ah" with high upstep, which both publicly displays a claim that mutual intelligibility has been restored and affirms Ayaka's candidate repair pronunciation as intelligible (Matsumoto, 2011). Next, Xue repeats [ˈga.dɛn.iŋ] once, which further substantiates the claim that mutual intelligibility has been restored. Last, Xue deploys the discourse markers "oh" and "okay". Accordingly, Xue displays through multiple signals that mutual intelligibility has been restored. This demonstrates that the superordinate question-answer-receipt sequence and the embedded segmental repair sequence have been brought to a successful conclusion.

This example reveals the interactional nature of segmentation within ELF interactions. This is because the association between phonetic segments and words can be a matter of interactional consent (O'Neal, 2016a). Xue's action in line 14 seems to indicate that Xue has reanalyzed the segmentation of speech. Previously, Xue oriented to the word boundaries as [laɪk] [skaɹ.dɛn.iŋ], but in line 14 Xue oriented to the word boundaries as [laɪks] [ga.dɛn.iŋ]. This is manifest in a comparison of Xue's responses in lines 11 and 14: in line 11, Xue articulates [ˈskaɹ.dɛn.iŋ] but in line 14 articulates [ga.dɛn.iŋ]. The [s] phone has been removed in the second iteration of the pronunciation and probably reanalyzed and resegmented as a part of the next word. Furthermore, the voicing feature of the [k] phone was modified to voiced, which results in a [g] phone.

In the first example of segmentation segmental repair, part of one word was missegmented as part of the following word. In the second example of segmentation segmental repair below, the exact opposite will occur: one of the phonetic segments of a word will be missegmented as part of the previous word. In this example, which is also taken from a recorded conversation that is not included in the corpus gathered for this study, Yi, who is a female Chinese exchange student who majors in Japanese, is expressing admiration for Miya, who is both a female Japanese undergraduate and a member of a pro-bono legal advising club. Yi's attempt to express her admiration, however, leads to a miscommunication within which the segmental boundaries of "too" and "great" are subject to segmental repair and resegmented.

Example 5.7. A second example of segmentation segmental repair

1	Yi:	and I think that it is.
2		(0.1)
3		[tʊ] [gɹiːt]
4		(0.3)
5		.hhh
6		(0.4)
7		↑wonderful.
8		(2.6)
9	Miya:	hm. [tʊk] [ʰɰʌt]? ((took what?))
10	Yi:	[gɹiːt].
11		(1.4)
12	Miya:	ah. [gɹei̯t].
13		(0.3)
14	Yi:	yeah.
15		(1.1)
16	Miya:	hahahaha. okay. thank you:.

Between lines 1 and 7, Yi formulates the first pair part of an admiration-acceptance sequence. Yi is impressed with Miya's pro-bono legal work. However, in line 9, Miya does not produce either an acceptance or a rejection of the admiration, which would be the matching second pair part of the sequence. Rather, she orients to the unit of English after what she orients to as "took" as unintelligible through the use of "what" as a closed class repair initiator (Drew, 1997; Ike, 2016). In line 10, in an attempt to self-repair, Yi articulates [gɹiːt] as a lone deployment of "great," to which Miya orients as an intelligible pronunciation of "great" in line 12[40]. This can be seen because Miya first deploys the discourse marker "ah" in her own turn, which displays a claim that mutual intelligibility has been restored (O'Neal, 2015a). But it is significant that even though Miya oriented to [gɹiːt] as an intelligible pronunciation of "great," she does not orient to [gɹiːt] as an sufficient pronunciation of "great" (See Chapter 6). This can be seen in the fact that Miya proffers a candidate pronunciation of "great," changing the vowel quality within [gɹiːt] to [gɹeit̯] in line 12, even though she has already claimed that mutual intelligibility has been restored. In line 14, Yi orients to [gɹeit̯] as a pronunciation candidate and confirms it, which acknowledges Miya's understanding of the pronunciation of "great." This concludes the segmental repair sequence and allows the return to the still incomplete superordinate admiration-acceptance sequence. In line 16, Miya laughs, which is a common feature of the restoration of mutual intelligibility in ELF interactions (Matsumoto, 2014), and then accepts the admiration with a "thank you," which brings both the segmental repair sequence and the superordinate admiration-acceptance sequence to a successful conclusion.

The missegmentation and resegmentation of "too" and "great" in the above example is very similar to the interaction in the example 5.6. Like Xue in example 5.6., Miya did segment the trouble source as two separate words, but she did not segment "too great" as [tʊ]

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[40] One of the phonetic characteristics of English is that vowels are elongated before voiced consonants and shortened before devoiced consonants (Roach, 2009). But in this example, Yi elongates the vowel in spite of it being located in front of a devoiced plosive. This example demonstrates that many of the phonetic characteristics of native speaker varieties of English might not actually apply to the phonetics of ELF users. It also opens the possibility that ELF interactions might operate under different phonetic parameters.

and [gɹiːt]. This could be because of the unexpected collocation of these two words, which may have an effect on the intelligibility of utterances (Bybee, 2010). Be that as it may, Miya nonetheless segmented “too great” into [tʊg] and [ɹiːt]. Applying relevance to her interpretative processes but arriving at an unintended interpretation (Sperber & Wilson, 1996), Miya seems to semantically derive “took” from [tʊg], likely ignoring or not noticing the voicing feature of the last phonetic segment and interpreting a /k/ phoneme as most probable. However, the remaining phonemes, [ɹiːt], are unintelligible to Miya, and she subjects them to repair in the next turn. Like Ayaka in example 5.6., Yi uses a lone deployment of one of the words in the trouble source as a means to restore mutual intelligibility (O’Neal, 2016a).

According to the tetrachotomy utilized in this study to categorize segmental repair sequences, examples 5.6. and 5.7. are other-initiated, self-segmental-repair sequences. This is because the recipients of the trouble sources identify the trouble sources as problematic, and thus these sequences begin as other-initiations. However, the producers of the trouble sources segmental repair the trouble sources, and thus these sequences conclude as self-segmental-repairs. But what makes these examples different from the canonical examples of other-initiated, self-segmental repair is that the phonetic segments of the trouble sources were resegmented rather than adjusted.

5.3.1.1.3. Serendipitous Non-Segmental Repair

The common pattern of other-initiated, self-segmental-repair is that the recipients of the trouble source identify it as such, after which the producer of the trouble source amends the pronunciation in some way that is conducive to the restoration of mutual intelligibility. But other-initiated, self-segmental-repair sequences that do not result in the amendment of pronunciation exist, yet nonetheless result in the restoration of mutual intelligibility. However, repair sequences that do not involve the reorganization, modification, deletion, or insertion of phonetic segments as at least one component of the repair process are explicitly excluded from the analysis offered in this research (see Chapter 4). Thus, repair sequences that utilized circumlocution, repetition, explanation, code-switching, writing, dictionary-usage, or other non-phonetic means were excluded from analysis because the identification of the phonetic causes of unintelligibility, if there were indeed phonetic causes, is impossible from an emic perspective in these repair sequences. This is because no intelligible variant of the unintelligible pronunciation with which to do a comparison manifests in such repair sequences (O'Neal, forthcoming).

However, instances in which non-segmental repair sequences serendipitously reveal the phonetic causes of unintelligibility do exist. That is, the way in which participants organize repair sometimes serendipitously reveals the phonetic causes of unintelligibility and intelligibility to the analyst, even though the trouble source is not overcome through segmental repair. Such sequences are called *serendipitous non-segmental repair sequences* (O'Neal, forthcoming). Serendipitous non-segmental repair covers all non-segmental repairs in which the trouble source is overcome through a non-segmental repair practice but nonetheless the organization of the repair sequence serendipitously provides an unintelligible and intelligible variant of the same pronunciation with which an analyst can make comparisons to determine the origins of unintelligibility and intelligibility.

The following example demonstrates that ELF users can use language identification rather than segmental repair to restore mutual intelligibility. In Example 5.8., Ryosuke, a male Japanese undergraduate, Hathai, a female Thai exchange student, and Misa, a female Japanese undergraduate, are conversing. Ryosuke mentions that he keeps a turtle as a pet, but Hathai orients to "turtle" as unintelligible, which catalyzes a repair sequence.

Example 5.8. An example of serendipitous non-segmental repair

1	Ryosuke	ando I have:
2		(0.3)
3		[te̞.tl̩].
4		(0.5)
5	Hathai	[te̞t]. oh{: : : }
6	Ryosuke	{yeah}
7		(0.2)
8	Hathai	whats- what is that?
9		(0.3)

10 [tẹ].
11 (0.3)
12 [tẹ.tl̩].
13 (0.3)
14 Ryosuke [tẹ.tl̩]. uh::. .ssssh. hm::. .hhh
15 (0.2)
16 [tẹ.tl̩]. is::: uh:.
17 (0.3)
18 Hathai is that japanese word?
19 (0.5)
20 Misa no. {no. no. eng}lish.
21 Ryosuke {>no. no. no.<}
22 (0.2)
23 english. uh. [tẹ.tl̩]. is uh::
24 (0.2)
25 sss.
26 (0.1)
27 hm::=
28 Hathai =↑ah [tɝ.tl̩].
29 Ryosuke [tɝ.tl̩].
30 Hathai >I know. I know. {okay. okay.}<
31 Misa {hahahahaha}
32 Ryosuke {hahahahaha} okay. okay. yeah.

In lines 1 to 3, Ryosuke claims to have a pet turtle, which is the first pair part of a telling-receipt sequence. Within this sequence, Ryosuke articulates the word “turtle” as [tẹ.tl̩]. Initially, in line 5, Hathai receipts the telling with a discourse marker “oh”, which nominally displays a claim of understanding (Heritage, 1984a). As a sequence closing third, Ryosuke deploys an affirmative “yeah,” which seems to be the conclusion of a quotidian telling-receipt sequence. However, in line 8, Hathai asks Ryosuke “whats- what is that?”, and then in lines

10 and 12 specifically identifies [tɐ̝.tl̩] as the trouble source, which demonstrates that initially Hathai utilized a "let-it-pass" strategy with regard to [tɐ̝.tl̩] in line 5 (Firth, 1996; Wong, 2000). Now, however, Hathai has decided to "not-let-it-pass" and problematizes something to which she previously oriented as unproblematic (Tsuchiya & Handford, 2014). This also shows that mutual intelligibility has faltered among these speakers. The continuation of the interaction is on hiatus until the speakers can restore mutual intelligibility (Matsumoto, 2011; O'Neal, 2015a).

In lines 14 and 16, Ryosuke makes a few unsuccessful attempts at repairing [tɐ̝.tl̩], so in line 18 Hathai asks Ryosuke "is that Japanese word?", attempting to ascertain the etymology of the word in question. It is possible that the presence of a Japanese vowel あ, or in IPA [ɐ̝][41], in the pronunciation of the trouble source led Hathai to orient to the trouble source as possibility indicative of a Japanese word rather than an English word[42]. However, in reaction to Hathai's question, both Misa and Ryosuke reject the possibility that the trouble source is a Japanese word in lines 20 and 21 respectively. Furthermore, Misa specifically mentions that [tɐ̝.tl̩] is an English word in line 20, and Ryosuke does the same in line 23. These actions also demonstrate that [tɐ̝.tl̩] is intelligible to both Misa and Ryosuke, although Hathai still does not understand it. In lines 23, 25, and 27, Ryosuke again attempts to explain [tɐ̝.tl̩] but does not complete the explanation before Hathai deploys the discourse marker "ah" in line 28 with high upstep, which displays a claim of sudden realization and intelligibility restoration, and then articulates "turtle" as [tɜ˞.tl̩] with downward intonation, which seems to assert that [tɜ˞.tl̩] is what Hathai orients to as both the intelligible and sufficient pronunciation of "turtle" (see Chapter 6). In line 29, Ryosuke repeats [tɜ˞.tl̩] once, which seems to both signal accommodation to Hathai's version of the pronunciation of "turtle" (Giles et al., 1991)

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[41] Japanese phonologists usually transcribe the Tokyo Japanese あ vowel as either /a̠/ or /ɑ̟/ (Vance, 2008).

[42] I am actually very skeptical that language etymology plays a big role in ELF interactions. There seem to be many cases in which ELF users use words etymologically derived from different languages and do not orient to this fact in any way. From an emic perspective, it is very difficult to claim that linguistic etymology or language topography actually matters to the progression of an interaction in any significant way. I reject the notion that lexical etymology renders an interaction ELF or non-ELF automatically.

and Ryosuke's internalization of the new pronunciation (Lantolf & Thorne, 2006). Next, in line 30, Hathai deploys multiple lexical devices that show that she understands "turtle" and that mutual intelligibility has been restored.

Although the fact that both Misa and Ryosuke insisted that [tɐ̞.tl̩] is an English word rather than a Japanese word seems to be the catalyst that restored mutual intelligibility, not segmental repair, Hathai's articulation of "turtle" as [tɝ.tl̩] in line 28 still allows the observer to make a serendipitous emic determination about the phonetic causes of the mutually unintelligible and intelligible versions of the pronunciations. The mutually unintelligible pronunciation of "turtle" was [tɐ̞.tl̩], and this is obvious because Hathai oriented to [tɐ̞.tl̩] as unintelligible multiple times. Furthermore, Hathai articulates "turtle" as [tɝ.tl̩] in line 28 and Ryosuke does so as well in line 29. A comparison of the pronunciation that Hathai oriented to as unintelligible with the pronunciation that Hathai oriented to as intelligible reveals that the vowel in the first syllable was the likely cause of the intelligibility problem in this interaction. Hathai oriented to the low centralized vowel as unintelligible and modified it to a rhotacized mid-central vowel instead. Although segmental repair is not present in this example, the way in which the speakers conducted the repair nonetheless revealed the phonetic causes of the unintelligible and intelligible pronunciations.

Having illustrated the ways in which other-initiated, self-segmental repair can be organized, I will next elucidate other-initiated, other-segmental repair, which is the second subclass of reactive segmental repair.

5.3.1.2. Other-Initiated, Other-Segmental-Repair

The canonical pattern of segmental repair to this point has been that the recipient of the trouble source identifies the problem specifically (closed class repair initiation) or generally (open class repair initiation), and then the producer of the trouble source repairs the problem. However, different organizations of segmental repair sequences exist within the corpus. In this section, I will illustrate other-initiated, other-segmental repair. This is an organization of segmental repair in which the recipient of the trouble source both identifies the problem and repairs the problem; the producer of the trouble source neither orients to the trouble source as a problem at the beginning of the repair sequence nor does he or she repair the trouble source into a more mutually intelligible variant.

In the first example of other-initiated, other-segmental repair, Hathai, a female Thai exchange student, Kumi, a female Japanese undergraduate, and Mitsu, a male Japanese undergraduate, are talking about Japanese New Year's traditions. Within the extract, Hathai will articulate "osechi" or 御節, a type of food that some Japanese people eat on New Years's day, as [sei̯d͡ʒi]. However, the two Japanese interlocutors will orient to Hathai's pronunciation of "osechi" as [sei̯d͡ʒi] in two very different ways: Mitsu will orient to Hathai's pronunciation as mutually intelligible and progress through his sequence with Hathai; Kumi, on the other hand, will orient to the same pronunciation as unintelligible, which will catalyze an other-initiated, other-segmental repair sequence to restore the intelligibility of "osechi".

Example 5.9. An example of other-initiated, other-segmental repair

1	Hathai	do japanese people usually eat [sei̯d͡ʒi].
2		(0.2)
3		like.
4		(0.3)
5		normally?
6		(0.8)
7	Kumi	{hm.}
8	Hathai	{not.} or only ea:t.
9		(0.2)
10		[sei̯d͡ʒi] only:.
11		(0.3)
12		when its come to be new year?
13		(1.2)
14	Mitsu	uhm::.
15		(1.5)
16		I.
17		(1.0)

18		I eat
19		(1.0)
20		new year.
21		(0.6)
22	Hathai	ah: you eat only {new year}.
23	Mitsu	{only: }.
24		(0.3)
25	Hathai	only new year.
26		(0.6)
27		how about you?
28		(0.7)
29	Kumi	[se]- [sei̯d͡ʒi]?
30		(0.1)
31	Hathai	yeah.
32		(0.5)
33	Kumi	[sei̯d͡ʒi]?
34		(0.1)
35	Mitsu	[oseːt͡ɕi].
36		(0.1)
37	Kumi	{oh:::. }
38	Hathai	{[set͡ʃi].} [set͡ʃi]. [set͡ʃi].
39		(0.7)
40	Kumi	[oseːt͡ɕi].
41		(0.2)
42		ohw::.
43		(0.7)
44		new years only.
45		(0.1)
46	Hathai	new years only.
47		(0.2)

48 okay::.

Between lines 1~5, Hathai formulates the first pair part of a question-answer-receipt sequence, within which she articulates “osechi” as [sei̯d͡ʒi]. However, after no one self-selects as next speaker at the TRP, Hathai expands and repeats her question in lines 8~12, and she once again articulates “osechi” as [sei̯d͡ʒi]. Between lines 14~20, however, Mitsu formulates an answer to the question, and then Hathai and Mitsu confirm the answer in lines 22~25. Thus, Mitsu has not oriented to Hathai’s pronunciation of “osechi” as problematic in any way; Mitsu does not manifest that Hathai’s articulation of “osechi” is unintelligible.

However, in line 27, Hathai relaunches the same question to Kumi, producing an obligation on Kumi to produce a matching second pair part answer. But in line 29, Kumi does not produce it. Rather, she articulates [sei̯d͡ʒi] with high rising intonation as a closed class repair initiator, which orients to [sei̯d͡ʒi] as a trouble source. This demonstrates that mutual intelligibility has faltered and that the production of the matching second pair part is on hiatus until after the restoration of mutual intelligibility. However, in line 31, Hathai just states “yeah,” which orients to Kumi’s other-initiated repair as the first pair part of a clarification-confirmation sequence and produces the matching second pair part. But Kumi again articulates [sei̯d͡ʒi] with rising intonation in line 33, which demonstrates both that mutual intelligibility has not been restored and that Kumi still orients to specifically [sei̯d͡ʒi] as a trouble source.

In order to restore mutual intelligibility and conclude the repair sequence, Mitsu articulates “osechi” as [oseːt͡ɕi] with downward intonation in line 35, simultaneously inserting a vowel, modifying a vowel quality from a diphthong to a monophthong, modifying the distinctive features of the affricate, and proffering [oseːt͡ɕi] as a candidate repair pronunciation for Kumi to affirm or reject as mutually intelligible as the next relevant action. In line 37, Kumi deploys and elongates the discourse marker “oh”, which displays a claim that understanding has been restored, and thus affirms [oseːt͡ɕi] as mutually intelligible (O’Neal, 2015a). In line 38, Hathai quickly deploys three [set͡ʃi], partially accommodating to Mitsu’s pronunciation of “osechi”. In response, Kumi repeats [oseːt͡ɕi] in line 40 and then again deploys the discourse marker “oh” in line 42, which again publicly displays a claim that mutual intelligibility has been restored. Accordingly, Kumi has twice indicated that mutual intelligibility has been restored, and as such, the participants can return to the superordinate question-answer-receipt sequence that has been on hold since line 29. Kumi quickly does so and formulates the second pair part of the question-answer-receipt sequence in line 44, to which Hathai responds with the receipt portion of the sequence in line 48. This brings both the superordinate question-answer-receipt sequence and the embedded repair sequence to a successful conclusion.

The assessment of the repair sequence reveals that the participants organized the sequence as an other-initiated, other-segmental-repair. First, one of the recipients of the trouble source identified it as such; although Hathai produces the trouble source, Kumi is the first participant to orient to [sei̯d͡ʒi] as a trouble source. Thus, this repair sequence begins with other-initiation. Furthermore, although Hathai produces the trouble source, Mitsu segmentally repairs [sei̯d͡ʒi] to [oseːt͡ɕi]. Accordingly, Hathai neither identifies the trouble source nor repairs it; thus, this repair sequence is other-initiated, other-segmental repair.

Having illustrated several examples of reactive segmental repair, which can manifest as other-initiated, self-segmental repair and other-initiated, other-segmental repair, I will now examine extracts in which the initiation of the repair is conducted by the producer of the trouble source.

5.3.2. Preemptive Segmental Repair

The second category of segmental repair to be examined is *preemptive segmental repair*, which covers both self-initiated, self-segmental repair and self-initiated, other-segmental repair (O'Neal, 2017, forthcoming). As such, the single unifying feature of preemptive segmental repair is self-initiation, or in other words, the producer of the trouble source identifies it. Whereas in reactive segmental repair sequences the recipient of the trouble source explicitly orients to it as problematic, in preemptive segmental repair sequences, the recipient is never the first in the interaction to overtly orient to the trouble source as problematic. Accordingly, they can be examples of "pre-empting strategies", which means that the producers of the trouble source attempt to resolve an incipient or potential interactional problem before it is overtly oriented to as an actual interactional problem (see e.g., Kaur, 2009; Cogo, 2009).

As with reactive segmental repair, preemptive segmental repair can be divided into two broad categories: self-initiated, self-segmental repair and self-initiated, other-segmental repair. Within a self-initiated, self-segmental repair sequence, the producer of the trouble source identifies and segmentally repairs the pronunciation. In a self-initiated, other-segmental repair sequence, the producer of the trouble source identifies the problem, but the recipient of the trouble source segmentally repairs the pronunciation. Each organization will be exemplified and examined below.

5.3.2.1. Self-Initiated, Self-Segmental Repair

Within self-initiated, self-segmental repair, the producer of the trouble source orients to it as problematic, and then segmentally repairs the trouble source pronunciation. As such, it is possible within a self-initiated, self-segmental repair sequence that the interlocutor is not much involved in the praxis of the interaction. Nonetheless, self-initiated, self-segmental repair is still interactionally relevant because the speaker has oriented to his or her own pronunciation as potentially problematic. Therefore, self-initiated, self-segmental repair better represents "pre-emptive strategies" than any other organization of segmental repair (see e.g., Kaur, 2009; Cogo, 2009).

In the following example of self-initiated, self-segmental repair, Bumbyn, a female Mongolian exchange student, and Masashi, a male Japanese undergraduate, are discussing the difference between the Japanese phoneme /う/ and the English phoneme /u/. Bumbyn will subject her articulation of the word "throat" to segmental repair even though Masashi does not explicitly orient to "throat" as unintelligible.

Example 5.10. An example of self-initiated, self-segmental repair

1	Bumbyn	so: what is the major difference between japanese u and english u?
2		(1.1)
3	Masashi	hm::.
4		(0.4)

5	Bumbyn	maybe::.
6		(0.2)
7	Masashi	hm:.
8		(0.1)
9	Bumbyn	I think it's almost,
10		(0.6)
11		[θɹoʊ̯]
12		(1.0)
13	Masashi	ah{: : : . }
14	Bumbyn	{[θɹuː]}. [θɹoʊ̯t].
15		(0.2)
16		because
17		(0.2)
18	Masashi	hm:.
19		(0.1)
20	Bumbyn	when you say japanese u:.
21		(0.6)
22		your [θɹoʊ̯t].
23		(0.4)
24		doesn't participate.

(Extracted from O'Neal, forthcoming)

In line 1, Bumbyn launches a question-answer-receipt sequence, which obligates an answer from the interlocutor. But after a long silence in line 2, Masashi passes on his opportunity to answer the question in line 3. Next, between lines 5~24, Bumbyn begins to provision an answer to her own question, and as part of her answer, she articulates "throat" as [θɹoʊ̯] in line 11. The interesting thing is that in line 13 Masashi deploys the discourse marker "ah," which is nominally a claim of understanding (Heritage, 1984a). In other words, Masashi is not claiming to misunderstand; if anything, Masashi is claiming to understand. Regardless, Bumbyn decides to preempt any potential problems due to her pronunciation, and orients to her own pronunciation of “throat” as a potential trouble source. She segmentally repairs her pronunciation of “throat” in line 14 from [θɹoʊ̯] to [θɹuː], proffering it as a candidate repair pronunciation, and then adjusting her pronunciation of “throat” to [θɹoʊ̯t], proffering a second candidate repair pronunciation. This is in spite of the fact that Masashi has not oriented to any trouble source in the interaction, least of all the pronunciation of “throat.” In line 18, Masashi again deploys a minimal response token that passes on his turn (Schegloff, 1981), which Bumbyn orients to as a green light to continue her explanation, and the interaction continues.

The organization of the repair sequence reveals that the participants created a self-initiated, self-segmental repair sequence. First, Bumbyn produces the trouble source, and then she orients to her own pronunciation as potentially problematic. Thus, this repair sequence begins with self-initiation. Furthermore, Bumbyn self-segmental repairs from [θɹoʊ̯] to [θɹuː] to [θɹoʊ̯t] even though Masashi has not overtly oriented to Bumbyn’s pronunciation of “throat” as an impediment to mutual intelligibility. Accordingly, Bumbyn both identifies the trouble source and repairs it; thus, this repair sequence is self-initiated, self-segmental repair.

The next extract again demonstrates an example of self-initiated, self-segmental repair. Hathai, a female Thai exchange student, is telling Ryo, a Japanese male undergraduate, about the location of Hathai’s hometown in Thailand. This leads to a sequence within which Hathai orients to her own pronunciation of “northeast” as potentially problematic, and subjects it to segmental repair even though Ryo does not overtly orient to Hathai’s pronunciation as unintelligible.

Example 5.11. A second example of self-initiated, self-segmental repair

1	Hathai	and.
2		(0.6)
3		my hometown is.
4		(0.1)
5		inde.
6		(0.4)

7		[ŋɑ].
8		(0.4)
9		[ŋɔ.ˈθis]?
10		(0.3)
11		[ˈŋɔ.θis].
12		(0.6)
13		ish.
14		(0.2)
15		[ŋɑ]- [ˈŋɔs.is] thailand.
16		(0.1)
17	Ryo	ah. [no˞θ.ist]. hm:.
18		(1.1)
19	Hathai	an::d.

Between lines 1~15, Hathai describes the geographical location of her hometown in Thailand, and this represents the first pair part of a telling-receipt sequence, which produces an obligation on Ryo to produce the matching second pair part. However, before arriving at the TRP of the first pair part of the sequence, Hathai orients to her own pronunciation as potentially problematic several times, and subjects her own pronunciation to self-repair. In line 7, in the first attempt to articulate "northeast", Hathai articulates [ŋɑ], only managing a single syllable. Less than a half of a second later, in line 9, Hathai orients again to her own pronunciation as potentially problematic or as possibly incomplete, thus identifying it as a trouble source, and rearticulates "northeast" as [ŋɔ.ˈθis]. This is the first instance of two self-segmental repairs. After a quick repetition of [ŋɔ.ˈθis] in line 11, Hathai again orients to her own pronunciation as potentially problematic, once again identifying her own pronunciation as a trouble source, after which she rearticulates "northeast" as [ˈŋɔs.is]. This is the second of two self-segmental repairs.

At the culmination of the second self-segmental-repair attempt in line 15, Ryo finally indicates that mutual intelligibility had been restored. In line 17, he first deploys the discourse marker "ah", which displays a claim that intelligibility has been restored. However, even though mutual intelligibility has been restored through segmental repair, Ryo "keeps going." He pronounces "northeast" as [nɔ˞θ.ist] with downward intonation, and then deploys the discourse marker "hm", which displays a receipt of the information in the first pair part as well as demonstrates that Ryo orients to Hathai's previous pronunciation as insufficient even if mutually intelligible (see Chapter 6).

Having illustrated the ways in which self-initiated, self-segmental repair can be organized, I will next elucidate self-initiated, other-segmental repair.

5.3.2.2. Self-Initiated, Other-Segmental Repair

Within self-initiated, other-segmental repair, the producer of the trouble source orients to it as problematic, but then the recipient of the trouble source repairs it. In one sense then, one could argue that self-initiated, other-segmental repair is a failed "pre-emptive strategy" (see e.g., Kaur, 2009; Cogo, 2009). This is because in a self-initiated, other-segmental repair sequence, the producer of the trouble source recognizes it as such and is often in the process of attempting to preempt the potential problem. However, before the producer of the trouble source can resolve the problem, the recipient of the trouble source segmentally repairs the trouble source pronunciation.

In the first example of self-initiated, other-segmental repair, Maki, a female Japanese undergraduate, Ryo, a male Japanese undergraduate, and Jia, a female Chinese graduate student, are talking about New Year's festivities, which in Japan often includes a trip to a Shinto shrine as a component of *Hatsumode* (初詣). However, Maki will orient to her own articulation of "shrine" as potentially problematic, and thus this repair sequence begins with self-initiation, but Jia will segmentally repair the trouble source, and therefore the sequence culminates with other-segmental repair.

Example 5.12. An example of self-initiated, other-segmental repair

1	Maki	uhm.
2		(0.5)
3		I went to asakusa.
4	Jia	hm:{:.}

5	Maki	{la}st year.
6		(0.4)
7		its so famous.
8	Jia	hm{::.}
9	Maki	{an} good. .hhh
10		(0.1)
11		so traditional::.
12		(0.7)
13		[ʃɹeɪ̯n]?
14		(0.1)
15	Jia	hm::. [ʃɻaɪ̯n]?
16		(0.1)
17	Maki	[ʃɹaɪ̯n]. yeah. so good.
18	Jia	hm::.
19		(0.5)
20		so what do you think?
21	Ryo	disneyland.

In lines 1~3, Maki formulates the first pair part of a telling-receipt sequence (Schegloff, 2007), and in line 4, Jia deploys the discourse marker “hm”, which functions as a continuer that passes on her opportunity to take the floor (Schegloff, 1981). In lines 5~7, Maki adds to her turn, appending further information about Asakusa, but in line 8, Jia again deploys the discourse marker “hm”, forfeiting her chance to take the floor a second time. After this, in line 9, Maki adds more information about Asakusa, articulating “shrine” as [ʃɹeɪ̯n] in line 15 with rising intonation, which could indicate Maki’s recognition that [ʃɹeɪ̯n] could be a trouble source. It could furthermore indicate that Maki is seeking assistance from her interlocutor. As such, this portion of Maki’s turn could be considered the beginning of an epistemic search sequence. That is, Maki’s actions in line 13 demonstrate an epistemic gap, in this case a lack of knowledge about how to pronounce “shrine”, which makes the provisioning of the requisite knowledge the next relevant action (Jakonen & Morton, 2015).

In response, in line 15, Jia first deploys a discourse marker "hm", which seems to adumbrate her own uncertainty as to the intended semantics of [ʃɹeɪ̯n], and then proffers [ʃɻaɪ̯n] as a candidate repair pronunciation with rising intonation, to which the next relevant action is an affirmation or rejection of [ʃɻaɪ̯n] as a mutually intelligible pronunciation (O'Neal, 2015a). In line 17, Maki articulates "shrine" as [ʃɻaɪ̯n] with downward intonation and then deploys a confirmatory discourse marker "yeah"; both actions publicly manifest that Maki affirms [ʃɻaɪ̯n] as a mutually intelligible pronunciation, which brings the self-initiated, other-segmental repair sequence to a successful conclusion. Further evidence that the interactants orient to the segmental repair sequence as finished is provided by the fact that Jia launches a new sequence in line 20, to which Ryo responds with alacrity in line 21.

Having explained the interactional organization of both reactive and preemptive segmental repair based on a tetrachotomy of self/other-initiation and self/other-segmental-repair, I will now demonstrate that the four organizations that comprise the segmental repair tetrachotomy are not equally frequent.

5.4. Quantification and Statistical Significance of Segmental Repair Organizations

This section assesses the frequency of segmental repair organizations. Although segmental repair organizations can be categorized according to a tetrachotomy that distinguishes between self- and other-initiation as well as between self- and other-segmental-repair, this does not mean that each of the four organizations are utilized with equal frequency. In fact, a lot of CA research, including some of the foundational work, suggests that self-repair is the most common type of repair (see Sacks et al., 1974; Schegloff, 2007). However, the extent to which self/other-initiation and self-other-segmental are frequent has never been assessed. As such, this section ascertains the extent to which each of the four segmental repair organizations are utilized within the corpus gathered for this study.

There are twenty-eight segmental repair sequences in the phase one portion of conversation analytic corpus and nine segmental repair sequences in the phase two portion of the conversation analytic corpus, for a total of thirty-seven segmental repair sequences. Seventeen of the segmental repair sequences are other-initiated, self-segmental repair sequences. Four of the segmental repair sequences are other-initiated, other-segmental repair sequences. Fourteen of the segmental repair sequences are self-initiated, self-segmental repair sequences. Two of the segmental repair sequences are self-initiated, other-segmental repair sequences. The aggregate number of each kind of segmental repair organization within the corpus is listed below in Table 5.1.

Table 5.1. Frequency of Segmental Repair Strategies

	Obs.	Exp.	R	SR	*p*
Other-initiated, Self-segmental repairs	17	9.25	7.75	2.548*	.011
Other-initiated, Other-segmental repairs	4	9.25	-5.25	-1.726	.084
Self-initiated, Self-segmental repairs	14	9.25	4.75	1.561	.118
Self-initiated, Other-segmental repairs	2	9.25	-7.25	-2.383*	.017

Note. Obs. = observed frequency; Exp. = expected frequency; R = residual; SR = standardized residual

In order to assess whether the frequency of appearance of each type of segmental repair strategy is statistically significant, the data from Table 5.1. was subjected to a one-way chi-square test. All statistical tests were conducted via the crosstabs function of SPSS v.25. The one-way chi-square test revealed a statistically significant difference between the actual frequencies of each type of segmental repair strategy and the expected frequencies of each type of segmental repair strategy if the frequencies were statistically random, χ^2 (3, N = 37) = 17.595, p = 0.0005. Standardized residuals (SR) were calculated to determine which frequency of the four sequential organizations were statistically significant. SRs are similar to Z-scores: Z-scores standardize normal distributions so that values can be compared in parametric testing; standardized residuals normalize data in chi-square testing for the same purpose (Agresti, 2007). A SR above 1.96 indicates a frequency of use that is statistically significant. A SR below -1.96 indicates a frequency of use that is so rare that it is also statistically significant. A SR between 1.96 and -1.96 indicates a statistically random frequency (Field, 2018, p. 857). The SR for other-initiated, self-segmental-repair (2.548) indicates that it is the most frequent organization of segmental repair in the corpus. The SRs for both other-initiated, other-segmental-repair (-1.726) and self-initiated, self-segmental-repair (1.561) are close to a statistically random frequencies, and thus it cannot be said that these segmental repair organizations are particularly frequent or rare. But the SR for self-initiated, other-segmental-repairs (-2.383) demonstrates that it is a rare segmental repair organization.

The results of the analysis demonstrate that other-initiated, self-segmental-repair (usually reactive segmental repair) is the most common organization of repair to a statistically significant degree. These results concord with a plethora of conversation analytic research that claims that self-repair is the most common organization of repair (e.g., Sacks et al., 1974; Schegloff, 2007). In other words, phonetic segments that are oriented to as trouble sources are subject to the same interactional pressures that any other trouble source are subjected. This evidence suggests that a preference structure exists for self-repair when ELF users encounter a pronunciation problem.

Having assessed the statistical significance of each organization and strategy of segmental repair within the corpus, I will now summarize the major findings of this chapter.

5.5. Summary

In this chapter, I have presented evidence that mutual intelligibility can arise through segmental repair sequences whose internal organization can be categorized according to a tetrachotomic taxonomy. Taking a conversation analytic approach in the form of segmental repair analysis, this chapter focused on how ELF users interactionally organize segmental repair sequences to overcome miscommunications and restore intelligibility because very little is known about the ways in which ELF users attempt to maintain intelligibility when faced with an interactional intelligibility problem. Section 5.2 examined the actions through which ELF users manifest that intelligibility that has faltered has been restored. This included a discussion of the devices through which mutually manifest unintelligibility and mutually manifest intelligibility are publicly displayed. Section 5.3 explored the organization of segmental repair and advanced the argument that the organization of segmental repair can be adequately captured through a tetrachotomic taxonomy that describes all segmental repair sequences as a combination of either self- or other-initiation and self- or other-segmental-repair. Section 5.4 assessed the extent to which certain types of segmental repair are frequent and whether the differences in frequency are statistically significant, and discovered that self-initiated, self-segmental-repair is frequent to a statistically significant degree.

Previous studies concerning intelligibility within ELF, WE, and SLA have all but ignored the idea that mutual intelligibility is partially dependent upon the negotiation of mutually intelligible phonetic form. Indeed, some ELF researchers have even claimed that there is no evidence that ELF users negotiate or accommodate pronunciation at all (Deterding, 2013, p. 87). This is surprising because a lot of recent ELF research has focused on negotiation and variation as prime components of ELF interactions, if not the defining features (e.g., Firth, 2009; Seidlhofer, 2011; Matsumoto, 2011; Iino & Murata, 2016; O'Neal, forthcoming). Thus, one might expect that this research focus would apply to phonology as well, but this has not happened. If anything, however, the opposite has occurred; World Englishes oriented ELF scholars continue to ignore the contribution of the negotiation of phonetics to mutual intelligibility in favor of the quest for the LFC, albeit slightly modified (see e.g., Walker, 2010; Deterding, 2013; Walker & Zoghbor, 2015; Deterding & Nur Raihan, 2016; Gardiner & Deterding, 2018; Zoghbor, 2018).

But an examination of the ELF interactions within the corpus of this study reveals that segmental repair is a major proportion of all repair sequences, and thus one can conclude that ELF users negotiate pronunciation. Within the two corpora gathered for this study, ninety repair sequences exist, but thirty-seven of the repair sequences are specifically segmental repair sequences; therefore, a full forty-one percent of the repair sequences were oriented to as having phonetic trouble sources, which is consistent with Jenkins's (2000) original findings as well (p. 84). Therefore, there is more than ample evidence both that ELF users negotiate pronunciation to maintain mutual intelligibility—contrary to Deterding's claims to the otherwise—and that ELF users rely on segmental repair to maintain mutual intelligibility. The present findings, therefore, lend additional support to the idea that phonetic negotiation and variation are intrinsic components of ELF interactions (e.g., Matsumoto, 2011; O'Neal, 2015a, 2016b, forthcoming).

In spite of its limitations, it is hoped that this chapter has demonstrated how ELF users actively contribute to the maintenance of the mutual intelligibility through the deployment of interactional practices that display mutually manifest unintelligibility and mutually manifest intelligibility, which further allow speakers to interactionally organize segmental repair. It also allows the analyst to juxtapose the unintelligible and intelligible pronunciations to determine the phonetic causes of unintelligibility and intelligibility from an emic perspective.

Having scrutinized the interactional organization of segmental repair to maintain mutual intelligibility, Chapter 6 will explore instances in which mutual intelligibility is not threatened, but phonetic segments are nonetheless adjusted.

Chapter 6
The Sequential Organization of Interactional Sufficiency

6.1. Introduction

This chapter examines how sufficiency, which I define as the orientation to a pronunciation as subjectively sufficient rather than intelligible (O'Neal & Matsumoto, forthcoming) is interactionally achieved. A word on what specifically "sufficiency" refers to is warranted here before proceeding any further. "Sufficiency" within this study does not refer to societal notions of acceptable pronunciation (see e.g., Moyer, 2015), and as such this study does not make any claims as to how acceptable any pronunciations are to society at large. It is very likely that readers will react differently to the pronunciations that appear in the transcripts below: some readers will think that the pronunciations are fine and thus acceptable; others will think that the pronunciations are comically bad and thus unacceptable. But from an emic perspective, the perspectives of the transcript readers towards the sufficiency or insufficiency of the pronunciations are unimportant. This study does not base assessments of pronunciation sufficiency on etic judgments. Rather, this study refers to "sufficiency" as the emic judgment of the interlocutor as to what a sufficient pronunciation is. Accordingly, a pronunciation that deviates from standard English pronunciation but is not oriented to as a trouble source will be considered "sufficient" in this study. Likewise, a pronunciation that is fully intelligible but nonetheless oriented to as a trouble source will be considered "insufficient" in this study. As with the previous chapter, judgments of sufficiency will be based entirely on the emic perspective of the participants.

Orientations to sufficiency are significant for any study of pronunciation because they provide interactants with evidence of the sufficiency and insufficiency of phonetic form, which is a phenomenon that may linguists assume only exists as indirect feedback (see e.g., Ellis, 2006; Ellis & Larsen-Freeman, 2009; Robenalt & Goldberg, 2016). This standpoint is perfectly represented by Robenalt & Goldberg (2016), who state that, "language…clearly does not come annotated with asterisks or question marks to indicate acceptability" (p. 62). But while this is literally true, it is not interactionally true. Language sometimes does come annotated after the fact, in the form of sufficiency adjustments, which directly manifest how at least one participant orients to the pronunciation as acceptable or not.

Although ELF users orient to the maintenance of mutual intelligibility as a major interactional goal, as a host of ELF research demonstrates (see e.g., Matsumoto, 2011; O'Neal, 2015a, 2016b, 2017, forthcoming), this does not mean that they adjust phonetic segments only so that mutual intelligibility is maintained. In fact, they adjust segmental pronunciation for reasons other than just maintaining or restoring mutual intelligibility (O'Neal & Matsumoto, forthcoming). However, this aspect of ELF interactions has gone largely unexplored because ELF phonology research is fixated on intelligibility phenomena. A quick perusal of ELF phonology studies will reveal that the overwhelming focus of ELF phonology studies is devoted to the elucidation of the relationship between phonology and intelligibility (see e.g., Jenkins, 2000; Kirkpatrick, 2010; Matsumoto, 2011; Deterding, 2013; O'Neal, 2015a; Deterding & Nur Raihan, 2016; Zoghbor, 2018). However, this is the fixation of the ELF researchers, not the ELF users, who orient to pronunciation not only as unintelligible and intelligible but also as insufficient and sufficient (O'Neal & Matsumoto, forthcoming). This chapter explores the interactional motivations for adjusting segmental pronunciation that are related to sufficiency rather than intelligibility.

In the following sections, I will first introduce the two sequential actions that make sufficiency adjustment analysis possible (Section 6.2), which are public displays of mutually manifest insufficiency (Section 6.2.1) and mutually manifest sufficiency (Section 6.2.2). Next, I will introduce the taxonomy through which this thesis will categorize sufficiency adjustments (Section 6.3): reactive sufficiency adjustment (Section 6.3.1) and preemptive sufficiency adjustment (Section 6.3.2). After that, I will introduce the ways in which ELF users can combine segmental repair sequences and sufficiency adjustments (Section 6.4). Then, I will compare the frequency of sufficiency adjustments to segmental repair sequences in the corpus in order to assess the comparative emic importance of intelligibility and sufficiency (Section 6.5). The last section will summarize the findings of the entire chapter (Section 6.6).

6.2. Sufficiency Adjustments

This section will introduce the interactional components of sufficiency adjustments[43] that make the taxonomic system in the next section possible. First, however, it is important to distinguish segmental repair sequences and sufficiency adjustments: segmental repair sequences are the restoration of intelligibility through the modification of phonetic form; sufficiency adjustments are the modification of phonetic form without the faltering of intelligibility (O'Neal & Matsumoto, forthcoming). This distinction is not seriously considered in a host of psycholinguistic and SLA research on recasts on phonetic form, which operationalizes intelligibility and sufficiency as the same phenomenon (see e.g., Chouinard & Clark, 2003; Saxton, Backley & Gallaway, 2005; Goo & Mackey, 2013; Lyster & Ranta, 2013; Saito & Akiyama, 2017). However, this distinction can be seen from an emic standpoint because participants orient to intelligibility and sufficiency in distinctive ways (Haberland, 2011; Hauser, 2013).

This section will introduce the two main interactional events that make sufficiency adjustment analysis possible from an emic perspective. In order for sufficiency adjustment analysis to be a valid means of detecting orientations to the pronunciation as sufficient or insufficient, ELF users must adjust phonetic segments even though the phonetic form is still demonstrably mutually intelligible from an emic perspective. Sufficiency adjustments must consist of two events: first, a speaker must orient to something as insufficient but still intelligible, or in other words, a speaker must display *mutually manifest insufficiency*; second, speakers must subsequently orient to something as sufficient, or in other words, a speaker must display *mutually manifest sufficiency*. *Mutually manifest insufficiency* refers to the practices with which ELF users publicly display a judgment that a pronunciation is insufficient, even if mutually intelligible, and these practices will be examined in Section 6.2.1. Furthermore, *mutually manifest sufficiency* refers to the practices with which ELF users publicly display a judgment that a pronunciation has become more sufficient, and these practices will be explored in Section 6.2.2. It is the sequential combination of these two

[43] This chapter avoids using the term "sufficiency sequence" because the action through which sufficiency adjustments can be seen are often doing something other than "doing sufficiency".

practices that allows an emic perspective into the insufficiency or sufficiency of a pronunciation.

6.2.1. Mutually Manifest Insufficiency

This section will examine the practices that constitute the ways in which ELF users can publicly display *mutually manifest insufficiency*, or in other words, how they can demonstrate that a pronunciation is insufficient even if intelligible. Displays of *mutually manifest insufficiency* are the catalysts of sufficiency adjustments, and an analyst cannot claim that a sufficiency adjustment has begun from an emic perspective unless the speakers themselves orient to something within the interaction as insufficient.

ELF users initiate a sufficiency adjustment through the deployment of a *sufficient pronunciation candidate*, which displays *mutually manifest insufficiency*. Whereas segmental repair sequences are initiated through open and closed class repair initiators, and the *intelligible pronunciation candidate* is deployed at a subsequent stage, the deployment of a *sufficient pronunciation candidate* initiates sufficiency adjustments. This should not be very surprising: after all, intelligibility (i.e., intersubjectivity) has not been threatened in a sufficiency adjustment, and thus it is not a repair sequence (Hauser, 2013). Accordingly, sufficiency adjustments will be initiated in ways very different than a repair sequence.

In the first example of *mutually manifest insufficiency* through the deployment of a *sufficient pronunciation candidate*, Masahiro, Misa, and Bai are discussing the relevance of ELF ideas to their futures careers. Masahiro and Misa are Japanese but Bai is Chinese. Masahiro mentions that an ELF perspective on communicative fluency could be useful when he travels abroad. Although Bai will display that she orients to Masahiro's articulation of "abroad" as intelligible, she nonetheless orients to it as insufficient, and deploys a *sufficient pronunciation candidate* for "abroad", which represents both the phonetic form that she orients to as sufficient and the initiation of the sufficiency adjustment.

Example 6.1. An example of a sufficient pronunciation candidate deployment

1	Masahiro	°for example.°
2		(0.4)

3		for exam::ple.
4		(0.3)
5		I go [eβɾod].
6		(0.9)
7		ande:.
8		(0.3)
9		traveru.
10		(0.2)
11		ah.
12		(0.2)
13		traveru [eβɾe̝do].
14		(0.9)
15	Misa	ºah.º=
16	Masahiro	=hn.
17		(0.4)
18	Bai	yes. I know. haha.
19		(0.6)
20		[əbrɔd].
21		(0.4)
22	Misa	hm::.=
23	Bai	=actually its [əbɹɔd].
24		(1.2)

(Extracted from O’Neal & Matsumoto, forthcoming)

In lines 5 and 13, Masahiro articulates “abroad” in two different ways, the second articulation being a portion of a self-initiated, self-segmental-repair. Bai displays mutual understanding in line 18, publicly claiming “I know”, which completes the telling-receipt sequence that Masahiro launched. Bai has not oriented to either of Masahiro’s articulations of “abroad” as unintelligible; in fact, she has claimed to understand and completed the superordinate telling-receipt sequence. Thus, Bai's actions display that Masahiro's pronunciation was mutually intelligible.

But none of this means that Bai oriented to Masahiro's articulation of "abroad" as sufficient—she does not. In line 23, Bai first deploys the discourse marker *actually*, which strongly adumbrates the speaker's orientation to something in the preceding discourse as warranting correction (Schiffrin, 1987; Takahara, 1998; Clift, 2001; Fraser, 2006; Siepmann, 2005; Müller, 2005). In fact, Aijmer (2002) claims that the discourse marker *actually* adumbrates "a counterclaim, a correction, or an incipient disagreement" (p. 267). Immediately after the deployment of *actually*, Bai proffers [əbɹɔd] for "abroad" as a *sufficient pronunciation candidate*, a phonetic form that Bai orients to as more sufficient for the purposes of the interaction (O'Neal & Matsumoto, forthcoming). Bai's articulation of "abroad" exhibits several phonetic differences with Masahiro's articulation of the same word, but it is important to emphasize that the action that Bai is initiating in line 23 is correction, not repair, which is demonstrated by the fact that Bai already publicly claimed to understand, and thus mutual intelligibility has not faltered (Jefferson, 1987; Schegloff, 1997a). Thus, through the deployment of the *sufficient pronunciation candidate*, Bai displays *mutually manifest insufficiency*.

However, *mutually manifest insufficiency* is not always initiated as correction of phonetic form, as the next example will demonstrate. In fact, displays of *mutually manifest insufficiency* can also initiate requests for interactional aid. In the second example of *mutually manifest insufficiency*, Shiori will orient to her own pronunciation of "Belgian" as potentially insufficient, and deploy a *sufficient pronunciation candidate*. Although Fu will reject Shiori's *sufficient pronunciation candidate* for "Belgian" and proffer a different one, this does not mean that Fu does this because Shiori's pronunciation is unintelligible.

Example 6.2. A second example of an sufficient pronunciation candidate deployment

1	Shiori	uh:::.
2		(0.5)
3		[be.ɾɯ̆.gi]- [bel.gi]?
4		(0.3)

5	Fu	>yeah< [bɛl.d͡ʒɪn].
6		(0.1)
7	Shiori	[ˈbɛl.d͡ʒɪn]. hahaha{hahaha}
8	Fu	{hahaha}
9	Shiori	yeah. [ˈbɛl.d͡ʒɪn],

(Extracted from O'Neal & Matsumoto, forthcoming)

In line 1, Shiori first deploys the discourse marker *uh*, which can adumbrate potential interactional trouble (Erard, 2007), and then articulates "Belgian" as [be.ɾɯ̆.gi] but then quickly adjusts to [bel.gi] with high rising intonation. This could indicate that Shiori displays that she is not confident that either [be.ɾɯ̆.gi] or [bel.gi] will be sufficient pronunciations for the word "Belgian." Furthermore, [bel.gi] operates as a *sufficient pronunciation candidate* for Fu to accept or reject as the next relevant action (O'Neal & Matsumoto, forthcoming), which can be interpreted as a request for help. In line 5, Fu first deploys the discourse marker *yeah*, which can display accord with the previous action (Schiffrin, 1987), and then articulates "Belgian" as [bɛl.d͡ʒɪn], which publicly demonstrates that although Fu orients to Shiori's articulations of "Belgian" as intelligible, she does not orient to either [be.ɾɯ̆.gi] or [bel.gi] as sufficient pronunciations for the purposes of the continuation of the interaction. Hence, she proffers a new *sufficient pronunciation candidate*, which Shiori accepts in line 9.

Accordingly, *mutually manifest insufficiency* can be demonstrated through the deployment of a *sufficient pronunciation candidate*, which can collocate with discourse markers. In the previous examples, both the discourse markers *actually* and *uh* collocated with the sequences in which *mutually manifest insufficiency* was displayed. However, the only single requirement for *mutually manifest insufficiency* is the deployment of a *sufficient pronunciation candidate* even when mutual intelligibility has not demonstrably faltered in any salient way.

Having discussed the ways in which ELF users can orient to some element of the phonetics of the interaction as insufficient, I will now introduce the ways in which speakers can publicly display that what was once insufficient is now sufficient.

6.2.2. Mutually Manifest Sufficiency

This section will explore the ways in which ELF users can publicly display *mutually manifest sufficiency*, or in other words, how they can demonstrate that they orient to a pronunciation as more sufficient whereas they once did not. Indications of *mutually manifest sufficiency* are the interactional practices that allow for an examination of the culmination of sufficiency adjustments, and as such, an analyst cannot claim that a sufficiency adjustment has concluded from an emic perspective unless the speakers themselves orient to something that was once insufficient is now more sufficient.

ELF users conclude a sufficiency adjustment through the affirmation of a *sufficient pronunciation candidate*, which displays *mutually manifest sufficiency* (O'Neal & Matsumoto, forthcoming). Both segmental repair sequences and sufficiency judgments are concluded through the affirmation of a pronunciation candidate, an *intelligible pronunciation candidate* in the case of a segmental repair sequence and a *sufficient pronunciation candidate* in the case of a sufficiency adjustment. This is because, as with *intelligible pronunciation candidates* within segmental repair sequences, the deployment of a *sufficient pronunciation candidate* makes its affirmation or rejection the next relevant action.

In the lone example of mutually manifest sufficiency, Bumbyn, Keita, and Misa are discussing *Shogi* (将棋)[44], a Japanese game that is superficially similar to chess—but is actually a thousand-times more fun[45]. Keita and Misa are Japanese, but Bumbyn is Mongolian. Bumbyn will proffer a *sufficient pronunciation candidate* for the word "Shogi" for Misa to affirm or reject as the next relevant action, but Misa will reject it, proffering her own *sufficient pronunciation candidate* for "Shogi" for Bumbyn to affirm or reject as the

[44] One criticism of this example is that the speakers are adjusting the phonetic segments of a Japanese word and therefore this is not even an example of an ELF interaction. However, lexical etymology is an etic concern. The speakers in the interaction are not orienting to "Shogi" as distinctive because it is etymologically derived from the Japanese language. This thesis stands on the emic perspective, and criticisms that lexical etymology automatically affect the praxis of the interaction have no place.

[45] To understand how cool Shogi is, you have to imagine Chess with Zombies and Battlestar Galactica jump engines.

next relevant action. Bumbyn repeats an approximation of the *sufficient pronunciation candidate*, thus affirming Misa's *sufficient pronunciation candidate*.

Example 6.3. An example of the affirmation of an sufficient pronunciation candidate

1	Bumbyn	haha. {but I:} really want to play it.
2	Keita	{haha}
3		(0.3)
4	Bumbyn	an: >I know< like [ʃoʊ̯.goʊ̯]?
5		(0.4)
6		whats [ʃ]-=
7	Misa	=[ɕo.ɟi].
8		(0.1)
9	Bumbyn	[ʃo.ɟi].
10	Keita	$[ɕo.ɟi]$. hahaha{hahahaha{hahahahahaha}}
11	Misa	{$[ɕo.go]$.{hahahahahaha}}
12	Bumbyn	{hahahahahaha} $[ʃo.ɟi]$.

In line 4, Bumbyn articulates "Shogi" as [ʃoʊ̯.goʊ̯] with upward intonation, which could indicate that she displays that she is not confident that [ʃoʊ̯.goʊ̯] will be an sufficient pronunciation in this context. This further operates as a proffer of [ʃoʊ̯.goʊ̯] as an sufficient pronunciation candidate, which projects its affirmation or rejection as the next relevant action. While Bumbyn is in the middle of her next turn in line 6, Misa latches onto Bumbyn's sibilant and initiates her action in line 7 well before the next TRP, proffering a new sufficient pronunciation candidate: [ɕo.ɟi]. This again projects an affirmation or denial of the sufficiency [ɕo.ɟi] as the next relevant action, and in line 9, Bumbyn affirms Misa's sufficient candidate pronunciation through her approximate repetition of it.

Sufficiency adjustments are a combination of displaying *mutually manifest insufficiency* through the deployment of a *sufficient pronunciation candidate*, and then followed by displaying *mutual manifest sufficiency* through an affirmation of the *sufficient pronunciation candidate* (O'Neal & Matsumoto, forthcoming). Having described both *mutually manifest insufficiency* and *mutually manifest sufficiency* and the ways in which they are interactionally instantiated, I will now describe the taxonomy through which sufficiency adjustments are categorized in this thesis.

6.3. Sufficiency Adjustment Organizations

This section will examine the interactional organization of sufficiency adjustments. Sufficiency adjustments are defined as sequences in which speakers orient to trouble sources as pronunciation sufficiency problems rather than pronunciation intelligibility problems, and then rearrange, modify, delete, or insert phonetic segments in order to co-construct sufficient pronunciation (O'Neal & Matsumoto, forthcoming). However, the organization of sufficiency adjustments is highly dependent on the exigencies of the interaction, and as such, a framework with which to categorize the interactional organization of sufficiency adjustments is in order so that this thesis can offer a meaningful taxonomy.

In order to do so, this study proposes a taxonomy that categorizes the participatory framework toward the initiation of the sufficiency adjustments. As with the taxonomy offered to categorize the initiation of segmental repair sequences in the previous chapter, this study adopts Björkman's (2014) arguments for categorizing the initiation of sufficiency adjustments into "self-initiated" and "other-initiated" categories according to whether the producer of the trouble source initiates the sequence (self-initiated) or the recipient of the trouble source initiates the sequence (other-initiation). However, the distinction between "self-segmental-repair" and "other-segmental-repair" that was offered in the previous chapter to categorize the culmination of segmental repair sequences is not applicable to describe the culmination of sufficiency adjustments because nothing is being repaired in the sense of restoring intersubjectivity (Jefferson, 1987; Schegloff, 1997a, 2007; O'Neal & Matsumoto, forthcoming).

Accordingly, this study offers a dichotomy to categorize sufficiency adjustments that includes a distinction between self- and other-initiation vis-à-vis the trouble source. Thus, the dichotomy with which to categorize sufficiency adjustments includes the following two categories: 1) other-initiated sufficiency adjustments (reactive sufficiency adjustments), and

2) self-initiated sufficiency adjustments (preemptive sufficiency adjustments). Each category of sufficiency adjustments will be explored and elucidated below.

6.3.1. Reactive Sufficiency Adjustments

The first category of sufficiency adjustments to be examined is *reactive sufficiency adjustments*. The single unifying feature of all reactive sufficiency adjustments is other-initiation, or in other words, the producer of the trouble source does not orient to the trouble source as insufficient, at least not until after the recipient of the trouble source orients to it as insufficient. As such, in reactive sufficiency adjustments, the recipient of the trouble source overtly reacts to something as insufficient within the phonetic form of the trouble source.

In the first example of a reactive sufficiency adjustment, Wu, a male Chinese graduate student, and Hiro, a male Japanese undergraduate, are discussing what Wu did after his trip to Hokkaido, the northernmost island in the Japanese archipelago. During the interaction, Hiro will orient to Wu's articulation of "Tokyo" as intelligible—evinced by the fact that he intuited the intended semantics of the articulation—but nonetheless as insufficient for some reason, which will trigger a sufficiency adjustment.

Example 6.4. An example of a reactive sufficiency adjustment

1	Wu	an:de: I:: also. uh.
2		(0.5)
3		after::. I-
4		(0.2)
5		after I wen::t to hokkaido?
6		(0.1)
7	Hiro	uhm hm.
8		(0.2)
9	Wu	I: went to [ˈto.c^{h}ju].
10		(0.6)
11	Hiro	[ˈto.cjo].
12		(0.2)

13	Wu	[to.ci.o]. hm.
14		(0.2)
15	Hiro	{hm::.}
16	Wu	{fo:r::}
17		(0.3)
18		the new years day.

Between lines 1~5, Wu continues a previous telling, which represents an expansion of a telling-receipt sequence (Schegloff, 2007), and in line 7 Hiro deploys the continuer "uhm hm" at the TRP, which displays a recognition that a telling is underway and simultaneously passes on a chance to initiate speaker-change (Schegloff, 1981). In line 9, Wu articulates "Tokyo" as [ˈto.cʰju] at the end of his TCU[46]. As such, Wu has completed the first pair part of a telling-receipt sequence, and the next relevant action is the production of a receipt of the information expressed by the telling (Schegloff, 2007). In line 11, however, Hiro articulates "Tokyo" as [ˈto.cjo] with downward intonation, which in no way represents the next relevant action projected by the completion of the first pair part of the telling-receipt sequence. Hiro's action in line 11 represents the proffering of [ˈto.cjo] as a sufficient pronunciation candidate, which makes the insufficiency of Wu's pronunciation, at least from Hiro's standpoint, mutually manifest. This furthermore projects an affirmation or rejection of the sufficient pronunciation candidate as the next relevant action (O'Neal & Matsumoto, forthcoming). In response, in line 13, Wu articulates "Tokyo" as [to.ci.o], which both approximates Hiro's sufficient pronunciation candidate and affirms it. In other words, Wu affirms that there was something insufficient about the first iteration of his pronunciation of "Tokyo" and then

[46] As with the "Shogi" and "osechi" examples, one criticism of this example is that the speakers are adjusting the phonetic segments of a Japanese word and therefore this is not even an example of an ELF interaction. Again, however, lexical etymology is an etic concern. The speakers in the interaction are not orienting to "Tokyo" as distinctive because it is etymologically derived from the Japanese language. This thesis stands on the emic perspective, and criticisms that lexical etymology automatically affect the praxis of the interaction have no place. The emic perspective simply informs the analyst that Hiro oriented to how "Wu" articulated "Tokyo" as intelligible but insufficient.

accommodated to Hiro's version of the pronunciation (Jenkins, 2000; O'Neal & Matsumoto, forthcoming).

Several aspects of the interaction reveal that although the pronunciation of "Tokyo" was oriented to as a problem, it was not oriented to as an intelligibility problem. First, Hiro never deploys any closed or open class repair initiators with rising intonation, which are the typical signals that an intelligibility problem has emerged within the interaction (see e.g., Drew, 1997; Brouwer, 2004; Matsumoto, 2011; O'Neal, 2015a, 2016b, 2017, forthcoming). Second, the fact that Hiro was able to proffer a sufficient pronunciation candidate for Wu's articulation of "Tokyo" demonstrates that Hiro understood Wu's pronunciation. Third, Hiro does not deploy any of the discourse markers that often collocate with the restoration of mutual intelligibility such as the discourse markers "oh" or "ah" after Wu accommodates to his pronunciation in line 13, which would indicate that mutual intelligibility had faltered and then been restored (O'Neal, 2015a, 2016b, 2017). Rather Hiro just deploys the affirmation discourse marker "hm", which does not entail a display of realization as "oh" and "ah" do (see e.g., Heritage, 1984a; Aijmer, 2002; O'Neal, 2015b).

Another example of a reactive sufficiency judgment will further elucidate its organization. In the following example, Keita, a male Japanese undergraduate, and Wu, a male Chinese graduate student, are talking about Wu's weekend activities, which include movie-watching at a cinema near Niigata train station. Although Keita will orient to Wu's pronunciation of "station" as insufficient, that does not mean that he finds it unintelligible.

Example 6.5. A second example of a reactive sufficiency adjustment

1	Keita	how bow chew? ((how about you?))
2		(0.4)
3	Wu	uh::
4		(0.9)
5		uh:
6		(0.4)
7		I::.
8		(0.9)

9		uh.
10		(0.3)
11		with my::,
12		(0.4)
13		friend?
14		(0.2)
15	Keita	uh hm.
16		(0.5)
17	Wu	uh.
18		(0.2)
19		together::.
20		(0.2)
21		go: to:: the::.
22		(0.6)
23		ni:gata [sɪ.t͡ɕʷeɪ̯.ʃən].
24		(0.7)
25		{uh.}
26	Keita	{ni:}gata [steː.ʃən].
27		(0.1)
28	Wu	[sː.ˈteː.ʃən].
29		(0.1)
30		oh. sorry.
31		(0.1)
32	Keita	uh hm.
33	Wu	ni:gata [steː.ʃən].
34		(0.8)
35		an:de:.
36		(0.6)
37		go to for the::.
38		(0.2)

39 cinema.

In line 1, Keita launches a question-answer-receipt sequence, and between lines 3 to 23, Wu formulates the second pair part of the sequence within which he articulates “station” as [sɪ.t͡ɕʷeɪ̯.ʃən] at the culmination of his turn. Although both Wu and Keita self-select as next speaker in lines 25 and 26 respectively, and even compete for speaking rights for one syllable, Keita takes the floor. Keita states “niigata station” with lowering intonation, within which he articulates “station” as [steː.ʃən], orienting to specifically [sɪ.t͡ɕʷeɪ̯.ʃən] as a trouble source and proffering [steː.ʃən] as a sufficient pronunciation candidate for Wu to accept or reject as the next relevant action. Wu orients to Keita’s action in line 26 as a sufficient pronunciation candidate and affirms it twice, once in line 28 and once again in line 33, which culminates the sufficiency adjustment. In other words, Wu accepts that there was something insufficient about the first iteration of his pronunciation of “station” and then accommodated to Keita’s version of the pronunciation (O’Neal & Matsumoto, forthcoming).

Several aspects of the interaction reveal that although the pronunciation of “station” was oriented to as a problem, it was not oriented to as an intelligibility problem. First, the fact that Keita was able to proffer a pronunciation candidate at all demonstrates that Wu’s initial articulation of “station” was intelligible to Keita but nonetheless insufficient. Second, Keita does not deploy the discourse markers “oh” or “ah” after Wu changes his pronunciation from [sɪ.tɕʷeɪ.ʃən] to [steː.ʃən], and thus it is impossible from an emic perspective to claim that Wu’s pronunciation restored mutual intelligibility. Therefore, it is likely that it never faltered in the first place. Third, although Wu deploys the discourse marker “oh” in line 30, which would seem to indicate that Keita’s actions had restored mutual intelligibility, it is unlikely that this “oh” displays a claim that mutual intelligibility had been restored. After all, one can assume that Wu understands what he himself is trying to say. It is far more likely that the discourse marker “oh” indicates that Wu oriented to “station” articulated as [steː.ʃən] as new information rather than a suddenly intelligible pronunciation (Aijmer, 2002). Accordingly, neither Keita’s nor Wu’s actions display a claim that mutual intelligibility has been restored, and therefore it is highly unlikely that mutual intelligibility had ever faltered. In fact, it is far more likely that this instance represents a reactive sufficiency adjustment.

Having illustrated several examples in which the recipient of the trouble source initiates the sufficiency judgment, I will now examine extracts in which the producer of the trouble source initiates the sufficiency adjustment.

6.3.2. Preemptive Sufficiency Adjustments

The second category of sufficiency adjustments to be examined is *preemptive sufficiency sequences*. The single unifying feature of preemptive sufficiency adjustment is self-initiation, or in other words, the producer of the trouble source orients to it as insufficient and proffers a sufficient pronunciation candidate for the recipient of the trouble source to affirm or reject.

In the first example of preemptive sufficiency sequence, Bumbyn, a female Mongolian exchange student, Misa, a female Japanese undergraduate, and Keita, a male Japanese undergraduate, discuss Bumbyn's affection for chess, which leads to a discussion of a somewhat similar Japanese game called *Shogi*. Although the pronunciation of *Shogi* is subject to segmental adjustment[47], this does not mean that this is because the pronunciation was oriented to as unintelligible. In fact, many clues suggest that the pronunciation of *Shogi* was intelligible both before and after the segmental adjustment.

Example 6.6. An example of a preemptive sufficiency adjustment

1	Bumbyn	a:nd I really like che:ss,
2		(0.3)
3	Misa	hm{:::.}
4	Keita	{oh.}
5	Bumbyn	{so.}
6		(0.4)
7		from my childhood.
8		(0.3)
9		my grandfather,

[47] Again, lexical etymology is an etic concern, and thus it is not considered a factor in this analysis. Whether the word that is subject to phonetic adjustment is derived from English or Japanese does not matter from an emic perspective.

10		(0.3)
11		taught me how to play chess?
12		(1.0)
13		a::nd
14		(0.7)
15		I really li- loved it.
16		(0.5)
17	Keita	hm. {hm.}
18	Bumbyn	{un }til now.
19		(0.2)
20		but I don-
21		(.)
22		now I don’t have ti:me,
23		(0.6)
24		o:r.
25		(0.3)
26		a chance to play:,
27		(0.5)
28		a chess?
29	Misa	ohw::.
30	Bumbyn	haha. {but I:} really want to play it.
31	Keita	{haha}
32		(0.3)
33	Bumbyn	an: >I know< like [ʃoʊ̯.goʊ̯]?
34		(0.4)
35		whats [ʃ]-=
36	Misa	=[ɕo.ɹi].
37		(0.1)
38	Bumbyn	[ʃo.ɹi].
39	Keita	$[ɕo.ɹi]$. hahaha{hahahaha{hahahahahaha}}

40 Misa {$[ʃo.ɡo]$.{hahahahahaha}}
41 Bumbyn {hahahahahaha} $[ʃo.ɟi]$.

After a discussion of chess, Bumbyn changes topics from chess to shogi in line 33. But within line 33, she articulates "Shogi" as [ʃoʊ̯.ɡoʊ̯] with upward intonation, which could indicate that she displays that she is not confident that [ʃoʊ̯.ɡoʊ̯] will be a sufficient pronunciation in this context. This further operates as a proffer of [ʃoʊ̯.ɡoʊ̯] as a sufficient pronunciation candidate, which projects its affirmation or rejection as the next relevant action. In line 35, Bumbyn begins formulating a question, but well before even the projected end of the TCU, Misa articulates [ɕo.ɟi] with downward intonation in line 36, both rejecting [ʃoʊ̯.ɡoʊ̯] and proffering [ɕo.ɟi] as a new sufficient pronunciation candidate. This again projects an affirmation or rejection of [ɕo.ɟi] as an sufficient pronunciation as the next relevant action, and in line 38, Bumbyn accepts it through her approximate, but not exact, articulatory repetition of it, which brings the sufficiency adjustment to a successful conclusion (O'Neal & Matsumoto, forthcoming).

Several aspects of the interaction reveal that although the pronunciation of "shogi" was oriented to as a sufficiency problem, it was not oriented to as an intelligibility problem. First, the fact that Misa was able to proffer a pronunciation candidate so far away from a potential TRP demonstrates that Bumbyn's initial articulation of "shogi" was intelligible to Misa but nonetheless insufficient. Second, although Misa proffers a pronunciation candidate for "shogi", which would seem to indicate an orientation to Bumbyn's pronunciation as unintelligible, no participant to the interaction deploys either the discourse markers "oh" or "ah" after Bumbyn accepts Misa's pronunciation candidate. Therefore, it is impossible from an emic perspective to claim that either Misa's or Bumbyn's pronunciation changes restored mutual intelligibility, and thus it is difficult to claim that mutual intelligibility had ever faltered at all.

Another example of a preemptive sufficiency adjustment will further elucidate its organization. In the second example of a preemptive sufficiency adjustment, Michio and Wu are discussing the pronunciation of the word "elect." The sound file makes it obvious that both Michio and Wu are looking at the course textbook at the time of the interaction, and the word “elect” is likely written on the page of the textbook that is open. Further, Michio mentions that there is a crossed E in the word, which implies that both Michio and Wu are looking at specifically one of the two E letters in the orthographic form of “elect” before the sufficiency judgment begins, which acts as an environmental affordance that strengthens mutual intelligibility (e.g., Guerrettaz & Johnston, 2013; Pennycook, 2016). These facts lend credence to the argument that although phonetic form is extensively negotiated throughout this sequence, mutual intelligibility had in fact never been threatened.

Example 6.7. A second example of a preemptive sufficiency adjustment

1	Michio	I:.
2		(0.2)
3		thi:nk.
4		(0.2)
5		>this<
6		(0.3)
7	Wu	{hm.}
8	Michio	{this } are:{s:t.}
9	Wu	{hm.}
10		(0.3)
11	Michio	crossed E.
12		(0.1)
13	Wu	hm::=
14	Michio	=uh:.
15		(0.5)
16		cha:nge to:: schwa.
17		(0.2)
18		{I think.}
19	Wu	{o- ohw:}
20		(0.3)
21		.hhh [a.ɹekt]?

22	Michio	like.
23		(0.1)
24		[ʊ˞.ekt].
25	Wu	[ɚ̆]?
26		(0.3)
27	Michio	[ə.lekt].
28		(0.2)
29	Wu	[ə.ɻekt]. ohw ohw. {yeah.}
30	Michio	{↑not.}
31		(0.1)
32		[i.lekt].
33		((metal clanging in the background))
34		[e.lekt].
35	Wu	{ohw ohw.}
36	Michio	{<I think.>} haha{ha}
37	Wu	{oh.}

Between lines 1 through 19, Michio and Wu discuss the potential location of a schwa vowel within the phonetic form of "elect," which catalyzes a sufficiency adjustment. In line 21, Wu articulates "elect" as [a.ɻekt] with rising intonation, proffering it as a sufficient pronunciation candidate, and as such it projects an affirmation or rejection of it as the next relevant action. In line 24, Michio articulates "elect" as [ʊ˞.ekt], which simultaneously rejects Wu's sufficient pronunciation candidate and proffers a new sufficient pronunciation candidate for Wu to affirm or reject as the next relevant action. However, in line 25, Wu articulates [ɚ̆] with a celerity and intonation that manifests that he has trouble with the first syllable of Michio's sufficient pronunciation candidate, which is an action that rejects Michio's sufficient pronunciation candidate. Michio orients to Wu's [ɚ̆] as an indication that Wu could not hear him, and in line 27, Michio articulates [ə.lekt], proffering another sufficient pronunciation candidate for Wu to affirm or reject as the next relevant action. Finally, in line 29, Wu first articulates "elect" as [ə.ɻekt], accepting the pronunciation candidate, and then deploys the discourse marker “oh” twice to display receipt of new information (Heritage, 1984a; Aijmer, 2002), which in this case is the realization of the sufficient pronunciation rather than the intelligible pronunciation, and then the affirmation discourse marker “yeah”, which further accepts the sufficient pronunciation candidate.

Several aspects of the interaction reveal that although the pronunciation of “elect” was oriented to as a sufficiency problem, it was not oriented to as an intelligibility problem. First, the fact that both Wu and Michio are looking at the textbook with the word “elect” on the page suggests that mutual intelligibility was likely never threatened (Guerrettaz & Johnston, 2013; Pennycook, 2016). Second, the discussion is specifically related to the location of schwa vowels, and as such the interaction revolves specifically around phonetic form rather than the intelligibility of phonetic form. Therefore, the topic of conversation matches the purpose of a sufficiency adjustment, making its instantiation more likely.

Having illustrated several examples of preemptive sufficiency adjustments, I will now examine examples in which segmental repair sequences and sufficiency adjustments are combined.

6.4. Segmental Repair Sequences and Sufficiency Adjustment Combinations

Segmental repair sequences are designed to maintain or restore mutual intelligibility after it has faltered through the adjustment of phonetic segments. Sufficiency adjustments are designed to co-construct sufficient pronunciations through the adjustments of phonetic segments. However, although segmental repair sequences and sufficiency adjustments have been described as separate phenomena up to this point, this does not mean that they never collocate. In fact, they sometimes do.

In the following example, the speakers will first segmental repair a pronunciation problem to restore mutual intelligibility, but after that, they will continue to adjust the pronunciation into a sufficient phonetic form. In this example, Mitsuhiro and Zhang are talking about Zhang’s opinions of Japanese people, which catalyzes a segmental repair sequence that concerns the pronunciation of “friendly.”[48]

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[48] This example is from an earlier corpus. This example is used, however, because it nicely demonstrates that ELF users

Example 6.8. An example of segmental repair and sufficiency adjustment together

1	Zhang	hm::.
2		(0.5)
3		the boys I ↑know?
4		(0.8)
5		is my ↑friends I ↑know:?
6		(0.5)
7		hn: is:
8		(0.1)
9		are ↑mostly very [fɹɛ.nə.li] to me:.
10		(0.3)
11		you know?
12		(0.1)
13	Mitsuhiro	°[fɹɛ.nə.li]°
14		(0.7)
15	Zhang	.hhh ↑japanese-
16		(0.1)
17		↑japanese man .hhh
18		(0.1)
19		is famous for ↑[ˈfɹɛ.nə.li].
20		(0.1)
21		yeah.
22		(0.6)
23		I think {so. }
24	Mitsuhiro	{[fɹ]-}
25		(0.5)
26		[ˈfɹɛ.nə.li]?

can orient to intelligibility and sufficiency in different ways.

27		(0.3)
28	Zhang	[ˈfɹɛn.də.li].
29		(0.6)
30	Mitsuhiro	ah [ˈfɹɛnd.li] ah {ah. }
31	Zhang	{yeah.}
32		(0.7)
33	Mitsuhiro	hm:::.
34	Zhang	they are very [ˈfɹɛn.də.li] an:de,
35		(0.2)
36		I ↑think that i:s very good.

(Extracted from O'Neal 2015d)

Between lines 1 to 11, Zhang tells Mitsuhiro her opinion of Japanese males, which is the first pair part of a telling-receipt sequence within which Zhang articulates "friendly" as [fɹɛ.nə.li]. This action makes a receipt of the telling the next relevant action (Schegloff, 2007), but in line 13, Mitsuhiro states °[fɹɛ.nə.li]° with very low volume, which is in no way the next relevant action projected by Zhang's telling. In lines 15 to 23, Zhang orients to Mitsuhiro's action in line 13 as an open class repair initiator, and repeats her entire turn within which she articulates "friendly" as [fɹɛ.nə.li] again (Drew, 1997). As an open class repair initiator, it projects an affirmation or rejection that mutual intelligibility has been restored as the next relevant action, but Mitsuhiro does not do this. Instead, Mitsuhiro deploys a closed class repair initiator, stating [ˈfɹɛ.nə.li] with rising intonation in line 26, which orients specifically to [ˈfɹɛ.nə.li] as the trouble source rather than the entire previous turn (Drew, 1997). Realizing that the trouble source is [ˈfɹɛ.nə.li], Zhang initiates segmental repair in line 28, deploying the intelligible pronunciation candidate [ˈfɹɛn.də.li], which projects an affirmation or rejection that mutual intelligibility has been restored as the next relevant action. Mitsuhiro does this: in line 30, Mitsuhiro first deploys the discourse marker "ah", which displays a claim that mutual intelligibility has been restored, then articulates "friendly" as [ˈfɹɛnd.li], and then the discourse marker "ah" two more times. This is all strong evidence that Zhang's segmental repair in line 28 was successful in restoring mutual intelligibility.

However, Mitsuhiro's action in line 30 also represents the first pair part of a confirmation-affirmation sequence. Mitsuhiro's articulation of "friendly" as [ˈfɹɛnd.li] in line 30 furthermore demonstrates the phonetic form that Mitsuhiro orients to as sufficient, and thus this action is also the beginning of a sufficiency adjustment as well. The confirmation projects an affirmation or rejection of the sufficient pronunciation candidate as the next relevant action (O'Neal & Matsumoto, forthcoming). In line 31, Zhang does affirm [ˈfɹɛnd.li] through the deployment of the affirmation discourse marker "yeah" (Aijmer, 2002). However, in line 34, Zhang does not accommodate to Mitsuhiro's sufficient pronunciation candidate; rather she continues to articulate "friendly" as [ˈfɹɛn.də.li], the pronunciation to which both participants have now oriented as the mutually intelligible pronunciation, although maybe not the mutually sufficient pronunciation, for "friendly." This reveals a difference between how Mitsuhiro and Zhang orient to the sufficiency of "friendly" articulated as [ˈfɹɛn.də.li]: Mitsuhiro orients to [ˈfɹɛn.də.li] as intelligible but insufficient; Zhang, on the other hand, orients to [ˈfɹɛn.də.li] as both intelligible and sufficient.

Having illustrated how segmental repair sequences and sufficiency judgments can appear within the same interaction, I will now quantify the sufficiency judgments that appear in the corpus gathered for this study and assess the statistical significance of each sufficiency judgment organization.

6.5. The Frequency of Sufficiency Adjustments and Segmental Repair Sequences

This section ascertains the frequency of sufficiency judgments and segmental repair sequences in order to assess the comparative importance of each to the participants in the corpora. Although both sufficiency adjustments and segmental repair sequences appear in the corpus, this does not mean that they appear with equal frequency. The relative frequency of these two within the corpus offers a clue as to how relatively important the maintenance of mutual intelligibility is compared to the maintenance of sufficiency.

In total, thirty-seven segmental repair sequences appear in the corpora. Only fifteen sufficiency adjustments appear in the corpora. The aggregate number of each kind of sequence within the corpus is listed below in Table 6.1.

Table 6.1. Frequency of Sufficiency Adjustments and Segmental Repair Sequences

	Obs.	Exp.	R	SR	*p*
Segmental Repair Sequences	37	26	11	2.157*	.031
Sufficiency Adjustments	15	26	-11	-2.157*	.031

Note. Obs. = observed frequency; Exp. = expected frequency; R = residual; SR = standardized residual;

In order to assess whether the frequencies of sufficiency adjustments and segmental repair sequences are statistically significant, the data from Table 6.1. was subjected to a one-way chi-square test. All analyses were conducted through the crosstabs function of SPSS v.25. The one-way chi-square test revealed a statistically significant difference between the actual frequencies and the expected frequencies of each type of organization if the frequencies were statistically random, χ^2 (1, N = 52) = 9.308, p = 0.002. Standardized residuals (SRs) were calculated to determine which frequency of the two practices were statistically significant. SRs are similar to Z-scores: Z-scores standardize normal distributions so that values can be compared in parametric testing; standardized residuals normalize data in chi-square testing for the same purpose (Agresti, 2007). A SR above 1.96 indicates a frequency of use that is statistically significant. A SR below -1.96 indicates a frequency of use that is so rare that it is also statistically significant. A SR between 1.96 and -1.96 indicates a statistically random frequency (Field, 2018, p. 857). The calculation of standardized residuals revealed a statistically significant standardized residual for both segmental repair sequences (2.157) and sufficiency adjustments (-2.157). This indicates that segmental repair sequences are more frequent to a statistically significant degree and that sufficiency adjustments are rare to a statistically significant degree.

The relative frequencies of segmental repair sequences and sufficiency adjustments warrants examination at this point. The fact that the interactions within the corpora gathered for this study contain more segmental repair sequences than sufficiency adjustments is strong evidence that the speakers within the corpora are far more interested in maintaining mutual intelligibility than they are in co-constructing sufficiency. Indeed, the χ^2 test results indicate that sufficiency judgments are overall rare. Accordingly, although an examination of the corpora from an emic perspective reveals that participants do orient to phonetic conditions beyond mutual intelligibility as significant for the progression of the interactions, this does not, statistically speaking, seem to happen very often. Rather the results seem to indicate that the participants in these corpora orient to the maintenance of mutual intelligibility as far more significant to the progression of the interactions than sufficiency, which is a finding that is in keeping with a host of ELF phonology research (e.g., Jenkins, 2000; Matsumoto, 2011; Deterding, 2013; Zoghbor, 2018; O'Neal, forthcoming).

Having assessed the frequencies of segmental repair sequences and sufficiency judgments within the corpus, I will now summarize the major findings of this chapter.

6.6. Summary

In this chapter, I have presented evidence that the co-construction of sufficient pronunciation can arise through sufficiency adjustments. This chapter focused on how ELF users interactionally organize sufficiency adjustments to co-construct a mutually sufficient pronunciation because very little is known about the ways in which ELF users orient to pronunciation as sufficient or acceptable (e.g., O'Neal & Matsumoto, forthcoming). Section 6.2 examined the actions through which ELF users manifest that pronunciation sufficiency has lapsed and then been restored. This included a discussion of the devices through which mutually manifest insufficiency and mutually manifest sufficiency are publicly displayed. Section 6.3 explored the organization of sufficiency adjustments and advanced the argument that the organization of sufficiency adjustments can be adequately captured through a dichotomy that describes all sufficiency adjustments as either self- or other-initiated. Section 6.4 presented evidence that sufficiency adjustments can be combined with segmental repair sequences. Section 6.5 assessed the comparative frequencies of segmental repair sequences and sufficiency adjustments. The one-way χ^2 test revealed that segmental repair sequences are frequent and sufficiency adjustments are rare to a statistically significant degree.

Previous studies within ELF, WE, and SLA have all but ignored the idea that ELF users orient to pronunciation as much more than just intelligible and unintelligible. Indeed, research on the efficacy of pronunciation recasts equates intelligible phonetic form to sufficient phonetic form and ignores the interactional orientations of speakers to the difference between the two phenomena (see e.g., Goo & Mackey, 2013; Lyster & Ranta, 2013; Saito & Akiyama, 2017). But an examination of the ELF interactions within the corpora of this study reveals that although sufficiency adjustments are not as frequent an occurrence as segmental repair sequences, ELF users do orient to aspects of pronunciation beyond just mutual intelligibility as relevant to the progression of the interaction (O'Neal & Matsumoto, forthcoming). The present findings, therefore, lend additional support to the idea that phonetic negotiation and variation are intrinsic components of ELF interactions (Matsumoto, 2011; O'Neal, 2017). Furthermore, phonetic negotiations need not be inherently tied to notions of mutual intelligibility, although it is fair to claim that a majority of phonetic negotiations within the corpus gathered for this study certainly are.

The statistical analyses offered in this chapter reveal that sufficiency adjustments are not a common occurrence and this fact seems to attenuate any claim of importance for sufficiency adjustments within ELF interactions. But this would be a misreading of the significance of the phenomenon. To be sure, Robenalt & Goldberg (2015) are surely correct when they claim that, "speakers are not reliably overtly corrected for producing ill-formed utterances" (p. 468). However, the significance of sufficiency adjustments does not lie within its corrective effect, but rather within its intent. The mere presence of sufficiency adjustments demonstrates that ELF users are sensitive to perfectly intelligible yet insufficient pronunciation. In other words, even ELF users orient to phonetic form as sufficient and insufficient at times, and interact in ways that reveal this from an emic perspective (O'Neal & Matsumoto, forthcoming).

Having scrutinized the interactional organization of sufficiency adjustments, Chapter 7 will explore the relationship among different types of phonetic segment adjustments, the syllabic position of the phonetic segment adjustments, and functional load theory.

Chapter 7
Phonetic Segment Adjustments, Syllabic Position, and Functional Load Theory

7.1. Introduction

This chapter examines the frequency of phonetic segment adjustments and their relationship with Functional Load Theory[49]. Although a large body of ELF research examines the contribution of individual phonetic segments to the maintenance of mutual intelligibility (e.g., Jenkins, 2000, Deterding, 2013; Deterding & Nur Raihan, 2016; Gardiner & Deterding, 2018; Zoghbor, 2018), little research exists that investigates the contribution of phonetic segment adjustments to the maintenance of mutual intelligibility (but see O'Neal, forthcoming for an exception). This is somewhat surprising because many ELF scholars fully admit that accommodation, which some ELF scholars describe in terms that are very reminiscent of the descriptions of phonetic segment adjustment that will be presented in this chapter, is a major component of intelligible pronunciation (Jenkins, 2000, pp. 167-175; Deterding, 2013, pp. 85-87). However, in spite of broad agreement among ELF phonology specialists that phonetic segment adjustments are likely to be a significant contributor to the maintenance of mutual intelligibility in ELF interactions, investigations into phonetic accommodation in ELF interactions thus far have been limited to discussions of segmental repair rather than the specific phonetic segment adjustments therein (e.g., Matsumoto, 2011; O'Neal, 2015a, 2015b). Accordingly, in order to fill this gap, this chapter will attempt to categorize phonetic adjustments so as to account for the phonetic variation, flexibility, and adaptability exhibited in ELF interactions.

Furthermore, this chapter examines the relationship between phonetic adjustments and syllabic position. The relationship between phonetic adjustments and syllabic position has never been even tangentially examined in any ELF research, but it is definitely worth investigating because it could be that certain phonetic adjustments tend to occur in certain syllabic locations. If true, one could make a decent case that pronunciation features in certain

[49] This chapter is based on articles that have been published or forthcoming in *Asian Englishes* (2015a), *Journal of Pragmatics* (2015b), and *Journal of Second Language Pronunciation* (forthcoming).

positions are more consequential to the maintenance of mutual intelligibility in ELF interactions. Accordingly, this chapter will investigate the extent to which certain phonetic adjustments occur in certain syllabic positions.

Last, this chapter elucidates the relationship between phonetic segment adjustments and Functional Load Theory. The relationship between intelligible pronunciation within ELF interactions and Functional Load Theory has not been assessed in any ELF research, but for reasons suggested in Section 2.2.3, Functional Load Theory predicts some of the findings of ELF phonology research (see e.g., Jenkins, 2000; Gilner & Morales, 2010; Deterding, 2013; Zoghbor, 2018), and thus the two standpoints can be reconciled to the benefit of both. Accordingly, this chapter will assess the extent to which the phonetic segment adjustments within the corpus accord with the predictions of Functional Load Theory.

In the following sections, I will first introduce the taxonomy that is used to categorize phonetic segment adjustments (Section 7.2), which can be categorized according to which phonetic aspect has been altered (Section 7.2.1) and the syllabic position in which the adjustment was conducted (Section 7.2.2). Next, I will assess the relationship between phonetic segment adjustments and syllabic positions (Section 7.3). Last, I will assess the relationship between phonetic segment adjustments and Functional Load Theory (Section 7.4). The final section will summarize the findings of the entire chapter (Section 7.5).

7.2. Taxonomy of Phonetic Segment Adjustments

Any categorization of phonetic segment adjustments must offer some method through which they can be classified. In order to do so, this study offers both a tetrachotomy to categorize phonetic segment adjustments and a trichotomy to categorize the location at which the phonetic segment adjustments are conducted. First, within the corpus, speakers can modify the phonetic segments within their pronunciations in four different ways: 1) they can resegment the phonetic segments of a pronunciation, changing the syllabic position of a phonetic segment rather than the articulatory features of the phonetic segment; 2) they can modify the phonetic segments, changing the articulatory features of a phonetic segment (i.e., the manner of articulation, the place of articulation, the voicing feature, lip rounding, etc.); 3) they can delete a phonetic segment, completely removing it from a pronunciation; and 4) they can insert a phonetic segment, realizing it into a pronunciation in which it was not present before (O'Neal, 2016a, 2016b, forthcoming). These four means of phonetic segment adjustment will be exemplified in Section 7.2.1. Second, the syllabic location at which the speakers conduct the phonetic segment adjustments is also significant, and this needs to be accounted for as well. Within the corpus, ELF users conduct phonetic segment adjustments in one of three different syllabic positions: 1) syllable onset position, 2) syllable nucleus position, or 3) syllable coda position. These three possible syllabic positions of phonetic segment adjustment will be examined in Section 7.2.2.

7.2.1. Phonetic Segment Adjustments

This section examines the phonetic segment adjustments that occur in segmental repair sequences. As previously mentioned, ELF users can modify the phonetic segments within their pronunciations in four different ways: resegmentation, modification, deletion, and insertion. Each of the four ways in which ELF speakers can modify their pronunciations will be examined below.

7.2.1.1. Resegmentation

Resegmentation is a unique type of phonetic segment adjustment because it does not necessitate the modification of the articulatory characteristics of a phonetic segment. Rather, resegmentation refers to the modification of the phonotactics of a word. The narrow definition of phonotactics is the permissible order of phonemes within a language (Jusczyk, 1997). Thus, for instance, it is a common understanding within phonology that English phonotactics does not allow /tl/ in syllable onsets, but it does allow /tr/ in syllable onsets. Phonotactics are set by the speech community of a language (Jusczyk, 1997; Roach, 2009). But the phoneme configurations that English phonotactics allow are not necessarily the same as the permissible phonetic segment configurations in ELF interactions. Accordingly, a broad definition of phonotactics is required for this analysis. Within this study, phonotactics are defined as the phonetic segment configurations that the speakers in the ELF interactions orient to as relevant to the progression of the interaction (O'Neal, 2016a). Thus, within this thesis, resegmentation refers to the reconfiguration of the phonotactics of words. Whether that reorganization results in a phonetic segment configuration that matches or deviates from the phonotactics set by the speech community of the language is irrelevant.

Resegmentation occurs in the extract below[50]. In the following extract, Xue, a female Chinese exchange student, and Ayaka, a female Japanese undergraduate, are discussing Ayaka's mother. The discussion turns to Ayaka's mother's hobbies, but Xue and Ayaka renegotiate the boundaries of two words, and in the process they resegment the phonetic segments in both words: "likes" and "gardening".

Example 7.1. An example of resegmentation

1	Xue	whats your mothers hobby?
2		(1.3)
3	Ayaka	pardon?
4		(0.9)
5	Xue	uhm mother.
6		(0.6)
7	Ayaka	mother?
8	Xue	hm.
9		(1.7)
10	Ayaka	my mothers hobby?
11		(0.1)
12	Xue	yeah.
13		(0.9)
14	Ayaka	ah:::
15		(0.5)
16		I don know::↑ah.

[50] This example is not from the corpora that were collected during phase one and phase two of data collection. It is included here only to demonstrate that the phenomenon that I am calling resegmentation exists. Furthermore, this example and the "too great" example are included in the statistical analyses at the end of this chapter to demonstrate that resegmentation are very rare.

17		(0.7)
18		but
19		(0.8)
20		ah. she::
21		(0.5)
22		she- uh- maybe she [laɪ̯ks] [ˈga.den.iŋ].
23		(0.6)
24	Xue	[ˈskaɹ.den.iŋ]?
25		(0.2)
26	Ayaka	[ˈga.den.iŋ].
27	Xue	↑ah [ˈga.den.iŋ]. oh. {okay. }
28	Ayaka	{[ga]- } yeah.
29		(0.3)
30		so in spring she::.
31		(0.7)
32		she grows some flowers.
33	Xue	↑hn:::.
34	Ayaka	yeah.

(Extracted from O’Neal, 2016a)

The interactional praxis of this example has already been explicated in a previous section (see Section 5.3.1.1.2). The focus here is instead on the phonetic segment adjustments. In the process of restoring mutual intelligibility, the speakers negotiated a sibilant [s] out of one word, and modified a devoiced [k] into its voiced [g] counterpart. In order to signify the resegmentation of a phonetic segment, or in other words, the idea that a phonetic segment has been moved from one syllable to another, the lower-case Greek letter sigma σ will be used, as this symbol is commonly employed in phonetics and phonology research to refer to syllables (Roach, 2009). Thus, the phonetic praxis of this example would be quantified both as one resegmentation of a consonant from a syllable onset to a syllable coda ([s] σ onset → σ coda) and as one phonetic segment modification ([k] → [g]) in Section 7.3.

7.2.1.2. Phonetic Segment Modification

Phonetic segment modification refers to the process through which ELF users negotiate new articulatory features for a phonetic segment to maintain mutually intelligible pronunciation (O'Neal, forthcoming). In other words, ELF users can modify the place of articulation, the manner of articulation, the length of pronunciation, and the degree of phonation of a phonetic segment during the process of maintaining mutual intelligibility.

Phonetic segment modification occurs in the example below. In the following extract, Bumbyn, Mashu, and Mitsu are talking about their university club activities. During the interaction, the word "chess" is problematized, and the speakers modify the phonetic segments within the word during the process of restoring its intelligibility.

Example 7.2. An example of phonetic segment modification

1	Bumbyn	an:de.
2		(0.5)
3		in my home university I am a member of [t͡ʃiz] cl- [t͡ʃɪs] club?
4		(0.6)
5	Mashu	°[t͡ʃe]°?
6	Bumbyn	[t͡ʃɛs] club.
7		(0.2)
8	Mitsu	[t͡ʃɛs]?
9		(0.4)
10	Bumbyn	you know {[t͡ʃɛs]?}
11	Mitsu	{oh:. } [t͡ʃɛs]. oh.
12		(0.1)
13	Bumbyn	yea::h.

A short gloss on the interactional praxis is that mutual intelligibility falters by at least line 5 and is restored by at least line 10. But the focus here is instead on the phonetic segment adjustments. In the process of restoring mutual intelligibility, the speakers negotiated the vowel quality from [ɪ] to [ɛ] in the process of restoring mutual intelligibility. Thus, the phonetic praxis of this example will be quantified as two phonetic segment modifications ([ɪ] → [ɛ] and ([z] → [s]) in Section 7.3.

7.2.1.3. Phonetic Segment Deletion

Phonetic segment deletion refers to the process through which ELF users remove a phonetic segment from the pronunciation of a problematic word or phrase to maintain mutually intelligible pronunciation (O'Neal, 2016b, forthcoming). In other words, phonetic segment deletion represents the orientation of ELF users to the presence of a phonetic segment as problematic and then remove it.

Phonetic segment deletion occurs in the example below. In the following extract, Xiang and Mizuki are discussing "job-hunting." During the interaction, the phrase "job hunting" is problematized, and among other things the speakers remove a phonetic segment within the word during the process of restoring its intelligibility.

Example 7.3. An example of phonetic segment deletion

1	Xiang	uhm:,
2		(1.2)
3		you have to::.
4		(0.8)
5		do some::.
6		(0.2)
7		[d͡ʑɑb.ɦʌn.tins].
8		(0.7)
9	Mizuki	what?
10		(0.7)
11	Xiang	[d͡ʑɑb.hʌn.tin]=
12	Mizuki	=↑ah yeah thats right.
13		(1.2)
14		hahaha so, {yeah.}

15	Xiang	{what} did you want to be?

A short gloss on the interactional praxis is that mutual intelligibility falters by at least line 9, if not earlier, and mutual intelligibility is restored by at least line 12. But the focus here is instead on the phonetic segment adjustments. In the process of restoring mutual intelligibility, the speakers negotiated the removal of a sibilant from the pronunciation of "job hunting." Thus, the phonetic praxis of this example will be quantified as one phonetic segment deletion ([s] → Ø) in Section 7.3.

7.2.1.4. Phonetic Segment Insertion

Phonetic segmental insertion refers to the process through which ELF users add a phonetic segment to the pronunciation of a problematic word or phrase in order to maintain mutually intelligible pronunciation (O'Neal, 2016b, forthcoming). In other words, phonetic segment insertion represents the orientation of ELF users to the lack of a phonetic segment as problematic and seek to introduce it to the pronunciation.

Phonetic segment insertion occurs in the example below. In the following extract, Bumbyn is asking Riku and Misa a question, but "club" is oriented to as problematic and subjected to self-segmental-repair. During the interaction, Bumbyn inserts an additional consonant into the pronunciation of "club" in the process of restoring mutual intelligibility.

Example 7.4. An example of phonetic segment insertion

1	Bumbyn	so.
2		(0.5)
3		do you hav-
4		(0.2)
5		do you- are you a member of
6		(0.2)
7		some [klʌ]?
8		(0.8)
9	Misa	hm?

10		(0.7)
11	Riku	uh:::.
12		(0.6)
13	Bumbyn	[klʌb]?
14		(0.3)
15	Misa	[kl]-. ↑ah yeah yeah.=
16	Bumbyn	=oh. [klʌb].
17		(0.1)
18		>sorry<.

A short gloss on the interactional praxis is that mutual intelligibility falters by at least line 7, and mutual intelligibility is restored by at least line 15. But the focus here is instead on the phonetic segment adjustments. In the process of restoring mutual intelligibility, the speakers negotiated the addition of a consonant into the pronunciation of "club." Thus, the phonetic praxis of this example will be quantified as one phonetic segment insertion (Ø → [b]) in Section 7.3.

The type of phonetic segment adjustment is certainly significant for the quantification of segmental adjustments to be described in Section 7.3. However, the type of segmental adjustment is not the only significant aspect of the phonetic praxis within sequences that are specifically designed to resolve mutual intelligibility problems. The syllabic location at which the segmental adjustments are conducted could also be significant, and thus in the next subsection the categorization of phonetic segment adjustment locations will be introduced.

7.2.2. The Syllabic Position of Phonetic Segment Adjustments

This section examines the syllabic position at which the phonetic segment adjustments are conducted. Previous research has shown that ELF users can orient to the syllabic position of a phonetic segment as relevant to the continuation of an interaction (e.g., O'Neal, 2016a), and therefore the syllabic position at which segmental adjustments are conducted is not an insignificant concern for an accurate description of the phonetic praxis of ELF interactions.

Each of the three syllabic positions at which ELF users can adjust phonetic segments will be examined below.

7.2.2.1. Phonetic Segment Adjustment in the Syllabic Onset

The syllabic onset refers to the syllabic position before the nucleus of the syllable. That is, the syllabic onset refers to all phonetic segments before the most sonorous phonetic segment within the same syllable (Roach, 2009). Phonetic segment adjustment occurs at the syllabic onset of the first syllable of the trouble source in the example below. Jia is talking with Mako about the relative ease of travel in Beijing as compared to Niigata, Japan. But Jia's articulation of "subway" is oriented to as problematic, and the speakers negotiate a new more intelligible variant pronunciation. In the process of doing so, they modify the segmental phoneme in the syllable onset of the trouble source.

Example 7.5. An example of phonetic segment adjustment in syllable onset position

1	Jia	since beijing- since ↑peking has a: [ʃʌb.weɪ̯].
2		(0.4)
3	Mako	[ʃʌb.we]?
4	Jia	[ʃʌb.weɪ̯].
5		(1.2)
6		niigata don't have,
7		(0.6)
8		didn't have,
9		(0.3)
10		don't have,
11		(0.1)
12		[ʃʌb.weɪ̯],
13		(0.3)
14	Mako	[ʃɑ.ɰɯ]?
15		(1.8)
16	Jia	[sʌb.weɪ̯].

17		(0.3)
18	Mako	[sʌb.weɪ̯]?
19		(0.2)
20	Jia	hm.
21	Mako	↑oh >yeah yeah< ah. >I know I know<.

(Extracted from O'Neal, forthcoming)

A short gloss on the interactional praxis is that mutual intelligibility falters by at least line 3, and it is restored by at least line 21. But the focus here is instead on the syllabic position of the phonetic segment adjustments. In the process of restoring mutual intelligibility, the speakers modified the sibilant consonant in the syllabic onset position of the first syllable of the trouble source. Thus, the phonetic praxis of this example will be quantified as one phonetic segment modification ([ʃ] → [s]) at syllable onset position (σ onset) in Section 7.3.

7.2.2.2. Phonetic Segment Adjustment in the Syllabic Nucleus

The syllabic nucleus refers to the center of the syllable. That is, the syllabic nucleus refers to the most sonorous phonetic segment within the syllable, usually a vowel (Roach, 2009). Phonetic segment adjustment occurs at the syllabic nucleus of the trouble source in the example below. Maki is telling Jia about her New Year's holiday, but Maki is unsure as to how to pronounce "shrine", which catalyzes the segmental repair sequence in which the speakers negotiate a new more intelligible variant pronunciation. In the process of doing so, they modify the phonetic segment in the syllable nucleus of the trouble source.

Example 7.6. An example of phonetic segment adjustment in syllable nucleus position

1	Maki	uhm.
2		(0.5)
3		I went to asakusa.
4	Jia	hm:{:.}
5	Maki	{la}st year.
6		(0.4)

7		its so famous.
8	Jia	hm{::.}
9	Maki	{an} good. .hhh
10		(0.1)
11		so traditional::.
12		(0.7)
13		[ʃɹeɪ̯n]?
14		(0.1)
15	Jia	hm::. [ʃɻaɪ̯n]?
16		(0.1)
17	Maki	[ʃɹaɪ̯n]. yeah. so good.
18	Jia	hm::.
19		(0.5)
20		so what do you think?
21	Ryo	disneyland.

A short gloss on the interactional praxis is that mutual intelligibility falters by at least line 15, and it is restored by at least line 18, if not line 17. But the focus here is instead on the syllabic position of the phonetic segment adjustments. In the process of restoring mutual intelligibility, the speakers modified a monophthong into diphthong in the syllable nucleus of the trouble source. Thus, the phonetic praxis of this example will be quantified as one phonetic segment modification ([eɪ̯] → [aɪ̯]) at syllable nucleus position (σ nucleus) in Section 7.3.

7.2.2.3. Phonetic Segment Adjustment in the Syllabic Coda

The syllabic coda refers to the syllabic position after the nucleus of the syllable. That is, the syllabic coda refers to all phonetic segments after the most sonorous phonetic segment within the same syllable (Roach, 2009). Phonetic segment adjustment occurs at the syllabic coda of the trouble source in the example below. Hathai asks Miya how old her dog is, but Hathai's articulation of "old" is oriented to as problematic, and the speakers negotiate a new more intelligible variant pronunciation. In the process of doing so, they insert a phonetic segment into the syllable coda of the trouble source.

Example 7.7. An example of phonetic segment adjustment in syllable coda position.

1	Hathai	and you?=
2	Miya	=I have a dog.
3		(0.3)
4	Hathai	dog?
5		(0.1)
6		one dog?
7		(0.3)
8	Miya	one dog.
9		(0.5)
10	Hathai	how [ol] is she?
11		(0.1)
12		how [ol]?
13		(0.3)
14		how [od] is?
15		(0.5)
16	Miya	[oːd]?
17		(0.4)
18	Hathai	how [ol]?
19		(0.4)
20	Miya	[old]?
21	Masashi	how [oʊld]?
22	Hathai	hm. how [old]?
23		(0.1)
24	Miya	like,
25		(0.3)
26		dog?

27		(0.6)
28	Hathai	hm:. dog.=
29	Miya	=↑ah.
30		(0.2)
31		yea::h. seven years {so.}
32	Hathai	{se }ven years.
33		(0.1)
34		woah.

A short gloss on the interactional praxis is that mutual intelligibility falters by at least line 16, if not earlier, and it is restored by at least line 29. But the focus here is instead on the syllabic position of the phonetic segment adjustments. In the process of restoring mutual intelligibility, the speakers inserted a plosive consonant into the syllabic coda of the trouble source. Thus, the phonetic praxis of this example will be quantified as one phonetic segment insertion (ø → [d]) into syllable coda position (σ coda) in Section 7.3.

7.3. The Relationship between Phonetic Segment Adjustments and Syllabic Position

This section assesses the frequency of phonetic segment adjustments. Although phonetic segment adjustments can be categorized according to a tetrachotomy that distinguishes between resegmentation, phonetic segment modification, phonetic segment deletion, and phonetic segment insertion, this does not mean that each of the four phonetic segment adjustments are utilized with equal frequency. As such, this section ascertains the extent to which each of the four phonetic segment adjustments are utilized within the corpora.

7.3.1. The Frequency of Phonetic Segment Adjustments

There are fifty-eight phonetic segment adjustments in the corpora, and because just one ratified candidate repair pronunciation within a segmental repair sequence can contain multiple phonetic segment adjustments, it needs to be remembered that the number of phonetic segment adjustments can far outnumber the total number of segmental repair sequences within the corpora. Two of the phonetic segment adjustments are resegmentations[51]. Thirty-five of the phonetic segment adjustments are modifications. Six of the phonetic segment adjustments are deletions. Fifteen of the phonetic segment adjustments are insertions. The aggregate number of each kind of phonetic segment adjustment is listed below in Table 7.1.

Table 7.1. The Frequency of Phonetic Segment Adjustments

	Obs.	Exp.	R	SR	*p*
Resegmentation	2	14.5	-12.5	-3.282*	= .001
Modification	35	14.5	20.5	5.383*	< .001
Deletion	6	14.5	-8.5	-2.232*	= .025
Insertion	15	14.5	0.5	-0.131	= .895

Note. Obs. = observed frequency; Exp. = expected frequency; R = residual; SR = standardized residual.

In order to assess whether the set of frequencies in Table 7.1. are different from a random set of frequencies to a statistically significant degree, the data from Table 7.1. was subjected to a one-way χ^2 test. The one-way chi-square test revealed a statistically significant difference between the set of actual frequencies and the expected set of frequencies if the frequencies were statistically random, χ^2 (3, N = 58) = 44.759, $p < .001$. Accordingly, the use of phonetic segment adjustments is highly unlikely to be random (i.e., the null hypothesis can be rejected).

In order to determine specifically which phonetic segment adjustments are frequent to a statistically significant degree, standardized residuals (SR) were calculated for each phonetic segment adjustment as post-hoc tests. SRs are similar to Z-scores: Z-scores standardize normal distributions so that values can be compared in parametric testing; standardized residuals normalize data in chi-square testing for the same purpose (Agresti, 2007). A SR above 1.96 indicates a frequency of use that is statistically significant. A SR below -1.96 indicates a frequency of use that is so rare that it is also statistically significant.

[51] These two phonetic segment resegmentations are both taken from corpora other than the two corpora gathered for this project. This was done so that this project could demonstrate just how rare these phonetic segment adjustments are.

A SR between 1.96 and -1.96 indicates a statistically random frequency (Field, 2018, p. 857). The SR for resegmentations is -3.282, which is statistically significant in a negative sense. This suggests that resegmentation is an extremely rare means with which to restore mutual intelligibility among the speakers in the corpora (O'Neal, 2016a, forthcoming). The SR for phonetic segment modification is 5.383, which is also statistically significant but in a positive sense. This means that the speakers in the corpora very frequently utilize phonetic segment modification to restore mutual intelligibility after its breakdown. The SR for phonetic segment deletion is -2.232, which is also statistically significant but again in a negative sense. This means that phonetic segment deletion, like resegmentation, is an extremely rare means with which to restore mutual intelligibility among the speakers in the corpora. The SR for phonetic segment insertion is -0.131, which is not statistically significant. In other words, the frequency of phonetic segment insertion to restore mutual intelligibility within the corpora is so close to a random frequency that the actual frequency and a random frequency of usage are almost the same. Accordingly, it is difficult to claim that phonetic segment insertion is used either frequently or infrequently.

In total, the evidence indicates that the speakers in the corpora were much more likely to use phonetic segment modifications than any other kind of phonetic segment adjustment. In other words, modifying the phonetic material that was already ambient within the trouble source pronunciation rather radically altering the phonetic material in the trouble source pronunciation through the insertion or deletion of phonetic segments seems to be the preferred phonetic means to negotiate through a mutual intelligibility problem among the speakers in the corpora. These findings also indicate that the number of phonetic segments in the trouble sources and the candidate repair pronunciations that were eventually oriented to as mutually intelligible were often similar, if not identical. This in turn shows that the phonetic segment content of a trouble source and a mutually intelligible pronunciation can be minor (O'Neal, forthcoming). This suggests that, from an emic perspective, the difference between the phonetic segments in an unintelligible pronunciation and an intelligible one is often phonetically fairly minor. In other words, phonetically similar entities can cause mutual intelligibility to falter; unintelligible pronunciations need not necessarily differ greatly from intelligible pronunciations.

7.3.2. Segmental Adjustments as a function of Syllabic Position

The previous section demonstrates that the speakers in the corpus frequently modify phonetic segments within segmental repair sequences in order to maintain mutual intelligibility. However, when the phonetic segment adjustments are reclassified according to the syllabic position at which they were conducted, a slightly different picture emerges[52]. Although the data demonstrates that each phonetic segment adjustment is possible in each syllabic position, this does not mean that each adjustment is equally prevalent in each syllabic position.

The statistical arguments that are presented in this section depend on one-way χ^2 test results. The one-way χ^2 test has prerequisites for its use, called assumptions (Field, 2018). One of the assumptions of a one-way χ^2 test is that each category to be compared has an expected value of at least five (Field, 2018, p. 849). Accordingly, for a one-way χ^2 test to function properly in a test that compares the appearance of phonetic segment adjustments in three syllable positions, each type of phonetic segment adjustment must appear at least fifteen times in the corpus. Unfortunately, resegmentation tokens (N = 2) and deletion tokens (N = 6) are too rare in the corpus to allow for this kind of one-way χ^2 analysis. In this data set, only phonetic segment insertion tokens (N = 15) and phonetic segment modification tokens (N = 35) meet this assumption. Accordingly, this section will only assess the following two aspects of the relationship between phonetic segment adjustment and syllabic position: 1) the relationship between phonetic segment insertion and the syllabic position at which it tends to occur; 2) the relationship between phonetic segment modification and the syllabic positions at which it tends to occur.

Fifteen phonetic segment insertions occur in the corpus, but that does not mean that they were equally distributed across syllabic onset, syllabic nucleus, and syllabic coda positions. One of the phonetic segment insertions occurred in syllabic onset position. One of the phonetic segment insertions occurred in syllabic nucleus position. Thirteen of the phonetic segment insertions occurred in syllabic coda position. The aggregate number of

[52] In many cases, the trouble source pronunciations are monosyllabic words, and thus the syllable onsets are often synonymous with word beginnings and syllable codas with word endings.

each phonetic segmental insertion as a function of syllabic position within the corpora is listed below in Table 7.2.

Table 7.2. The frequency of phonetic segment insertions in three syllabic positions

	Obs.	Exp.	R	SR	*p*
Syllable Onset	1	5	-4	-1.788	= .073
Syllable Nucleus	1	5	-4	-1.788	= .073
Syllable Coda	13	5	8	3.577*	< .001

Note. Obs. = observed frequency; Exp. = expected frequency; R = residual; SR = standardized residual.

In order to assess whether the set of frequencies in Table 7.2. are different from a set of random frequencies to a statistically significant degree, the data was subjected to a one-way χ^2 test. The one-way chi-square test revealed a statistically significant difference between the set of actual frequencies and the expected set of frequencies if the frequencies were statistically random, χ^2 (2, N = 15) = 19.2, $p < .001$. Accordingly, the syllabic location at which phonetic segment insertion tends to be conducted is highly unlikely to be random (i.e., the null hypothesis can be rejected).

In order to determine specifically which syllabic position frequently hosts phonetic segment insertions, standardized residuals (SRs) were calculated for each syllabic position as post-hoc tests. A SR above 1.96 indicates a frequency of use that is statistically significant. A SR below -1.96 indicates a frequency of use that is so rare that it is also statistically significant. A SR between 1.96 and -1.96 indicates a statistically random frequency (Field, 2018, p. 857). The SRs for phonetic segment insertion in syllable onset position and in syllable nucleus position are both -1.788, which is not statistically significant. It is accordingly not possible to claim that phonetic segment insertion in syllable onset or nucleus position was either frequent or infrequent. The SR for phonetic segment insertion in syllable coda position is 3.577, which is statistically significant ($p < .001$). This result means that phonetic segment insertion is frequent at syllable coda position to a statistically significant degree.

Thirty-five segmental modifications appear in the corpus, but that does not mean that they were equally distributed across syllabic onset, syllabic nucleus, and syllabic coda positions. Fifteen of the segmental modifications occurred in syllabic onset position. Sixteen of the segmental modifications occurred in syllabic nucleus position. Four of the segmental modifications occurred in syllabic coda position. The aggregate number of each segmental modification as a function of syllabic position within the corpora is listed below in Table 7.3.

Table 7.3. The frequency of phonetic segment modifications in three syllabic positions

	Obs.	Exp.	R	SR	*p*
Syllable Onset	15	11.666	3.333	0.975	= .329
Syllable Nucleus	16	11.666	4.333	1.268	= .204
Syllable Coda	4	11.666	-7.666	-2.24*	= .025

Note. Obs. = observed frequency; Exp. = expected frequency; R = residual; SR = standardized residual.

In order to assess whether the set of frequencies in Table 7.3. are different from a set of random frequencies to a statistically significant degree, the data was subjected to a one-way χ^2 test. The one-way chi-square test revealed a statistically significant difference between the set of actual frequencies and the expected set of frequencies if the frequencies were statistically random, χ^2 (2, N = 35) = 9.09, $p = 0.022$. Accordingly, the syllabic location at which phonetic segment modification is conducted is highly unlikely to be random (i.e., the null hypothesis can be rejected).

In order to determine specifically which syllabic position frequently hosts phonetic segment modifications, standardized residuals (SRs) were calculated for each syllabic position as post-hoc tests. A SR above 1.96 indicates a frequency of use that is statistically significant. A SR below -1.96 indicates a frequency of use that is so rare that it is also statistically significant. A SR between 1.96 and -1.96 indicates a statistically random frequency (Field, 2018, p. 857). The SR for phonetic segment modifications in syllable onset position is 0.189, which is not statistically significant. This means that the actual frequency with which phonetic segment modifications were conducted in syllable onsets and a random frequency are similar. It is accordingly not possible to claim that phonetic segment modification in syllable onset position was either frequent or infrequent. The SR for phonetic segment modification in syllable nucleus position is 1.268, which is not statistically significant. Thus, it is not possible to claim that phonetic segment modification in syllable nucleus position was either frequent or infrequent. The SR for phonetic segment modification in syllable coda position is -2.24, which is statistically significant ($p = .025$) in the sense that phonetic segment modification in syllable codas is rare.

In total, the evidence supports the idea that certain phonetic segment modifications occur more frequently in some syllabic positions than others. This is because phonetic segment insertion occurs in syllable coda position to a statistically *frequent* degree while phonetic segment modification occurs in syllable coda position to a statistically *infrequent* degree. This is evidence for a complementary distribution of phonetic segment adjustments: phonetic segment insertion tends to occur in syllable coda position; phonetic segment modification does not. This in turn suggests that phonetic segment elision in syllable coda position is oriented to as a serious problem within the corpus, and thus the ELF users in the corpus inserted phonetic segments to repair the elision. However, phonetic segment variation in syllable coda position was not nearly as serious a problem, and thus phonetic segment modification does not occur there very often. This result also supports functional load theory if phoneme elision is automatically considered to carry a high functional load. In sum, the weight of the evidence suggests that certain types of phonetic variation are more problematic in some syllable positions than in others: phonetic elision in syllable coda position—but not syllable onset position—was harmful to the maintenance of mutual intelligibility; phonetic variation in syllable coda position was not nearly as much of a problem for the ELF users.

7.4. Phonetic Segment Adjustments and Functional Load Theory

This section will assess the predictions of functional load theory vis-à-vis the aggregate phonetic segment adjustments within the corpora gathered for this study. As stated in Section 7.3.1, fifty-eight phonetic segment adjustments appear in the two corpora gathered for this study. If functional load theory is be able to predict many if not most phonetic segment adjustments within the two corpora, then the theory is a valid explanation for phonetic segment adjustments within ELF interactions. But if functional load theory is unable to predict many of the phonetic segment adjustments, then the theory cannot serve as an explanation for phonetic praxis within ELF interactions.

As stated in Section 2.2.3, functional load theory allows the analyst to make falsifiable predictions concerning the potential intelligibility of phonetic stimuli within ELF interactions, but the theory cannot be applied without some modifications[53]. As demonstrated in Section 7.3.1, phonetic segment adjustments can be divided into four types: resegmentation, modification, insertion, and deletion. Although functional load theory can be directly applied to an assessment of phonetic segment modifications, the theory has much less to say about resegmentation, insertion, and deletion. As such, the theory must be amended to include predictions concerning phoneme elision, which is oriented to as a trouble source within segmental repair sequences that include phonetic segment insertion, and phoneme epenthesis, which is oriented to as a trouble source within segmental repair sequences that include phonetic segment deletion. In order to overcome this void within functional load theory, the lack of a requisite phoneme or the presence of an extraneous phoneme is automatically considered a high functional load contrast for the purposes of the following analysis. With these modifications, functional load theory specifically predicts:

1) Changes to high functional load phoneme contrasts will harm intelligibility more than changes to low functional load phoneme contrasts.
2) The lack of requisite phonemes (elision) and the presence of extraneous phonemes (epenthesis) will harm intelligibility to the same extent that changes to high functional load phoneme contrasts do.

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[53] One of the biggest problems in applying functional load theory to the data in these two corpora is that functional load theory is a theory of phonemic oppositions (Catford, 1988; Gilner & Morales, 2010), not a theory of phonetic oppositions. The data within the two corpora gathered for this study have been transcribed according to narrow phonetic transcription conventions from the IPA. Of course, phonemes are psychological units, not necessarily acoustic or articulatory units, and as such it is very difficult to ascertain whether the interactants are orienting to phones and phonemes from an emic perspective. This section assumes that phonemic oppositions are in play when the interactants orient to phones as necessitating segmental repair.

Accordingly, this section will assess the extent to which these two functional load theory predictions actually predict the phonetic segment adjustments that occurred within the two corpora gathered for this study.

7.4.1. Determining High and Low Functional Load Contrasts

Functional Load Theory depends on a fundamental dichotomy between high functional load phoneme contrasts and low functional load phoneme contrasts. Functional load theory predicts that changes to high functional load phoneme contrasts will heavily attenuate mutual intelligibility while changes to low functional load phoneme contrasts will hardly affect mutual intelligibility at all (Munro & Derwing, 2006; Sewell, 2017). As such, the decision to assign a phoneme contrast to the high functional load category or the low functional load category is critical to the entire endeavor of assessing this theory.

Many criteria have been offered for the division of a phoneme contrast into the high functional load phoneme contrast category and the low functional load contrast category. Most theorists agree that the absolute number of phoneme contrasts should heavily factor into such a decision (see e.g., King, 1967; Brown, 1988). Other theorists contend that factors such as the frequency with which an opposition appears should also factor into the decision (see e.g., Surendran & Niyogi, 2006; Rischel, 2007;). Still others argue that the frequency of vocabulary in the ambient language should factor into the dichotomy (see e.g., Stokes & Surendran, 2005; Gilner & Morales, 2010) and the syllabic position of the contrast (see e.g., Catford, 1987, 1988) should be factors. As one can see, many potential factors can reasonably be said to affect whether a phonemic contrast is considered a high functional load contrast or a low functional load contrast.

As the decision to assign the boundary between high and low functional load contrasts is another doctoral project in and of itself, this study will adopt the following dividing line: Catford's (1988) list of functional load contrasts (pp. 8-9). Furthermore, the dividing line between high functional load contrasts and low functional load contrasts is arbitrarily defined as the fiftieth percentile. All functional load contrasts equal to or higher than Catford's (1988) fifty percent are considered high functional load contrasts; all functional load contrasts lower than Catford's (1988) fifty percent are considered low functional load contrasts. Of course, this decision to dichotomize Catford's (1988) functional load contrasts into two categories obfuscates the fact that functional load is a continuous phenomenon, not a dichotomous phenomenon. This decision does, however, allow the theory to be tested through non-parametric statistical tests, as will be done in the next section.

7.4.2. Phonetic Segment Adjustments and Functional Load Oppositions

Phonetic segment adjustments reveal from an emic perspective which phonetic oppositions the interactants orient to as consequential to the maintenance of mutual intelligibility (Brouwer, 2004; Matsumoto, 2011; O'Neal, forthcoming). Thus, these phonetic segment adjustments within segmental repair sequences can reveal the functional load of the phonetic oppositions. These phonetic oppositions can be quantified to assess whether they match the predictions of functional load theory. Specifically, functional load theory predicts that most, if not all, of the segmental repair sequences within the two corpora should be phonetic segment adjustments of high functional load phonemes (i.e., operationalized as phoneme contrasts above the fiftieth percentile in Catford, 1988, pp. 8-9). Inversely, functional load theory also predicts that most, if not all, of the segmental repair sequences should not be phonetic segment adjustments of low functional load phonemes (i.e., operationalized as phoneme contrasts under the fiftieth percentile in Catford, 1988, pp. 8-9).

However, functional load theorists did not develop the theory to apply to interactional contingencies, and as such, a discussion of how phonetic segment adjustments will be quantified to test functional load theory's predictions is warranted at this point. In the following example, Xiang and Takeshi conduct segmental repair on the word "chocolate", and the phonetic segment adjustments within the sequence are a combination of low and high functional load contrasts.

Example 7.8. Phonetic segment adjustments and high/low functional load contrasts

1	Xiang	I didn know: eh.
2		(0.5)
3		>the words like< engineer:.
4		(0.9)

5		eh- is.
6		(0.5)
7		is french word.
8		(1.9)
9		uh:.
10		(0.2)
11		I learned the first french words is:
12		(0.3)
13		.hhh [ɕo.kɻə].
14		(0.5)
15	Takeshi	[ˈɕɯ.kɾə]?
16		(0.1)
17	Xiang	[t͡ɕo.kɻəts].
18		(0.3)
19	Takeshi	↑ah. {yes yes.}
20	Xiang	{hm: : : : }

In line 15, Takeshi orients to [ɕo.kɻə] as unintelligible, and Xiang adjusts her pronunciation to [t͡ɕo.kɻəts], which restores mutual intelligibility. Because Xiang repairs her pronunciation from [ɕo.kɻə] to [t͡ɕo.kɻəts], there are three phonetic oppositions within this example that the interactants orient to as consequential to the maintenance of mutual intelligibility: syllable onset consonant modification [ɕ] → [t͡ɕ], syllable coda consonant insertion: Ø → [t], syllable coda consonant insertion: Ø → [s]. According to Catford's (1988) classifications, [ɕ] → [t͡ɕ], which is being considered as an opposition between phonemic /ʃ/ and /tʃ/, is considered a low functional load contrast. The other two oppositions are considered high functional load contrasts according to the operationalization for functional load that is adopted by this thesis for the purpose of quantifying functional load oppositions for the analysis below.

In total, fifty-eight phonetic segment adjustments appear in the two corpora, but only fifty-six are subjected to the following analysis. The two resegmentation phonetic adjustments are excluded from the analysis because Functional Load Theory makes no predictions concerning phonotactics. Therefore, of the fifty-six phonetic segment adjustments that are subjected to the following analysis, thirty-five are modifications, six are deletions, and fifteen are insertions. The six phonetic segment deletions and the fifteen phonetic segment insertions are automatically considered high functional load contrasts according to the operationalization of functional load theory in this thesis. Phonetic segment modifications, on the other hand, can be either high functional load contrasts or low functional load contrasts according to Catford's (1988) criteria. According to the operationalization of high and low functional load in this thesis, thirty-seven of the phonetic segment adjustments are classified as high functional load contrasts. Nineteen of the phonetic segment adjustments are classified as low functional load contrasts. The aggregate number of each kind of sequence within the corpus is listed below in Table 7.4.

Table 7.4. Frequency of High and Low Functional Load Contrasts in Phonetic Segment Adjustments

	Obs.	Exp.	R	SR	*p*
High Functional Load Contrasts	37	28	9	1.701	.088
Low Functional Load Contrasts	19	28	-9	-1.701	.088

Note. Obs. = observed frequency; Exp. = expected frequency; R = residual; SR = standardized residual;

In order to assess whether the set of frequencies in Table 7.4. are different from a set of random frequencies to a statistically significant degree, the data was subjected to a one-way χ^2 test. The one-way chi-square test did reveal a statistically significant difference between the set of actual frequencies and the expected set of frequencies if the frequencies were statistically random, χ^2 (1, N = 56) = 5.786, p = 0.016. Accordingly, the frequency of high and low functional load contrasts is highly unlikely to be random (i.e., the null hypothesis can be rejected).

In order to determine specifically how frequent each functional load contrast is within the corpora, standardized residuals (SRs) were calculated as post-hoc tests. A SR above 1.96 indicates a frequency of use that is statistically significant. A SR below -1.96 indicates a frequency of use that is so rare that it is also statistically significant. A SR between 1.96 and

-1.96 indicates a statistically random frequency (Field, 2018, p. 857). Neither the SR for high functional load contrasts nor the SR low functional load contrasts are statistically significant. In combination with the χ^2 test results, this means that although the distribution of high and low functional load contrasts within segmental repair sequences cannot be considered random (i.e., there are more high functional load contrasts within the phonetic segment adjustments than low functional load contrasts), the difference in the frequencies is not different enough from a statistically random distribution of these two contrasts. In total, it seems that functional load theory, at least the way that it was operationalized in this thesis, is not a good explanation for the phonetic praxis of segmental repair sequences within the two corpora gathered for this study.

Having examined the predictions of functional load theory vis-à-vis the segmental repair sequences and having found it lacking in explanatory power, I will now conclude this chapter.

7.5. Summary

In this chapter, I have presented arguments for a four-way classification of phonetic segment adjustments, and statistical evidence that the four types of phonetic segment adjustments do not occur with equal frequency. Section 7.2 examined the types of phonetic segment adjustments that speakers can conduct on pronunciations during segmental repair sequences and the syllabic positions at which the phonetic segment adjustments can be conducted. This section argued that phonetic segment adjustments can be classified into resegmentation, modification, deletion, and insertion adjustments. Section 7.3 explored the frequencies of the four types of phonetic segment adjustments as well as the syllabic position in which they occur in the corpora. This section presented statistical evidence that the frequencies with which the four adjustments are used are not equal, and thus argued that one kind of phonetic segment adjustment was more consequential to the progression of the ELF interactions in these corpora. That is, phonetic segment modification was the most consequential phonetic means with which to maintain mutual intelligibility among the speakers in the corpora. Furthermore, this section was able to provide evidence for the hypothesis that phonetic segment adjustment and syllabic position have some kind of relationship: insertion is frequent in syllable coda position; modification is not. Section 7.4 assessed the extent to which functional load theory could predict phonetic segment adjustments within the segmental repair sequences in the two corpora gathered for this study. Although most of the phonetic segment adjustments represent high functional load contrasts as the theory predicts, the frequency of high to low functional load contrasts was not great enough to qualify as statistically significant. Accordingly, functional load theory does not seem to predict which aspects of phonetics ELF users will orient to as consequential to the maintenance of interactional intelligibility.

Having scrutinized the relationship between phonetic segment adjustment and its syllabic position and having continually claimed that mutually intelligible pronunciation necessitates both segmental repair sequences and phonetic segment adjustments, I will now describe an experiment that assessed the relationship between segmental repair and the development of mutual intelligibility over time.

Chapter 8
Interaction and Intelligibility

8.1. Introduction

This chapter reexamines one of the oldest theories in SLA from an ELF perspective: the *interaction hypothesis*. Long's (1996) interaction hypothesis states that adult SLA can be facilitated through conversational interaction with NESs because such interactions provide many opportunities to notice both incorrect linguistic forms and correct linguistic forms when interactants encounter communication breakdowns. During the collaboration to overcome such communication breakdowns, interactants first notice which linguistic forms are not successful, and then the interactants negotiate a more successful linguistic form. In a word, the interaction hypothesis states that conversational interaction provides both negative and positive evidence as to the efficacy of linguistic forms, which helps learners develop second language abilities (Long, 1996; Gass & Mackey, 2015).

Although a host of SLA research largely supports the predictions of Long's (1996) interaction hypothesis (see e.g., Gass & Varonis, 1994; Mackey, 1999; McDonough, 2006; Goo & Mackey, 2013; Shintani, Li & Ellis, 2013; Saito & Akiyama, 2017; Loewen & Isbell, 2017), this does not mean that the interaction hypothesis does not warrant a critical reexamination. This is for two main reasons. First, the interaction hypothesis assumes that, or is operationalized in such a way that, interaction with NESs is a prerequisite for the development of language abilities (e.g., Gass & Varonis, 1994; Mackey, 1999; Gass & Mackey, 2015; Saito & Akiyama, 2017). However, reasons abound to doubt that interaction with NESs is the only way to gain the benefits derived from the positive and negative evidence that is provided through negotiations designed to overcome miscommunications. This is because ELF users can also provide positive and negative evidence as to the efficacy of linguistic forms, and this efficacy does not even need to be equated to NES linguistic forms either (see e.g., Kaur, 2010, 2012; Widdowson, 2012; Pitzl, 2016; Iino & Murata, 2016). Second, even though experiments have been used to demonstrate that the predictions of the interaction hypothesis can explain the development of syntax (see e.g., Mackey, 1999), vocabulary (see e.g., Ellis & Sheen, 2006), and even the comprehensibility (see Section

2.2.1.1) of pronunciation (see e.g., Saito & Akiyama, 2017), no research to date has yet explored the relationship between the predictions of the interaction hypothesis and the intelligibility of pronunciation. Accordingly, this chapter intends to test the predictions of the interaction hypothesis on the intelligibility of speech within ELF interactions under experimental conditions.

In the following sections, I will first introduce the original formulation of the interaction hypothesis, the cognitivist-SLA research that claims to have validated it, and the criticisms that could be levelled against it from an ELF perspective (Section 8.2). Then I will introduce the research questions that the experiment will attempt to answer, as well as the five hypotheses that will be tested (Section 8.3). Next, I will describe the experiment used to test the hypotheses and delineate the procedures through which participants completed the experimental tasks (Section 8.4). After that, I will report the experimental results (Section 8.5), which will include statistical analyses (Section 8.5.1) and conversation analytic analyses of select interactions from the experimental trials (Section 8.5.2). After that, I will discuss whether the experimental results support the five hypotheses, and evaluate whether the interaction hypothesis can be applied to ELF research (Section 8.6). The last section will summarize the findings of the entire chapter (Section 8.7).

8.2. The Interaction Hypothesis

Long (1981, 1983) hypothesizes that adult SLA can be facilitated through conversational interaction with other NESs because such interactions provide many opportunities to notice so-called incorrect and correct linguistic forms when NES-NNES dyads encounter communication breakdowns. Long (1996) claims that during the collaboration to overcome such communication breakdowns, interactants first notice which linguistic forms are not successful, which yields negative feedback that an unsuccessful linguistic form is both ineffective and not correct, and then the interactants negotiate a more successful linguistic form, which yields positive feedback that the successful linguistic form is both effective and correct. That is, Long (1996) claims that both negative and positive evidence synergistically combine to scaffold learning through explicit signals of what to do and what not to do, which helps NNESs progress along the interlanguage continuum and better approximate NES forms (Selinker, 1972; Long, 1996).

Long's (1981, 1983) original formulation of the interaction hypothesis remained untested until the seminal Gass & Varonis (1994) study, which is the first experimental SLA study to directly test the predictions of the interaction hypothesis. Gass & Varonis (1994) used data gathered from an information-gap task among sixteen NES-NNES dyads in order to assess the relationship between interaction and "communicative success", which was operationalized as placing an object on a board at the location described by one's partner. Half of the NES-NNES dyads were allowed to interact (i.e., ask for clarification, repeat themselves, etc.) and half of the dyads were not allowed to interact. The Gass & Varonis (1994) study is a seminal study in SLA for two reasons: first, it created a way to experimentally control for the phenomenon of "interaction", which allows for it to be tested through the scientific method; second, it tested and validated the predictions of the interaction hypothesis in the sense that the NES-NNES dyads who were allowed to interact during the task were much more successful at the task than the NES-NNES dyads who were not allowed to interact.

Numerous follow up studies, many of which fully or partially replicated Gass & Varonis's (1994) experimental procedure, further tested and validated the predictions of the interaction hypothesis. Polio & Gass (1998) replicated a portion of the Gass & Varonis (1994) experiment, which demonstrated the reliability of the original experiment and further validated the predictions of the interaction hypothesis. Both Mackey (1999) and Mackey & Philp (1998) experimentally investigated the relationship among interaction, recasts, and question syntax formation. Both studies yielded positive and significant results, and thus, Mackey & Philp (1998) concluded, that "there does appear to be evidence for a significant relationship between [interaction and] development, as measured by question production and exposure to recasts" (pp. 347-348, brackets added). Saito & Akiyama (2017) directly tested the relationship between interaction and the comprehensibility of pronunciation in a longitudinal study, and the experiment garnered positive and significant results for several linguistic attributes, not just pronunciation. Thus, in the aggregate, these experiments all provide evidence from an experimental point of view to support the interaction hypothesis.

However, the research that validates the predictions of the interaction hypothesis is not without problems. The first flaw with the interaction hypothesis is an ideological one that permeates a lot of SLA research: all of the research previously cited is premised on the idea that interaction between NESs and NNESs are the catalysts for the positive and negative feedback for the efficacy and correctness of linguistic forms (see e.g., Gass & Varonis, 1994; Mackey, 1999; Saito & Akiyama, 2017). However, no one has bothered to check whether interaction among NESs is actually *sine qua non* for linguistic improvement, however defined; it is often just assumed and taken for granted (Oda, 1999, 2017; Cook, 2016; Toh, 2016; D'Angelo, 2018). The second problem with the research up to now is that only a few aspects of the relationship between interaction and language development have been assessed. Although the relationship between interaction and syntax has been extensively studied (see e.g., Mackey, 1999; Mackey & Philp, 1998; McDonough, 2006; McDonough & Kim, 2009), research on the relationship between interaction and aspects of pronunciation is much rarer. Even when this relationship is assessed, second language pronunciation development is often operationalized as approximation to NESs pronunciation norms (see e.g., Saito & Lyster, 2012; Saito & Akiyama, 2017; Loewen & Isbell, 2017). But this operationalization makes no distinction between intelligible pronunciation, which is required for an interaction to continue, and sufficient pronunciation, which is just what one interactant thinks the pronunciation should be regardless of its intelligibility or its interactional effectiveness (O'Neal & Matsumoto, forthcoming). This is a problem for research that assesses the relationship between interaction and pronunciation because the experimental designs do not control for sufficient pronunciation, and thus the experiments confound sufficient pronunciation with intelligible pronunciation, and therefore the relationship between experimental results and intelligible pronunciation is less than clear (Horgues & Scheuer, 2014; O'Neal & Matsumoto, forthcoming). Accordingly, the claims of the research that assessed the relationship between interaction and pronunciation should be approached with some doubt.

In spite of the limitations of previous research on the interaction hypothesis, to date no research has claimed to falsify the predictions that are derived from it, and indeed all studies have claimed to support it to varying degrees. Indeed, the interaction hypothesis has a lot of intuitive appeal (i.e., interaction develops language abilities), and if it can be accommodated to ELF phenomena, then it can be used in ELF research as well. However, as yet, no research has assessed the relationship between interaction and intelligibility in either SLA or ELF research, and thus certain aspects of the efficacy of the predictions of the interaction hypothesis are still unknown.

8.3. Research Question & Hypotheses

This experiment first joins experiment participants into ELF dyads, and then places the ELF dyads into one of three conditions: 1) an unlimited interaction condition, within which the ELF dyads can interact in any way they like during the experimental trials; 2) a segmental repair condition, within which the ELF dyads can only use repeat repair strategies or segmental repair strategies during the experimental trials; 3) a script condition, within which the ELF dyads cannot interact during the experimental trials. Each ELF dyad will complete the same trial three times with about a week delay between the trials. Under these experimental conditions, this study will attempt to answer the following research question: What is the effect of interaction on the intelligibility of pronunciation among ELF dyads? The following hypotheses were formulated in light of the research question:

H_1: The ELF dyads in the unlimited interaction condition will become more intelligible to each other across the three trials.

H_2: The ELF dyads in the segmental repair condition will become more intelligible to each other across the three trials.

H_3: The ELF dyads in the script condition will not become more intelligible to each other across the three trials.

H_4: The ELF dyads in the unlimited interaction condition will be as intelligible as the ELF dyads in the segmental repair condition at the end of the third trial.

H_5: The ELF dyads in the segmental repair condition will be more intelligible than the ELF dyads in the script condition at the end of the third trial.

8.4. Experiment

In this section, I will describe the experiment that was designed to assess the five hypotheses. First, I will introduce the participants in the experiment and describe how they were recruited (Section 8.4.1). Then, I will describe the experimental design (Section 8.4.2). Last, I will describe how the participants were prepared for the experiment and how the participants performed the three trials of the experiment (Section 8.4.3).

8.4.1. Participants

The participants in this study (N = 90) ranged in age from 18 to 25 with an average age of 20.32 years (SD = 1.89). They had begun English study at an average of 11.5 years of age (SD = 1.8 years). The participants were recruited through fliers (see Appendix C), which were either posted at various locations across the campus of a large public Japanese university. The participants are all from outer circle (N = 1) or expanding circle countries (N = 89): Japanese (N = 45), Chinese (N = 34), Korean (N = 5), French (N = 1), Russian (N = 2), German (N =1), Sri Lanka (N = 1), Nigerian (N = 1), and Lithuanian (N = 1)[54]. A majority of the participants were female (female N = 67; male N = 23). All participants reported measures of English proficiency, but some of the measures are difficult to compare to each other (i.e., many Japanese students reported TOEFL and Eiken English test scores; many Chinese students reported CET English test scores, etc.). However, it is important to remember that none of the measures of English proficiency assess interactional competence at all, and thus variation in the measures of English proficiency on an English test do not necessarily equate in any valid way to the ability of the participants to perform the tasks in this experiment (Firth & Wagner, 2007). Many of the participants reported some experience

[54] These numbers do not include the data gathered from three ELF dyads (N = 6) whose experimental results were excluded from analysis. The data from one ELF dyad in the unlimited interaction condition was removed from analysis because they did not follow instructions during the experiment. The data from one ELF dyad in the limited interaction condition were also excluded because they did not follow instructions during the experiment. The data from another ELF dyad in the limited interaction condition was also excluded because of experimental error (the experimenter forgot to turn on the cameras during the first trial).

traveling or living away from their home countries (N = 57). All participants reported that they did not know their partners before the first trial of the experiment.

8.4.2. Experimental Design

The design of this experiment largely follows the experimental design of Gass & Varonis (1994), which utilized a picture differences task. This task was chosen because it is representative of interactive tasks used in language classes (e.g., Basturkmen, Loewen & Ellis, 2004) and L2 research (e.g., Gass & Varonis, 1994; Gass, Mackey & Ross-Feldman, 2005; Loewen & Isbell, 2017). However, the task is extensively modified so as to make the relationship between interaction and intelligibility assessable[55]. The experiment utilized minimal pair word cards and minimal pair word boxes rather than pictures. The segmental differences in the minimal pair word cards and in the word boxes were selected from lists of segmental features that Japanese speakers of English have trouble articulating according to SLA, WE, and ELF literature (e.g., Jenkins, 2000; Tsuzuki & Nakamura, 2009; Oda & Tajima, 2010; Saito, 2011; Saito & Lyster, 2012; Orikasa, 2016). The specific minimal pairs that were used for the word cards and boxes were taken from publicly available lists of minimal pairs (Nilsen & Nilsen, 2010).

During the experiment, one member of the ELF dyad stands in front of the Instructor 1 whiteboard (see Figure 8.1 below). On the whiteboard, sixteen word boxes are drawn in four

[55] ELF research does not often involve experimentation (but see Osmik, 2009 and Kennedy, 2017 for exceptions). ELF research is heavily biased toward corpus linguistic and conversation analytic methodology (see e.g., Seidlhofer, 2004; Mauranen, 2012; Matsumoto, 2011; Cogo & Dewey, 2012; O'Neal, 2015a; Kappa, 2016). Perhaps these researchers eschew experimental methodology because it seems a less natural means with which to assess linguistic phenomena. However, as Kennedy (2017) rightly explains, "although such communication elicited by [experimental] researchers is not naturalistic, findings from naturalistic ELF interaction are not inevitably applicable to the majority of naturalistic ELF interaction either…Results from naturalistic ELF interaction in a particular communicative context may therefore be substantially different from findings from a different communicative context" (p. 8). This thesis accepts these arguments. Experimental methodology has something to add to our understanding of ELF phenomena, and a fixation on only one methodology to investigate ELF leads to only one perspective rather than many.

by four rows in the middle of the whiteboard. Each of the sixteen word boxes are labelled with a minimal pair title. Each of the four rows of word boxes contains some combination of a minimal pair. The top four word boxes are titled, from left to right, “clash-clash”, “clash-crash”, “crash-clash”, and “crash-crash”. The second row of word boxes are titled, from left to right, “glow-glow”, “glow-grow”, “grow-glow”, and “grow-grow”. The third row of word boxes are titled, from left to right, “collect-collect”, “collect-correct”, “correct-collect”, and “correct-correct”. The fourth row of word boxes are titled, from left to right, “load-load”, “load-road”, “road-load”, and “road-road”. The titles of the word boxes did not change across the three tasks of the experiment.

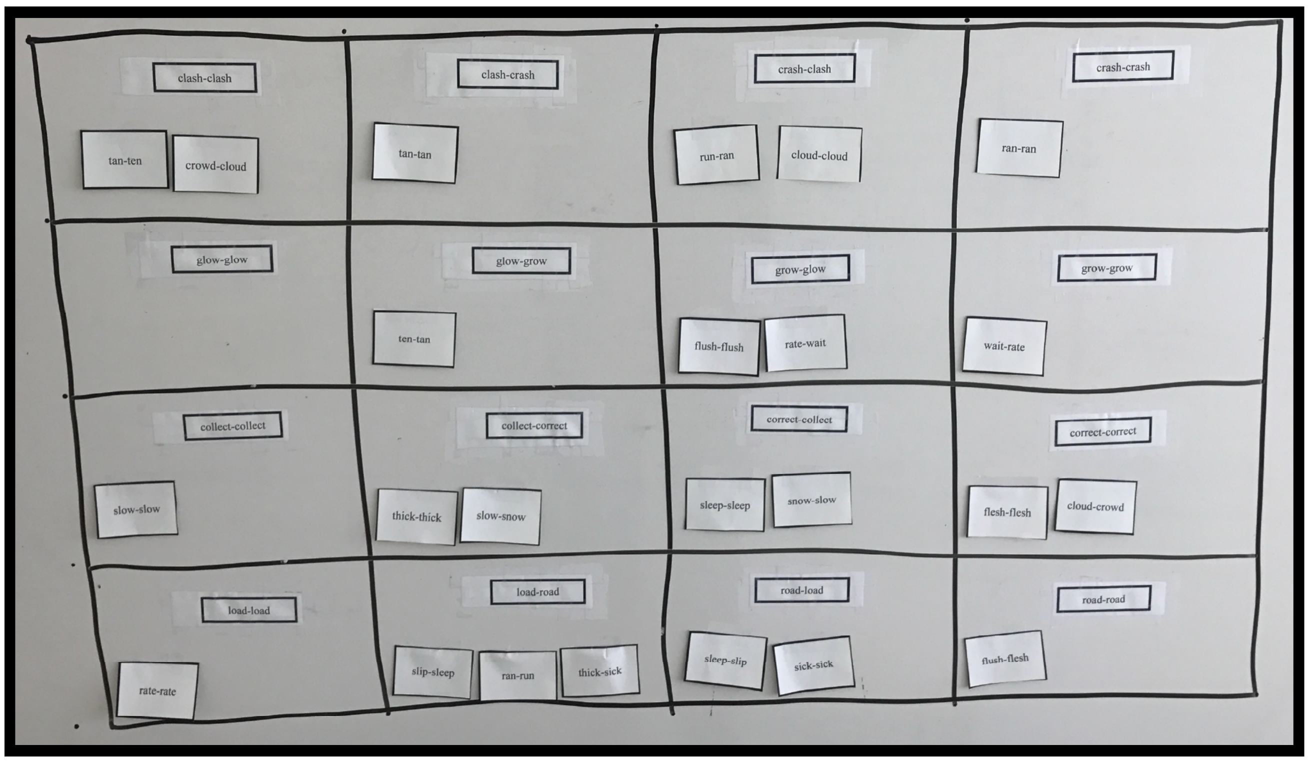

Figure 8.1. Instructor 1’s whiteboard (trial 1, task 1)

Twenty-four word cards from among thirty-two possible word cards were placed within the word boxes prior to each trial. The word cards also represent some combination of a minimal pair. The following thirty-two word cards were utilized in this experiment, although only twenty-four of these would be used in any one task: sleep-sleep, sleep-slip, slip-sleep, slip-slip, ten-ten, ten-tan, tan-ten, tan-tan, ran-ran, ran-run, run-ran, ran-ran, flesh-flesh, flesh-flush, flush-flesh, flush-flush, thick-thick, thick-sick, sick-thick, sick-sick, snow-

snow, snow-slow, slow-snow, slow-slow, cloud-cloud, cloud-crowd, crowd-cloud, crowd-crowd, wait-wait, wait-rate, rate-wait, rate-rate.

In each trial, twenty-four of these thirty-two word cards would be placed in the word boxes. Sometimes word boxes were left empty. Sometimes word boxes had only one word card within them. Sometimes word boxes had two or three word cards within them. The twenty-four word cards would be selected so that three of the four cards in a minimal pair set would always be present somewhere within the word boxes. The selection and arrangement of the word cards were different for each of the three trials, but all ELF dyads in trial one, two, and three were exposed to the same word card placements.

The other member of the ELF dyad stands in front of the Listener 1 whiteboard (see Figure 8.2. below). On the whiteboard, sixteen word boxes are draw in four by four rows in the middle of the whiteboard. However, no word cards are placed within the word boxes beforehand. All thirty-two word cards are placed to the upper left of the word boxes.

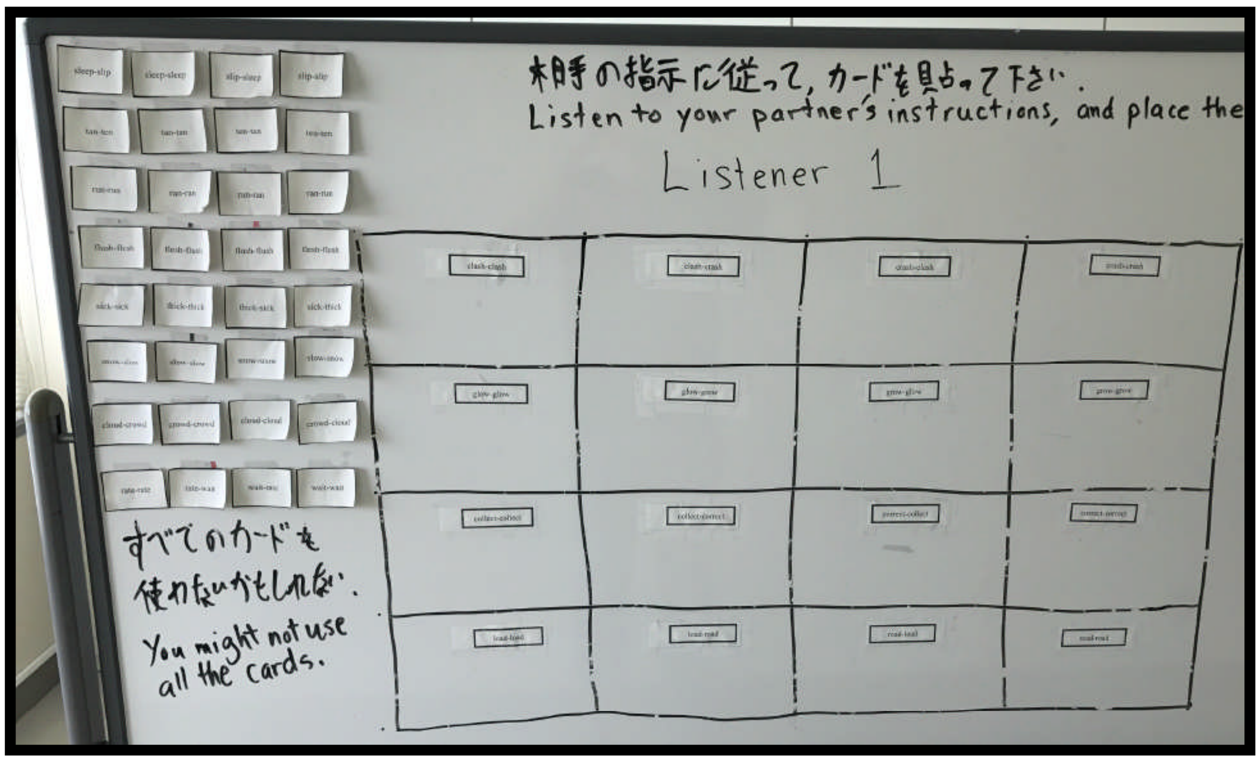

Figure 8.2. Listener 1's whiteboard (trial 1, task 1)

Even though only twenty-four word cards will be used during the experimental task, all thirty-two word cards are available for Listener 1 to use. This was done in order to reduce process of elimination effects, which could affect the validity of the experiment. Each task took approximately ten minutes to complete, with each trial taking about twenty minutes to finish.

8.4.3. Experimental Procedure

One Japanese participant was assigned to one non-Japanese participant to create a dyad (N = 45). Therefore, according to the definition of ELF under use in this thesis (see Section 3.2.5), each dyad is an ELF dyad (Osimk, 2009; Kennedy, 2017). The pairing of a Japanese participant to a non-Japanese participant was done by convenience (i.e., according to the times that the participants were available to do the experiment). However, each ELF dyad was randomly assigned to either the unlimited interaction condition, the segmental repair condition, or the script condition. Fifteen ELF dyads were assigned to the unlimited interaction condition (ELF dyad N = 15; Participant N = 30), fifteen ELF dyads were assigned to the segmental repair condition (ELF dyad N = 15; Participant N = 30), and fifteen ELF dyads were assigned to the script condition (ELF dyad N = 15; Participant N = 30).

Each trial of the experiment contained two tasks. Before the first trial of the experiment, all ELF dyads were first briefed on the basic nature of the experiment, and then asked to read and sign consent forms (see Appendix D). After the consent forms were read and signed, the participants were paid a small honorarium (1000 yen). What happened next depended on which of the three conditions the ELF dyad had been assigned.

8.4.3.1. Unlimited Interaction Condition

ELF dyads in the unlimited interaction condition were shown the speaker and listener sides of the pre-experiment practice whiteboard (see Figures 8.3. and 8.4. below). The pre-experiment practice whiteboard contains none of the word cards or word boxes that are used in the actual experiment, but is designed to familiarize the participants with the experimental task and thus reduce practice effects, which could threaten the validity of the experiment. First, the experimenter explained that one participant would explain the location of word cards to the participant on the other side of the whiteboard, and then the experimenter modelled word card location instructions to both participants. The experimenter instructed each participant to place two word cards on the listener side of the board. The experimenter checked to ensure that the participants were placing word cards within boxes on the listener side of the whiteboard, but the experimenter did not evaluate the placement of the cards.

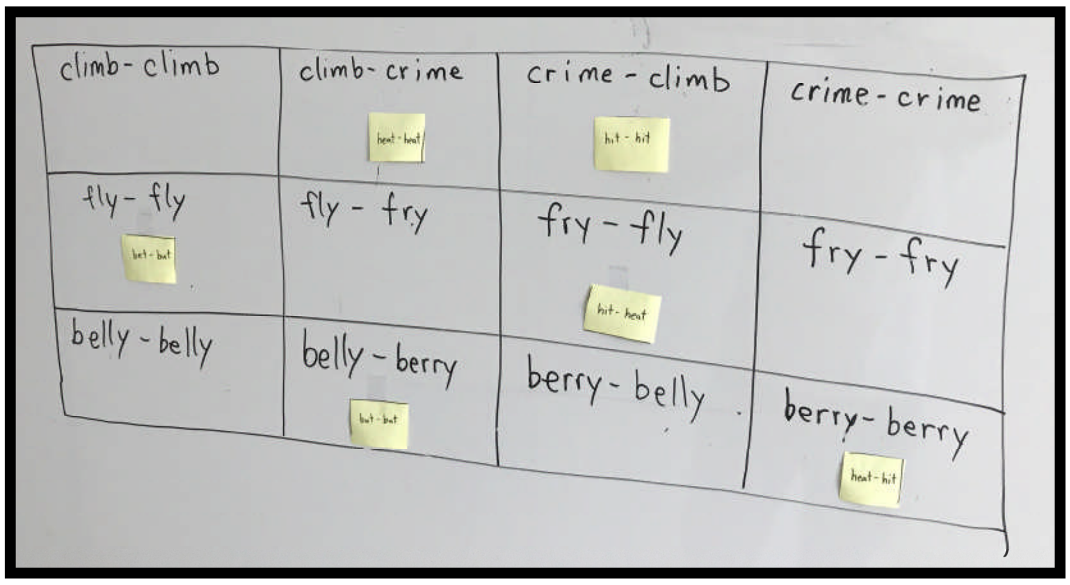

Figure 8.3. Instructor's side of the pre-experiment practice whiteboard

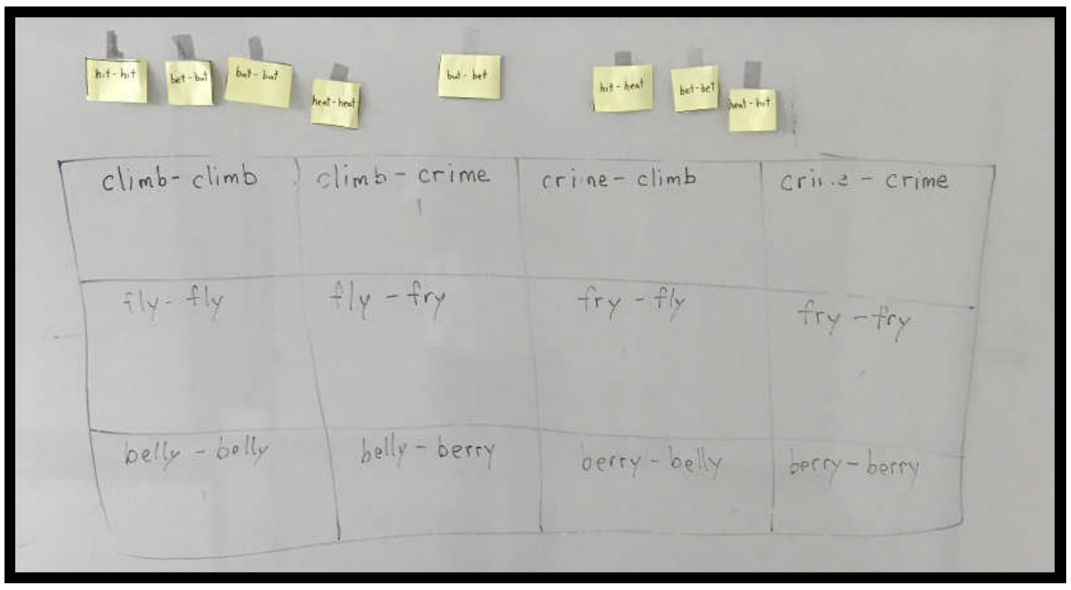

Figure 8.4. Listener's side of the pre-experiment practice whiteboard

Next, the experimenter and the two participants switched sides, the experimenter in front of the listener side of the board and the two participants in front of the instructor side of the board. The experimenter asked both participants to explain where two word cards were on the instructor side of the board. During this phase of the experimental instructions, the experimenter purposely modelled segmental repair, circumlocution repair, repetition repair, and definition repair.

Next the experimenter instructed one participant to stay on the instructor side of the whiteboard, and the other participant to move to the listener side of the whiteboard. The experimenter then asked the participant who was on the instructor side of the whiteboard to tell the participant who was on the listener side of the whiteboard the location of four word cards. The experimenter also told the ELF dyad that "if you don't understand your partner, it is okay to talk to each other until you do." The experimenter encouraged the dyad to interact during this stage (ask for clarification, change pronunciation, repeat statements, check for understanding, etc.). Once the instructor described the location of four word cards, the participants switched places, and the new instructor described the locations of four other word cards. The experimenter again encouraged the dyad to interact (ask for clarification, change pronunciation, repeat statements, check for understanding, etc.) during this stage.

After the ELF dyad had completed the unlimited interaction condition pre-experiment practice, the first task of the experiment began. First, the ELF dyad drew lots from a paper cup to determine the order of the instructor and the listener (see Figure 8.5. below). Accordingly, the order of the instructor and the listener in each of the two tasks in a trial is considered a random variable. The participant who drew the instructor lot would be instructor for the first task, and then the listener for the second task; the participant who drew the listener lot would be listener for the first task and instructor for the second task in the trial.

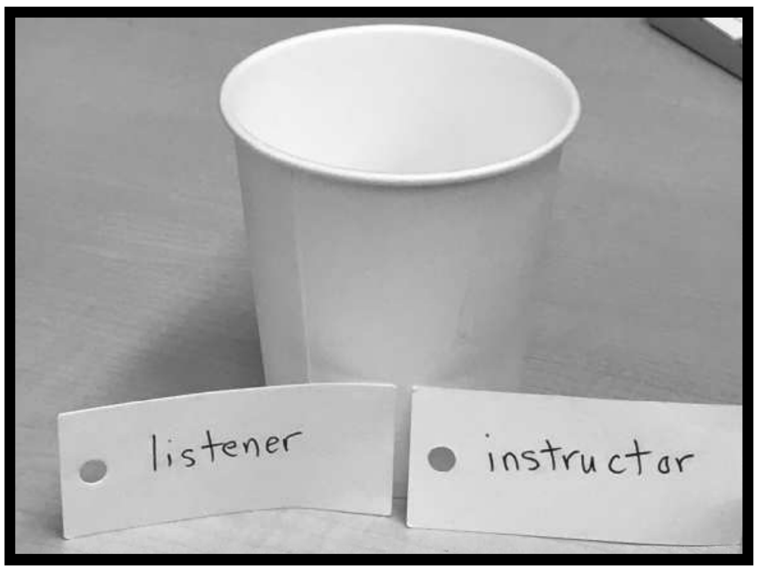

Figure 8.5. Instructor/Listener lots cup

Next, the ELF dyad was led to the experiment room, and the participant that was designated the instructor was directed to stand in front of the “instructor 1” whiteboard, and the listener was directed to stand in front of the “listener 1” whiteboard. After the participants stood at their respective positions, the experimenter turned on the four cameras to record the progression of the experiment. The four cameras were positioned so that the whiteboards and the faces of the participants were clearly visible. Next, the experimenter told the instructor to not move the word cards on the instructor whiteboard and to explain where the word cards are to his or her partner. After that, the experimenter moved to the listener side of the room, and told the listener to follow the instructor’s directives, and to place the word cards within the requisite word boxes. The listener was also told that some of the word boxes will not contain any word cards at all, some boxes will contain only one word card, some boxes will contain two word cards, and some boxes will contain three word cards. Furthermore, the listener was told that although he or she will place the majority of the word cards in word boxes, he or she would not use all of the word cards.

Last, the experimenter walked towards the door of the experiment room and repeated the following three instructions to both the instructor and the listener: 1) speak only in English; 2) do not show each other the word cards; 3) do not spell the words in order to disambiguate them, which prevents word spelling being used as a means of repair (O’Neal, 2014; Loewen & Isbell, 2017)[56]. After that, the experimenter told the participants to knock on the door of the experiment room after they had completed the first task of the trial, and then exited the room.

[56] During one of the pilot experiments, the subjects just spelled words out loud to disambiguate them. This strategy made the task too easy. The third instruction is designed to prevent this from happening in the experiment. Thus, it is fair to say that even the unlimited interaction condition is not truly unlimited, but the prohibition against spelling repair is the only significant constraint on the interaction within this condition.

Figure 8.6. Unlimited Interaction Condition Experiment Setup

After the participants completed the first task, the experimenter entered the room again and flipped the whiteboards around[57] so that the subject who was instructor 1 for the first task was now listener 2, and the participant who was listener 1 was now instructor 2 (see Figure 8.7. below).

[57] The whiteboard of listener 1 was always flipped first so that the subject who would be listener 2 would not see the placements of the word cards on instructor 2's whiteboard. The subject who was listener 1 would only see listener 2's whiteboard, which would not have word cards placed in word boxes yet, and the subject who was instructor 1 would only see listener 1's upside-down word card placements. Since Listener 1's word card placements had already occurred, this would not affect the validity of the experiment. Even if the subjects looked at the whiteboards, the flipping was fairly quick (approximately 15 seconds), so this is not considered a significant threat to the validity of the experiment.

Figure 8.7. Switching the whiteboard for the unlimited interaction condition

Next, the experimenter repeated the instructions to the new instructor and new listener, and then exited the room. The ELF dyad then completed the second task of the trial (see Figure 8.8. below).

Figure 8.8. Second Task for the unlimited interaction condition

After the participants completed the second task of a trial, the experimenter stopped the cameras, and then directed the participants to exit the experiment room. Next, the experimenter confirmed the time for the next experimental trial with the participants. Last, the experimenter went back to the experiment room and took pictures of the instructor and listener whiteboards to document the results of the experiment. Participants in the interaction condition were never informed as to how well they performed in any of the three trials of the experiment.

The procedure for the second and third trials was exactly the same. The second trials were conducted about ten days after the first trials (M = 10.4 days; SD = 5.51 days). The third trials were also conducted about ten days after the second trials (M = 9.8 days; SD = 6.3 days). The only difference among the first, second, and third trials, other than the time at which they were conducted, is that the word cards on the instructors' whiteboards were either different or in different word boxes; however, the twenty-four word cards on the instructors' whiteboards were always drawn from the same set of thirty-two minimal pair word cards.

However, the same ELF dyads performed the same task, which was not counterbalanced, three times, and so practice effects might mitigate the validity of this experiment because the participants might become better at the test rather than more intelligible (see e.g., Cohen, 2013). But I assume that test-retest gains were minimized in this study for the following reasons: first, task familiarity was reduced before the experiment during the pre-experiment practice session, and thus participants did not become substantially more familiar with the experimental procedure during the experiment; second, the ELF dyads did not significantly improve in the script condition, which suggests that just performing the same task three times does not automatically equate to better performance (see e.g., Saito & Hanzawa, 2017). Accordingly, lack of counterbalancing the three tasks is not seen as a threat to the validity of this experiment.

8.4.3.2. Segmental Repair Condition

Participants in the limited interaction condition were given slightly different instructions. As with the participants in the unlimited interaction condition, ELF dyads in the limited interaction condition were shown the speaker and listener sides of the pre-experiment practice whiteboard (see Figure 8.3. and Figure 8.4.). First, the experimenter instructed each participant to place two cards on the listener side of the board. The experimenter checked to ensure that the participants were placing cards within boxes on the listener side of the whiteboard, but the experimenter did not evaluate the placement of the cards. Next, the experimenter informed the participants that there were limits as to what could be said to each other during the experiment: 1) the participants could repeat the words within the word cards and word boxes as many times as he/she thought necessary for his/her partner to understand; 2) the participants could say "yes", "no", and "okay" to confirm or reject a partner's attempted pronunciations; 3) the participants could say "please repeat"; 4) the participants could say "shall I repeat it?" if he/she thought that his/her partner did not understand him/her. Accordingly, the interactions within this condition are limited: the only communication strategy that participants can use is segmental repair.

Next the experimenter instructed one participant to stay on the instructor side of the whiteboard, and the other participant to move to the listener side of the whiteboard. The experimenter then asked the participant who was on the instructor side to tell the participant who was on the listener side where four word cards are located while also obeying the limits imposed by the experiment. Once the instructor and the listener placed four word cards, the participants switched places, and the new instructor and listener placed four more word cards on the pre-experiment practice whiteboard.

After the ELF dyad had completed the limited interaction condition pre-experiment practice, the first task of the experimental trial began. First, the ELF dyad drew lots from a paper cup to determine the order of the instructor and the listener (see Figure 8.5.). Next, the ELF dyad was led to the experiment room, and the participant that was designated the instructor was directed to stand in front of the "instructor 1" whiteboard, and the listener was direct to stand in front of the "listener 1" whiteboard (see Figure 8.9. below). After the participants stood at their respective positions, the experimenter turned on the four cameras to record the progression of the experiment. Next, the experimenter told the instructor to not move the cards on the instructor whiteboard, and to tell the listener the locations of twenty-four word cards. The instructor was reminded of the four limitations of the experiment again. After that, the experimenter moved to the listener side of the room, and told the listener to follow the instructor's directives, and place the word cards within the word boxes. The listener was also told that some of the word boxes will not contain any word cards at all, that some word boxes will contain only one word card, that some word boxes will contain two word cards, and that some word boxes will contain three word cards. Furthermore, the listener was told that although he or she will place the majority of the word cards in the word boxes, he or she would not use all of the cards. The listener was also reminded of the four limitations of the experiment again.

Last, the experimenter walked towards the door of the experiment room and repeated the limitations of the experiment to the participants again. After that, the experimenter told the participants to knock on the door of the experiment room after they had completed the first task of the trial, and then exited the room so that the participants could complete the first task.

After the participants completed the first task of the trial, the experimenter entered the room again and flipped the whiteboards around so that the participant who was instructor 1 for the first task was now listener 2, and the participant who was listener 1 was now instructor 2. Next, the experimenter repeated the instructions to the new instructor and new listener, and then exited the room. The ELF dyad then completed the second task of the trial. After the participants completed the second task of the trial, the experimenter stopped the cameras, and then directed the participants to exit the experiment room. The experimenter confirmed the time for the next trial with the participants. Last, the experimenter went back to the experiment room and took pictures of the instructor and listener whiteboards to document the results of the experiment. Participants in the limited interaction condition were never informed as to how well they performed the tasks in the trials.

The procedure for the second and third trials was exactly the same. The second trials were conducted about seven days after the first trials (M = 7.3 days; SD = 6.32 days). The third trials were also conducted about seven days after the second trials (M = 7.5 days; SD = 8.9 days). The only difference among the first, second, and third trials, other than the time at which they were conducted, is that the word cards on the instructors' whiteboards were either different or in different word boxes; however, the twenty-four word cards on the instructors' whiteboards were always drawn from the same set of thirty-two minimal pair word cards.

8.4.3.3. Script Condition

Participants in the script condition were given very different instructions. As with the participants in the unlimited and limited conditions, ELF dyads in the script condition were shown the speaker and listener sides of the pre-experiment practice whiteboard (see Figure 8.3. and Figure 8.4.). First, the experimenter instructed each participant to place two cards on the listener side of the board. The experimenter checked to ensure that the participants were placing cards within boxes on the listener side of the whiteboard, but the experimenter did not evaluate the placement of the cards. Next, the experimenter and the two participants switched sides, the experimenter in front of the listener side of the whiteboard and the two participants in front of the instructor side of the whiteboard. The experimenter then asked both participants to explain where two cards were on the instructor side of the board.

Next the experimenter instructed one participant to stay on the instructor side of the whiteboard, and the other participant to move to the listener side of the whiteboard. The experimenter then asked the participant who was on the instructor side to read four prepared sentences one time each from a script to the participant who was on the listener side of the whiteboard to describe the location of four word cards. Once the instructor read the four sentences from the script and the listener placed four word cards in boxes, the participants switched places, and the new instructor read four prepared sentences one time each from a different script to the new listener to describe the location of four word cards.

After the ELF dyad had completed the script condition pre-experiment practice, the first task of the experimental trial began. First, the ELF dyad drew lots from a paper cup to determine the order of the instructor and the listener (see Figure 8.5.). Next, the ELF dyad was lead to the experiment room, and the participant that was designated the instructor was directed to stand in front of the "instructor 1" whiteboard, and the listener was directed to stand in front of the "listener 1" whiteboard (see Figure 8.12. below). After the participants stood at their respective positions, the experimenter turned on the four cameras to record the progression of the experiment. The four cameras were positioned so that the whiteboards and the faces of the participants were clearly visible. Next, the experimenter told the instructor to not move the cards on the instructor whiteboard, to read twenty-four prepared sentences one time each from a script, and to wait for the listener to say "okay" before proceeding to the next sentence. After that, the experimenter moved to the listener side of the room, and told the listener to follow the instructor's directives, and place the word cards within the word boxes. The listener was also told that some of the word boxes will not contain any word cards at all, that some word boxes will contain only one word card, that some word boxes will contain two word cards, and that some word boxes will contain three word cards. Furthermore, the listener was told that although he or she will place the majority of the word cards in the word boxes, he or she would not use all of the cards. The listener was also told to say "okay" one time after he or she placed a card so that the instructor knew to proceed to the next sentence.

Last, the experimenter walked towards the door of the experiment room and repeated the following two instructions to both the instructor and the listener: 1) speak only in English; and 2) do not show each other the word cards. After that, the experimenter told the participants to knock on the door of the experiment room after they had completed the first task of the trial, and then exited the room so that the participants could complete the first task. After the participants completed the first task of the trial, the experimenter entered the room again and flipped the whiteboards around so that the participant who was instructor 1 for the first task was now listener 2, and the participant who was listener 1 was now instructor 2. The experimenter repeated the instructions to the new instructor and new listener. Next, the experimenter repeated the instructions to the new instructor and new listener, and then exited the room. The ELF dyad then completed the second task of the trial.

After the participants completed the second task of the trial, the experimenter stopped the cameras, and then directed the participants to exit the experiment room. The experimenter confirmed the time for the next trial with the participants. Last, the experimenter went back to the experiment room and took pictures of the instructor and listener whiteboards to document the experiment. Participants in the script condition were never informed as to how well they performed the tasks in the trials.

The procedure for the second and third trials was exactly the same. The second trials were conducted about seven days after the first trials ($M = 6.5$ days; $SD = 5.88$ days). The third trials were also conducted about seven days after the second trials ($M = 6.5$ days; $SD = 6.5$ days). The only difference among the first, second, and third trials, other than the time at which they were conducted, is that the word cards on the instructors' whiteboards were either different or in different word boxes; however, the twenty-four word cards on the instructors' whiteboards were always drawn from the same set of thirty-two minimal pair word cards.

8.5. Results

The dependent variable is the number of word cards the listener places on the listener's whiteboard that match the instructor's word cards out of the twenty-four word cards in each task. However, assessing the intelligibility of just the instructor or the listener is impossible in this experiment because participants were allowed to interact. Any increase in intelligibility could be due to the speaker's pronunciation, the speaker's ability to adjust pronunciation, or the listener's ability to solicit more intelligible pronunciation. Therefore, this experiment assesses the intelligibility of the dyad, not the individual (Canagarajah, 2007; Matsumoto, 2011; O'Neal, forthcoming). The dyad's intelligibility is operationalized as the number of matching word card placements on the instructor's and the listener's whiteboards. Under the conditions of this experiment, a dyad could be assigned an intelligibility score from 0 (none of the word cards on the instructor's whiteboard and the listener's whiteboard are in the same word boxes in either task 1 or task 2) to 48 (all of the word cards on the listener's whiteboard are in the same word boxes as the word cards on the instructor's whiteboard in both task 1 and task 2). I take this to be a measure of both the dyad's mutual intelligibility and the dyad's ability to negotiate intelligibility.

8.5.1. Statistical Analyses

The intelligibility of the dyads in the unlimited interaction condition increased from trial 1 (M = 37.00; SD = 5.37) to trial 2 (M = 42.33; SD = 4.73), and then increased again from trial 2 to trial 3 (M = 44.07; SD = 2.78). The intelligibility of the dyads in the segmental repair condition increased from trial 1 (M = 24.07; SD = 12.73) to trial 2 (M = 31.87; SD = 12.58), but then decreased from trial 2 to trial 3 (M = 30.13; SD = 14.87). The intelligibility of the dyads in the script condition increased from trial 1 (M = 9.00; SD = 4.69) to trial 2 (M = 13.47; SD = 7.18), and then decreased from trial 2 to trial 3 (M = 13.40; SD = 9.34). These scores are reflected in Table 8.1. and Figure 8.9. below.

Table 8.1. Descriptive Statistics

	Condition	M	SD	Dyads N
Trial 1	Unlimited	37.00	5.37	15
	Segmental	24.07	12.73	15
	Scripts	9.00	4.69	15
	Total	23.36	14.20	45
Trial 2	Unlimited	42.33	4.73	15
	Segmental	31.87	12.58	15
	Scripts	13.47	7.18	15
	Total	29.22	14.81	45
Trial 3	Unlimited	44.07	2.78	15
	Segmental	30.13	14.87	15
	Scripts	13.40	9.34	15
	Total	29.20	16.16	45

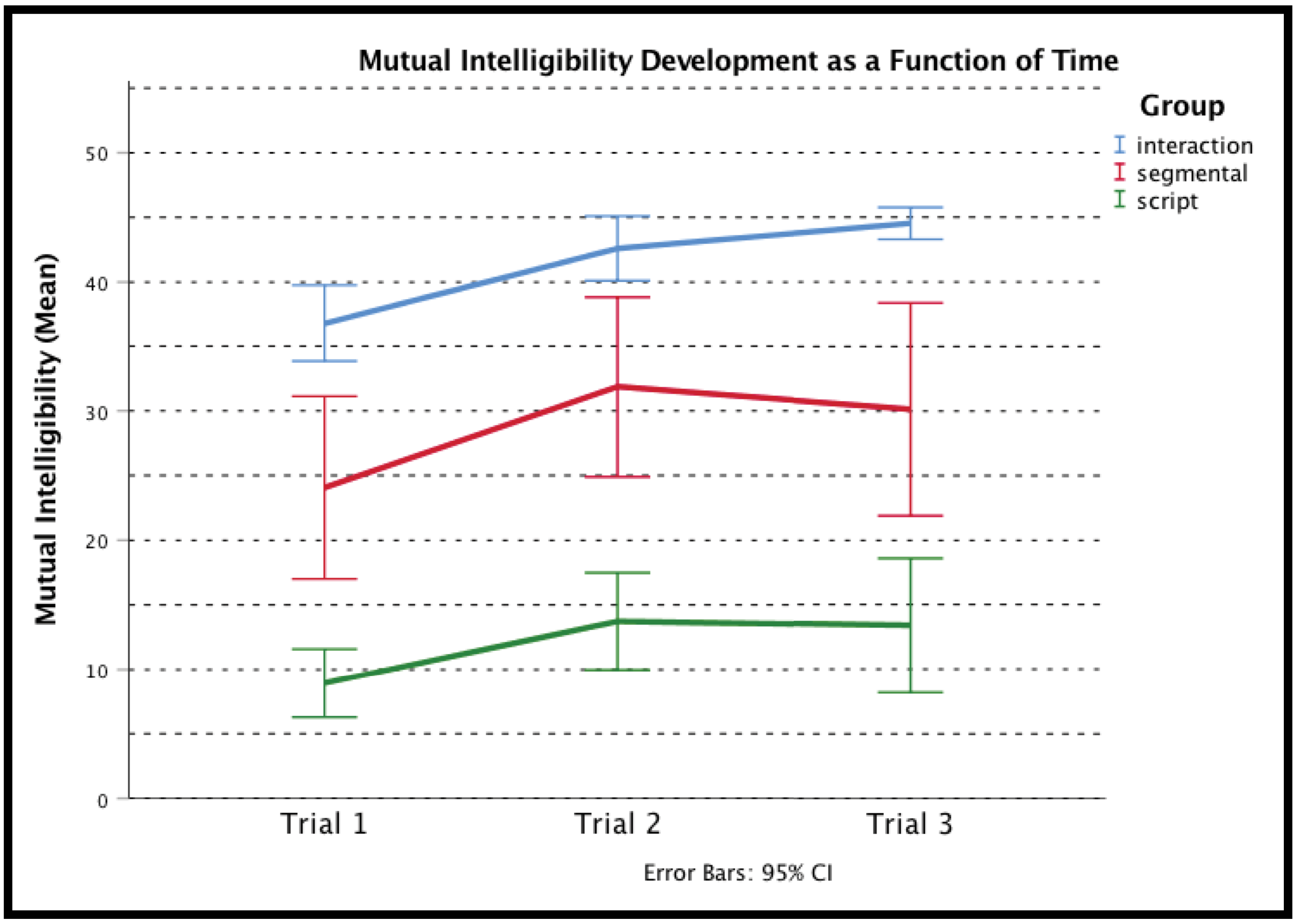

Figure 8.9. Plots of Mutual Intelligibility Development among the Three Conditions

The original intent of this experiment was to conduct a 3 (independent measures) x 3 (repeated measures) mixed design ANOVA in which alpha was set at .05 and condition (unlimited interaction, limited interaction, and scripts) is a between-subjects factor and time (trial 1, trial 2, trial 3) is a within-subjects factor. However, because the segmental repair condition results had a much higher variance than either the unlimited interaction or script conditions, the data had to be transformed to meet the assumption of homogeneity of variance. Unfortunately, no transformation that was available in SPSS v.25 could adjust the variances enough that the results of all three conditions met the assumption of homogeneity of variance.

Accordingly, the segmental repair condition results were analyzed twice. One 2 x 3 mixed design ANOVA in which condition (unlimited interaction and segmental repair) is a between-subjects factor and time (trial 1, trial 2, trial 3) is a within-subjects factor was conducted. Another 2 x 3 mixed design ANOVA in which condition (segmental repair and script) is a between-subjects factor and time (trial 1, trial 2, trial 3) is a within-subjects factor was also conducted. Because the same segmental repair data is being subjected to statistical tests twice, a Bonferroni adjustment was used on the alphas for both ANOVAs to account for the increase chance of a Type I error ($\alpha = .025$). Each analysis will be described below.

8.5.1.1. Unlimited Interaction vs. Segmental Repair

Normal procedures were used to assess whether the data to be used in the 2 x 3 mixed design ANOVA that compared the unlimited interaction condition data and segmental repair condition data met the assumptions of such a test. The independent random sampling assumption was fulfilled with random ELF dyad assignment to the two conditions. The Shapiro-Wilk test was used to determine if the data sets differed significantly from a normal distribution. Although no data set was perfectly normally distributed, no data set differed from a normal distribution to a significant degree, and thus the assumption of normal distribution has not been violated. The assumption of homogeneity of variance was violated because the variance in the segmental repair condition was more than twice that of the variance in the unlimited interaction. To account for the violation of the assumption of homogeneity of variance, a cube transformation was used on the data, after which it met the assumption of homogeneity of variance. Mauchly's test indicated that the assumption of homogeneity of covariance (sphericity) had also been violated, χ^2 (2, N = 30) = 13.293, $p = .001$. To account for the violation of the assumption of homogeneity of covariance, Greenhouse-Geisser is used to correct degrees of freedom for the repeated measure (time).

Initial statistical analyses were conducted through SPSS v.25. Post-hoc tests and effect size calculations were conducted through Microsoft excel. The 2 x 3 mixed design ANOVA yielded a significant main effect of time on mutual intelligibility, $F(1.44, 40.323) = 21.507$, $p < .0001$, as well as a significant main effect of condition on mutual intelligibility, $F(1, 28) = 10.824$, $p = .003$, but did not yield a significant two-way interaction, $F(1.44, 40.323) = 1.077$, $p = .331$. So as to maximize statistical power during the post-hoc tests without increasing the chance of a Type I error, four post-hoc pairwise comparisons were conducted: between the trial 1 scores and trial 3 scores within the same condition (two comparisons with equal variances assumed), between the trial 1 scores of each condition (one comparison with unequal variances assumed), and between the trial 3 scores of each condition (one comparison with unequal variances assumed). Accordingly, a Bonferroni adjustment has been applied to the α to account for the four post-hoc comparisons (Bonferroni adjusted α = .0125).

The first post-hoc test revealed a significant difference between the mutual intelligibility of the participants in the unlimited interaction condition at trial 1 and at trial 3, $t(14) = -5.24$, $p < .001$, $d = 1.35$. This demonstrates that the participants in the unlimited interaction condition became more mutually intelligible to each other over the course of the three trials. Furthermore, the effect-size is large[58], so it can be said that allowing participants to interact in any way they see fit over the course of three trials greatly increases their mutual intelligibility. However, the second post-hoc tests did not reveal a significant difference between the mutual intelligibility of the participants in the segmental repair condition at trial 1 and at trial 3, $t(14) = -2.35$, $p = .033$, $d = 0.61$. Although p is below the standard alpha level, it is not below the Bonferroni adjusted alpha level. Furthermore, the effect size can be considered small for a within groups difference. This demonstrates that the participants in the segmental repair condition did not became much more mutually intelligible to each other over the course of the three trials. The third post-hoc tests revealed a significant difference between the mutual intelligibility of the participants in the unlimited interaction condition at trial 1 and the participants in the segmental repair condition at trial 1, $t(20) = 3.41$, $p = .002$, $d = 0.92$ (unequal variances assumed). The fourth post-hoc test revealed a significant difference between the mutual intelligibility of the participants in the unlimited interaction condition at trial 3 and the participants in the segmental repair condition at trial 3, $t(16) = 3.40$, $p = .003$, $d = 0.84$ (unequal variances assumed). These two results demonstrate that participants in the unlimited interaction condition were more mutually intelligible to each

[58] This study accepts Plonsky & Oswald's (2014) arguments that Cohen's (1988) overused effect size interpretations (i.e., $d = .2$ (small); $d = .5$ (medium); $d = .8$ (large)) are both too simple and not reflective of actual L2 research effect sizes. On Plonsky & Oswald's (2014) suggestions for L2 research, this study interprets effect size in the following ways: for differences between groups, d values of .4 are small, .7 are medium, and 1.0 are large; for differences within groups, d values of .6 are small, 1.0 are medium, and 1.4 are large.

other than the participants in the segmental repair condition were even at the beginning and the end of the experiment.

8.5.1.2. Segmental Repair vs. Scripts

Normal procedures were used to assess whether the data to be used in the 2 x 3 mixed design ANOVA that compared the segmental repair condition data and scripts condition data met the assumptions of such a test: independent random sampling, normal distributions, homogeneity of variance (for the independent measure), and sphericity (for the repeated measure). The independent random sampling assumption was fulfilled with random ELF dyad assignment to the three conditions (Cohen, 2013). The Shapiro-Wilk test was used to determine if the data sets differed significantly from a normal distribution. Although no data set was perfectly normally distributed, no data set differed from a normal distribution to a significant degree, and thus the assumption of normal distribution has not been violated for either data set. The assumption of homogeneity of variance was violated because the variance in the segmental repair condition was more than twice that of the variance in the script interaction. To account for the violation of the assumption of homogeneity of variance, a Log10 transformation was used on the data, after which it met the assumption of homogeneity of variance. Mauchly's test indicated that the assumption of homogeneity of covariance (sphericity) had been violated, χ^2 (2, N = 30) = 12.389, p = .002. To account for the violation of the assumption of homogeneity of covariance, Greenhouse-Geisser is used to correct degrees of freedom for the repeated measure (time).

Initial statistical analyses were conducted through SPSS v.25. Post-hoc tests and effect size calculations were conducted through Microsoft excel. The 2 x 3 mixed design ANOVA yielded a significant main effect of time on mutual intelligibility, $F(1.462, 40.936) = 5.194$, $p = .011$, as well as a significant main effect of condition on mutual intelligibility, $F(1, 28) = 19.989$, $p < .001$, but did not yield a significant two-way interaction, $F(1.462, 40.936) = 0.007$, $p = .977$. So as to maximize statistical power during the post-hoc tests without increasing the chance of a Type I error, four post-hoc pairwise comparisons were conducted: between the trial 1 scores and trial 3 scores within the same condition (two comparisons with equal variances assumed), between the trial 1 scores of each condition (one comparison with unequal variances assumed), and between the trial 3 scores of each condition (one comparison with unequal variances assumed). Accordingly, a Bonferroni adjustment has been applied to the α to account for the four post-hoc comparisons (Bonferroni adjusted α = .0125).

The first post-hoc test did not reveal a significant difference between the mutual intelligibility of the participants in the segmental repair condition at trial 1 and at trial 3, $t(14) = -2.35$, $p = .033$, $d = 0.61$. Although p is below the standard alpha level for both of these post-hoc tests, it is not below the Bonferroni adjusted alpha level. The second post-hoc test did not reveal a significant difference between the mutual intelligibility of the participants in the scripts condition at trial 1 and at trial 3, $t(14) = -2.46$, $p = .027$, $d = 0.63$. Furthermore, the effect size for both results can be considered small for a within groups difference. This demonstrates that neither the participants in the segmental repair condition nor the participants in the scripts condition became much more mutually intelligible to each other over the course of the three trials. The third post-hoc test revealed a significant difference between the mutual intelligibility of the participants in the segmental repair condition at trial 1 and the participants in the scripts condition at trial 1, $t(18) = 4.30$, $p < .001$, $d = 1.27$ (unequal variances assumed). The fourth post-hoc test revealed a significant difference between the mutual intelligibility of the participants in the segmental repair condition at trial 3 and the participants in the scripts condition at trial 3, $t(24) = 3.59$, $p = .001$, $d = 0.99$ (unequal variances assumed). These two results demonstrate that participants in the segmental repair condition were more mutually intelligible to each other than the participants in the scripts condition were even at the beginning and the end of the experiment. Furthermore, the effect size is medium, and thus it can be said that effect of allowing participants to only segmental repair yields a moderate increase in mutual intelligibility.

8.5.1.3. Correlation Analysis of Segmental Repair and Intelligibility

Because neither 2 x 3 mixed design ANOVA revealed that the interactions within the segmental repair condition were conducive to the development of mutual intelligibility over the course of the three trials, a subsequent correlation analysis was conducted on just the mutual intelligibility scores of the fifteen dyads in the segmental repair condition and the number of segmental repair attempts the fifteen dyads had to use to complete the experimental trials. Because there were fifteen dyads and each dyad completed three trials, a total of forty-five data points was collected. Figure 8.10 below is a scatterplot diagram of the relationship between segmental repair attempts on the y-axis and the intelligibility score of a dyad during one trial on the x-axis.

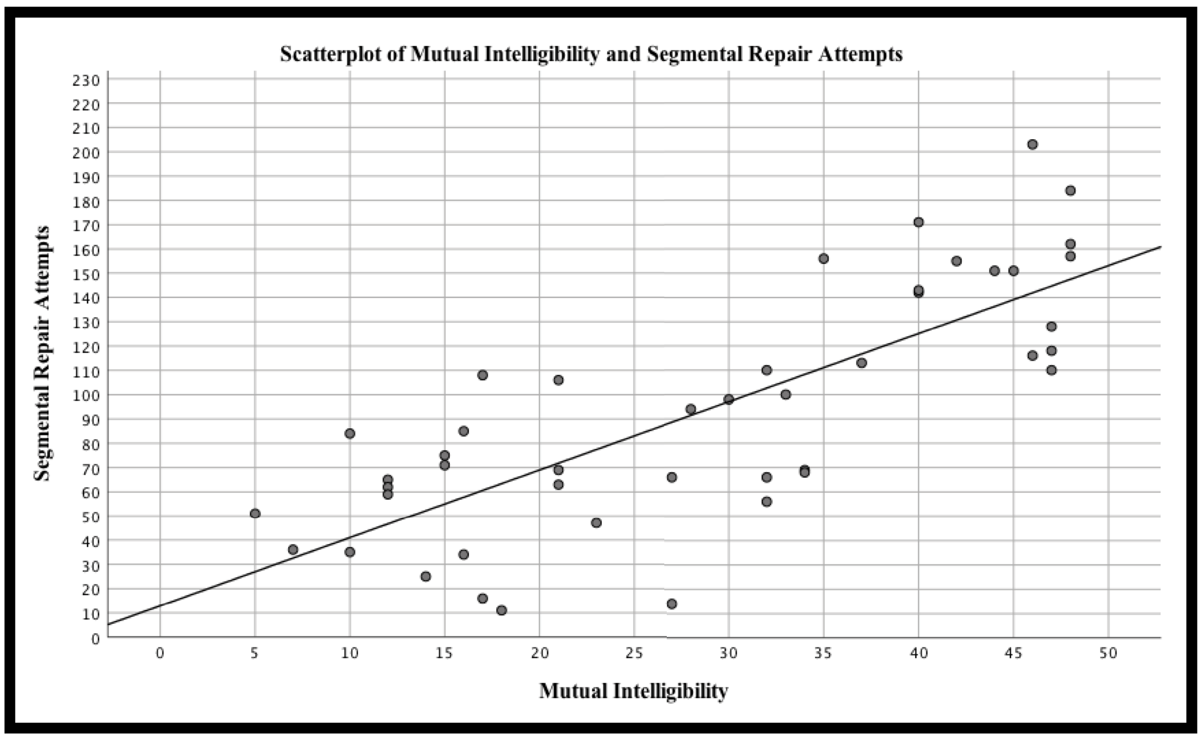

Figure 8.10. Scatterplot of Mutual Intelligibility and Segmental Repair Attempts

The correlation analysis was conducted through SPSS v.25. Standard procedures were used to determine the data set met the assumptions of a correlation test. A Shapiro-Wilks test was used to assess whether the Segmental Repair Attempt and Mutual Intelligibility Score data sets were normally distributed. Although the Segmental Repair Attempt data set did not significantly differ from a normal distribution, the Mutual Intelligibility Score data set did. Bootstraping was used to account for the violation of the assumption of normal distribution.

Bias corrected and accelerated bootstrap 95% CIs are reported in square brackets. More segmental repair attempts were significantly correlated to higher mutual intelligibility, $r = .777$ [.671, .861], $p < .001$. This finding demonstrates that the number of segmental repair attempts correlates to a statistically significant degree with mutual intelligibility. Of course, correlation is not causation, but this finding does suggest that there is a greater relationship between segmental repair and mutual intelligibility than the results of the 2 x 3 mixed design

ANOVA tests indicated. In other words, on the basis of this analysis, it can be said that the more dyads conducted segmental repair on their pronunciation, the more their pronunciation tended to become mutually intelligible.

8.5.2. Conversation Analytic Analyses

Although statistical analyses are appropriate for assessing intelligibility changes at the aggregate level, conversation analytic procedures are appropriate for examining intelligibility changes at the interactional level, and indeed conversation analytic analyses can flesh out the details that are lacking in statistical analysis (Eskildsen, 2008, 2012). The statistical analyses reveal that the participants in the unlimited interaction conditions became more intelligible to a statistically significant degree between trial 1 and trial 3, and that the participants in the segmental repair and script conditions did not. However, the statistical analyses also revealed that the participants in the unlimited condition were more intelligible to each other than the participants in the segmental repair condition and that the participants in the segmental repair condition were more intelligible to each other than the participants in the scripts condition. But the statistical analyses do not answer the most important question—what is happening at the interactional level to allow the participants in the unlimited interaction condition to be more intelligible than the participants in the segmental repair condition? What is happening at the interactional level to allow the participants in the segmental repair condition to be more intelligible than the participants in the script condition? Conversation analytic procedures can suggest a better answer to that question than statistical analyses[59].

However, analyzing the entire corpus of interactions among the participants in the unlimited interaction, segmental repair, and script conditions according to conversation analytic methodology is unrealistic in this chapter. As such, I will only examine a few

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[59] Stivers (2015) makes excellent arguments for the application of quantification to conversation analytic methodology. This thesis largely accepts these arguments, which in the aggregate contradict the arguments put forth by Schegloff (1993) that quantification and statistical analyses have no place in conversation analytic research. However, this thesis also argues that once a researcher has accepted that conversation analytic data can be quantified, statistical analysis is the next logical step.

exemplars to explore two overall tendencies within the data: first, I will explore the general nature of the interactions among the subjects in the unlimited interaction, segmental repair, and script conditions; after that, I will examine two instances of interaction from the unlimited interaction condition to explore the ways in which ELF dyads can maintain mutual intelligibility in this experiment through the use of segmental repair sequences and other means.

First, I examine three sequences, one from each of the three experimental conditions. The first sequence from the script condition is between Lena[60] and Ryo, who are from Lithuania and Japan respectively and had been randomly assigned to the script condition. Lena is the instructor and Ryo is the listener during this sequence. Accordingly, Lena has been instructed to read each sentence on the script one time each to Ryo, and Ryo has been instructed to state "okay" one time after he has placed a word card on the board.

Example 8.1. Script Condition Transcript

1	Lena	so: the first one put.
2		(0.5)
3		uh:: [↑ɹʷɛɪ̯t],
4		(0.5)
5		[wɛɪ̯t],
6		(0.6)
7		i:n
8		(0.2)
9		[klæɕ][61].
10		(0.3)
11		[↑klæɕː].

[60] All names are pseudonyms that are meant to be representative of the linguacultural background of the speaker.

[61] Within this thesis, [ɕ] is being used to represent [ʃ] with unrounded lips. Although there is a difference in tongue position as well between the alveolo-palatal fricative [ɕ] and the post-alveolar [ʃ], the lack of lip rounding in the alveolo-palatal fricative [ɕ] is another difference.

12		(3.5)
13	Ryo	okay.

Between lines 1 to 11, Lena formulates the FPP of a base imperative-compliance sequence, which makes compliance with the imperative the next relevant action. Acting on the next relevant action, Ryo complies with Lena's imperative and places the "rate-wait" word card in the "clash-clash" word box, and then states "okay", which successfully concludes the base sequence. These kinds of unexpanded base sequences are common between the subjects in the script condition, and repair sequences, insert sequences, pre-sequences, and post-expansions do not appear.

In contrast to Lena and Ryo, Rie and Yan, who are Japanese and Chinese respectively and were randomly assigned to the segmental repair condition, expand the base sequences within their interaction to a greater degree. Within this sequence, Rie is the instructor and Yan is the listener, but the condition in which they have been assigned allows them to expand base sequences in a limited way: they are allowed to repair through repetition and segmental adjustments. Accordingly, if either Rie or Yan believes that his or her partner does not understand a pronunciation, either one can ask for clarification through a request for repetition, which simultaneously opens up the possibility of segmental repair, as the example below demonstrates.

Example 8.2. Segmental Repair Condition Transcript

1	Rie	[lɤʊd].
2		(0.2)
3		[ɹʷoʊd].
4		(1.4)
5		[sl̥li̞p].
6		(0.2)
7		[sl̥liːp].
8		(5.0)
9	Yan	uh:: please repeat.

10		(0.8)
11	Rie	[lɤʊd].
12		(0.2)
13		[ɹʷoʊd].
14		(0.7)
15		[sl̥lɪp].
16		(.)
17		[sɾiːp].
18		(1.1)
19	Yan	°[slɪp]°
20		(2.5)
21		okay.

Between lines 1 to 7, attempting to convey the idea that the "slip-sleep" word card is located in the "load-road" word box by articulating "load" as [lɤʊd], "road" as [ɹʷoʊd], "slip" as [sl̥li̞p], and "sleep" as [sl̥liːp], Rie formulates the FPP of a base imperative-compliance sequence, which makes compliance with the imperative or an account for not complying with the imperative the next relevant action. After five seconds, Yan requests a repeat of the FPP, which is simultaneously an account for not deploying the action made relevant by Rie's imperative and the beginning of an insert sequence. Thus, Yan's action has expanded the base sequence. In response to Yan's request, Rie repeats her imperative, but this time, her pronunciation changes slightly: she articulates "load" as [lɤʊd], "road" as [ɹʷoʊd], "slip" as [sl̥lɪp], and "sleep" as [sɾiːp]. In other words, although Yan requested a repeat, Rie conducts a segmental repair instead (Matsumoto, 2011; O'Neal, 2015a). This segmental repair restores the obligation to produce the matching SPP to Rie's FPP, and thus in line 21 Yan says "okay", which both displays understanding and completes the base sequence. These kinds of sequential expansions are common between the subjects in the limited interaction condition, but the sequential expansions are limited to repetitions and segmental repair.

In contrast to Rie and Yan, Wang and Kazumi, who are Chinese and Japanese respectively and were randomly assigned to the unlimited interaction condition, considerably expand the sequences within their interaction to place the word cards. Wang is the instructor and Kazumi is the listener during this sequence. Accordingly, Wang and Kazumi have been instructed to interact until they understand each other, and no limitations have been placed on how they may interact with each other.

Example 8.3. Unlimited Interaction Condition Transcript

1	Wang	uh >first<.
2		(1.2)
3		[θiŋg].
4		(.)
5		[θiŋg].
6		(0.8)
7	Kazumi	[ðiŋkʰː]. [ðiŋk].
8	Wang	[θiŋk]. [θiŋk].
9		(0.2)
10		same.
11		(0.4)
12	Kazumi	{same}
13	Wang	{no:t } catch the cold.
14		(0.3)
15		{not} check the {cold.}
16	Kazumi	{o:.} {kay. }
17		(0.1)
18	Wang	its uhm.
19		(.)
20		[klaɕ],
21		(0.1)
22		[klaɕ]. same.
23		(0.8)
24	Kazumi	same?

25	Wang	same.
26		(0.6)
27		[kə̆lɐ], [klɐ].
28		(1.1)
29	Kazumi	in the (( ))?
30		(1.2)
31		hahahaha.
32		(1.2)
33		.hhh [klɐ]?
34		(0.7)
35		ohw{: : : : }
36	Wang	{[↑klæ}ɐ] [klæɐ].
37		(0.2)
38	Kazumi	[kɯ̆ræɐ]?
39		(0.9)
40	Wang	uh: not the car.
41		(0.8)
42	Kazumi	ohwhaha. .hhh left?
43		(0.2)
44		right?
45		(1.8)
46	Wang	[klæːɐˑ].
47		(0.2)
48		[klæɐ].
49		(0.8)
50	Kazumi	same words?
51	Wang	yeah {same.}
52	Kazumi	{ohw::.}
53		(2.2)
54		$which$?

55	Wang	uh:.
56		(0.4)
57	Kazumi	which words?
58	Wang	you- >you can< you can recognize the:
59		(0.2)
60		[klæɕ] an [kɻʷæɕ]?
61		(1.7)
62	Kazumi	[klæɕ]?
63		(0.3)
64		not [kɹæɕ]?
65		(0.3)
66	Wang	yeah. [klæɕ].
67		(0.1)
68	Kazumi	[klæɕ] okay:.
69		(1.6)
70		next.

Between lines 1 to 70, Wang and Kazumi use two base sequences to first identify the word card "thick-thick" and then to specify the word box "clash-clash". However, unlike Lena and Ryo, Wang and Kazumi expand both base sequences considerably. In the first base sequence, Kazumi initiates an insert sequence to confirm the word card, and Wang initiates a post-expansion sequence beyond the SPP to further identify the word card. In the second base sequence, Kazumi and Wang proceed through multiple repair sequences and confirmation sequences in order to specify in which word box Kazumi should place the word cards. These kinds of expansions beyond the base sequence, which include pre-sequences, insert sequences, post-expansions, and especially repair sequences, are common between the subjects in the unlimited interaction condition. It is easy to imagine that the ability to considerably expand beyond the base sequence contributed greatly to the development of intelligibility among the ELF dyads in the unlimited interaction condition.

However, the ability to expand beyond the base sequence does not necessarily mean that intelligibility increased because the subjects' pronunciations began to approximate NES pronunciations. On the contrary, conforming to citation form pronunciation is not a prerequisite to be intelligible within this experiment. In the following extract, Zhan and Takuya, who are Chinese and Japanese respectively and were randomly assigned to the unlimited interaction condition, are in the process of placing the "flush-flesh" word card in the "road-road" word box, but the interaction is only half successful. Although Zhan and Takuya are able to identify the "flush-flesh" word card, which means that they co-constructed an intelligible phonemic difference for "flush-flesh", they are not able to identify the "road-road" word box. However, the manner in which Zhan and Takuya co-construct the intelligible phonemic difference for "flush-flesh" warrants special comment.

Example 8.4. Creating Novel Phonemic Oppositions

1	Zhan	[flɯɕ].
2		(0.1)
3		[fleɕ].
4		(0.8)
5	Takuya	↑[flɯɕ] [fleɕ].
6	Zhan	yes.
7		(0.1)
8		is on [↑ɹɤd] [↑ɹɤd].
9		(0.3)
10		same word.
11		(0.4)
12	Takuya	°okay°
13		(3.4)
14		okay.

In lines 1 to 3, Zhan specifies the "flush-flesh" word card, but she articulates "flush" as [flɯɕ] and "flesh" as [fleɕ]. Although Takuya confirms "flush-flesh" once through an insert sequence, it is obvious that Zhan's pronunciation contains an intelligible phonemic difference because Takuya takes the "flush-flesh" word card off his whiteboard in preparation for placement. Even though the citation form pronunciation for "flush" is /flʌʃ/ and for "flesh" is /flɛʃ/ or /fleʃ/ (see e.g., Jones, 2011; Wells, 2008), this example demonstrates that the subjects can create novel phonemic differences between words that do not conform to citation form pronunciations in order to succeed in these experimental tasks.

Although novel intelligible phonemic differences can contribute to the disambiguation of word cards and word boxes in the unlimited interaction and segmental repair conditions of this experiment, this is certainly not the only way to do so. In the following extract, Ceng and Shota, who were randomly assigned to the unlimited interaction condition, are in the process of placing the "sleep-slip" word card in the "clash-clash" word box, but Ceng does not use pronunciation to disambiguate the word card "sleep-slip". Rather, another strategy that is just as effective in disambiguating the word cards is used.

Example 8.5. Creating Phonemic Oppositions with Semantics

1	Ceng	in this one we: have ↑three words.
2		(0.1)
3	Shota	three. oh. {whats the (( ))}
4	Ceng	{↑yeah. so first} is: [sliːp].
5		(0.1)
6		[slip].
7		(0.4)
8	Shota	[sə̆ˈrip].
9	Ceng	[↑sliːp] [slip].
10		(2.0)
11	Shota	uhm::. .hhh {(( ))}
12	Ceng	{the } first is the dreaming one.
13		(0.3)
14		the second is different.
15		(0.1)

16	Shota	okay::.
17	Ceng	[sliːp] [slip].
18		(0.4)
19	Shota	[slip] [slip].
20		(0.3)
21		{okay}
22	Ceng	{yea:h}

In lines 1 through 6, Ceng attempts to differentiate between “sleep” and “slip” through vowel quantity differences (Jenkins, 2000; Roach, 2009), articulating “sleep” as [sliːp] with an elongated vowel and articulating “slip” as [slip] with a comparatively short vowel, but in line 8, Shota indicates that mutual intelligibility has faltered, which indicates that vowel quantity differences alone could not disambiguate these two words. In line 9, Ceng again attempts to disambiguate the words through vowel quantity differences, but Shota’s response in line 11 again demonstrates that this is not successful. Being unsuccessful with the attempts to differentiate the two words through pronunciation, Ceng changes tactics in lines 12 to 14 and disambiguates “sleep” and “slip” through contextualization: Ceng refers to “sleep” as “the dreaming one” and to “slip” as “different”. This is enough for Shota to disambiguate the words because at this point he both deploys the discourse marker “okay” to indicate comprehension (Beach, 1993, 1995) and takes the “sleep-slip” word card off his whiteboard in preparation for placement. This example demonstrates that this experiment allows for the possibility that non-phonetic means can be used to disambiguate word cards and word boxes. Although phonetic disambiguation certainly played a role in disambiguating words within the exchanges in the unlimited interaction condition, other factors, such as semantic disambiguation, also contributed to the success of the ELF dyads in the unlimited interaction condition to become progressively more intelligible to one another.

8.6. Discussion

This experiment was designed to determine how much interaction matters to the development of mutual intelligibility among ELF dyads, and the results support some of the hypotheses but do not support some of the others. The first three hypotheses concerned the effect of interaction (time) on the development of mutual intelligibility. The first hypothesis stated that the ELF dyads in the unlimited interaction condition will become more intelligible to each other across the three trials. The results of the experiment support the first hypothesis; the statistical analyses revealed that the ELF dyads in the unlimited interaction condition became more intelligible to each other between trial 1 and trial 3 to a statistically significant degree, which demonstrates that segmental repair in combination with other communicative strategies contributes to a significant development of mutual intelligibility. The second hypothesis, on the other hand, was not supported by the experimental results. The second hypothesis stated that the ELF dyads in the segmental repair condition will also become more intelligible to each other across the three trials. The statistical analyses revealed that the ELF dyads in the segmental repair condition did not become more intelligible to each other between trial 1 and trial 3 to a statistically significant degree. The third hypothesis was supported by the experimental results. The third hypothesis stated that the ELF dyads in the script condition would not become more intelligible to each other across the three trials, and this is exactly what happened. There was no statistically significant difference between the intelligibility of the ELF dyads in the script condition at trial 1 and trial 3, in spite of the fact that the subjects must have become more familiar with the task and its vocabulary across the three trials. Therefore, even familiarity with the task did not lead to intelligibility gains among the ELF dyads in the script condition. Accordingly, one can claim that not being allowed to interact beyond a base sequence either attenuates or eliminates the benefits that accrue to subjects who grow more familiar with a task.

The fourth hypothesis, however, is the most important and significant. The fourth hypothesis states that the ELF dyads in the unlimited interaction condition at trial 3 will be as intelligible as the ELF dyads in the segmental repair condition at trial 3. In other words, the fourth hypothesis states that the intelligibility of the subjects in the unlimited and segmental repair conditions at trial 3 will not differ to a statistically significant degree. Unfortunately, the experimental results do not support the fourth hypothesis of this study, which predicted that the participants in the unlimited interaction condition and segmental repair condition would be equally intelligible. The participants in the unlimited interaction condition were more intelligible to each other at trial 3 than the participants in the segmental repair condition were to each other at trial 3, and this difference rises to the level of a statistically significant degree. This suggests that a series of segmental repair sequences are not as effective in edifying the intelligibility of pronunciation as a series of potentially any repair sequences.

The reasons as to why the participants in the unlimited interaction condition were more intelligible than the participants in either the segmental repair or script conditions are fairly obvious from the conversation analytic analyses. Although ELF dyads in all conditions made use of multiple imperative-compliance base sequences in order to complete the word card placements, only the ELF dyads within the unlimited interaction and segmental repair conditions expanded beyond the base sequence first and second pair parts. Within the unlimited interaction condition, the ELF dyads often expanded the base sequence through the deployment of multiple insert sequences and repair sequences that clarified to which word cards were referred and which word boxes were targets for word card placement. These processes also lead to the negotiation of pronunciation, which in turn created the environment for the development of intelligible pronunciation. The ELF dyads in the script condition, on the other hand, were limited to using only base sequences to complete the task. The difference in results seem to be directly attributed to this.

Overall, the analysis provides evidence that supports arguments for a new iteration of the interaction hypothesis (Long, 1996; Gass & Mackey, 2015). Although the interaction hypothesis predicts that increased interaction would allow for the development of increased intelligibility, which is exactly what happened in this study, the interaction hypothesis is still too tied to the assumptions of the cognitive-SLA paradigm from which it came (e.g., Long, 1996; Gass & Varonis, 1994; Gass & Mackey, 2015). Scholars who assess the interaction hypothesis either explicitly state that interaction with NESs is a necessary prerequisite for the beneficial effects of the hypothesis (e.g., Gass & Varonis, 1994) or operationalize the predictions of the interaction hypothesis as requiring interaction with NESs (e.g., Saito & Akiyama, 2017), but this experiment demonstrates that interaction with NESs is not a prerequisite for the development of intelligibility. Indeed, the results of this experiment demonstrate that the predictions of the interaction hypothesis are valid within ELF interactions, and thus the interaction hypothesis can be applied to ELF research as well.

8.7. Summary

In this chapter, I have presented evidence that interaction is the prime requisite for the development of intelligible pronunciation. This chapter focused on an experiment that was designed to assess the relationship between interaction and intelligibility among ELF dyads. Section 8.2 described the interaction hypothesis. Section 8.3 introduced the research questions and hypotheses that informed the construction of the experiment. Section 8.4 introduced the experiment, which included discussion of the participants and the experimental procedures through which the subjects completed the tasks. Section 8.5 displayed and analyzed the results from two perspectives: statistical analysis and conversation analysis. Section 9.6 discussed the relevance of the experimental results vis-à-vis the interaction hypothesis, and argued that the interactional hypothesis needs to be reconceptualized from an ELF perspective.

Having scrutinized the relationship between interaction and intelligibility from the perspective of an ELF-informed interaction hypothesis, I will now conclude this thesis. In chapter 9, I will argue that the evidence that has been gathered across the eight chapters of this thesis points in one direction—that interaction is the critical component of intelligiblity, and that intelligiblity is negotiated in situ among the interactants, not determined beforehand.

Chapter 9
Conclusion

9.1. Introduction

This chapter concludes this thesis. I will first summarize the key findings and revisit the concept of intelligibility from a CA-based ELF perspective (Section 9.2). This will be followed by a discussion of the pedagogical implications (Section 9.3) and the limitations of this research (Section 9.4). Finally, suggestions for further research will be put forward (Section 9.5).

9.2. Revising Intelligibility Formation from an ELF Perspective

The general aim of this research is to ascertain the ways in which ELF users develop and maintain mutual intelligibility. Given the complete lack of research on the accommodation of pronunciation intelligibility within ELF research, this research particularly aims to determine how ELF users conduct four different kinds of segmental repair, namely reactive segmental repair, preemptive segmental repair, reversion segmental repair, and serendipitous non-segmental repair. In other words, this research has examined how ELF users among school classmates utilize phonetic resources to maintain pronunciation intelligibility.

The research was carried out at a large public university in Japan, where English is used both as an academic language and as a lingua franca. A multitude of homework conversations among school classmates were collected from eighty-five Japanese students and six non-Japanese students, all of whom were students at the large public Japanese university at the time of the recording. The research adopted a two-method design in which in-depth qualitative phonetic analyses of segmental repair sequences were followed up by quantitative statistical analyses to reveal overall patterns within the data. In other words, the research takes an interactional intelligibility view towards the maintenance of intelligibility (Matsumoto, 2011; O'Neal, 2015a, 2015b, 2015c) and supports its arguments through the deployment of a statistically informed CA perspective (Stivers, 2015).

In summary, these findings and discussion suggests the following points:

- ELF users are largely intelligible to each other; that is, neither repair sequences nor segmental repair sequences are particularly frequent within the corpus gathered for this study.

- When mutual intelligibility does break down, ELF users can conduct segmental repair on the phonetic segments of a trouble source in order to restore mutual intelligibility.
- The most common organization of segmental repair is other-initiated, self-segmental-repair, which is frequent to a statistically significant degree. The least common organization of segmental repair is self-initiated, other-segmental-repair, which is infrequent to a statistically significant degree. These findings match the conclusions of other CA studies which claim that self-repair is the most preferred kind of repair.
- The trouble sources in segmental repair sequences are often very close to the phonetic content of the pronunciation that is eventually oriented to as intelligible; the phonetic segments of a trouble source pronunciation and the phonetic segments of a ratified candidate intelligible pronunciation are often very similar, often differing by just one distinctive feature. That is, even minor phonetic variation can become the difference between intelligible and unintelligible pronunciation.
- ELF users sometimes adjust the phonetic segments of a pronunciation even though mutual intelligibility has not broken down. That is, ELF users sometimes orient to pronunciations as insufficient even if intelligible. This demonstrates that some ELF users orient to sufficiency rather than intelligibility as a goal of the phonetic negotiations within interactions.
- ELF users orient to the maintenance of mutual intelligibility as a more significant goal than the co-construction of sufficient pronunciation. The frequency of segmental repair is greater than the frequency of sufficiency adjustments to a statistically significant degree. This finding is in accord with much ELF research that claims that ELF users orient to the maintenance of mutual intelligibility as a major goal of interactions.
- The most common phonetic segment adjustments are modifications.

Phonetic segment resegmentations and phonetic segment deletions are rare. Both statements are true to a statistically significant degree.

- Phonetic segment adjustments seem to be in complementary distribution. Phonetic adjustments are more frequent in some syllabic positions than in others. Phonetic segment insertion is frequent in syllable coda position to a statistically significant degree. Phonetic segment modification is infrequent in syllable coda to a statistically significant degree. These facts suggest that phonetic segment adjustments are in complementary distribution.
- Functional load theory does not seem to predict the phonetic segment adjustments that ELF users orient to as consequential to the maintenance of interactional intelligibility.
- The results of a correlation analysis suggest that segmental repair alone is just as effective as any other repair strategy in maintaining and developing interactional intelligibility.

In what follows, I will provide a summary of each chapter in order to elaborate on the above points. The first subsection summarizes how ELF users organize segmental repair sequences after mutual intelligibility has broken down (Section 9.2.1), and the second subsection summarizes how and why ELF users sometimes adjust phonetic segments even though mutual intelligibility has not faltered (Section 9.2.2). The third subsection summarizes the relationship between phonetic segment adjustments and syllabic position within segmental repair sequences (Section 9.2.3). The last subsection summarizes the results of an experiment in which the relationship between kinds of interaction and mutual intelligibility was ascertained (Section 9.2.4).

9.2.1. The Organization of Segmental Repair

Chapter 5 explored the organization of segmental repair and argued that the organization of segmental repair can be adequately captured through a tetrachotomic taxonomy that describes all segmental repair sequences as a combination of either self- or other-initiation and self- or other-segmental-repair. The analyses revealed that other-initiated, self-segmental-repair was frequent and self-initiated, other-segmental-repair was infrequent to a statistically significant degree. Furthermore, an examination of the ELF interactions within the corpus of this study reveals that segmental repair is a major proportion of all repair sequences, and thus one can conclude that ELF users do indeed negotiate pronunciation. Within the corpus, there are ninety repair sequences, but thirty-seven of the repair sequences are specifically segmental repair sequences; therefore, a full forty-one percent of the repair sequences were oriented to as having phonetic trouble sources, which is consistent with Jenkins's (2000) original findings as well (p. 84). Therefore, there is more than ample evidence that both ELF users negotiate pronunciation to maintain mutual intelligibility—contrary to Deterding's claims to the otherwise—and that ELF users rely on segmental repair to maintain mutual intelligibility. The present findings, therefore, lend additional support to the idea that phonetic negotiation and variation are intrinsic components of ELF interactions (e.g., Matsumoto, 2011; O'Neal, 2015a, 2016b, forthcoming).

9.2.2. The Organization of Sufficiency

Chapter 6 explored sufficiency adjustments and argued that the organization of sufficiency adjustments can be adequately captured through a dichotomy that describes all sufficiency adjustments as a combination of either self- or other-initiation. This chapter also assessed the frequencies of segmental repair sequences and sufficiency adjustments. A one-way χ^2 test revealed that segmental repair sequences are frequent and sufficiency adjustments are rare to a statistically significant degree within the corpus, which lends credence to the argument that sufficiency adjustments are not major concerns of ELF users. However, the mere presence of sufficiency adjustments demonstrates that ELF users are sensitive to perfectly intelligible yet insufficient pronunciation. In other words, even ELF users orient to phonetic form as sufficient and insufficient at times, and interact in ways that reveal this from even an emic perspective (O'Neal & Matsumoto, forthcoming). These findings are novel because most ELF phonology studies are premised on the idea that mutual intelligibility is the superlative concern of ELF users, but the results of this study suggest otherwise.

9.2.3. Phonetic Segment Adjustments, Syllabic Position, and Functional Load

Theory

Chapter 7 argued that phonetic segment adjustments can be classified into resegmentation, modification, deletion, and insertion adjustments. Statistical evidence that the frequencies with which the four adjustments are used are not equal was discovered, and thus it was argued that one kind of phonetic segment adjustment was more consequential to the progression of the ELF interactions in these corpora. That is, phonetic segment modification was the most consequential phonetic means with which to maintain mutual intelligibility among the speakers in the corpora. The other phonetic segment modifications were not as frequent. In fact, phonetic segment deletion and resegmentation were rare to a statistically significant degree. Furthermore, not all phonetic modifications were equally distributed among the syllabic positions. Phonetic segment insertion is common in syllable coda position, but phonetic segment modification is infrequent in syllable coda position, a finding which suggests that these phonetic segment adjustments are in complementary distribution. Last, this chapter assessed the extent to which the predictions of functional load theory accurately adumbrate the phonetic segment adjustments that ELF users oriented to as consequential to the maintenance of interactional intelligibility. Statistical tests did not support functional load theory, and thus some other explanation is possible.

9.2.4. The Relationship between Interaction and Intelligibility

Chapter 8 focused on an experiment that was designed to assess the relationship between three different types of interaction and the development of interactional intelligibility among ELF dyads. In the experiment, pairs of participants were randomly assigned to one of three different conditions, each of which limited the interactional options of the participants when they encountered a miscommunication: the unlimited interaction condition, the segmental repair condition, and the scripts condition. It was discovered that the unlimited interaction condition, in which interactants could use any repair strategy they wished to pursue the successful conclusion of the experimental task, and segmental repair interaction condition, in which interactants could only segmentally repair to complete the experimental task, were not equally conducive to the development of mutual intelligibility among the experiment participants. Indeed, the participants in the segmental repair condition did not improve their interactional intelligibility to a statistically significant degree over the three trials of the experiment. Furthermore, the script condition did not contribute to the development of mutually intelligible pronunciation in any significant way. In the end, only three of the five hypotheses that were proposed before this experiment began were affirmed.

9.3. Pedagogical Implications of this research

The present findings have illustrated the dynamic negotiation of mutual intelligibility among ELF users in both naturalistic conversations and experimental settings (Brouwer, 2004; Matsumoto, 2011; O'Neal, 2015a). What can be suggested for English language teaching (ELT) based on these findings is that the pedagogical basis for successful pronunciation teaching needs to shift away from an orientation to intelligibility for native speakers as the goal and to an orientation of negotiated mutual intelligibility as the goal (Jenkins, 2000; Matsumoto, 2011; O'Neal, 2015c, 2015c, forthcoming). This reorientation of the pedagogical basis of pronunciation teaching can be achieved through the following two methods: 1) redirecting the fundamental question that pervades most pronunciation research; and 2) providing students with meaningful opportunities to be unintelligible, and thus necessitate segmental repair. In what follows, these two methods will be explained.

Redirecting the ultimate question of pronunciation research

The question that directs most pronunciation research, whether the pronunciation research is based on ELF, SLA, or WE paradigms, is some variation of the following: "how can a teacher best identify the pronunciation features that are most consequential to communication?" For example, Saito (2014) asks "how can we identify and prioritize a set of problematic pronunciation features"? (p. 251), and Levis (2005) asks that given that "certain types of pronunciation errors may have a disproportionate role in impairing [intelligibility]", how can a pronunciation teacher identify which phonetic elements are most important to intelligibility? (pp. 370-371). The purpose of these questions is to identify pronunciation features that are more consequential to intelligibility so that once the features have been identified, they can be targeted in the classroom for amendment so that learners will never encounter communication breakdowns ever again.

However, these are the wrong questions; the entire premise upon which these questions are based is flawed. This is because mutual intelligibility breakdowns are completely natural and indeed vitally necessary for the learning process. The questions that pronunciation researchers ask should be premised on the idea that repair, and indeed segmental repair, is part and parcel of the learning process. This research has demonstrated that interaction alone is enough for speakers to identify problematic phonetic features and negotiate more mutually intelligible variants. That is, with enough interaction, any problematic pronunciation can be overcome (O'Neal, forthcoming). Accordingly, the idea that pronunciation teaching should be based around the notion that speakers should be trained to articulate words and phrases in such a way that communication never breaks down actually robs students of meaningful learning opportunities.

Therefore, the better question for phonetics and intelligibility research is the following: "which pronunciations are most resistant to becoming more mutually intelligible over the course of interactions?" A decent paraphrase of this question would be the following: "which aspects of phonetics that are consequential to mutual intelligibility are most intractable to the ameliorative effect of interaction?" The answer to this question would reveal the pronunciations that are most and least likely to become more intelligible across multiple interactions. The pronunciations that are most likely to become more intelligible due to interaction can be consigned to homework tasks that necessitate interaction (Kohn, 2018; O'Neal, 2015c; Kim, 2018). On the other hand, the pronunciations that are most intractable to amelioration due to interaction can be targeted for teaching in the classroom. In a word, teachers should focus more class time on the pronunciations that are most resistant to improvement through interaction and less time on pronunciations that are easily amended through the beneficial effect of segmental repair. This is because interaction should be assumed from the beginning of any decisions as to what to include in a pronunciation syllabus, and the decision to prioritize one phonetic feature over another should be based entirely on how likely or unlikely a feature is to be improved through interaction. Features that are less likely to be mastered even after multiple interactions should be prioritized on a pronunciation syllabus.

Answering this question better prepares pronunciation teachers to prioritize certain pronunciation features over others. The pronunciations that are most resistant to segmental repair can be prioritized in classroom practice. On the other hand, pronunciations that are best facilitated by interactions can be consigned to after class conversation homework. As long as the conversation homework necessitates certain pronunciations, then this dichotomy that divides *interaction-facilitated* and *interaction-resistant* pronunciations is viable and worthwhile.

Opportunities for purposeful negotiation in ELF interactions

A multitude of scholars claim that explicit phonetic instruction helps learners (e.g., Derwing et al., 1998; Saito & Lyster, 2012; Saito, 2013; Sturm, 2013). This is likely to be very true, and this study in no way claims to have falsified what has now become a maxim in pronunciation education. However, this study demonstrates that inadvertent phonetic instruction in the form of segmental repair sequences also helps speakers adjust the phonetic segments of their speech into more mutually intelligible configurations. Indeed, another implication of this study is that segmental repair is a highly effective method to make pronunciation more intelligible. Accordingly, providing students with opportunities to be in a situation in which segmental repair is likely is pedagogically beneficial. Kohn (2018) rightly argues that creating opportunities for students to engage in ELF interactions is one of the prime elements of encouraging students to recognize the value of ELF. Providing opportunities for students to encounter intelligibility breakdowns and the concomitant segmental repair sequences is yet another way to induce more mutually intelligible pronunciation. These kinds of activities would allow teachers to "transform their [ELF] awareness in effective classroom activities" (Widdowson, 2015, p. 230).

One way in which to induce segmental repair sequences is to use a version of the experimental task that this study employed. In this experimental task, participants had to negotiate a more mutually intelligible pronunciation in order to succeed. A smaller version of the same activity could easily be deployed in a pronunciation course. The activity necessitates segmental repair, and thus this activity might be the best way to introduce segmental repair to the pronunciation classroom.

9.4. Limitations of this research

All research has limitations, and this research in particular has several shortcomings that must be acknowledged. First and foremost, the corpus includes only six speakers who were not from L1 Japanese backgrounds. This limited sample size probably does not reflect the high L1 heterogeneity that one could find in other ELF interactions. It is more than justified to claim that a greater number of speakers and a greater number of different L1 backgrounds among the speakers could have given rise to a fuller picture of the inherent variability of intelligibility within ELF interactions. As such, it is unclear if these results can be generalized to the whole population of ELF users (Dauer, 2005).

Second, the method utilized in this study to assess intelligibility only finds certain kinds of intelligibility issues. Segmental repair analysis only detects issues that cause catastrophic damage to intelligibility; subtler issues that influence mutual intelligibility are likely beyond what can be expected from segmental repair analysis. Perhaps post-interaction interviews with participants could reveal the phonetic causes of unintelligible pronunciation that would go unnoticed with a strict application of CA methodology (Cogo, 2009; Matsumoto, 2011, 2018).

Third, the data collection method also attenuated the value of the data itself. The data is based solely on audio-recorded data. However, recent research has demonstrated that phonology cannot be assessed solely from audio-only data (Smotrova, 2017). Smotrova (2017) presents compelling evidence that the phonetic and phonological realms are linked to gestural movements, which in turn suggests that looking at any aspect of pronunciation without including gestural elements impoverishes any analysis. It is entirely likely that a fuller picture of the negotiation of intelligible pronunciation could have been ascertained through video-recordings that would have revealed the kinesthetic movements that might have signaled the faltering of mutual intelligibility and its reestablishment. Furthermore, not all of the IPA transcriptions were double-checked by another phonetic transcriber. This means that some of the IPA transcriptions might not be as phonetically accurate as they seem.

Fourth, the data collection location also attenuated the value of the data. The data was collected from university coursework. Although the researcher was not present during the collection of the data, the participants to the recordings still might have oriented to the interaction in ways that they believed were consistent with satisfying the homework requirements (i.e., satisfying the researcher's requirements). In fact, some of the coursework that the students had to complete were from pronunciation courses, and as such, this might have had an effect on the data that rendered it less valid.

9.5. Suggestions for Further Research

Considering the limitations of this research that were highlighted in the previous section, I propose that the following research topics would be worthwhile. First, the limited sample size of heterogeneous L1 backgrounds in this study limits its generalizability. It is highly likely that a greater number of heterogeneous L1 backgrounds would have yielded a different number of segmental repairs, different types of segmental repairs, different frequencies of segmental repairs, and different kinds of segmental adjustments. Furthermore, because a greater number of heterogeneous L1 backgrounds would very likely lead to significantly different results, the notion of the *lingua franca factor* (Firth, 2009) needs to be explored in the realm of ELF intelligibility.

Second, another limitation of this research is what segmental repair analysis can detect. Segmental repair analysis can detect the breakdown and restoration of mutual intelligibility and the concomitant segmental adjustments, but it can only do this if one of the interactants specifically orients to a word or phrase as unintelligible. Segmental repair analysis can only detect what I would call catastrophic intelligibility problems (O'Neal, forthcoming), or in other words, intelligibility problems that require the interactants to stop the on-going sequence and resolve the trouble source before returning to the superordinate sequence to continue the interaction. But of course, not all intelligibility problems are oriented to as problems within an interaction, and thus segmental repair analysis cannot detect all intelligibility issues. Although segmental repair analysis is adept at detecting significant interactional intelligibility problems that necessitate repair sequences, it is not very adept at detecting much more subtle or minor intelligibility problems (O'Neal, forthcoming).

Some might suggest that one way to extend the power of segmental repair analysis to detect more subtle intelligibility problems would be to include post-hoc interviews with participants (e.g., Matsumoto, 2011; Sewell, 2017; Kim, 2018). The arguments in favor of this include the idea that because repair analysis only detects problems that interactants orient to, researchers should interview interactants after a conversation to detect the intelligibility problems that were not actually oriented to as problems within the interactions. This argument is true as far as that goes. However, as Seedhouse (2005) argues, from an *emic* perspective, it is difficult to argue that a participant's description of his or her behavior after an interaction is really the same as what the participant was actually doing during the interaction itself (p. 253). Accordingly, introducing post-hoc interview information to the pool of data used to describe interactional phenomena moves CA away from the emic perspective that is so important to its original conception. It is nonetheless true, however, that some modern CA scholars argue that moving CA away from the emic perspective is exactly the direction that CA research should move (see e.g., Stivers, 2015). As CA researchers resolve the future focus of CA research methodology, there is room to argue that future CA research can include post-hoc interview data. Thus, a follow-up study could include post-hoc interviews with interactants to ascertain the extent to which much more subtle intelligibility problems have gone undetected during an interaction.

Third, this research has focused on the negotiation of mutually intelligible pronunciation, claiming that mutually intelligible pronunciation is greatly facilitated by interaction (O'Neal, forthcoming; O'Neal & Matsumoto, forthcoming). However, with the exception of the experimental data, all of the data that was gathered for this study was audio-recordings, and the preponderance of audio-recordings may have left out non-auditory elements that affected the formation of mutually intelligible pronunciation (Smotrova, 2017). Accordingly, any replication study would need to incorporate video-recordings into the data set that could capture the kinesthetic elements (Smotrova, 2017) and situational affordances (Thoms, 2014; Pennycook, 2016; Matsumoto, 2018). Either one of these two factors could have greatly contributed to the formation of the mutual intelligibility in these ELF interactions.

Fourth, regression analyses of the experimental results that compares the relationship between the number of repair attempts and the intelligibility score would be most welcome! If some statistical relationship could be found between the frequency of segmental repair attempts and the concomitant increase in mutual intelligibility, then this discovery would be the first of its kind. This research was an investigation into the triangular relationship between interaction, intelligibility, and phonetic adjustments in ELF settings. This kind of research is just beginning (see e.g., Saito & Akiyama, 2017; O'Neal, forthcoming).

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Appendices

Appendix A

Conversation Analytic Research Information Sheet

早稲田大学
WASEDA University

A PhD research project
Maintaining Mutual Intelligibility in English as a Lingua Franca Interactions
George O'Neal

Would you please help me with my research project?

Who am I?

I am George O'Neal, a PhD student at the Graduate School of Education, Waseda University. I am interested in pronunciation in intercultural communication in English, especially among people from different first language backgrounds. Please feel free to contact me about this project.

Aim of this Research

I want to explore how people from different first language backgrounds adjust their pronunciation to be more understandable. Communication among people from different first language backgrounds is called English as a lingua franca (ELF).

Target Participants

I would like to ask students from different first language backgrounds to participate in this project. Only students who are enrolled in this class can participate.

What will happen if you help me in the project?

Time Commitment

No extra time commitment beyond what is required to do the conversation homework assignment.

You will be involved in…

- **The handing over of conversation homework for this study**
- Answering a short background survey

Confidentiality

- Anonymity guaranteed.
- All of the recordings will be kept secure.
- Recordings will be transcribed.
- The transcriptions will appear in published reports.

Participants' Rights

- You can decide to not hand over your conversation homework recordings.
- Even if you decide to hand over your recordings, you can withdraw participation.

Benefits

- It is hoped that some valuable pedagogical insights can be drawn from this research.
- If requested, I can send you a short summation of my research findings.

Contact Information
George O'Neal
E-mail: cerebral1978@akane.waseda.jp
Graduate School of Education, Waseda University
1-6-1 Nishi Waseda, Shinjuku-ku, Tokyo, 169-8050, Japan

Appendix B

Conversation Analytic Research Informed Consent Form

Consent Form

早稲田大学
WASEDA University

The researcher:
George O'Neal
PhD student, Graduate School of Education, Waseda University

Title for this project:
Maintaining Mutual Intelligibility in English as a lingua franca interactions

Thank you very much for helping me with my research project. I really appreciate your help. Before agreeing to hand over your conversation homework recordings to me, please read through the following sentences and check that you understand:

- ☐ **I have read and understood the Research Information Sheet.**
- ☐ **I agree to hand over my conversation recordings for research purposes.**
- ☐ **I agree that my conversations can be transcribed and used for research purposes.**
- ☐ **I understand that my participation is unpaid.**
- ☐ **Questions about my participation in this project have been answered satisfactorily.**

____
Participant's Name (ローマ字)

____________________________ ____________________________
Participant's Signature **Date**

Appendix C

Experimental Research Information/Recruitment Flier

英語の発音の実験に参加してください！

Please participate in my English pronunciation experiment

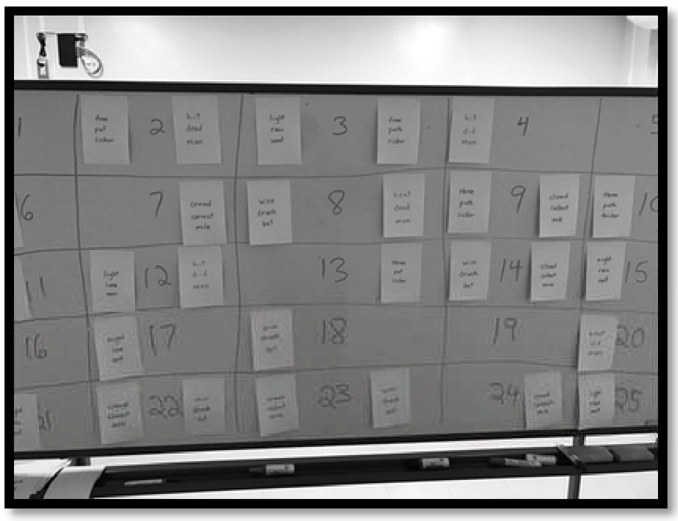
请你参加我的英语发音的研究

二人の参加者は「説明する人」と「説明される人」になってもらい、「説明する人」はホワイトボードに貼ってある「単語のカード」の位置を「説明される人」に説明する実験です。「説明される人」は「説明する人」の指示に従い、「単語のカード」を貼る。実験は録画・録音されます。

Two participants will become the explainer and the explainee. The explainer will describe the location of word cards to the explainee. The experiment will be video/audio recorded.

两个参加者当"说明者"和"被说明者"的角色。"说明者"就说明"词卡"的地方。"被说明者"就听"说明者"的话，把"词卡"放在白板上。

「説明する人」のホワイトボード
Explainer's whiteboard
说明者的白板



「説明される人」のホワイトボード
Explainee's whiteboard
被说明者的白板

興味のある方：オニール・ジョージ先生に連絡してください。If you are interested, please contact: George O'Neal. 如果你想参加的话，我请你联系乔治。

george@ge.niigata-u.ac.jp

参加の謝礼・Payment・付款：3000Yen
参加の回数・# of Times・几次：3 回・Three times・三次
実験の場所・Place・研究的地方：人文社会学科系棟
予想された参加の時間・How long・多少时间：２０～３０分 / 20-30 Minutes

Appendix D

Experimental Research Informed Consent Form

Name・氏名:

Age・年齢:

Home County・母国:

First Language(s)・第一言語:

Second Language(s)・第二言語:

How long have you learned the Second Language(s)?・第二言語を何年学んだ？

Have you ever visited countries in which your second language(s) is/are spoken?・第二言語が話される国を訪問したことがある？

How long have you lived in countries in which your second language(s) is/are spoken?・第二言語が話される国に住んだことがあるか？

What is your TOEFL/TOEIC/IELTS/英検 score(s)?・TOEFL/TOEIC/IELTS/英検のスコアまたは級を書いてください。

In this experiment, you will place word cards on a white-board according to the instructions of your partner. The experiment will take about 20-30 minutes. The experiment will be video and audio recorded. The video and audio might be played at an academic conference. Your name and test scores will never be revealed to anyone. You are allowed to quit an experiment at any time. You will be paid 1000 yen at the completion of an experiment. If you complete all three experiments, then in total you will receive 3000 yen.

この実験において、相手の指示に従って、カードをホワイトボードに貼る。実験は２０分から３０分までかかる。実験は録音・録画される。録音・録画は学会で再生されるかもしれない。本名は極秘扱いとされる。実験を開始の前でも途中でも辞めてもいい。実験が終わったら、1000 円もらえる。実験に 3 回参加すれば、全部で 3000 円もらえる。

Signature・サイン：________________________________

Appendix E
Segmental Repair Analysis Transcription Conventions

Symbol	Indicates
[ ]	IPA narrow phonetic transcription
{ }	a simultaneous utterance
{[ ]}	a simultaneous utterance in IPA broad phonetic transcription
=	a latched utterance with discernable gap between the utterances
:	lengthened sound
(.)	a silence of less than one tenth of a second
(0.2)	a timed silence (two tenths of a second)
{word}	simultaneous speech
°word°	word said more quietly than the surrounding words
$word$	word said while giggling or laughing
<word>	word that is said slower than the surrounding words
>word<	word that is said faster than the surrounding words
word-	sudden cut off of speech
.hhh	breathing in
hahaha	laughter
?	high rising intonation
,	slightly rising intonation
.	falling intonation
↑	high rising volume

Appendix F
All Examples of Segmental Repair & Sufficiency Adjustment in the Corpus

Example 1: Self-initiated, self-segmental-repair & sufficiency adjustment

1	Jia	hm:.
2	Ryu	how?
3		(0.2)
4		how do you about.
5		(1.2)
6		hobbies?
7		(0.9)
8	Jia	I like-=
9	Ryu	=you have:.
10		(0.3)
11	Jia	playing::,
12		(0.3)
13		play [bad.mɪ.ʃʌnz].
14		(0.7)
15		playing [pa.mɪ.ʃonz].
16		(0.5)
17		[ˈpa.mɪ.ʃonz].
18	Ryu	>ah.<
19		(0.6)
20		[pe.ɾe.mɪ.ʃən].
21		(0.1)
22	Jia	{yeah. }
23	Ryu	{[pe.ɾe. }mɪ.ʃən].
24	Jia	yes.
25		(0.5)
26		yes.

27		(0.1)
28	Ryu	ah::. I like [pe.ɾe.mɪ.ʃən].=
29	Jia	=haha=
30	Ryu	=too.

Gloss

The producer of the trouble source orients to [bad.mɪ.ʃʌnz] as an unintelligible pronunciation for “permission” (the name of a video game) and self-repairs it to [ˈpa.mɪ.ʃonz]. The recipient of the trouble source further adjusts the pronunciation to [pe.ɾe.mɪ.ʃən] even though intelligibility had already been restored.

Segmental Repair: [bad.mɪ.ʃʌnz] → [ˈpa.mɪ.ʃonz]
syllable onset consonant modification: [b] → [p] HFL
syllable coda consonant deletion: [d] → Ø HFL
syllable nucleus vowel quality modification: [ʌ] → [o] HFL
word stress addition

Sufficiency Adjustment: [ˈpa.mɪ.ʃonz] → [pe.ɾe.mɪ.ʃən]

Example 2: Self-initiated, self-segmental-repair

1	Mitsu	how about you?
2		(0.4)
3	Bumbyn	uh:: my club?
4		(0.2)
5		uh: I don.
6		(0.1)
7		Im not a member of.
8		(0.2)
9		any club {in niigata uni}versity ↑<u>but</u>? .hhh
10	Mitsu	{ahh: : . oh}
11		(0.3)
12	Bumbyn	I::: like to participa:te.
13		(0.6)
14		uh international student clubz: {event. events.} .hhh
15	Mitsu	{ohw:. uh hm.}
16		(0.1)
17	Bumbyn	an:de.
18		(0.5)
19		in my home university I am a member of [t͡ʃiz] cl- [t͡ʃɪs] club?
20		(0.6)
21	Mashu	°[t͡ʃe]°?
22	Bumbyn	[t͡ʃɛs] club.
23		(0.2)
24	Mitsu	[t͡ʃɛs]?
25		(0.4)
26	Bumbyn	you know {[t͡ʃɛs]?}
27	Mitsu	{oh:. } [t͡ʃɛs]. oh.
28		(0.1)
29	Bumbyn	yea::h.

Gloss

The producer of the trouble source orients to [t͡ʃiz] as an unintelligible pronunciation for "chess" (an inferior version of *Shogi*) and self-repairs it to [t͡ʃɛs].

Segmental Repair: [t͡ʃiz] → [t͡ʃɛs]

syllable nucleus vowel quality modification: [i] → [ɛ] HFL

syllable coda consonant modification: [z] → [s] LFL

Example 3: other-initiated, self-repair

Example 4: other-initiated, self-repair & sufficiency adjustment

Bumbyn	so.
	(0.5)
	do you hav-
	(0.2)
	do you- are you a member of
	(0.2)
	some [klʌ]?
	(0.8)
Misa	hm?
	(0.7)
Riku	uh:::.
	(0.6)
Bumbyn	[klʌb]?
	(0.3)
Misa	[kl]-. ↑ah yeah yeah.=
Bumbyn	=oh. [klʌb].
	(0.1)
	>sorry<.
Misa	{I-}
Riku	{I-}
	(0.2)
	I belon::ged
	(0.4)
	to::
	(0.5)
	[be̞ribe̞l] club.
	(0.5)
Bumbyn	what?

29		(0.4)
30	Riku	[be̞ɾibe̞l] club.
31		(0.3)
32	Bumbyn	[bäɹ]?
33		(0.2)
34		{[bäɹ]}?
35	Misa	{[be̞ɾi]}- [be̞ɾibo]?
36		(0.2)
37	Riku	[be̞ɾibol].
38	Bumbyn	↑ah:::.
39	Misa	[be̞ɾibol].
40		(0.2)
41	Bumbyn	[valibol].
42		(0.2)
43		okay.
44	Riku	hn:.

Gloss

The recipient of the trouble source orients to [klʌ] as an unintelligible pronunciation for "club" and the producer of the trouble source self-repairs it to [klʌb].

Segmental Repair: [klʌ] → [klʌb]

syllable coda consonant insertion: Ø → [b] HFL

Gloss

The recipient of the trouble source orients to [be̜ribe̜l] as an unintelligible pronunciation for "volleyball" and the producer of the trouble source self-repairs it to [be̜ribol]. The recipient of the trouble source further adjusts the pronunciation to [valibol] even though intelligibility had already been restored.

Segmental Repair: [be̜ribe̜l] → [be̜ribol]

Syllable nucleus vowel quality modification: [e̜] → [o] HFL

Sufficiency Adjustment: [be̜ribol] → [valibol]

Example 5: Self-initiation, self-repair & sufficiency adjustment

Example 6: Other-initiation, self-repair & sufficiency adjustment

1	Kawase	uh.
2		(1.5)
3		not [kompɪʃɯn] speed ano:.
4		(1.4)
5		[konβɪʃɯn].
6		(0.1)
7		((taps on something plastic))
8		(0.2)
9	Zhan	[kompɪʃən]?
10		(0.6)
11	Kawase	[kompɪʃən].
12		(0.4)
13		[konβɪʃən].
14	Zhan	↑ah. [kompi]-
15		(0.2)
16	Kawase	{[kom]-}
17	Zhan	{[kom }pitɪʃən].=
18	Kawase	=[kompitɪʃən].
19		(2.1)
20		form ovu.
21		(1.7)
22		[ski.iŋg].
23		(1.0)
24	Zhan	[stiŋk]?
25		(0.1)
26	Kawase	[ski.ɪn].
27		(0.3)
28	Zhan	ah. [s]- [ski].

29		(0.3)
30		[ski].
31	Kawase	[ski].
32		(1.3)
33	Zhan	so:?
34		(0.6)
35		>ah<.
36		(0.2)
37		do you mean [skin]?
38		(1.6)
39		its
40		(0.3)
41		in the:
42		(0.3)
43		winter.
44		(1.9)
45		i:n the sno-. in the snows.
46		(0.7)
47		you go [skin]?
48		(0.9)
49	Kawase	haha. $yeah$ $yeah$.

Gloss

The producer of the trouble source orients to [kompɪʃʌn] as an unintelligible pronunciation for "competitive" and the producer of the trouble source self-repairs it to [konβɪʃən]. The recipient of the trouble source further adjusts the pronunciation to [kompitɪʃən] even though intelligibility had already been restored.

Segmental Repair: [kompɪʃʌn] → [konβɪʃən]
syllable coda consonant modification: [m] → [n] HFL
syllable onset consonant modification: [p] → [β] HFL
syllable nucleus vowel quality modification: [ɯ] → [ə] HFL

Sufficiency Adjustment: [konβɪʃən] → [kompitɪʃən]

Gloss

The recipient of the trouble source orients to [ski.ɪŋg]. as an unintelligible pronunciation for "ski" and the producer of the trouble source self-repairs it to [ski.ɪn]. The recipient of the trouble source further adjusts the pronunciation to [ski] even though intelligibility had already been restored.

Segmental Repair: [ski.ɪŋg] → [ski.ɪn]
syllable nucleus vowel quality modification: [ɪ] → [i] HFL
syllable coda consonant modification: [ŋ] → [n] LFL
syllable coda consonant deletion: [g] → Ø HFL

Sufficiency Adjustment: [ski.ɪn] → [ski]

Example 7: other-initiated, self-repair (reversion segmental repair)

1	Zhan	first different.
2		(0.3)
3		difference is.
4		(1.7)
5		hm::.
6		(0.3)
7	Chaya	is what?
8		(0.6)
9		eh?
10		(0.3)
11	Zhan	the len-. the length ande::.
12		(0.2)
13	Chaya	yeah.
14		(0.2)
15		{[dɪgɾi] }
16	Zhan	{( )}
17		(0.1)
18		((sound of a knock on a desk))
19		(0.1)
20	Chaya	ah.=
21	Zhan	=[di]-
22		(0.2)
23		[digɻi]?
24	Chaya	[digɾi].
25		(0.1)
26		[digɾi] of.
27		(0.5)
28	Zhan	ah. [digɻi] of.
29		(0.2)

30	Chaya	[digɾi].
31		(0.5)
32	Zhan	hn.
33		(0.9)
34		[dɪgɹi]?
35	Chaya	yes.
36	Ryosuke	hm hm::.
37	Chaya	yes.
38		(0.2)
39	Zhan	[dɪgɹi] of.
40		(0.3)
41	Chaya	of opening mouth.
42	Zhan	↑ah.
43		(0.2)
44		ye{s:. }
45	Ryosuke	{ah.}
46		(2.4)
47	Zhan	english is more rounded.
48		(0.1)
49	Chaya	hm.
50	Zhan	yes.
51	Chaya	yes.
52	Zhan	yes I think so.

Gloss

The recipient of the trouble source orients to [dɪgɾi] as an unintelligible pronunciation for "degree", proffering [dɪgɹi] as an intelligible candidate pronunciation. But the producer of the trouble source self-repairs it to (reverts it back to) [dɪgɾi].

Segmental repair: [dɪgɹi] → [dɪgɾi]

syllable onset consonant modification: [ɹ] → [ɾ] LFL

Example 8: self-initiated, self-repair & sufficiency adjustment

Example 9: other-initiated, self-repair

1	Zhan	so whi-
2		(0.2)
3		which [gɹeɪː]?
4		(0.4)
5		so,
6		(1.3)
7		which [gɹeɪː].
8		(0.6)
9		I mean.
10		(0.6)
11	Teruki	uh? sorry?
12		(0.3)
13	Zhan	which [gɹeɪt]?
14		(1.3)
15	Teruki	ah.
16		(0.5)
17		yeah.
18		(0.4)
19	Zhan	are you
20		(0.1)
21		in.
22		(0.1)
23		now.
24		(1.2)
25	Teruki	are in now?
26		(0.5)
27	Zhan	hm.
28		(0.3)

29	Teruki	eh?
30		(0.1)
31	Zhan	now?
32		(0.5)
33		now whi- which [gɻeɪd] are you in now?
34		(0.7)
35	Nao	ohw.
36		(0.3)
37		your [gɹeɪd]?
38		(0.3)
39	Zhan	↑yeah. [gɻeɪd].
40	Nao	[gɹeɪd].
41	Zhan	now.
42		(0.2)
43	Teruki	I:-=
44	Nao	=[sɛkʌ{n}]-
45	Teruki	{[s}eken] [gɹeɪd].
46		(0.6)
47	Nao	si:r?
48		(0.1)
49	Teruki	[seken] [gɹeɪ].
50		(1.3)
51	Zhan	[seken]?
52		(0.2)
53	Teruki	[seken].
54		(0.6)
55	Zhan	similar.
56		(1.3)
57	Nao	yeah. no.
58		(0.4)

59		uh-=
60	Teruki	=no.
61		(0.2)
62		jap-
63		(.)
64		[seken] [gɹeɪz].
65		(0.4)
66	Nao	.hhh
67		(1.4)
68		yeah?
69		(2.3)
70	Zhan	[seken]?
71		(0.1)
72	Teruki	[sekʌndɯ̆].
73		(0.5)
74	Zhan	[sekʌnd]?
75		(0.2)
76	Teruki	[sekʌn] [gɹeɪd].
77		(0.3)
78	Zhan	↑ah. yeah. got it.
79		(0.3)
80	Nao	hm.
81		(0.2)
82	Teruki	yeah.

Gloss

The producer of the trouble source orients to [gɻeɪː] as an unintelligible pronunciation for "grade" and the producer of the trouble source self-repairs it to [gɻeɪt]. The producer of the trouble source further adjusts the pronunciation to [gɻeɪd] even though intelligibility had already been restored.

Segmental repair: [gɻeɪː] → [gɻeɪt]

syllable coda consonant insertion: Ø → [t] HFL

Sufficiency adjustment: [gɻeɪt] → [gɻeɪd]

Gloss

The producer of the trouble source orients to [seken] as an unintelligible pronunciation for "second" and the producer of the trouble source self-repairs it to [sɛkʌn].

Segmental repair: [seken] → [sekʌn]

syllable nucleus vowel quality modification: [e] → [ʌ] HFL

Example 10: other-initiated, other-repair

1	Midori	so:.
2		(0.2)
3		uhm?
4		(0.6)
5		you.
6		(0.4)
7		said.
8		(0.1)
9		you.
10		(0.8)
11		were from china?
12	Zhan	yeah.
13	Midori	an:
14		(0.8)
15	Zhan	s- >[häjuɛβɚbɪntut͡ɕaɪnə]<?
16	Midori	↑hn?
17		(0.2)
18	Zhan	>[häjuɛβɚbɪntut͡ɕaɪnə]<?
19		(0.6)
20	Midori	[hə]?
21		(0.3)
22	Zhan	[häjuː].
23		(0.2)
24		[ɛβɚ].
25		(0.1)
26		[bɪntu]?
27		(0.1)
28		[t͡ɕʰaɪn]?
29		(0.2)

30		[t͡ɕʰaɪnə]?
31		(0.7)
32	Midori	$sorry$ haha.
33		(0.2)
34	Zhan	{[häju] }
35	Midori	{can you }
36		(.)
37	Zhan	[ɛβɚbɪntut͡ɕaɪnə].
38		(0.3)
39	Midori	<[haʊː] [juː]>?
40	Zhan	[hä]- [↑häv].
41		(0.3)
42		[häβju],
43		(0.4)
44	Midori	[häʊju]?
45		(0.2)
46	Zhan	[häβ]?
47		(0.8)
48	Zhan	{[häβ]}.
49	Midori	{[häv]} [juː]?
50		(0.2)
51	Zhan	hm.
52	Midori	↑ah. {I- Ive never } been to china.
53	Zhan	{>°[häjuɛβɚbɪntutɕaɪnə]°?<}
54		(0.1)
55	Midori	Im sorry.

Gloss

The recipient of the trouble source orients to [häjuɛβɚbɪntut͡ɕaɪnə] as an unintelligible pronunciation for “have you ever been to China” and the recipient of the trouble source self-repairs the [häju] portion of the utterance to [hävjuː].

Segmental repair: [häju] → [hävjuː]
syllable coda consonant insertion: Ø → [v] HFL

Example 11: self-initiated, self-repair

1	Hathai	and you?=
2	Miya	=I have a dog.
3		(0.3)
4	Hathai	dog?
5		(0.1)
6		one dog?
7		(0.3)
8	Miya	one dog.
9		(0.5)
10	Hathai	how [ol] is she?
11		(0.1)
12		how [ol]?
13		(0.3)
14		how [odɪs]?
15		(0.5)
16	Miya	[oːd]?
17		(0.4)
18	Hathai	how [ol]?
19		(0.4)
20	Miya	[old]?
21	Masashi	how [oʊld]?
22	Hathai	hm. how [old]?
23		(0.1)
24	Miya	like,
25		(0.3)
26		dog?
27		(0.6)
28	Hathai	hm:. dog.=
29	Miya	=↑ah.

30		(0.2)
31		yea::h. seven years {so.}
32	Hathai	{se }ven years.
33		(0.1)
34		woah.
35	Masashi	hm::.
36		(0.4)
37		too longu.
38	Miya	hm hm:.

Gloss

The producer of the trouble source orients to [ol] as an unintelligible pronunciation for "old" and the producer of the trouble source self-repairs it to [old].

Segmental repair: [ol] → [old]

syllable coda consonant insertion: Ø → [d] HFL

Example 12: other-initiated, other-repair

1	Hathai	do japanese people usually eat [seɪd͡ʒi].
2		(0.2)
3		like
4		(0.3)
5		normally?
6		(0.8)
7	Kumi	{hm.}
8	Hathai	{not.} or only ea:t.
9		(0.2)
10		[seɪd͡ʒi] only:.
11		(0.3)
12		when its come to be new year?
13		(1.2)
14	Mitsu	uhm::.
15		(1.5)
16		I.
17		(1.0)
18		I eat
19		(1.0)
20		new year.
21		(0.6)
22	Hathai	ah: you eat only {new year}.
23	Mitsu	{only: }.
24		(0.3)
25	Hathai	only new year.
26		(0.6)
27		how about you?
28		(0.7)
29	Kumi	[se]- [seɪd͡ʒi]?

30		(0.1)
31	Hathai	yeah.
32		(0.5)
33	Kumi	[seɪd͡ʒi]?
34		(0.1)
35	Mitsu	[oset͡ɕi].
36		(0.1)
37	Kumi	{oh:::. }
38	Hathai	{[set͡ʃi].} [set͡ʃi]. [set͡ʃi].
39		(0.7)
40	Kumi	[oset͡ɕi].
41		(0.2)
42		ohw::.
43		(0.7)
44		new years only.
45		(0.1)
46	Hathai	new years only.
47		(0.2)
48		okay::.

Gloss

The recipient of the trouble source orients to [seɪd͡ʒi] as an unintelligible pronunciation for "osetchi" and the recipient of the trouble source repairs it to [oset͡ɕi].

Segmental repair: [seɪd͡ʒi] → [oset͡ɕi].
syllable onset consonant insertion: Ø → [o] HFL
syllable nucleus vowel quality modification: [eɪ] → [e] HFL
syllable onset affricate consonant modification: [d͡ʒ] → [t͡ɕ] LFL

Example 13: Other-initiated, other-repair

Zhan	so:, do you ha-
	(0.2)
	have any hobbies?
	(0.5)
Daiki	↑ah.
	(0.7)
	my- my hobby izs::
	(0.4)
	[ɾidiŋ] books.
	(0.5)
Zhan	[ɾidiŋ]?
	(0.2)
Daiki	{[ɾid]-}
Zhan	{[ɻid] }[iŋ]?
Daiki	[ɾi]- [ɾidɪŋ]. [ɾidɪŋ].
	(.)
Zhan	[ɻidɪŋ]?
Daiki	[↑ɹidɪŋ] books.
	(0.5)
Zhan	hn.
	(0.1)
	[ˈɻidiŋ]?
	(0.1)
Daiki	yeah.
	(0.1)
Zhan	ah::.
	(0.4)
Daiki	yeah
	(0.3)

30		un::de:-=
31	Zhan	=you like [ɹidiŋ].
32		(0.1)
33	Daiki	uhn?
34		(0.2)
35	Zhan	you like [ɹidɪŋ].
36		(0.6)
37	Daiki	uh yes.
38		(0.1)
39		I like [ɾidɪŋ].
40		(0.2)
41	Zhan	what kind of books do you [ɹid]?

Gloss

The recipient of the trouble source orients to [ɾidiŋ] as an unintelligible pronunciation for "reading" and the recipient of the trouble source repairs it to [ɹidɪŋ].

Segmental repair: [ɾidiŋ] → [ɹidɪŋ]

syllable onset consonant modification: [ɾ] → [ɹ] LFL

Example 14: other-initiated, self-repair

1	Hathai	my hobby is:.
2		(1.0)
3		[ɹi.tiŋ],
4		(0.5)
5	Midori	[ɹitiŋ]?
6	Hathai	[ɹidiŋ].
7		(0.2)
8	Midori	[ɹidiŋ]?
9		(0.2)
10	Hathai	[ɹid͡ʒiŋ].
11		(0.3)
12		[ɹidiŋ] {comics.}
13	Ryo	{hm: ah.}
14	Midori	ah really. {oh. }
15	Hathai	{{yeah}[ɹidiŋ] comics.}
16	Ryo	{{oh. } [ɾidiŋ] comics.}
17		(0.4)

Gloss:

The recipient of the trouble source orients to [ɹi.tiŋ] as an unintelligible pronunciation for "reading" and the producer of the trouble source repairs it to [ɹidiŋ].

Segmental repair: [ɹitiŋ] → [ɹidiŋ]

syllable onset consonant modification: [t] → [d] HFL

Example 15: self-initiated, other-repair

1	Maki	uhm.
2		(0.5)
3		I went to asakusa.
4	Jia	hm:{:.}
5	Maki	{la}st year.
6		(0.4)
7		its so famous.
8	Jia	hm{::.}
9	Maki	{an} good. .hhh
10		(0.1)
11		so traditional::.
12		(0.7)
13		[ʃɹeɪn]?
14		(0.1)
15	Jia	hm::. [ʃɻaɪn]?
16		(0.1)
17	Maki	[ʃɹaɪn]. yeah. so good.
18	Jia	hm::.
19		(0.5)
20		so what do you think?
21	Ryo	disneyland.

Gloss

The producer of the trouble source orients to [ʃɹeɪn] as an unintelligible pronunciation for "shrine" and the recipient of the trouble source repairs it to [ʃɻaɪn].

Segmental repair: [ʃɹeɪn] → [ʃɹaɪn]

syllable nucleus vowel quality modification: [eɪ] → [aɪ] HFL

Example 16: other-initiated, self-repair

1	Jia	since beijing- since ↑peking has a: [ʃʌb.weɪ].
2		(0.4)
3	Mako	[ʃʌb.we]?
4	Jia	[ʃʌb.weɪ].
5		(1.2)
6		niigata don't have,
7		(0.6)
8		didn't have,
9		(0.3)
10		don't have,
11		(0.1)
12		[ʃʌb.weɪ],
13		(0.3)
14	Mako	[ʃɑ.ɰɯ]?
15		(1.8)
16	Jia	[sʌb.weɪ].
17		(0.3)
18	Mako	[sʌb.weɪ]?
19		(0.2)
20	Jia	hm.
21	Mako	↑oh >yeah yeah< ah. >I know I know<.

Gloss

The recipient of the trouble source orients to [ʃʌb.weɪ] as an unintelligible pronunciation for "subway" and the producer of the trouble source repairs it to [sʌb.weɪ].

Segmental repair: [ʃʌb.weɪ] → [sʌb.weɪ]

syllable onset consonant modification: [ʃ] → [s] HFL

Example 17: self-initiated, self-repair

1	Mizuki	how do you like in $niigata$?{haha}
2	Zhan	{haha}
3		(1.3)
4	Mizuki	{I want} to know:.
5	Zhan	{hm: : :}
6		(2.1)
7	Mizuki	do you like it?
8		(1.6)
9	Zhan	yea:h I think its very [kliːn].
10		(0.6)
11		[ˈkə̆.lin].
12		(0.1)
13		tidy.
14	Mizuki	[kə̆lin].
15		(0.2)
16		↑ohw::. {yeah} ah::. I know.
17	Zhan	{I did}

Gloss

The producer of the trouble source orients to [kliːn] as an unintelligible pronunciation for "clean" and the producer of the trouble source repairs it to [ˈkə̆.lin].

Segmental repair: [kliːn] → [ˈkə̆.lin]

syllable nucleus vowel insertion: Ø → [ə̆] HFL

Example 18: self-initiated, self-repair & sufficiency adjustment

1	Hathai	and
2		(0.6)
3		my hometown is.
4		(0.1)
5		inde
6		(0.4)
7		[ŋɑ].
8		(0.4)
9		[ŋɔ.ˈθis]?
10		(0.3)
11		[ˈŋɔ.θis].
12		(0.6)
13		ish.
14		(0.2)
15		[ŋɑ]- [ˈŋɔs.is] thailand.
16		(0.4)
17	Ryo	ah. [no˞θ.ist]. hm:.
18		(1.1)
19	Hathai	an::d.

Gloss

The producer of the trouble source orients to [ŋɔ.ˈθis] as an unintelligible pronunciation for "north east" and the producer of the trouble source repairs it to [ˈŋɔs.is]. The recipient of the trouble source further adjusts the pronunciation to [no˞θ.ist] even though intelligibility had already been restored.

Segmental repair: [ŋɔ.ˈθis] → [ˈŋɔs.is]

syllable onset consonant modification: [θ] → [s] LFL

Sufficiency adjustment: [ˈŋɔs.is] → [no˞θ.ist]

Example 19: self-initiated, self-repair

1	Bumbyn	so: what is the major difference between japanese u and english u?
2		(1.1)
3	Mitsuhiro	hm::.
4		(0.4)
5	Bumbyn	maybe::.
6		(0.2)
7	Mitsuhiro	hm:.
8		(0.1)
9	Bumbyn	I think it’s almost,
10		(0.6)
11		[θɹoʊ]
12		(1.0)
13	Mitsuhiro	ah{: : : .}
14	Bumbyn	{[θɹuː] }. [θɹoʊt].
15		(0.2)
16		because
17		(0.2)
18	Mitsuhiro	hm:.
19		(0.1)
20	Bumbyn	when you say japanese u:.
21		(0.6)
22		your [θɹoʊt].
23		(0.4)
24		doesn’t participate.

Gloss

The producer of the trouble source orients to [θɹoʊ] as an unintelligible pronunciation for "throat" and the producer of the trouble source repairs it to [θɹoʊt].

Segmental repair: [θɹoʊ] → [θɹoʊt]

syllable coda consonant insertion: Ø → [t] HFL

Example 20: self-initiated, self-repair

1	Jia	you, you,
2		(0.4)
3		you ↑take
4		(0.1)
5		a bus?
6		(0.1)
7		take-
8		(0.8)
9		take a bus?
10		(0.5)
11	Yuko	no no no. I::,
12		(0.6)
13		take a [tɹeɪ]?
14		(1.2)
15		[tɹeɪn].
16		(0.6)
17	Jia	[tɹeɪn]. ↑ah.
18		(0.4)
19		hm:.
20		(0.7)
21		okay so how long?
22		(0.2)
23		how long does it take?
24		(0.4)
25	Yuko	uhm:::.
26		(0.8)
27		one hours?
28		(0.2)
29	Jia	hm:::.

Gloss

The producer of the trouble source orients to [ɹeɪ] as an unintelligible pronunciation for "train" and the producer of the trouble source repairs it to [ɹeɪn].

Segmental repair: [ɹeɪ] → [ɹeɪn]

syllable coda consonant insertion: Ø → [n] HFL

Example 21: Self-initiated, self-repair

1	Zhan	did you do some [fa˞]?
2		(0.1)
3		[fa˞.mə.wɝk].
4		(0.2)
5		[fa˞m.wɝk].
6		(0.6)
7	Hiroki	[hoʊm.wɝ]?
8		(0.2)
9		uhn?
10	Zhan	[ˈfa˞.mɯ̆].
11		(0.1)
12	Hiroki	[fa˞m]- ↑ah. [fa˞m.wɝk].
13	Zhan	[fa˞m.wɝk].
14		(0.2)
15	Hiroki	uh:::.
16		(0.4)
17	Zhan	[fa˞m.wɝk].
18		(0.2)
19	Hiroki	hm::.
20		(0.7)
21		I::,
22		(1.2)
23		I::.
24		(0.4)
25		dont.
26		(0.9)
27		hm::.
28		(1.1)
29		do [fa˞m.wɝk].

Gloss

The producer of the trouble source orients to [hoʊm.wɝ] as an unintelligible pronunciation for "farm work" and the producer of the trouble source repairs it to [fa˞m.wɝk].

Segmental repair: [hoʊm.wɝ] → [fa˞m.wɝk]
syllable onset consonant modification: [h] → [f] HFL
syllable nucleus vowel quality modification: [oʊ] → [a˞] LFL
syllable coda consonant insertion: Ø → [k] HFL

Example 22: Other-initiated, self-repair (reversion segmental repair)

1	Takeshi	do you eat.
2		(0.5)
3		often,
4		(0.5)
5		do you eat often:.
6		(0.6)
7		[fɪʃ] in niigata?
8		(0.4)
9	Zhan	[fɪt͡ʃ]?
10		(0.5)
11	Takeshi	[fɪʃ].
12	Zhan	ah [fɪʃ]=
13	Takeshi	=[fɪʃ].
14		(1.0)
15	Zhan	.hhh
16		(0.6)
17	Takeshi	neve{r?}
18	Zhan	{no}::?
19		(0.3)
20		I never eat {[fɪʃ]} because,
21	Takeshi	{oh:}
22		(0.9)
23	Zhan	I don’t know how to make it. how to cook it.

Gloss

The recipient of the trouble source orients to [fɪʃ] as an unintelligible pronunciation for “fish”, proffering [fɪt͡ʃ] as an intelligible candidate pronunciation. But the producer of the trouble source self-repairs it to (reverts it back to) [fɪʃ].

Segmental repair: [fɪt͡ʃ] → [fɪʃ]

syllable coda consonant modification: [t͡ʃ] → [ʃ] LFL

Example 23: Other-initiated, self-repair

1	Mari	I:: hm.
2		(0.4)
3		I want to:: watch contact.
4		(0.4)
5	Hathai	a{h: :.}
6	Mari	{hm.}
7		(0.4)
8	Hathai	you think its going to be a [gu] movie?
9		(0.4)
10	Mari	hm?
11		(0.4)
12	Hathai	do you think its going to be a
13		(0.1)
14		[gud] movie.
15		(0.2)
16	Mari	ah. yeah. hm::.
17		(0.2)
18	Hathai	hm:::. I see.
19		(0.8)
20		so you like movie about space?

Gloss

The recipient of the trouble source orients to [gu] as an unintelligible pronunciation for "good" and the producer of the trouble source repairs it to [gud].

Segmental repair: [gu] → [gud]

syllable coda consonant insertion: Ø → [d] HFL

Example 24: Self-initiated, self-repair

1	Madoka	I::- I like him when::. I waz::.
2		(0.5)
3		thirteen.
4		(0.1)
5	Zhan	ah. when.
6		(1.5)
7		when you are thirteen.
8		(0.4)
9	Madoka	thirteen,=
10	Mako	=hahaha{ha}. .hhh
11	Madoka	{ha}.
12		(0.2)
13	Madoka	I:::.-=
14	Zhan	=so [ɦaʊ̯]-
15		(0.1)
16	Madoka	{yes }
17	Zhan	{[ɦaʊ̯]} [oʊ̯ld] are you now? ha.
18		(0.6)
19	Madoka	ah.
20		(0.6)
21		I:: see::.
22		(0.8)
23		I watched.
24		(0.6)
25		this is when:.
26		(1.0)
27	Zhan	hn. [ɦaʊ̯] [oʊ̯də]- [ɦaʊ̯] [↑oʊ̯d] are you now?
28		(1.6)
29	Madoka	I am.

30	Zhan	hm.
31		(0.8)
32	Madoka	twenty old years.
33		(0.1)
34	Zhan	twenty.
35		(0.4)
36	Madoka	twenty.
37	Zhan	yeah. youre very young.

Gloss

The producer of the trouble source orients to [haʊ̯] [oʊ̯ld] as an unintelligible pronunciation for "how old" and the producer of the trouble source repairs it to [ɦaʊ̯] [oʊ̯d].

Segmental repair: [haʊ̯] [oʊ̯ld] → [ɦaʊ̯] [oʊ̯d]
syllable onset consonant modification: [h] → [ɦ] LFL
syllable coda consonant deletion: [l] → Ø HFL

Example 25: Self-initiated, self-repair (serendipitous non-segmental repair) & sufficiency adjustment

1	Mutsumi	uhn. (.) my: hobby is:.
2		(0.1)
3		to listening to:: the ↑[ko.ɾi.e̥] music.
4		(0.9)
5		[ko.ɾi.e̥].
6	Zhan	[ko]?
7		(0.4)
8		[ko]?
9	Mutsumi	[ko.ɾi.e̥n].
10		(0.2)
11		[ko.ɾi.e̥].
12		(0.3)
13	Zhan	[ko.ɾi]?
14		(0.1)
15	Mutsumi	[ko.ɾi.e̥n].
16	Zhan	s:. whats the meaning of [ko.ɾi.an]?
17		(0.2)
18	Mutsumi	[ˈko.ɾi.e̥n].
19		(1.3)
20		[ko.ɾi.e̥].
21		(0.7)
22		((sound of pen beginning to write))
23		(0.3)
22		<°[ko.ɹi.e̥n]°>. ((sound of pen writing on a table))
23		(1.6)
24	Zhan	↑ah.
25		(0.4)
26		[ko.ɹi.an].

27		(0.1)
28	Mutsumi	[ko.ɹi.ja]. .hh
29		(0.1)
30	Zhan	[ko.ɹi.a]. ah.
32		(0.2)
33	Mutsumi	°hahaha°
34	Zhan	yeah I got.
35	Mutsumi	.hhh haha{hahaha. }
36	Zhan	{$okay$.}

Gloss

The producer of the trouble source orients to [ko.ɾi.e̞] as an unintelligible pronunciation for "korea" and the producer of the trouble source repairs it to [ko.ɹi.e̞n]. The recipient of the trouble source further adjusts the pronunciation to [ko.ɹi.an] even though mutual intelligibility had already been restored.

Segmental repair: [ko.ɾi.e̞] → [ko.ɹi.e̞n]
syllable onset consonant modification: [ɾ] → [ɹ] LFL
syllable coda consonant insertion: Ø → [n] HFL

Sufficiency adjustment: [ko.ɹi.e̞n] → [ko.ɹi.an]

Example 26: other-initiated, self-repair (serendipitous non-segmental repair) & sufficiency adjustment

1	Ryosuke	ando I have:
2		(0.3)
3		[te̞.tl̩].
4		(0.5)
5	Hathai	[te̞t]. oh{: : : }
6	Ryosuke	{yeah}
7		(0.2)
8	Hathai	whats- what is that?
9		(0.3)
10		[te̞].
11		(0.3)
12		[te̞.tl̩].
13		(0.3)
14	Ryosuke	[te̞.tl̩]. uh::. .ssssh. hm::. .hhh
15		(0.2)
16		[te̞.tl̩]. is::: uh:.
17		(0.3)
18	Hathai	is that japanese word?
19		(0.5)
20	Misa	no. {no. no. eng}lish.
21	Ryosuke	{>no. no. no.<}
22		(0.2)
23		english. uh. [te̞.tl̩]. is uh::
24		(0.2)
25		sss.
26		(0.1)
27		hm::=
28	Hathai	=↑ah [tɝ.tl̩].

29	Ryosuke	[tɜ˞.tl̩].
30	Hathai	>I know. I know. {okay. okay.}<
31	Misa	{hahahahaha}
32	Ryosuke	{hahahahaha} okay. okay. yeah.

Gloss

The recipient of the trouble source orients to [te̞.tl̩] as an unintelligible pronunciation for "turtle" and the producer of the trouble source repairs it through explanation. The recipient of the trouble source nonetheless articulates "turtle" as [tɜ˞.tl̩] even though mutual intelligibility has already been restored.

Segmental repair: [te̞.tl̩] → [tɜ˞.tl̩]
syllable nucleus vowel quality modification: [e̞] → [ɜ˞] LFL

Sufficiency adjustment: [te̞.tl̩] → [tɜ˞.tl̩]

Example 27: Self-initiated, self-repair (serendipitous non-segmental repair) & sufficiency adjustment

1	Riku	because.
2		(0.2)
3		english language and german language. .hhh is the.
4		(0.7)
5		uh:n. s-
6		(0.4)
7		in.
8		(0.3)
9		in the same family.
10		(0.2)
11	Ai	oh.
12	Riku	the {fami }ly language.
13	Ai	{same}
14		(.)
15		same [wɝd.o.dɚ].
16		(0.9)
17		[wɝd].
18		(0.5)
19	Riku	{>is it-<}
20	Ai	{[wɝd }o.dɚ].
21		(0.4)
22		ohw.
23		(0.7)
24		yeah.
25	Riku	°whats this mean°?
26	Ai	khh.
27		(0.6)
28		[wɝd].

	(0.1)
	khh.
	(0.3)
	[wɝd.o.dɚ].
	(0.3)
Zhan	[o]?
	(0.1)
Riku	[wɝd.o.de̥]?
Ai	[o˞.dɚ].
	(0.4)
Zhan	[o.dɚ]?
	(0.4)
Ai	[oʊ]? >°hahaha°.<
	(0.5)
	yeah.
	(0.5)
	((sounds of writing on paper))
	(1.1)
Riku	hn hn. I don’t know {the meaning.}
Ai	{the object. }and subject. next is.
	(0.2)
Riku	↑ah. [we̥d.o.dɚ]?
Ai	yeah.
	(0.1)
Riku	{yeah.}
Zhan	{°what} {it mean°? }
Riku	{in german.} in german.
	(1.0)
	language,
	(0.1)

59		uh::. at.
60		(0.3)
61		first.
62		(0.1)
63		uh::. subje:ct,
64		(0.3)
65		an::.
66		(0.1)
67		last.
68		(0.4)
69		an::.
70		(0.9)
71		object.
72	Ai	hm hmm:.
73		(0.8)
74	Riku	.hhh an yeah.
75		(0.9)
76		>it is<.
77		(0.4)
78		uh:: rule.
79		(0.6)
80		they have rule.
81		(0.1)
82		like.
83		(0.4)
84		uh.
85		(0.6)
86		verb.
87		(0.2)
88		must

89		(0.3)
90		be::.
91		(0.5)
92		uhn:. second.
93		(0.9)
94		second order.
95		(0.6)
96	Zhan	hm{: : : .}
97	Riku	{yeah.}
98		(0.3)
99	Ai	{hm::.}
100	Zhan	{yeah,}

Gloss

The producer of the trouble source orients to [wɝd.o.dɚ] as an unintelligible pronunciation for “word order” and the producer of the trouble source repairs it through explanation. The recipient of the trouble source nonetheless articulates “word order” as [we̞d.o.dɚ] even though mutual intelligibility has already been restored.

Segmental repair: [wɝd.o.dɚ] → [we̞d.o.dɚ]
syllable nucleus vowel quality modification: [ɝ] → [e̞] LFL

Sufficiency adjustment: [wɝd.o.dɚ] → [we̞d.o.dɚ]

Example 28: Other-initiated, self-repair (serendipitous non-segmental repair) & sufficiency adjustment

1	Atsuko	uh::m. what?
2		(0.4)
3		what did you do in your:: spring vacation? ↑last spring vacation?
4		(0.7)
5	Jia	ah laste spring {vaca}tion?
6	Atsuko	{yeah}
7	Jia	I.
8		(0.3)
9		I went to::.
10		(0.6)
11		uhn. kyo:to:,
12	Atsuko	kyoto.
13	Jia	o:saka:.
14	Atsuko	ah:.
15		(0.2)
16	Jia	[u.ˈt͡ʃi].
17		(0.3)
18	Atsuko	°to°.
19	Jia	[u.ˈt͡ʃi].
20		(0.3)
21	Atsuko	[u.ˈt͡ʃi]?
22	Jia	[u.ˈt͡ʃi].
23		(0.6)
24		[u.ˈt͡ʃi]. [u.ˈt͡ʃi].
25		(.)
26		macha no-=
27	Atsuko	=↑[ɯ.d͡ʑi].

28		(.)
29	Jia	>[ɯ.d͡ʑi].<
30	Ryota	↑ah:.=
31	Atsuko	=ah ah ah ah yeah yeah. hn.

Gloss

The receipient of the trouble source orients to [u.ˈt͡ʃi] as an unintelligible pronunciation for "Uji" (the name of a small city in Japan) and the producer of the trouble source repairs it through code switching (macha no/抹茶の). The recipient of the trouble source nonetheless articulates "Uji" as [ɯ.d͡ʑi] even though mutual intelligibility has already been restored.

Segmental repair: [u.ˈt͡ʃi] → [ɯ.d͡ʑi]
syllable nucleus vowel quality modification: [u] → [ɯ] LFL
syllable onset affricate consonant modification: [t͡ʃ] → [d͡ʑ] LFL

Example 29: self-initiated, self segmental repair

1	Kaede	yea:h.
2		(0.5)
3		after I enter this college:,
4		(0.4)
5		I:: study french ↑but.
6		(0.4)
7		haha I haven-
8		(0.2)
9		I didn know this.
10		(0.2)
11	Kanna	mha{haha.}
12	Kaede	{haha.}
13		(0.1)
14	Wu	hm in ↑my opinion:.
15		(0.1)
16	Kaede	uh hm.
17		(0.1)
18	Wu	I:::,
19		(0.3)
20		know the word before the class iz: the:.
21		(0.4)
22		[jʊ.ˈniːk]
23		(0.1)
24		uh [ˈjuː.nik].
25		(0.2)
26	Kaede	[ˈjuː.nik].
27		(.)
28	Kanna	↑ah::.=
29	Kaede	={°yeah°}

30 Wu =(ah. }
31 (0.1)
32 Kaede yeah.=
33 Wu =yeah.

Gloss

The producer of the trouble source orients to [jʊ.ˈniːk] as an unintelligible pronunciation for “unique” and the producer of the trouble source repairs it to [ˈjuː.nik].

Segmental repair: [jʊ.ˈniːk]→ [ˈjuː.nik].
syllable nucleus vowel quality modification: [ʊ] → [uː] LFL

Example 30: other-initiated, self repair

1	Xiang	I didn know: eh.
2		(0.5)
3		>the words like< engineer:.
4		(0.9)
5		eh- is.
6		(0.5)
7		is french word.
8		(1.9)
9		uh:.
10		(0.2)
11		I learned the first french words is:
12		(0.3)
13		.hhh [ɕo.kɻə].
14		(0.5)
15	Takeshi	[ˈɕɯ.krə]?
16		(0.1)
17	Xiang	[t͡ɕo.kɻəts].
18		(0.3)
19	Takeshi	↑ah. {yes yes.}
20	Xiang	{hm: : : : }

Gloss

The recipient of the trouble source orients to [ɕo.kɻə] as an unintelligible pronunciation for "unique" and the producer of the trouble source repairs it to [t͡ɕo.kɻəts].

Segmental repair: [ɕo.kɻə]→ [t͡ɕo.kɻəts]

syllable onset consonant modification: [ɕ] → [t͡ɕ] LFL

syllable coda consonant insertion: Ø → [t] HFL

syllable coda consonant insertion: Ø → [s] HFL

Example 31: other-initiated, self-repair

1	Xiang	uhm:,
2		(1.2)
3		you have to::.
4		(0.8)
5		do some::.
6		(0.2)
7		[d͡ʑɑb.ɦʌn.tins].
8		(0.7)
9	Mizuki	what?
10		(0.7)
11	Xiang	[d͡ʑɑb.hʌn.tin]=
12	Mizuki	=↑ah yeah thats right.
13		(1.2)
14		hahaha so, {yeah.}
15	Xiang	{what} did you want to be?
16		(0.3)
17		uhm:: I want to be

Gloss

The recipient of the trouble source orients to [d͡ʑɑb.ɦʌn.tins] as an unintelligible pronunciation for "job hunting" and the producer of the trouble source repairs it to [d͡ʑɑb.hʌn.tin].

Segmental repair: [d͡ʑɑb.ɦʌn.tins] → [d͡ʑɑb.hʌn.tin]
syllable onset consonant modification: [ɦ] → [h] LFL
syllable coda consonant deletion: [s] → Ø HFL

Example 32: other-initiated, self-repair & sufficiency adjustment

1	Xiang	how- how old?
2		(0.2)
3		are you?
4		(0.7)
5	Mika	h:::? {hahahahahahaha}
6	Kaede	{hahahahahahaha}
7		(1.0)
8	Mika	haha{haha}
9	Kaede	{haha}
10		(0.1)
11	Xiang	it's a [si.kɻit].
12		(0.5)
13	Mika	.hhh [siks.ti]?
14		(0.2)
15	Xiang	uh [si.kɻits].
16		(0.7)
17	Mika	↑ah:. {hahahahahaha.}
18	Xiang	{[si.kɻɛt]. sorry.} okay?}
19	Kaede	{hahahahahaha}hahaha.}
20		(0.1)
21	Mika	hm::.
22		(1.7)
23	Xiang	you looks very young.
24		(0.4)
25	Mika	°yeah°

Gloss

The recipient of the trouble source orients to [si.kɻit] as an unintelligible pronunciation for "secret" (but possibly indicative of "sixty") and the producer of the trouble source repairs it to [si.kɻits]. Furthermore, the producer of the trouble source further adjusts the pronunciation to [si.kɻɛt] even though mutual intelligibility has already been restored.

Segmental repair: [si.kɻit] → [si.kɻits]
syllable coda consonant insertion: Ø → [s] HFL

Sufficiency adjustment: [si.kɻits] → [si.kɻɛt]

Example 33: other-initiated, self-repair

1	Sae	how bow chew.
2	Moe	ah.
3		(0.5)
4		Im from {akita. }
5		{((click))}
6		(0.2)
7		((click))
8	Sae	↑akita.
9		(0.4)
10		{ah.}
11	Moe	{aki}ta. .hhh eto::::. north of japan.
12	Sae	hm yeah=
13	Xiang	=.hhh I know.
14		(0.2)
15		.hhh I hear.
16		(0.9)
17		there are very::
18		(1.2)
19		there are ↑many ↑beautiful girls in akita.
20	Sae	↑yes ↑yes=
21	Moe	=yeah yeah no no no. haha. no {no no}
22	Sae	{me too. }
23		(.)
24	Moe	no no=
25	Sae	=wow.
26		(0.8)
27		good.
28		(0.3)
29	Xiang	an.

30		(0.3)
31		((something turning over))
32		(0.2)
33		youre ink [skinz] I think.
34		(0.1)
35		((laughter from a different group))
36	Moe	[ski]?
37		(0.1)
38	Xiang	[skin].
39		(0.3)
40		[skin].
41		(0.3)
42	Moe	[skɪn]?
43		(0.2)
44		↑ah. thank you. ha{hahahahaha}
45	Sae	{hahahahaha}
46	Xiang	{hahahahaha}
47		(0.3)
48	Moe	.hhh
49		(0.2)
50		.hh
51		(0.3)
52	Xiang	really pretty.
53		(0.8)
54	Moe	hm. thank {you hahaha.}
55	Sae	{hahahahahaha}

Gloss

The recipient of the trouble source orients to [skinz] as an unintelligible pronunciation for "skin" and the producer of the trouble source repairs it to [skin]. Furthermore, the producer of the trouble source further adjusts the pronunciation to [si.kɻɛt] even though mutual intelligibility has already been restored.

Segmental repair: [skinz] → [skin]
consonant coda consonant deletion: [z] → Ø HFL

Example 34: other-initiated, self repair (serendipitous non-segmental repair)

1	Wu	an
2		(0.6)
3		uh when we should
4		(0.1)
5		repair these sentences?
6		(.)
7		.hhh
8		(0.1)
9		uh.
10		(0.2)
11		I:: will see:.
12		(0.7)
13		hm:.
14		(0.2)
15		↑this?
16		(0.8)
17		is a ↑[pɛə̯].
18		(0.6)
19		{a}
20	Keita	{a} [pɛə̯]?
21		(0.2)
22	Wu	a [pɛə̯] an.
23		(0.3)
24		I::,
25		(0.2)
26	Keita	>uh< excuse {me.}
27	Wu	{uh. }
28		(0.3)
29		an.

30		(0.3)
31		I::.
32		(0.4)
33		always.
34		(0.3)
35		said in
36		(0.3)
37		japanese,
38		(0.2)
39		.hhh kore wa ↑nash.
40		(0.7)
41	Keita	.hhh
42		(0.3)
43		↑ah::=
44	Wu	=uh::.
45	Keita	nashi {[pɛɚ].} okay. I- I understand.
46	Wu	{yeah.}

Gloss

The recipient of the trouble source orients to [pɛə̯] as an unintelligible pronunciation for "pear" and the producer of the trouble source repairs it through code-switching to Japanese. Furthermore, the recipient of the trouble source further adjusts the pronunciation to [pɛɚ] even though mutual intelligibility has already been restored.

Segmental repair: [pɛə̯] → [pɛɚ]
syllable nucleus vowel quality modification: [ə] → [ɚ] LFL

Example 35: other-initiated, self-repair (serendipitous non-segmental repair)

1	Xiang	so.
2		(0.1)
3		do you have any suggestions for the teacher.
4		(0.3)
5	Chiaki	hahaha.
6		(0.2)
7		↑.hhhh
8		(0.3)
9		uh::::.
10		(0.6)
11		I think this class?
12		(1.8)
13		uh::.
14		(1.0)
15		this class was very good class?
16		(0.4)
17		{uh : : : .}
18	Xiang	{[pɜ˞.fes]} ↑class.
19		(0.7)
20	Chiaki	hm?
21		(0.5)
22	Xiang	[pɜ˞.fes].
23		(0.2)
24	Chiaki	↑[pʰɜ˞]?
25		(0.2)
26	Xiang	[pʰ]- [pɻo.fes].
27		(0.3)
28	Chiaki	[pɻo.gres]?
29		(3.0)

30	Xiang	°japanese is kanpeki°
32		(0.2)
33	Chiaki	ah.
34		(0.1)
35		[pɝ.fekt]?
36		(0.4)
37		((plastic click—possibly an electronic dictionary closing))
38		(0.7)
39		ah:::,
40		(0.5)
41		[pɝ]?
42		(0.4)
43		[pɝː.fekt].
44		(0.3)
45		but.
46		(2.2)
47		yes:.
48		(0.1)
49		I-
50		(0.5)
51		I have
52		(0.2)
53		↑chance to:.
54		(0.3)
55	Xiang	hm:=
56	Chiaki	=talk eng:lish?
57		(0.1)
58	Xiang	hm:.
59		(0.7)
60	Chiaki	thats.

61	(0.6)
62	hm:.
63	(0.1)
64	thats goo::d.

Gloss

The recipient of the trouble source orients to [pɝ.fes] as an unintelligible pronunciation for "perfect" and the producer of the trouble source repairs it through code-switching to Japanese. Furthermore, the recipient of the trouble source further adjusts the pronunciation to [pɝ.fɛkt] even though mutual intelligibility has already been restored.

Segmental repair: [pɝ.fes] → [pɝ.fɛkt]
syllable coda consonant modification: [s] → [k] LFL
syllable coda consonant insertion: Ø → [t] HFL

Example 36: self-initiated, other-repair

1	Xiang	do you have any [prɛn] to:: uh:.
2		(0.8)
3		go to=
4	Mari	=uh hm
5		(0.9)
6	Xiang	english,
7		(0.2)
8		<countries>,
9		(0.7)
10		as {a ex}change students?=
11	Mari	{uh hm} =uh hm.
12		(0.1)
13	Xiang	do you have any [præn]?
14		(0.8)
15	Mari	[fɹɛnz]?
16		(0.5)
17		((sound of paper rustling))
18	Xiang	[præn].
19		(0.9)
20		((sound of pencil scraping paper))
21	Mari	[plæn]? ↑ah::.
22		(1.2)
23	Xiang	I heard,
24		(0.1)
25	Mari	{yeah}
26	Xiang	{that}
27		(0.2)
28		in this university there are ↑lots of programs {to::. }
29	Mari	{yeah.}

30		(0.6)
31	Xiang	go to:: canadas?
32	Mari	ah yeah {yeah.}
33	Xiang	{or } australee.
34		(0.1)
35	Mari	uh hn I-
36		(0.2)
37		ive already:,
38		(0.5)
39		hm::.

Gloss

The producer of the trouble source orients to [prɛn] as an unintelligible pronunciation for "plan" and the recipient of the trouble source repairs it to [plæn].

Segmental repair: [prɛn] → [plæn]
syllable onset consonant modification: [ɾ] → [l] HFL
syllable nucleus vowel quality modification: [ɛ] → [æ] HFL

Example 37: other-initiated, other-repair

1	Wu	I:: sed the-
2		(0.2)
3		I saw the:: glasses?
4		(0.9)
5		an the:
6		(0.5)
7		an::,
8		(0.6)
9		an the ↑cute animals.
10		(0.2)
11		tsh haha.
12		(0.7)
13	Keita	>cute an<- in asahikawa?
14	Wu	hn yeah.
15		(0.1)
16		a- a- asahi<yama>,
17		(0.2)
18		[d͡zɯn].
19		(0.7)
20	Keita	asahi?
21		(0.3)
22	Wu	asahiyama [d͡zɯn].
23		(0.2)
24	Keita	↑[d͡zɯ] ah.
25		(0.3)
26		oka:y?=
27	Wu	=hn=
28	Keita	=I know.
29		(0.5)

30	Wu	okay? okay?
31		(.)
32	Keita	Ive never been to that.

Gloss

The recipient of the trouble source orients to [d͡zɯn] as an unintelligible pronunciation for "zoo" and the recipient of the trouble source repairs it to [d͡zɯ].

Segmental repair: [d͡zɯn]→ [d͡zɯ]

syllable coda consonant deletion: [n] → Ø HFL

Example 38: sufficiency adjustment

1	Wu	an:de: I:: also. uh.
2		(0.5)
3		after::. I-
4		(0.2)
5		after I wen::t to hokkaido?
6		(0.1)
7	Hiro	uhm hm.
8		(0.2)
9	Wu	I: went to [ˈto.c^{h}ju].
10		(0.6)
11	Hiro	[ˈto.cjo].
12		(0.2)
13	Wu	[to.ci.o]. hm.
14		(0.2)
15	Hiro	{hm::.}
16	Wu	{fo:r::}
17		(0.3)
18		the new years day.

Gloss

The recipient of the trouble source orients to [ˈto.c^{h}ju] as a problematic pronunciation for "Tokyo", proffering [ˈto.cjo] as an sufficient pronunciation candidate. The recipient never orients to [ˈto.c^{h}ju] as unintelligible, however.

Sufficiency adjustment: [ˈto.c^{h}ju] → [ˈto.cjo]

Example 39: sufficiency adjustment

1	Keita	how bow chew?
2		(0.4)
3	Wu	uh::
4		(0.9)
5		uh:
6		(0.4)
7		I::.
8		(0.9)
9		uh.
10		(0.3)
11		with my::,
12		(0.4)
13		friend?
14		(0.2)
15	Keita	uh hm.
16		(0.5)
17	Wu	uh.
18		(0.2)
19		to<u>ge</u>ther::.
20		(0.2)
21		go: to:: the::.
22		(0.6)
23		ni:gata [sɪ.t͡ɕʷeɪ.ʃən].
24		(0.7)
25		{uh.}
26	Keita	{ni:}gata [steː.ʃən].
27		(0.1)
28	Wu	[sː.ˈteː.ʃən].
29		(0.1)

30		oh. sorry.
31		(0.1)
32	Keita	uh hm.
33	Wu	ni:gata [steː.ʃən].
34		(0.8)
35		an:de:.
36		(0.6)
37		go to for the::.
38		(0.2)
39		cinema.

Gloss

The recipient of the trouble source orients to [sɪ.t͡ɕʷeɪ.ʃən] as a problematic pronunciation for "station", proffering [steː.ʃən] as an sufficient pronunciation candidate. The recipient never orients to [sɪ.t͡ɕʷeɪ.ʃən] as unintelligible, however.

Sufficiency adjustment: [sɪ.t͡ɕʷeɪ.ʃən] → [steː.ʃən]

Example 40: sufficiency adjustment

1	Bumbyn	a:nd I really like che:ss,
2		(0.3)
3	Misa	hm{:::.}
4	Keita	{oh.}
5	Bumbyn	{so.}
6		(0.4)
7		from my childhood.
8		(0.3)
9		my grandfather,
10		(0.3)
11		taught me how to play chess?
12		(1.0)
13		a::nd
14		(0.7)
15		I really li- loved it.
16		(0.5)
17	Keita	hm. {hm.}
18	Bumbyn	{un }til now.
19		(0.2)
20		but I don-
21		(.)
22		now I don’t have ti:me,
23		(0.6)
24		o:r.
25		(0.3)
26		a chance to play:,
27		(0.5)
28		a chess?
29	Misa	ohw::.

30	Bumbyn	haha. {but I:} really want to play it.
31	Keita	{haha}
32		(0.3)
33	Bumbyn	an: >I know< like [ʃoʊ̯.goʊ̯]?
34		(0.4)
35		whats [ʃ]-=
36	Misa	=[ɕo.ɟi].
37		(0.1)
38	Bumbyn	[ʃo.ɟi].
39	Keita	$[ɕo.ɟi]$. hahaha{hahahaha{hahahahahaha}}
40	Misa	{$[ʃo.go]$.{hahahahahaha}}
41	Bumbyn	{hahahahahaha} $[ʃo.ɟi]$.

Gloss

The producer of the trouble source orients to [ʃoʊ̯.goʊ̯] as a potentially problematic pronunciation for "shogi". The recipient of the trouble source proffers [ɕo.ɟi] as an sufficient pronunciation candidate. The recipient never orients to [ʃoʊ̯.goʊ̯] as unintelligible, however.

Sufficiency adjustment: [ʃoʊ̯.goʊ̯] → [ɕo.ɟi]

Example 41: sufficiency adjustment

1	Michio	I:.
2		(0.2)
3		thi:nk.
4		(0.2)
5		>this<
6		(0.3)
7	Wu	{hm.}
8	Michio	{this } are:{s:t.}
9	Wu	{hm.}
10		(0.3)
11	Michio	crossed E.
12		(0.1)
13	Wu	hm::=
14	Michio	=uh:.
15		(0.5)
16		cha:nge to:: schwa.
17		(0.2)
18		{I think.}
19	Wu	{o- ohw:}
20		(0.3)
21		.hhh [a.ɻekt]?
22	Michio	like.
23		(0.1)
24		[ʊ˞.ekt].
25	Wu	[ɚ̆]?
26		(0.3)
27	Michio	[ə.lekt].
28		(0.2)
29	Wu	[ə.ɻekt]. ohw ohw. {yeah.}
30	Michio	{↑not.}

31		(0.1)
32		[i.lekt].
33		((metal clanging in the background))
34		[e.lekt].
35	Wu	{ohw ohw.}
36	Michio	{<I think.>} haha{ha}
37	Wu	{oh.}

Gloss

The recipient of the trouble source orients to [a.ɻekt] as a problematic pronunciation for "elect". The recipient of the trouble source proffers [ə.lekt] as an sufficient pronunciation candidate. The recipient never orients to [a.ɻekt] as unintelligible, however.

Sufficiency adjustment: [a.ɻekt] → [ə.lekt]

Example 42: First example of Phonetic Segment Resegmentation (This example is from a corpus that was not included in this project. However, the example was included to demonstrate that phonetic segment resegmentation exists but is rare.)

1	Ayaka	ah:::
2		(0.5)
3		I don know::↑ah.
4		(0.7)
5		but
6		(0.8)
7		ah. she::
8		(0.5)
9		she- uh- maybe she [laɪ̯ks] [ˈga.dɛn.iŋ].
10		(0.6)
11	Xue	[ˈskaɹ.dɛn.iŋ]?
12		(0.2)
13	Ayaka	[ˈga.dɛn.iŋ].
14	Xue	↑ah [ˈga.dɛn.iŋ]. oh. {okay. }
15	Ayaka	{[ga]- } yeah.
16		(0.3)
17		so in spring she::.
18		(0.7)
19		she grows some flowers.
20	Xue	↑hn:::.
21	Ayaka	yeah.

Gloss

The recipient of the trouble source orients to it as a problem in line 11, and the producer of the trouble source self-repairs it to restore mutual intelligibility by line 14.

Segmental Repair: [laɪ̯k.sga.dɛn.iŋ] → [laɪ̯ks.ga.dɛn.iŋ]

Example 43: Second example of Phonetic Segment Resegmentation (This example is from a corpus that was not included in this project. However, the example was included to demonstrate that phonetic segment resegmentation exists but is rare.)

1	Yi:	and I think that it is.
2		(0.1)
3		[tʊ] [gɹiːt]
4		(0.3)
5		.hhh
6		(0.4)
7		↑wonderful.
8		(2.6)
9	Miya:	hm. [tʊk] [ʰɰʌt]? ((took what?))
10	Yi:	[gɹiːt].
11		(1.4)
12	Miya:	ah. [gɹei̯t].
13		(0.3)
14	Yi:	yeah.
15		(1.1)
16	Miya:	hahahaha. okay. thank you:.

Gloss

The recipient of the trouble source orients to it as problematic in line 9, and then the producer of the trouble source self-repairs it to restore mutual intelligibility by at least line 12.

Segmental repair: [tʊg.ɹiːt] → [tʊ.gɹiːt]

Vita

George O’Neal
Department of Education
Waseda University
1-6-1 Totsukamachi
Shinjuku-ku, Tokyo

Education

Ph.D in Education (2019)
Waseda University
Ph.D in Global Community (2012)
Niigata University
M.A. in Teaching English to Speakers of Other Languages (2008)
San Francisco State University
Mandarin Chinese Language Certificate (2006)
Beijing Language & Culture University
BA in Japanese Literature (2001)
U.C. Berkeley

Employment

2008-current: Associate Professor, Niigata University, Japan
2006-2008: Teaching Assistant in the English Tutoring Center, San Francisco State University, America
2002-2005: Assistant Language Teacher at Yoshida Junior High School, Niigata, Japan

Honors, Awards, Grants, & Fellowships

2017-2019 Grants-in-Aid for Young Scientists B (No. JP17K17734)