UNIVERSIDADE FEDERAL DE SANTA CATARINA

THE EFFECTS OF TRAINING AND INSTRUCTION ON THE PERCEPTION OF

THE ENGLISH INTERDENTAL FRICATIVES BY BRAZILIAN EFL LEARNERS

NADIA KARINA RUHMKE-RAMOS

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CORRESPONDENTE

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Where there is a Will, there is a way.

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ABSTRACT

THE EFFECTS OF TRAINING AND INSTRUCTION ON THE PERCEPTION OF
THE INTERDENTAL FRICATIVES BY BRAZILIAN EFL LEARNERS

NADIA KARINA RUHMKE-RAMOS

UNIVERSIDADE FEDERAL DE SANTA CATARINA

2009

Supervising Professor: Barbara Oughton Baptista

The present study investigated the effect of training and instruction on the perception of English interdental fricatives by Brazilian EFL learners. The main objectives of the present study were to investigate (a) the extent to which (1) training and instruction and (2) training would enhance participants' perception of the interdental fricatives in word-initial position, and (b) the procedure which would be more effective in promoting change on the perception of the target sounds. The 53 participants enrolled at level three of English extracurricular course at UFSC were organized in Training Group (TG), Instruction-Training Group (ITG), and Control Group (CG). The researcher was in charge of the experimental groups (TG and ITG), and the treatment was organized in seven sessions of 30 minutes each throughout the first semester of 2008 when the data were collected. The TG received only perceptual training whereas the ITG received perceptual training and explicit instruction on the perception of the English interdental fricatives. All participants answered a profile questionnaire and

took a categorial discrimination test before and after the treatment period. The findings suggest that the procedures affected participants' perception even though a statistically significant result was found only for the contrast [θ]-[s] in the ITG. These results suggest that (1) training and instruction and (2) training seem to be effective tools to improve learners' perception of these sounds in pronunciation classes. Long term goals are necessary in order to investigate the effects of treatment. Thus, longitudinal studies and long term goals should be carried out in order to investigate the effectiveness of pronunciation training and instruction.

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RESUMO

OS EFEITOS DE INSTRUÇÃO E TREINAMENTO NA PERCEPÇÃO DOS FRICATIVOS INTERDENTAIS POR BRASILEIROS APRENDIZES DE INGLÊS COMO LÍNGUA ESTRANGEIRA (EFL)

NADIA KARINA RUHMKE-RAMOS

UNIVERSIDADE FEDERAL DE SANTA CATARINA

2009

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Este estudo investigou os efeitos do treinamento e da instrução na percepção das fricativas interdentais do inglês por brasileiros aprendizes de inglês como língua estrangeira. Os principais objetivos são investigar (a) até que ponto o (1) treinamento e instrução e (2) treinamento melhorariam a percepção das fricativas interdentais em posição inicial, e (b) qual procedimento seria mais eficaz na promoção da mudança na percepção dos sons alvos. Os 53 participantes matriculados no nível 3 do curso extracurricular da Universidade Federal de Santa Catarina foram organizados em Grupo de Treinamento (TG), Grupo de instrução e treinamento (ITG), e Grupo Controle (CG). A pesquisadora foi responsável pelo tratamento nos grupos experimentais (TG e ITG), o qual foi organizado em sete sessões de 30 minutos cada no decorrer do primeiro semestre de 2008, quando os dados foram coletados. O TG recebeu apenas treinamento perceptual, enquanto o ITG recebeu treinamento perceptual e instrução explícita na

percepção dos fricativos interdentais do inglês. Todos os participantes responderam a um questionário e a um teste de percepção (CDT) antes e depois do período de tratamento. Os resultados sugerem que os procedimentos afetaram a percepção dos participantes embora apenas o contraste [θ]-[s] no ITG tenha atingido resultados estatisticamente significativos. Os resultados também sugerem que (1) treinamento e instrução e (2) treinamento parecem ser ferramenta eficientes na melhora da percepção dos sons nas aulas de pronúncia. Entretanto, estudos longitudinais e com metas de longo prazo são necessárias para investigar os efeitos do tratamento de forma mais efetiva.

Número de páginas: 112 (excluindo apêndices), e 173 (incluindo apêndices)
Número de palavras: 26. 116 (excluindo apêndices)

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LIST OF ABREVIATIONS

AOA – Age of Arrival

EFL – English as a Foreign Language

ESL – English as a Second Language

FCM – Feature Competition Model

H5 – Hypothesis 5

L1 – First Language

L2 – Second Language

L2LP – Second Language Linguistic Perception Model.

NLM – Native Language Magnet

NNSs – Non-native speakers

NSs – Non-native speakers

OPM – Ontogeny Phylogeny Model

OT – Optimality Theory

P1 – Postulate 1

PAM – Perceptual Assimilation Model

PAM-L2 – Perceptual Learning Model

SLM – Speech Learning Model

UFSC – Universidade Federal de Santa Catarina

CHAPTER 1

INTRODUCTION

Although pronunciation instruction did not receive as much focus as vocabulary and grammar in the history of second/foreign language learning, and thus was not considered important to be taught, there has been some effort to reintroduce it to the ESL/EFL curriculum in recent years due to its probable contribution to learner's improvement (Celce-Murcia, Goodwin & Brinton, 1996; Morley, 1994; Pennington, 1994; Silveira, 2004). In the line of recent tendencies in the study of pronunciation acquisition, this study aims at investigating the influence of pronunciation training and instruction on the perception of the interdental fricatives – [θ] and [ð] – by Brazilian learners of English as a foreign language (EFL) in a classroom setting.

According to Dubois and Horvath (2004), the interdental fricatives are rare in the world's languages and are acquired late by native-speaking children. Maddieson (1984) carried out a detailed study involving 451 languages, and found that the interdental fricatives occur in only about 7% of these languages. The voiceless fricative occurs in 3.99%[1], and the voiced fricative is present in 4.88% of the languages investigated[2].

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[1] Percentage represents a total of 18 languages, as reported on the website http://web.phonetik.uni-frankfurt.de/S/S0153.html. However, it is already known that the voiceless fricative is also present in other languages that were not reported in the study, such as Icelandic (Ladefoged & Maddieson, 1996).

[2] Percentage corresponds to 22 languages that can be accessed on http://web.phonetik.uni-frankfurt.de/S/S0168.html. The voiced fricative also occurs as an allophone of the alveolar stop /d/ in formal Danish (Ladefoged & Maddieson, 1996).

In addition, Blevins (2006) claims that literacy[3], prescriptive norms, social convention and language contact also play an important role in the acquisition of these sounds which are part of standard varieties of English, such as British, American, and Australian but are not present in some varieties of Modern English. ESL and EFL learners also have a tendency to replace the interdentals by other sounds from their L1 inventory, as shown by Kabak (2004), who found that Turkish speakers of EFL tend to produce /θ/ as [t], whereas Korean speakers tend to produce it as [s]. Importantly, Blevins suggests that these replacements occur mainly due to the misperception of the interdental fricatives.

Some studies (Ahn, 2003; Cho & Lee, 2001; Eckman, 1977; Lee & Cho, 2002; Lombardi, 2000; Paradis & LaCharité, 1997, all as cited by Lee, 2006) have found a pattern of substitution for the voiceless interdental fricative. According to Lee's (2006) summary of these studies, /θ/ is replaced by [t] by Thai, Russian, Hungarian, Serbo-Croatian, Tagalog, Moroccan Arabic, Quebec French, and Xhosa speakers; and is replaced by [s] by Japanese, German, Egyptian Arabic, and European French speakers.

The interdental fricatives in English are represented by two distinct phonemes: /θ/ and /ð/ Giegerich (1992). Reis (2004) found that Brazilians EFL learners commonly replace the voiceless interdental fricative by [f], [t] and [s], and its voiced counterpart by [d], [v] and [z]. However, the problem is not restricted to the production of these sounds, but occurs also in perception. Reis (2006) found that, in production, /θ/ is most commonly replaced by [t] and /ð/ by [d], but in perception, /θ/ is commonly confused with [s], [t] and [f] and /ð/ with [d], [v] and [z].

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[3] Although literacy was not investigated in this study, this is an important concept to be taken into consideration. For further reading on the topic check Kleiman (1995), Soares (1999), and Xhafaj (2009).

Grounded in the findings of the studies cited above, mainly those of Reis, and on my personal interest in exploring the possibilities of foreign language pronunciation improvement in the classroom setting, [θ] and [ð] were selected as the object of this study. Perception was chosen as the skill to be investigated inasmuch as the problems identified in the production of the sounds may, as suggested by Blevins (2006), be related to the misperception of these sounds. However, misperception is not the only cause for mispronunciation. There are other variables that may influence the inaccurate production, such as, inadequate phonetic input, motivation, motoric difficulties, inadequate habit formation (Flege, 1995; Reis, 2006).

Pronunciation enhancement has been studied in relation to the effects of training and instruction. In general terms, in this study, *training* denotes practice per se, without metalinguistic input, whereas *instruction* denotes learning activities involving practice and metalinguistic input.

The concepts of training and instruction in this study are related to the constructs of *explicit* and *implicit* instruction, which will be discussed in the review of the literature, along with the benefits found to be obtained by training and instruction and the treatment of perception in empirical studies.

Since the interdental fricatives have been found to be difficult for Brazilian Portuguese speakers (e.g. Reis 2006), as for speakers of other languages which do not have them in their phonological inventory (e.g. Kabbak, 2004; Lee, 2006; Wester, Gilbers and Lowie, 2007) the relevance of this thesis lied in the identification of how pronunciation training and instruction can help to promote more effective teaching and learning of these segments.

This research also intended to provide insights into the pronunciation area in general by showing which techniques prove to be effective in the classroom. Thus, this

study aimed at investigating a) the extent to which training and instruction in perception will enhance participants' perception of the interdental fricatives in word initial position, and b) the procedure which appears to be more effective (training, which refers basically to practice, and/or instruction and practice, which refer to metalinguistic input and practice)[4].

This study was strongly based on the study conducted by Reis (2006), who investigated perception and production of /θ/ and /ð/ by Brazilian EFL learners at the pre-intermediate and advanced levels, and by Silveira (2004), who investigated the role of pronunciation instruction on the perception and production of English word-final consonants by Brazilian EFL learners at the beginning level.

The main theoretical discussion, the development of the study, the results, and conclusion of the study are organized in five chapters: Chapter 2 presents the review of literature in which the study is grounded: perception studies, studies on the interdental fricatives, explicit and implicit instruction, and experiments in training and instruction. Chapter 3 describes the research questions, hypotheses, design, and procedures of the study. Chapter 4 reports and discusses the results of the perception test based on treatment. Finally, Chapter 5 closes the study with few tentative conclusions about the results, some pedagogical implications and practical applications for the study, besides pointing out the limitations of the study, and suggestions for further research.

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[4] A procedure was considered effective in this study if it yielded a statistically significant difference in performance in the perception test after treatment.

CHAPTER 2

REVIEW OF LITERATURE

This chapter reviews the most relevant literature to this study. The chapter is divided into four sections. Section 2.1 describes the perception models adopted here and reviews one empirical study on the perception of English consonants. Section 2.2 describes the interdental fricatives, and summarizes some relevant studies investigating English native speakers or EFL and ESL perception or production of the sounds in question. Section 2.3 presents a brief discussion about *explicit* and *implicit* instruction. And finally, section 2.4 describes the pronunciation goals that should orient an English pronunciation classroom and reviews research carried out on training and instruction of English pronunciation.

2.1 Speech Perception

2.1.1 L2 speech perception models

Perception has played an important role in explaining L2 phonology. In order to investigate where the problem concerning L2 speech perception lies, several perception models have been proposed, such as Kuhl's (1991, Kuhl & Iverson, 1995) Native Language Magnet (NLM); the Perceptual Assimilation Model (PAM) proposed by Best (1993; 1994; 1995), the Feature Competition Model (FCM) by Hancin-Bhatt (1994), the Speech Learning Model proposed by Flege (1995), the Feature Geometry by Brown

(1998, 2000), Escudero's (2005) Second Language Linguistic Perception Model (L2LP), and The Perception Learning Model (PAM-L2) by Best and Tyler (2007).

The perceptual magnet effect (Kuhl & Iverson, 1995; Iverson & Kuhl, 1995; Iverson & Kuhl, 2000) deals with phonetic prototypes of sounds which are good examplars of a determined category. They are placed in the middle of an acoustic space and function as "perceptual magnets" attracting the sounds in the same category. The magnet effect tries to explain the fact that language experience changes perception in the mind of the listener overtime.

Interestingly, Kuhl and colleagues (Grieser & Kuhl, 1989; Kuhl, 1991, and Miller, 1994) cited in Kuhl and Iverson (1995) found that "adult listeners of a particular language were adept at identifying best instances (prototypes) of phonetic categories in their native language" (p. 123). Summing up, the prototype of a sound will pull other members of the same category toward itself, inasmuch as the more similar a sound is to the prototype, the closer it will be placed toward it, and the poorer the discrimination around the prototype will be.

The model that incorporates these results is the Native Language Magnet (NLM) (Kuhl, 1991; Kuhl & Iverson, 1995), which claims that speech perception is innate to human beings and that language experience will form the best instance of a certain sound; that is, every sound will have its prototype. The implications of the model extend both to infants learning their first language and to adults learning a second language. Although the model was first designed fom testing vowels, the same magnet effect was found to exist for consonants (Davis & Kuhl, 1994, Iverson & Kuhl, 1996).

According to Iverson and Kuhl (1995), the NLM claims that "exposure to a primary language distorts the underlying perceptual space by reducing sensitivity near

phonetic prototypes, and that these perceptual effects can be difficult to alter" (p. 561). This may explain why adults have difficulties in perceiving contrasts in a new language that are similar to the native-language prototype, which is the case of the perception of the voiceless interdental fricative that are perceived by Brazilian EFL learners as similar to [f], [t] or [s], not as new or different from sounds in their L1 inventory.

Kuhl, Conboy, Coffey-Corina, Padden, Rivera-Gaxiol and Nelson (2008) proposed an extended version of the NLM, the NLM-e, which describes four phases of speech perception, based on outcomes from recent studies. In phase 1, young children can discriminate any sound in the world's languages. In phase 2, the infants' perception starts to be tuned due to experience with the language and culture in which they are being raised. In phase 3, since the phonetic learning is being established, children's progress is directed to word patterns. And finally in phase 4, neuro-representations are relatively stable, and unlike in childhood, in adults these representations will not be affected by short periods of listening to a new language. The extension of the model will not be discussed here because it is beyond the scope of this study. For a more detailed review of the NLM model, NLM-e, and related empirical studies, see Kluge (2009) and Nobre-Oliveira (2007). Thus, in accordance with the NLM, the L2 variants of /θ/, which are the voiceless stop and fricatives [t], [s] and [f], would be placed around the prototype of the /θ/ due to lack of discrimination, as would also happen to the voiced variants of /ð/: [d], [z], and [v].

The Speech Learning Model (SLM) developed by (Flege, 1995) and the Perception Assimilation Model (PAM) developed by (Best, 1993; 1994; 1995) will also be briefly described here, since they are well documented models and have contributed to the area of L2 speech perception.

The SLM accounts for perception and production of L2 sounds by experienced L2 learners. The model claims that production of L2 sounds will only be accurate if there is accurate perception, but does not claim that *all* errors are motivated by perceptual problems. Flege describes the model using four postulates and seven hypotheses[5].

One of the postulates (P1) is that the ability to form new phonetic categories is accessible across the life span inasmuch as the mechanisms and processes guiding the L2 learning are the same ones used in L1 learning. However, children are said to be more likely to create new categories for L2 sounds, even though adults retain the capacity to do so. This critical period is generally referred to as *Age of Arrival* (AOA).

One of the SLM predictions (Hypothesis 5) is that L1 and L2 categories assimilate when category formation is blocked, which is why a certain L2 sound will continue to resemble a certain L1 sound. This may explain why Brazilian learners tend to produce the interdentals using sounds from their L1 inventory, such as [t] for the voiceless, and [d] for the voiced, for instance. Thus, according to the process of equivalence classification, the interdentals are perceived as 'similar' not 'new' sounds.

Unfortunately, since the SLM suggests that more experienced learners should be tested, the model could not be tested in this study because the participants were almost beginners. The model claims that errors produced by inexperienced L2 learners may be caused by learning in progress and not inability to learn (Flege, 2005), because L2 is, just like L1, influenced by time exposure. For further discussion about the SLM, see Koerich (2002).

The PAM was developed to explain non-native speech perception by naïve listeners, defined as functional monolinguals. However, in the extension of the model

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[5] Only P1 and H5 are discussed in this review because the other postulates and hypotheses are beyond the scope of this study.

to PAM-L2 (Best & Tyler, 2007, p. 16), there is the inclusion of L2 learners, defined as people in the process of actively learning an L2 to achieve functional, communicative goals, since perception differs between naïve listeners and listeners who have been in contact with a second language.

Unlike the NLM and the SLM, the PAM relies on articulatory perception, and the characteristics of sounds will determine to what extent they will be assimilated to the phonetic categories of the native-language system (Eckman, 2004, p. 519). Moreover, the fundamental premise of the model is that non-native segments tend to be perceived according to the similarities with, and discrepancies from, the phonological space of the native language. In addition, listeners are expected to detect gestural similarities between non-native and native-language phonemes (Best, 1995). For a more detailed description of the model see Bettoni-Tecchio (2008) and Nobre-Oliveira (2007).

2.1.2 An empirical L1 and L2 speech perception study

Guion, Flege, Akahane-Yamada and Pruitt (2000) carried out a study with near-monolingual Japanese speakers aiming at providing insights into the perception of English consonants by native Japanese speakers of English differing in English language experience, especially by examining the relation between the perceived phonetic distance of L2 and L1 consonants and discrimination of those sounds. The study was divided into two experiments[6]: the first one was carried out in order to assess the perceived relation between English and Japanese consonants. Nine native speakers of Japanese (*Mean age*=20.1) with the minimum possible exposure to English were

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[6] The stimuli for both experiments, the contrasts, were recorded by native speakers of Japanese and English.

selected. They participated by identifying English and Japanese consonants in terms of a Japanese category, and then rated the identifications for goodness-of-fit to that Japanese category.

The second experiment aimed at testing the discrimination of word-initial consonants by native speakers of Japanese and English. The researchers used a Categorial Discrimination Test (see section 3.4.2) examining three kinds of contrasts: (a) English-English /s/-/θ/; (b) English-Japanese /θ/-/s/; and (c) Japanese-Japanese /s/-/d/. The participants in this experiment were 30 native speakers of Japanese – 10 comprised the high-experience group[7], 10 comprised the mid-experience group[8], and 10 comprised the low-experience group[9]. There were also 10 native speakers of American English.

The cross-language mapping data from Experiment 1 and the consonant discrimination A' scores[10] in Experiment 2 were examined in order to determine the relationship between the perceived phonetic distance and discrimination of the sounds. The PAM and the SLM were used to interpret the results and test the researchers' hypotheses, and to investigate whether the PAM and the SLM could be extended to the early stages of naturalistic L2 acquisition. The authors explained that they chose these models because the PAM usually focuses on the discrimination of sounds in an unknown language and the SLM usually focuses on highly experienced learners of L2. Results suggest that the PAM was able to predict the discrimination of L2 consonants, although a minor revision to the PAM would be recommended. On the other hand, the authors concluded that the SLM can not be extended to the early stages of L2 learning

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[7] Because they have lived in the United States for an average of 3.1 years.
[8] College students who had never lived abroad, but used English in their jobs.
[9] College students who had never lived outside Japan.
[10] *A'* scores are derived from the proportions of correct selection of the odd item in different trials (i.e., "hits"), and incorrect selection of an odd item in catch trials (i.e.,"false alarms"), as an unbiased measure of perception sensitivity.

without further investigation, because it was not able to predict the learnability of all English-Japanese contrasts, showing that certain English consonant contrasts are more difficult for Japanese adults to discriminate than others. Therefore, learnability did not seem to depend on the perceived cross-language similarity of English and Japanese consonants.

2.2 Interdental fricatives

Learners from different L1s face different difficulties when learning a foreign or second language. In our context of English as a foreign language, there are several studies investigating the different phonological aspects which cause Brazilians difficulties, such as Koerich (2006), who investigated the perception and production of final consonants; Rauber (2006), who investigated the perception and production of vowels; Kluge (2004), who investigated the perception and production of English nasals; Delatorre (2006) and Frese (2006), investigated the pronunciation of –ed, and Reis (2006), who investigated the pronunciation of the interdental fricatives, just to name a few. Other studies introduced the variables instruction, training, and visual cues to the investigation of Brazilian Portuguese-English interphonology. Silveira (2004), for instance, implemented the variable instruction to the learning of final consonants; Nobre-Oliveira (2007) investigated the effect of perceptual training on the learning of the English vowels by Brazilian learners; Kluge (2009) investigated the effects of visual cues on the perception of English nasals by Brazilians; and Mariano (2009) evaluated the effect of instruction and training on the production of verbs ending in –ed. In the same line, the present study investigated the effects of training and instruction on the perception of the interdental fricative sounds.

The interdental fricatives are already known to cause great difficulty in terms of both perception and production not only to Brazilian learners of English but even to English L1 speakers, as reported by Jongman, Wang and Kim (2003), Polka Colantonio and Sundara (2001), and Reis (2006). Since there has been little investigation on this issue, the present study focused on the investigation of instruction and training on the perception of the interdental fricative sounds in an attempt to lead to more effective ways of triggering the process of learning these two sounds.

2.2.1 Characteristics of interdental fricatives

A look at the phonological features of the interdentals and their most frequent replacements may help to explain why these replacements occur. Table 1 displays the feature specifications for the voiceless interdental fricative and its most frequent replacements, based on Giegerich (1992), and shows how similar the sounds are. The pair [θ] - [t] is distinguished only by the feature [continuant],[11] the pair [θ] - [s] by the feature [strident],[12] and the pair [θ] - [f] by the features [coronal][13] and [strident]. Despite the fact that [f] differs the most from [θ] in terms of number of features, Reis (2006) found that [f] is the sound that is the most difficult to be perceptually discriminated from [θ], followed by [s].

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[11] A continuant sound is a sound during whose production the air stream is not blocked in the oral cavity (Giegerich, 1992, p. 93).

[12] Strident sounds are marked acoustically by greater noisiness than their nonstrident counterparts are (Giegerich, 1992, p. 118).

[13] Coronal sounds are produced with the blade of the tongue raised above its neutral position (Giegerich, 1992, p. 116).

Table 1. Feature specifications of [θ] and its frequent replacements[14]

	[θ]	[t]	[s]	[f]
[Consonantal]	+	+	+	+
[Continuant]	+	-	+	+
[Anterior]	+	+	+	+
[Coronal]	+	+	+	-
[Strident]	-	-	+	+
[Tense]	+	+	+	+
[Voice]	-	-	-	-

Table 2 displays the feature specifications for the voiced interdental fricative and its most frequent replacements, and shows them to differ by the same features as the voiced group. The first pair [ð] - [d] is differentiated by the feature [continuant], the pair [ð] - [z] by the feature [strident], and the pair [ð] - [v] by the features [coronal] and [strident]. According to Reis (2006) the contrast [ð] - [v] was the most difficult for participants in the discrimination test (in parallel with the voiceless pair), followed by [ð] - [d] and [ð] - [z].

Table 2. Feature specifications of [ð] and its frequent replacements[15]

	[ð]	[d]	[v]	[z]
[Consonantal]	+	+	+	+
[Continuant]	+	-	+	+
[Anterior]	+	+	+	+
[Coronal]	+	+	-	+
[Strident]	-	-	+	+
[Tense]	-	-	-	-
[Voice]	+	+	+	+

In terms of similar sounds, [f] is more similar to [θ] and [v] is more similar to [ð] due to acoustic properties, they are only distinguished by the movement of the second formant into the following vowel, according to Ladefoged (2001). However, neither Brazilian speakers of English nor Dutch speakers (Wester, Gilbers & Lowie, 2007), for instance, seem to replace the interdentals only by their most phonetically

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[14] Feature retrieved from Giegerich, (1992, p.128)
[15] Features retrieved from Giegerich (1992, p.128)

similar counterparts. The interdental fricatives are also replaced by their phonologically most similar counterparts [s] and [z] and by [t] and [d], which, in addition to being distinguished from the interdentals by only one feature, are segmentally the least marked sounds (Maddieson, 1984).

According to Lombardi (2003), the different replacements of the interdental fricatives may be explained by taking into consideration the grammar of the learners' first language (L1). Lombardi claims that learners will replace [θ] by [t] or [s], and that there are some reasons that explain why the stop or the fricative is chosen. Grounded on Optimality Theory (OT), the author argues that [θ] will be replaced by [t] "as a result of a universal markedness relationship, that stops are the less marked manner compared to fricatives" (p. 246), or will be replaced by [s] as a matter of L1 transfer to L2.

A few studies involving subjects of different L1s and even English as a first language have been carried out investigating the replacements of those sounds. The next section reviews the outcomes of some of them.

2.2.2 Empirical research on the interdental fricatives

Infants exposed to English as their L1 have also been subject of studies investigating fricatives. According to Vihman (1996) "contrasts between fricatives are among the few which have been reported to resist discrimination in the early months and thus to require learning by the child" (p.60). As reported by Eilers and Minifie (1975) and Eilers (1977), this failure in discrimination seemed to appear when naturally produced syllables were used, that is, [sa] versus [za], [fa] versus [θa], [fi] versus [θi], whereas Jusczyk, Murray and Bayly (1979) found that 2- to 3-month-olds

appeared to be able to discriminate [fa] versus [θa] when computer-synthesized tokens were used.

Levitt, Jusczyk, Murray and Carden (1988) investigated 2-month-old infants' perception of a subset of highly confusable English fricatives in two different experiments using a modification of the high-amplitude sucking (HAS) technique (first designed by Siqueland & DeLucia, 1969). In the first experimental procedure, 64 infants (*Mean age* = 9.5 weeks) were tested on naturally produced syllables ([fa], [θa], [va], and [ða]). Results from this first experiment suggest that infants at this age are capable of discriminating place of articulation contrasts in voiced and voiceless fricative pairs. In the second experimental procedure aimed at investigating the role which fricative noise plays in infants' discrimination of fricative contrasts, the stimuli [fa] and [θa] were modified, the formant transitions of the vocalic portion of [fa] were removed, for instance, and 36 infants (*Mean age* = 10.1 weeks) underwent the HAS procedure. Results suggest infants are able to utilize differences in either formant transition of fricative noise to signal the [fa]-[θa] contrast and that the appropriate fricative noise context is a critical factor influencing the way contrasts are perceived.

A study investigating both infants and adults, was carried out by Polka et al. (2001), who investigated the contrasts /ð/-/d/ with 15 English and 14 French-speaking adults and 23 English and 19 French-learning infants in two age groups (6-8 and 10-12 months). The stimuli for the perceptual test consisted of two sets of naturally produced English minimal word pairs. The control pair /b/-/v/ was used in addition to /ð/-/d/ because it is present in both English and French consonant inventories and it contrasts the same manner classes and similar place differences as /ð/-/d/. The headturn technique was used to access infants' perception, whereas adults were required to raise their hands after hearing a sound change. Their findings suggest that

language experience does not seem to affect perceptual differentiation in the first year of life, but seems to have a facilitative effect on performance after 12 months.

Jongman et al. (2003) investigated the effects of linguistic context and visual and auditory cues on the perception of the distinction between the fricatives [f]-[θ], [s]-[ʃ], and [v]-[ð]. In the first experiment, which aimed at exploring the effect of linguistic context on the perception of English fricatives, twenty minimal pairs – 10 pairs beginning with the nonsibilant [f] or [θ] and the other 10 pairs beginning with the sibilant [s] or [ʃ] preceded by various contexts, were heard by twenty native speakers of English. Results suggest that linguistic context affects the contrasts that are not well-defined acoustically.

In the second experiment, the effects of visual information on the perception of nonsibilant fricatives [f, v, θ, ð] paired with each of the vowels [i, ɑ, u] were explored in (a) the audiovisual condition, in which participants watched the speaker's face on TV and heard her pronouncing the trials; (b) the visual condition, in which they only watched the speaker's face producing the trials; and (c) the auditory condition, in which participants only heard the trials. Thirty English native speakers of English were assigned to one of the three conditions and were supposed to circle one of the thirteen alternatives (fi, fa, fu, vi, va, vu, thi, tha, thu[16], dhi, dha, dhu[17], or other) provided on the answer sheet for each token heard. Results show that perception on the basis of simultaneous auditory and visual information was quite accurate, followed by perception based on auditory information, and finally participants' performance was the poorest on visual information. However, when voicing errors were not counted, the visual cues condition seemed to outperform the auditory cues condition, which

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[16] th = [θ]
[17] dh = [ð]

indicates that visual information also contributes to the identification of fricatives by normal-hearing adults.

Gonet and Pietron (2006) identified more than one replacement for the production of voiceless and voiced interdentals by Polish speakers of English. According to their findings, the sound used in the replacement depends on the voicing of the target sound and on the position in which it occurs in the utterance, for instance. They found that /θ/ is realized either as [f] in contexts that are easy to pronounce or as [f] or [t] in consonant clusters, whereas /ð/ is produced as [d] before vowels, and as [v] before consonants. And in word-final position, /ð/ is often devoiced to [θ], and both are realized as [f].

Kabak and Maniwa (2007) sought to address the relative importance of phonemic, phonetic, and acoustic factors by observing the perception of English fricatives by standard German and Swabian German adult listeners. The two-alternative forced-choice identification perception test was taken by 14 Standard-German listeners (*Mean age*=24.79), 14 Swabian-dialect listeners (*Mean age*=22.29), and 14 native speakers of American English (*Mean age*=24.56). The eight minimal pairs were grouped depending on place of articulation and voicing ([f]-[θ], [v]-[ð], [s]-[ʃ], [z]-[ʒ], [f]-[v], [θ]-[ð], [s]-[z], and [ʃ]-[ʒ]), and each pair was tested separately for clear and conversational styles, comprising a total of 16 sub-tests. Results regarding the interdental fricatives suggest that the poor identification by all groups was due to acoustic, rather than language-specific issues. As expected, a pair versus group analysis revealed that the native speaker group performed better on the distinction involving the interdentals. Analysis of style versus groups demonstrated that all the groups benefited from clear speech. Summing up, results suggest that both general acoustic enhancement

in clear speech and more specific acoustic salience play an important role in the perception of non-native contrasts.

Finally, Reis (2006) investigated perception and production of /θ/ and /ð/ by Brazilian EFL learners at the pre-intermediate and advanced levels of students enrolled in the extracurricular courses of the Universidade Federal de Santa Catarina. Twenty-four participants took three perception tests – (a) a general pronunciation error test, (b) an adaptation of the CDT (see section 3.4.2 for more detailed information on the CDT), and (c) a forced-choice identification test – and three production tests – (d) a text reading task, (e) a sentence reading task, and (f) a story retelling task. Her main findings were (a) that there is a pattern of replacement for /θ/ as [t] and for /ð/ as [d] in word-initial position, and (b) that the voiceless interdental is less difficult to perceive and produce than its voiced counterpart /ð/. However, no significant correlation between perception and production was found in the study, and language experience seemed to have a weak influence on the perception and production. Interestingly, test type was also shown to have influenced the perception of the replacements.

2.3 Explicit and implicit instruction

A foreign language can be taught explicitly or implicitly, which should theoretically result in explicit or implicit learning and explicit or implicit knowledge. Interestingly, N. Ellis (2005), who claims for the weak interface position, compares the implicit and explicit systems to the yin and the yang, arguing that "conscious and unconscious processes are dynamically involved together in every cognitive task and in every learning episode" (p.340). Instruction can be either explicit or implicit: Implicit

instruction, on the one hand, in which information is processed receptively by students (Hulstijn, 2002) and learners are required to induce rules from examples given to them, is likely to encompass the "acquisition" claim proposed by Krashen (1982), who claims for the non-interface position, in which learners acquire the language through implicit learning, immersion. Explicit instruction, on the other hand, involves the explanation and practice of rules (R. Ellis 1994), and is commonly defined as learning. However, the dichotomy between learning and acquisition is not as simple as it seems and has provoked a number of studies with inconsistent findings.

Silveira and Alves (2006) observed that students benefit from explicit instruction on the perception and production regular verbs ending in *–ed*. The researchers believe that when a certain aspect of pronunciation is highlighted to students, they are able to notice this L2 form, even though they are not be able to pronounce the target sounds accurately and immediately, but they will be aware of their pronunciation and may be able to compare the differences between their speech and a native-like speech. Besides, the researchers believe that even though they have not mastered the L2 sounds for spontaneous speech, they will be able to use them in a monitored situation. Results suggest that explicit instruction effects may not appear immediately after treatment because this kind of instruction promotes new memory formation. Moreover, this finding may explain why long term goals must be set in the area of pronunciation, since this memory formation may take long to manifest in learners' speech.

Results from Long (1983) suggest that explicit instruction is only beneficial for beginning students whose only opportunity for L2 input is in the classroom. The bulk of the literature that investigates the explicit and implicit instruction dichotomy shows an advantage for explicit instruction and learning (e.g. DeKeyser, 1995; N. Ellis, 1993;

Robinson, 1996). Berry (1994, cited in Han & R. Ellis, 1998) believes that there is bias towards explicit instruction and learning since the type and method of testing employed can influence the results, which would explain why experiments have shown explicit instruction to have an advantage over implicit instruction

According to Whitelsea and Wright (1997, cited in Alves & Zimmer. 2005, p. 224), it is necessary to deconstruct the idea that explicit learning is dynamic and conscious while implicit learning is static and lacks consciousness. N. Ellis (2005) believes that implicit learning takes place during fluent comprehension and production, while explicit learning occurs when students struggle to negotiate meaning consciously affecting the language processes. Such consciousness is defined by the author as experiencing, and it is through experience that students will have their attention drawn to what has been taught to them and finally notice it. According to Schmidt (1990), learning on the basis of awareness is usually defined as explicit learning, and learning without awareness is defined as implicit learning. Conversely, Doughty (2003) believes implicit learning also takes place when learners are struggling to learn complex structures while explicit learning occurs when more simple structures are taught.

The objective of explicit instruction is to increase the salience of a cue through consciousness, aiming at making students aware of a cue that might not be frequent or perceived by them, and link the cue with its interpretation (N. Ellis, 2005). Toward this end, N. Ellis (2002, 2005) and R. Ellis (2002a, 2005) bring the consciousness-raising construct to light[18]. N. Ellis (2002) claims that "without any focus on form or consciousness-raising […] formal accuracy is an unlikely result" (p.175). Moreover, N. Ellis (2002) also claims that explicit instruction can speed the language acquisition.

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[18] Although both researchers discuss the consciousness-raising concept, some caution is necessary inasmuch as they come from different paradigms.

Regarding the concept of *consciousness*, Schmidt (1994) points out that its focus has changed over time depending on the teaching methodology being used. He defines the term consciousness based on the literature available in the area subdividing it into four basic senses (a) consciousness as *intentionality*; (b) consciousness as *attention*; (c) consciousness as *awareness*; and (d) consciousness as *control*. In addition, he makes a number of recommendations for the use of each theoretical term.

Consciousness-raising is directly related to explicit knowledge (R. Ellis, 1994). According to R. Ellis, learners performing consciousness-raising activities are expected to understand and formulate some cognitive representation on how the target structure works but are not expected to perform them. R. Ellis (2002b, 2005) suggests that consciousness-raising be used as a tool in the classroom instead of focusing only on practice. This use may have a delayed effect, probably because they are not ready to learn what they have been taught.

2.4   Pronunciation Training and Instruction studies

The teaching of pronunciation has received increasing attention over the past decades and has been considered an essential component in most ESL/ EFL instructional programs (Celce-Murcia et al., 1996; Goodwin, 2001; Goodwin, Brinton & Celce-Murcia, 1994). According to Morley (1994), there are two reasons for this change in focus of pronunciation teaching – learners' problems and unmet learner needs. These needs are originated in the problems the non-native speakers (NNSs) may face in an English L2 environment. According to Morley, these problems may be a complete breakdown in communication, ineffectual speech performance, negative

judgments about personal qualities, foreignism stereotyping, anticipatory-apprehensive listener reactions, and pejorative stereotyping.

However, the implementation of pronunciation teaching in the classroom is far from ideal. Morley (1994) claims that some conventional wisdoms about pronunciation have been interfering in this change, such as the belief that pronunciation is not important, the premise students will pick it up, that it is not possible to teach pronunciation or because of the lack of technical knowledge of phonetics and phonology on the part of English teachers. Motter (2001) claims that the lack of technical knowledge can negatively interfere in the effectiveness of pronunciation teaching. Moreover, not only the lack of technical knowledge can influence the pronunciation teaching in the classroom but also learner variables, setting variables, institutional variables, linguistic variables and methodological variables (Celce-Murcia et al., 1996).

Morley (1991) argues that, besides instruction objectives, individual factors also need to be involved, such as (a) intellectual involvement: speech-awareness and study-awareness; (b) affective involvement: recognition of self-responsibility, development of self-monitoring skills, development of speech modification skills, recognition of self-accomplishment; and (c) physical or performative involvement: pronunciation/speech practice, pronunciation-oriented listening practice, spelling-oriented pronunciation practice.

2.4.1 Pronunciation Goals

According to Silveira (2004), pronunciation goals should encompass the development of learners' "(a) intelligibility, (b) communicative ability, (c) self-

monitoring and self-correction strategies, and (d) ability to understand native speakers' fluent speech. In addition, pronunciation instruction should help learners (e) acquire the L2 phonological system and (f) deal with L1 interference" (p.17). These communicative goals should be part of a pronunciation curriculum, and for greater effectiveness it should be presented in combination with other language components. The goals are overlapping connected, making it hard or unnecessary to define when and where one ends and another begins.

Before discussing the necessity or not of native-like pronunciation, a brief discussion about the varieties of English is necessary. In addition to the two most widespread standard varieties of English (American English and British English), there are many other Englishes that include not only the previous colonies in which English is spoken as a second or official language, but also all the speakers of English as a foreign language. Since English is used as an international language worldwide, speakers of different L1s in the same conversation need to have intelligible speech in order to maintain the flow of the conversation. Moreover, Pronunciation instruction, as explained in Morley (1991), aims at enabling students to communicate intelligibly, becoming confident users of spoken English.

According to Morley (1991), pronunciation is not just picked up by students, no matter whether they are in an ESL or EFL context. Some formal instruction is needed in order to prevent mispronunciation and therefore, misunderstandings. Wong (1986), cited in Morley (1991), claims that in ESL settings, the lack of intelligibility in pronunciation prevents immigrant residents from growing professionally, which usually makes such immigrants enroll in accent improvement and effective communication courses in an attempt to reach the level of communication their jobs demand. In EFL settings the situation is more underprivileged because there are other issues besides just

learning a foreign language. Students, according to Morley (1991), tend to maintain "consciously or unconsciously accent features to mark their L1 identity and to insure that they are not perceived as betraying their loyalty to their L1 community" (p. 499). They want to communicate without losing their identity, which may cause a large variety of pronunciations for the same word. Psychosocial reasons are also reported by Flege (1999) in a tentative explanation for subjects' failure to produce the sounds they could perceive accurately.

With the easy access to the World Wide Web, people can easily communicate with other people throughout the world, and to make this communication more effective, people need to have a language in common. Once people understand each other, the degree of perfection or native-like speech will come into play. However, this need for perfection will change according to whom the speech is directed. Christophersens (1973, cited in Morley, 1991, p.499) argues that a NS facing a too-perfect NNS pronunciation may react as "a host who sees an uninvited guest making free with his possession". Therefore, in some situations the speaker tends to maintain some L1 features in order not to sound like an intruder or because it is not necessary to have a native-like pronunciation when you are communicating with other nonnative speakers who have a different L1.

For us, teachers of English as a foreign language, it is very common to have students whose pronunciation suffers from lack of intelligibility, as in the case of students who play online games, for instance, and have a vast vocabulary but unintelligible pronunciation. That is why there is a need for formal pronunciation instruction, in order to prevent such students from fossilizing wrong patterns of sounds that would be extremely difficult to change later.

Likewise, communicative ability is as important as intelligibility. Students need to develop the ability to take part in conversations, make requests, ask for what they want, negotiate meanings, making inferences, for instance. In order to be capable of carrying out such tasks effectively, they need to make themselves understood as well as understand others. These processes may be improved by working on students' perceptive and productive skills (Silveira, 2004). By improving perceptive skills, students will be able to understand other people's speech, not only NSs. Also by improving their productive skill, they will be able to communicate appropriately, if not with a native-like pronunciation, at least with an intelligible one.

At the same time, students should be able to correct wrong utterances and mispronunciations after they produce them, which is why self-monitoring and self-correction strategies may help students in their communicative performance. These strategies can be improved through formal training according to Krashen (1981). However, he points out that a speaker overly concerned about correctness may be unable to speak with fluency at all. This Monitor overuser, according to him, refers to the conscious use of grammar all the time when using his/her second language (p.15).

Equally important, Baptista (2001), Rauber and Koerich (2004) and Silveira (2004) claim that the learners' L1 should be considered in pronunciation teaching since it is known that different L1s cause different problems in the acquisition of English pronunciation. For this reason, pronunciation teaching should also take L1 into account in order to diminish the effect of L1 interference in the acquisition of L2 phonological system.

Paradis (1997) points out that what speakers learning new sounds are aware of is the result of their production, for example "how closely their production approximates the intended acoustic target" (p. 402). However, their judgment might be

deceived by perception problems that might create a discrepancy between the sounds they think they produce and the sounds they actually produce. According to Fraser (1999, p. 02) the importance of having clear goals set in a pronunciation class may also help teachers in the job of making their students realize the differences between (a) what people think they are saying; (b) a phonetic description of the sounds they are actually producing and, (c) how someone from a different language background describes their speech.

However, according to Morley (1991) these objectives will only be accomplished if teachers have a background in applied English phonetics and phonology, along with "a continuing need for development of pronunciation activities, tasks, materials, methodologies, and techniques across the spectrum of imitative, rehearsed, and extemporaneous speaking practice experiences" (p. 511). That is why the objective of this study is to investigate not only the effects of instruction but also of training on the perception of the interdental fricative sounds of English, using some pronunciation manuals available for EFL or ESL students.

Two characterizations of pronunciation teaching have generally been investigated: *training* and *instruction.* Training has mostly been restricted to perceptual training (e.g. Bettoni-Techio, 2008; Nobre-Oliveira, 2007), for which various technologies and synthetic speech have often been used. There are studies designed with the use of specially-developed computer programs (e.g. Akahane-Yamada et al, 1999; Bettoni-Techio, 2008; Nobre-Oliveira, 2007; Rvachew, 1994), audio-visual cues (e.g. Hazan et al 2005; Kluge, 2009), and synthetic auditory stimuli (e.g. Flege, 1989; Jamieson & Rvachew, 1994), just to name a few. Instruction, on the other hand, has been investigated in terms of the explicit teaching of rules for perception and/or production (e.g. Alves, 2004; Silveira, 2004). However, the distinction between

training and instruction is not as clear as it seems, and in fact these terms have been used interchangeably in a few studies such as Matthews (1997). Some relevant studies on training and instruction are reviewed below.

2.4.2 Pronunciation Training

Concerning training on perception, we can start with Jamieson and Morosan (1986), who tested and trained adult Canadian speakers of French on the English contrast /θ/ versus /ð/, using synthesized speech stimuli with cue manipulation[19] in order to verify the influence of training on the improvement of perception of these sounds. Participants received 4 sessions of training on the interdental fricatives, using synthesized stimuli, for only about 90 minutes. The researchers used the fading technique to reduce slowly the magnitude of the perceptual contrast, using cafeteria background noise as a distracter. Results suggest that performance improved for both voiced and voiceless interdental fricatives and there was a transfer in improvement from the synthesized stimuli to natural stimuli which had not been trained.

In the line of training as practice, Bettoni-Techio (2008) investigated the effects of perceptual training on the perception and production of word-initial /s/-clusters, by twenty-three Brazilian learners of English. The training program consisted of two-alternative-forced-choice identification trials with immediate feedback, in which participants were also allowed to replay the trials after hitting the decision key, and six blocks of imitation. The researcher also investigated the transfer of training to a discrimination task and to untrained words. The phases of the study were a pretest, a training period, a posttest, and a retention test. The instruments used were a reading

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[19] Cue manipulation refers to the manipulation of acoustic cues. In Jamieson & Morosan, the fricative formant transitions and duration were manipulated.

task, and interview, an AX discrimination task, an identification task, and the training task. Results in the pretest and posttest showed improvement in identification, as well as transfer to production, to discrimination and to untrained clusters. Also, the eight-month retention test revealed retention of improvement in identification, discrimination and production.

There are other studies similar to Bettoni-Techio investigating the effects of perceptual training on the production of some sounds, such as Rvachew (1994), who investigated the role of speech perception training in the correction of phonological errors of children, who misarticulated /ʃ/ in their L1. Results suggested that perceptual training can facilitate sound production for some phonologically-impaired children, and better results could be achieved if speech perception training were provided concurrently with speech production training as did Bettoni-Techio.

Training is defined in the current study as practice without explicit instruction, that is, participants did perception exercises that departed from sounds, then moved to contrasts between the sounds under investigation, and finally, the sounds in context, and were supposed to realize by themselves how the interdental fricatives are articulated and produced. In addition to the exercises proposed, they had only the input provided by the teacher to help them perceive the sounds being investigated.

2.4.3 Pronunciation instruction

There are some studies investigating explicit instruction as the systematization of rules of a particular L2 structure, as demonstrated below.

Matthews (1997) investigated whether explicit instruction on the articulation of non-native segments contributes to the development of a new underlying phonetic or phonological category by Japanese learners of English. Among the contrasts investigated were [θ]~[f] (both of which are absent from the Japanese segmental inventory), and [s]~[θ] (only [s] is present in the Japanese inventory). Results suggest a significant improvement in their ability to discriminate the non-native segments from other segmental categories ([s]-[f], [b]-[v], [l]-[r], and [p]-[b]) upon perceptual testing; however, concerning the [θ]~[f] and [s]~[θ], only the first contrast showed significant improvement from pretest to posttest. The study demonstrates that explicit instruction can contribute "to the development of novel segmental categories which can then be used to discriminate members of the novel category from members of other categories perceptually. However, not all non-native contrasts are created equal" (p.229).

Although Macdonald, Yule and Powers (1994) did not investigated pronunciation, they investigated four different types of instruction concerning vocabulary learning. Twenty-three Chinese studying English at a university in the US were randomly assigned to one of the following conditions: (A) traditional vocabulary drilling activities; (B) self-study with tape recordings; (C) interactive activities and; (D) a no-intervention control condition. Participants were recorded three times and judged by twenty-three native speakers of English. Results suggest that no condition exhibited a significant positive change resulting in an increased mean preference by NSs. Of the four conditions, condition A – the traditional vocabulary drilling activities – evinced the fewest changes in increased mean preference. Condition B, a listen and repeat session involving the key vocabulary seemed to evince greater changes, yet not consistent ones inasmuch the self-study did not accrue to all learners to the same

degree. Surprisingly, the no-intervention condition seemed to be beneficial to all learners who experienced it. The authors also acknowledge that individual differences can be a powerful variable influencing the acquisition of pronunciation and may have influenced the results of the experimental study.

Finally, a study that influenced the present research is Silveira (2004), who investigated the role of pronunciation instruction on the perception and production of English word-final consonants with beginners. To do so, the researcher developed a manual especially designed for the study in order to investigate to what extent pronunciation instruction would influence participants' performance on word-final consonants, with the objective of minimizing the production of epenthesis. In addition, Silveira also investigated some factors influencing the acquisition of the phonological system, such as (a) different syllabic patterns of the L1 and the L2, (b) markedness, (c) orthography, and (d) phonological environment, as suggested by interphonology research.

The research involved two groups of students enrolled in the beginning level of the extracurricular course at the Universidade Federal de Santa Catarina for six weeks, with 40 minutes of pronunciation instruction per week, for a total of 4 hours. The researcher was in charge of both the experimental group (12 students, Mean age = 21) and the control group (10 students, Mean age = 18) and used the manual along with the regular textbook in the experimental group.

The data was gathered by means of perception and production pre and posttests (Categorial Discrimination Test and the reading of a list of sentences, respectively), a period of pronunciation instruction for the experimental group, and questionnaires. Her results revealed that pronunciation instruction had a positive effect on word-final consonant acquisition; that the acquisition of word-final consonants is influenced by

orthography, phonological environment, and word frequency; and that the effects of pronunciation instruction were higher at the production level than at the perception level.

Instruction in the present study was based on Silveira (2004), who investigated instruction under the explicit definition. In the present study, participants in the ITG (Instruction and Training Groups) received explicit information on the target sounds investigated. Even though the teacher in this study was the main model, other sources of information were brought to the classroom, such as posters showing the articulation of the sounds, the university of Iowa website[20], which presents the sounds being produced visually and auditorily as well as drawings focusing especially on the articulation of the sounds.

Supporting the view that pronunciation is undoubtedly important for the development of learners' communicative ability, the objective of this study was to investigate to what extent training and instruction on the perception of two specific sounds ([θ] and [ð]) would affect participants' perception. This distinction between (1) training and (2) instruction and training is necessary in order to shed light in how to conduct a language class without jeopardizing the development of the class, by providing insights in how to present the pronunciation aspects without interfering in the class, or by presenting non-contextualized task.

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[20] Since there was no internet connection available in the classroom, participants were requested to access the website <http://www.uiowa.edu/~acadtech/phonetics/english/frameset.html> at home.

CHAPTER 3

METHOD

3.1 Introduction

This chapter presents the hypotheses and research questions and describes the participants, the materials and procedures for the data collection, and the analysis used to investigate the effects of instruction and training on the perception of the interdental fricatives /θ/ and /ð/. The instruments were (a) a questionnaire; (b) a pretest; (c) pronunciation teaching materials, and (d) a posttest. The pretest and posttest comprised the perception test used in Reis (2006), with her permission, a Categorial Discrimination Test (CDT) (See section 3.4.2).

The materials selected for the treatment, which took place throughout the first semester of 2008 in the extracurricular EFL courses of Universidade Federal de Santa Catarina (UFSC), were retrieved from some pronunciation manuals used in the undergraduate program in *Letras Inglês*. Although the activities selected were the same for the instruction and training groups, they were used differently in terms of explicit and implicit teaching of the rules about the interdental fricatives. A more detailed description is given in Section 3.4.3.

3.2 Research questions and hypotheses

The following research questions and hypotheses guided the investigation of the effects of instruction and training on the perception of the word-initial interdental fricatives [θ] and [ð] under two different group conditions: (a) the Training Group

(TG), and (b) the Instruction and Training Group (ITG). A (no-intervention) Control Group (CG) was also included.

RQ1 – Does training affect the perception of the word-initial interdental fricatives?

H1 – The perception of the interdental fricatives by students who undergo training (TG) will improve from the pretest to the posttest.

Background: Jamieson & Morosan (1986) and Bettoni & Koerich (2009).

RQ2 – Do instruction and training together affect the perception of the word-initial interdental fricatives?

H2 – The perception of the interdental fricatives by students who undergo instruction and training together (ITG) will improve from the pretest to the posttest.

Background: Nobre-Oliveira (2007) and Silveira (2004).

RQ3 – Which one of the two group conditions – TG or ITG – is more effective?

H3 – Performance of the ITG will show more improvement than those in the TG condition.

Background: Macdonald et al. (1994)

3.3 Participants

English students (all Brazilian) enrolled in level 3 in the extracurricular foreign language program at UFSC took part in this study. This was considered as the most appropriate level for the research, considering that at this point participants had already

had contact with English at the extracurricular course for at least one year[21], during approximately 90 hours of instruction, and were expected to have already developed strategies for the perception of /θ/ and /ð/. In addition, it was reasoned that the selection of third-level students would make the comparison with Reis's (2006) study possible. Reis's participants were also Brazilian English students at levels 3 and 10. The researcher was the teacher of four of the six groups in the present study, and of which two were assigned to each treatment group: (a) Training Group (TG) – formed by students who underwent only training; and (b) Instruction and Training Group (ITG) – formed by students who underwent training and instruction. Two other extracurricular groups were included as control – (c) Control Group (CG) – formed by students who took the tests, but received no treatment. The teachers of these two groups agreed not to deal with training or instruction of the target sounds investigated during the data collection period.

There were a total of 108 participants at the beginning of the study. However, due to absences in the pretest or posttest or during the treatment session, only 53 participated in all phases of the study – 34 female and 19 male, with ages ranging from 15 to 58 (*M*=23, *SD*=7.01). These were distributed as follows: 21 in the TG (39.6% of the total, 07 male and 14 female, *Mean age*=23); 18 in the ITG (34% of the total, 07 male and 11 female, *Mean age*=23); and 14 in the CG (26.4% of the total, 05 male and 09 female, *Mean age*=22). The profile questionnaire (Appendices A and B) revealed the following additional information about the participants: (a) the mean age participants of all groups started studying English was 11; (b) 45.3% had started studying English in Junior high school and had had contact with the language until the end of high school; (c) 45.3% of them had interrupted their English studies for up to

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[21] It is important to acknowledge that there may have been students who had studied English at other language institutions for different time periods and had been placed at this level by the placement test.

five years; (d) 51% had studied English only at school and at the extracurricular course; (e) 91% never spoke English with Brazilians outside the classroom and 98% never spoke English with native speakers outside school; and (f) only 3.8% had been abroad for a short period of time (For further information about the questionnaire results check appendix C). These data show that the students formed quite homogeneous groups in terms of exposure to the L2, making it possible to investigate the potentiality of pronunciation training and instruction in promoting changes in their perception of the interdental fricatives.

3.4 Instruments and procedures

The data collection took place throughout the first semester of 2008 and comprised three instruments: (a) a participant's profile questionnaire; (b) a perception pre and posttest – an adaptation of the Categorial Discrimination Test (CDT); and (c) pronunciation materials.

3.4.1 Questionnaire

A participant profile questionnaire (Appendices A and B), based on Koerich (2002), and a research permission form (Appendices D and E) were filled out (and the latter signed) at the beginning of the semester by the six groups participating in the study. The purpose of the questionnaire was to assess information on the participants' demographic characteristics and L2 experience, such as length of exposure to the language in formal and informal environments, time devoted to studying English,

exposure to L2 outside the classroom, contact with other languages, and experience in foreign countries.

3.4.2 Categorial Discrimination Test (CDT)

The adaptation of the CDT used in this study was borrowed (with permission) from Reis (2006) and aimed at evaluating participants' perception in terms of discrimination of the target sounds in word-initial position. Before the test was administered, participants underwent a practice session in class in order to familiarize themselves with the procedures of the test. In order to disguise the objective of the research, the contrasts and words used in the practice session were different from those of the study – they were words beginning with the oral stops /p, b, t, d, k, g/ (Appendix F)[22].

The CDT practice contained 10 trials. The first four trials of the test had been previously marked on the answer sheet, in order to help participants understand how the tests would work. The other six trials required participants to listen to the teacher and mark their answers on the answer sheet. Following that, participants received immediate feedback and any doubts they had about the test were clarified. The practice session lasted twenty minutes and was given two days before the actual data collection.

For the data collection, each group took the test in two sessions at the language laboratory during their class time: the first session was before the treatment period and the second session was after the treatment was over. The testing sessions lasted about 20 minutes and were conducted as follows: (1) explanation in English about the CDT – 2 minutes; (2) first part of the CDT with the voiceless interdental (trials 1 to 11) – 2

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[22] The model was the same used in Reis's (2006) practice session.

minutes; (3) break – 1 minute; (4) second part of the CDT with the voiceless interdental (trials 12 to 22) – 2.15 minutes; (5) break – around 4 minutes; (6) first part of the CDT with the voiced interdental (trials 1 to 11) – 2 minutes; (7) break – 1 minute; (8) second part of the CDT with the voiced interdental (trials 12 to 22) – 2.20 minutes;

The version of the CDT (Flege, Munro & Fox, 1994) used in this study was the one used by Reis (2006), first adapted from Koerich (2002). Though originally developed for vowels, since Koerich's adaptation for discrimination of final consonant with presence or absence of paragogic vowels, the CDT has been used in L2 perception studies at UFSC for several other consonantal distinctions (e.g., Bettoni-Techio, Rauber & Koerich, 2007; Frese, 2006; Kluge, 2004;; Silveira, 2004) often with Koerich's adaptations. For example, Koerich included distracters in the test trials, in order to prevent participants from identifying the objective of the test and devote attention to it, which could interfere with the results. She also used two-word phrases in the trials, whereas only isolated phones had been used previously. This was necessary, as she was testing the perception of the presence or absence of a phone (the paragogic [i] or [ɪ], rather than of two contrasting phones). Reis made her own adaptations: (a) a reduction to only one catch trial for each target phoneme; (b) de-contextualized minimal-pair words rather than phones or phrases; (c) the absence of distracters, differently from Koerich; (d) an increase and decrease, respectively, in the within-trial and between-trial intervals (2.0 s and 2.7 s respectively, compared to Flege's and Koerich's 1.3 s and 2.8 s); and (e) recording of all test words by speakers of the same sex – female.

As described in Koerich, change trials consist of three tokens where two are repeated and one is the odd item. Participants listen and identify the position of the odd item, marking in grids on the answer sheets the corresponding column where the odd item appears. Catch trials are trials in which all three tokens are the same. Three of the

four columns in the grid correspond to the positions of the tokens heard and are labeled with the numbers *1*, *2*, *3*; the fourth column is labeled *0* and is marked if all tokens are the same. For example, after participants hear the trial sequence "sigh thigh thigh", they are supposed to mark number '*1*', and after they hear "tie tie tie" they should mark '*0*' (Appendix G).

As in Reis, the CDT of this study consisted of 44 randomized trials (6 contrasts x 6 change trials = 36 + 8 catch trials = 44 trials)[23] and was split into two sets of 22 trials each, 18 change trials and 4 catch trials in each. In the change and catch trials, the voiceless set consisted of the words *thigh-fie-tie-sigh*, and the voiced set consisted of the words *thee-vee-dee-zee*. In each trial one of the interdental fricatives was contrasted with one of the three other fricatives of the same voicing parameter. Also as in Reis, the interval within trials was set at 2.0 seconds and the interval between trials was set at 2.7 seconds.

As explained above, Reis's version of the CDT test was used in this study. The test was revised using the Sound Forge 9.0 program before being administered, and slight details such as some intervals which were not exactly as specified were corrected[24].

3.4.3 Pronunciation materials for the two experimental groups

Silveira (2004) analyzed four pronunciation course books, focusing her review on their organization and the features of language presented. In addition, she developed a pronunciation manual for her study involving perception and production activities.

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[23] Reis (2006) explains that the decision about the number of trials was taken based on pilot studies, which revealed the test to be rather long and mentally demanding.

[24] The test was originally recorded in Reis's study on a Sony Minidisk, then digitalized and normalized for peak intensity at 6dB.

Two of the four books Silveira analyzed were used in the present study: *Clear Speech from the Start: Basic Pronunciation* (2001) and *Intermediate Pronunciation* (1993), both by Gilbert and *Focus on Pronunciation* (1993) by Lane. The other books used in this study were: *Pronunciation in Use* (Hancock, 2003), *Ship or Sheep?* (Baker, 2006), *Sounds Great Book 1* (1994) and *Book 2* (1995), both by Beisbier.

The activities selected for the treatment were used in class along with the course book *Interchange 2* (Richards, Hull & Proctor, 2005). *Interchange 2* has activities related to pronunciation in short activities that deal mainly with intonation, reductions, linking, consonant release, emphatic and contrastive stress at the word and sentence levels consisting of presentation through a model, listening discrimination, identification, repetition, and a few activities requiring learners' elaboration of examples based on the model provided, as described by Silveira (2004, p.28-29)[25]. In order to carry out the treatment, the activities from *Interchange 2* were used to contextualize the pronunciation activities that were subsequently carried out in the classroom, so that participants would understand that there was a link between the activities proposed in the textbook and the ones the researcher was bringing to class.

The treatment was carried out in seven sessions, each session consisting of activities retrieved from chapters of the books used, involving the voiceless and voiced interdental fricatives. The types of activities were selected based on the sequences presented in most of the pronunciation books, that is, focus on the identification of sounds, followed by focus on discrimination, then on contrasts, and finally, on sounds in context.

In the first treatment session, participants performed activities from *Clear Speech – Basic pronunciation* (2001, Appendix H). As pointed out by Silveira, *Clear*

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[25] Silveira's description was based on previous editions of the book – *Interchange* (1990) and *New Interchange* (1997). Since the activities differed little or not at all from those of the new edition, the description is still valid for this study.

Speech relies on the manner of articulation criterion instead of place of articulation or voicing as other books do, allowing the fricatives /s/, /θ/, /z/ to be contrasted with /d/ and /t/ in the same chapter. The activities in the chapter were selected and only the silent perception activities were maintained, while saying out loud (production) activities were excluded, and were adapted to each group condition. The ITG participants received the illustrations of the tongue and lips the book presents showing how the sounds are articulated. The TG participants, on the other hand, received only the activities from the book with no illustration or explicit explanation that could have helped them figure out how to produce [θ] and [ð].

The activities on perception from *Clear Speech from the Start: Basic Pronunciation* are at the word level, showing the sounds in final position only; first, the sounds are compared and the differences between them are shown; then there are discrimination and identification activities; and finally, the target sounds appear in a contextualized activity. According to Silveira (2004), the way the book is organized focusing on perception and production of consonants in final position favors Brazilian Portuguese learners, because there are a limited number of consonants in their L1 inventory that can occur in this position. Therefore, in this practice session participants had contact with five different sounds in word-final position (/s/, /θ/, /z/, /d/ and /t/), which may help them distinguish one from another, and by making this distinction they might be able to perceive and/or produce them correctly, especially the interdentals, which are the focus in this study. Although the present study dealt with the interdentals in word-initial position, the book bring valid activities especially because it presents sound contrasts between the target sound and its most frequent replacements.

In the second session, participants worked with activities from *Pronunciation in use* (Appendix I). The chapter from *Pronunciation in use* (Hancock, 2003) dealing with

/θ/ and /ð/ starts by presenting a picture of the manner in which the sounds are produced and a brief description of how they should be produced. After the explicit information about the interdentals, the chapter presents the sounds first produced in isolation and then the contrasts (a) first the voiceless contrasts – /θ/ and /s/, /t/, /f/, and then (b) the voiced contrasts – /ð/ and /d/ in final and initial position, and /v/ in initial position.

The chapter also shows some cultural notes about the differences in the pronunciation of the interdental fricatives in different dialects. The author says that some Irish speakers pronounce *thick* /θɪk/ as [tɪk], some London speakers pronounce *three* /θriː/ as [triː], and some Nigerian speakers pronounce *then* /ðen/ as [den]. Since the objective of the session was to help learners perceive the interdentals this information was excluded from the treatment.

The TG and ITG groups did virtually all the activities from the chapter because most of them deal with perception and also present the interdentals with their most common replacements. The pictures and further explanations as well as the phonetic symbols were not included in the sheet for the TG group; only the ITG group had access to the pictures and further information about the sounds.

The chapter activities from *Pronunciation in Use* start with a poem in which participants are supposed to find a *th*-word that rhymes at the end of each line by listening to the CD; then, it moves to a contextualized exercise that presents the situation of a computer with a supposed "perception" problem that identifies words wrongly, confusing the interdental fricatives with some of their most common replacements, requiring participants to identify and replace the wrong word; finally, there is a minimal pair activity which presents two similar words in a trial and asks participants to listen to the words and identify the proper one in the context.

There are further perception practice activities at the end of the book, containing the sound pairs /s/ and /θ/; /z/ and /ð/; /f/ and /θ/; /v/ and /ð/; /t/ and /θ/; and /d/ and /ð/. In these extra practices, participants are supposed to identify and discriminate the sounds listened. All the exercises in the chapter and the extra ones were used in this session of the treatment.

In the third session, participants performed activities from *Focus on Pronunciation* (1993, Appendix J). Silveira (2004, p. 34) remarks that the chapters from this book usually present a slightly heavy description of the phonological features, tips and illustrations, and are generally followed by exercises in which learners have to listen and repeat or discriminate sounds, as well as a few exercises involving listening to oral texts, answering questions, dialogue practice, games about the vocabulary involving the target sounds, and spontaneous speech.

The chapter from *Focus on Pronunciation* used in this study presents /θ/ and /ð/ together. There is a description of how the sounds should be pronounced, but there is no picture available. Then, the interdental fricatives are divided into two sub-sections in a table. Each sub-section has three columns: the first column presenting one of the fricatives in word-initial position, the second column in the word-medial position, and the third column in word-final position. Next, there is a game activity, followed by an idiom and expressions practice, and finally, there is a discussion about the importance of pronunciation.

The activities of the chapter from *Focus on Pronunciation* were selected and carried out in two sessions: the word list, idiom and expression practice were done in this (third) session, and the discussion about the importance of pronunciation was done in the fifth session. Once again, the activities involving oral practice were excluded, such as repetition of the words in the columns, and the game. The idiom and expression

activity proved to be a very interesting activity, since not only did participants have exposure to the target sounds but also learned some words containing them in context along with other vocabulary.

In the fourth session, the activities were retrieved from *Ship or Sheep?* (2006) (Appendix K). The book includes two chapters devoted to the interdental fricatives, one chapter for the voiceless and another for the voiced counterpart. The chapters start with explanations on how to pronounce the sounds, as well as illustrations of the sounds to be produced. Following that, there are some examples of minimal pairs: (a) [s] versus [θ], [f] versus [θ], and [t] versus [θ] in the chapter on the voiceless interdental fricative; and (b) [d] versus [ð], and [z] versus [ð] in the chapter on the voiced interdental fricative. Both chapters include other minimal pair activities involving word and sentences, in which there is no clue available and students are supposed to listen and identify the sounds, understanding the words by relying on what they hear and on the context. The last activity of this minimal pair practice is one in which minimal pair words are placed together, and by listening to a sentence, students are supposed to identify the correct word. Next, there is an activity divided into two parts. In the first part, participants are familiarized with the vocabulary that appears in the second part focusing on the target sounds; in the second part, they listen to a dialogue and are supposed to highlight the stressed words in the conversation, the content words. Finally, the last activity of the chapter uses the same dialogue from the previous exercise with the focus now on intonation.

Although all the activities from the two chapters of *Ship or Sheep?* focused on perception, only some of them were selected either due to time constraints or because audio recordings were unavailable. Moreover, only the voiceless counterpart was used. This decision was made based on the other pronunciation material used in this research,

which devotes more practice activities to the voiceless interdental, probably because of number of occurrences in content words, whereas the voiced interdental is more often found in function words. The explanations and illustrations about the minimal pairs and the target sounds were given only to ITG participants.

In the fifth session, there were activities from *Clear Speech: Intermediate pronunciation* (1993), and *Focus on Pronunciation* (1993) (Appendix L). The activity from *Clear Speech: Intermediate pronunciation* followed the same pattern of *Clear speech: Basic pronunciation*. However, the chapter from the intermediate book deals only with the contrast /θ/ - /t/, and at this time only one activity fulfilled the perception criterion. The ITG group received a sheet containing mouth illustrations on how the sounds are pronounced and a description of how the sounds should be produced, along with a discrimination activity. On the other hand, the TG received only the activity. As mention in the third session, the activity from *Focus on Pronunciation* was done in this session. In this activity, participants discussed first in small groups and then shared their opinion about the importance of pronunciation. They were also required to write down their answers (either the group's answer or individual answers) and to hand them in to the researcher.

Since the last two sessions were planned based on activities from Beisbier's *Sounds Great Low Intermediate – Book 1* (1994) and *Sounds Great Intermediate – Book 2* (1995), which follow the same pattern, the following description comprises both books and sessions.

Both books present a chapter containing both interdental fricatives in which the minimal pairs [θ] versus [t], [θ] versus [s], [ð] versus [d], [ð] versus [z], are contrasted. Each minimal pair is detailed in the chapter in a different sub-section,

totaling four – two voiceless pairs and two voiced. The intermediate book deals with the same contrasts and activity types except for the minimal pair [ð] versus [z].

In the first section of the chapter, there are tables with three columns with examples of the target sounds in word-initial, word-medial and word-final position. Then, there are pictures showing the contrast between the two minimal pairs presented and also a picture representing the articulation of both sounds. Next, there are listening and repetition tasks, followed by peer activities of discrimination, speaking and/or role play. Since the activities of these books were carried out in the two last sessions of the treatment period, pair activity practice was included, as a matter of self-assessment as proposed by Goodwin et al. (1994). Up to this point, participants had performed the perception activities only individually. According to Fraser (1999), pairwork activities help to promote critical listening, that is,

> the ability to notice, diagnose and repair their [the students'] own errors, and those of their fellows, rather than always relying on the teacher's feedback. It is through critical listening that perceptual discrimination, and appropriate conceptual analysis of English words and sentences into sounds and letters, can best develop (p. 04).

The activities of listening and repetition were excluded, as well as the pictures contrasting the minimal pairs and columns describing the target sounds, in all three positions. This decision was made taking into account that the ITG group had already had an activity in which the sounds appeared in different positions, and had already seen pictures illustrating the minimal pairs. The pictures and phonetic symbols were not presented to the TG group, so that participants did not have visual cues to infer how the sounds are produced.

In the sixth session, participants worked with activities from *Sounds Great - Book 1* (Appendix M), and finally, in the seventh session, participants carried out activities from *Sounds Great – Book 2* (Appendix N).

3.4.4 Treatment

Students of the UFSC extracurricular course have classes of one hour and a half twice a week, totalizing 45 hours of English classes per semester. The data collection was carried out during the first semester of 2008, and the treatment took place along with the regular classes in seven sessions from May to June 2008.

Before the treatment was implemented, certain steps needed to be taken: (a) the teachers of the CG groups received instructions not to provide any explanation about the target sounds; (b) the treatment was planned so that the time devoted to it did not prevent participants from having all the content planned for level 3 as in the textbook; (c) the pronunciation manuals were selected in order to collect activities for the study; (d) the language laboratory was scheduled for the sessions; and (f) the pretest, questionnaire and the consent form had to be prepared in advance to be used before the treatment started;

After these steps were accomplished, the TG and ITG were provided with a 30-minute session weekly for a period of seven weeks, in a total of 3.5 hours of perception training or instruction and training. The sessions were planned in such a way as to have the first half of the class in their classroom, and the other half in the language lab[26].

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[26] This measure did not work in all the groups during the whole period due to external factors, such as a storm which prevented us from using the lab on the day we had scheduled to, since the lab does not work on rainy days because of humidity.

3.5 Data analysis

The effects of training and instruction on the perception of the interdental fricatives were investigated with six groups of participants enrolled in level 3 of UFSC Extracurricular English course. One instrument was used to collect the perception data, the Categorial Discrimination Test (CDT) which was administered at two distinct times: as a pretest before treatment and as posttest after treatment. The fifty-three participants produced a total of 2332 responses for the CDT (1166 for each phoneme) each time they took the test.

A-prime (*A'*) scores were calculated for each participant's results in order to provide an unbiased measure of perceptual sensitivity. This sensitivity measure was chosen because *A'* is more robust than other sensitivity measures, such as *d'*, when the variance is not homogeneous (Donaldson, 1993); that is, the results do not imply equal-variance underlying distribution (Verde, Macmillan & Rotello, 2006). Hence, non-parametrical data, which is the case in this study, could be safely used. The *A'* scores range from 0.0 to 1.0, a score of 1.0 indicates perfect discrimination of a contrast, whereas 0.5 or lower indicates insensitivity to a contrast.

The scores were calculated using the formula provided by Snodgrass, Levy-Berger & Haydon (1995)[27], which takes into account the correct responses in the change trials ("hits" (H) – participants correctly select the odd item) and the wrong responses in catch trials ("false alarm" (FA) – participants are not able to identify the trial as having the same words, wrongly selecting an item out).

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[27]If H = FA, A' = 0.5

If H > FA, $A' = 0.5 + [(H - FA)(1 + H - FA)] / [4 H (1 - FA)]$

If H < FA, $A' = 0.5 + [(FA - H)(1 + FA - H)] / [4 FA (1 - H)]$

Once the *A'* scores were calculated, descriptive statistics were done and non-parametric tests were run on the 4664 responses from the pre and post tests by using the Statistical Package for Social Sciences (SPSS) software 16.0 in order to check for statistical significance.

Since the data collected were not normally distributed, Kruskal-Wallis and Mann-Whitney tests were used for the between-group analyses and Friedman and Wilcoxon Signed Ranks Tests were used for the within-group analyses. For the analyses the probability level of statistical significance was set at .05. For further information about the tests check Koerich (2002).

CHAPTER 4

RESULTS AND DISCUSSION

With the purpose of investigating the effects of training and instruction on the perception of the interdental fricatives by Brazilian EFL learners, the Categorial Discrimination Test used in Reis's (2006) study was administered in the present study with the aim of testing participants' capacity to discriminate the sound contrasts of the voiceless and voiced fricatives.

The CDT was first designed by Flege, Munro and Fox (1994) and aimed at investigating the discrimination of vowels. Koerich (2002) was the first to adapt the CDT, with the purpose of investigating the discrimination between CVC and CVCV words, that is, the difference between the presence and absence of a vowel, and Reis (2006), based on the modifications made by Koerich (2002), used the CDT for the study of the interdental fricatives, thus creating two versions of the test, one testing $[\theta]$ and another testing $[\eth]$. For the voiceless interdental version of the CDT, Reis used the words *thigh-fie-sigh-tie*, combined to test the following sound contrasts: $[\theta]$-$[f]$, $[\theta]$-$[t]$ and $[\theta]$-$[s]$; and for the voiced interdental version, the words *thee-vee-zee-dee* were combined to test the contrasts $[\eth]$-$[d]$, $[\eth]$-$[v]$ and $[\eth]$-$[z]$.

The raw scores[28] obtained from the CDT in the three condition groups under investigation in the present study – the training group (TG), the instruction and training group (ITG), the non-intervention or control group (CG) – were calculated using *A'* scores, which show an unbiased measure of perceptual sensitivity and vary from 0.0 to 1.0. The closer to 1.0 the better the discrimination; 0.5 or below represents insensitivity

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[28] The raw scores are presented in appendix O for further reference.

to the contrast (Guion et al., 2000). Gain scores based on the *A'* scores were also used to show participants' individual performance.

In order to analyze and discuss the Research Questions and Hypotheses, the non-parametric Wilcoxon and Mann-Whitney tests were run for each condition group under analysis, and the Kruskal-Wallis was used for between-group analysis across the three conditions. The results were compared and contrasted in terms of TG versus CG, ITG versus CG, TG versus ITG, and TG versus CG versus ITC.

This chapter reports and discusses the findings from the perception test before and after the treatment period for the three different groups of participants (two classes for each group) who comprised the three different groups[29] – the TG, the CG, and the ITG. The research questions, hypotheses and test results are organized following the characteristic of the sound: first the results for the voiceless fricative, and then the results for the voiced fricative.

4.1 Between-group analyses

In order to have an overall picture of the groups' performances, the results of the pretest and posttest of the sounds under investigation are displayed bellow.

4.1.1 Between-group analyses for the voiceless sound

Figure 1 displays the comparison of Medians of the three groups in the pretest, and Figure 2 shows the same comparison in the posttest. Medians were used as an alternative for the Means, because they are less influenced by extreme scores.

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[29] The TG was composed of 21 participants, from S33 to S53; the ITG of 18 participants, from S1 to S18; and the CG of 14 participants, from S19 to S32.
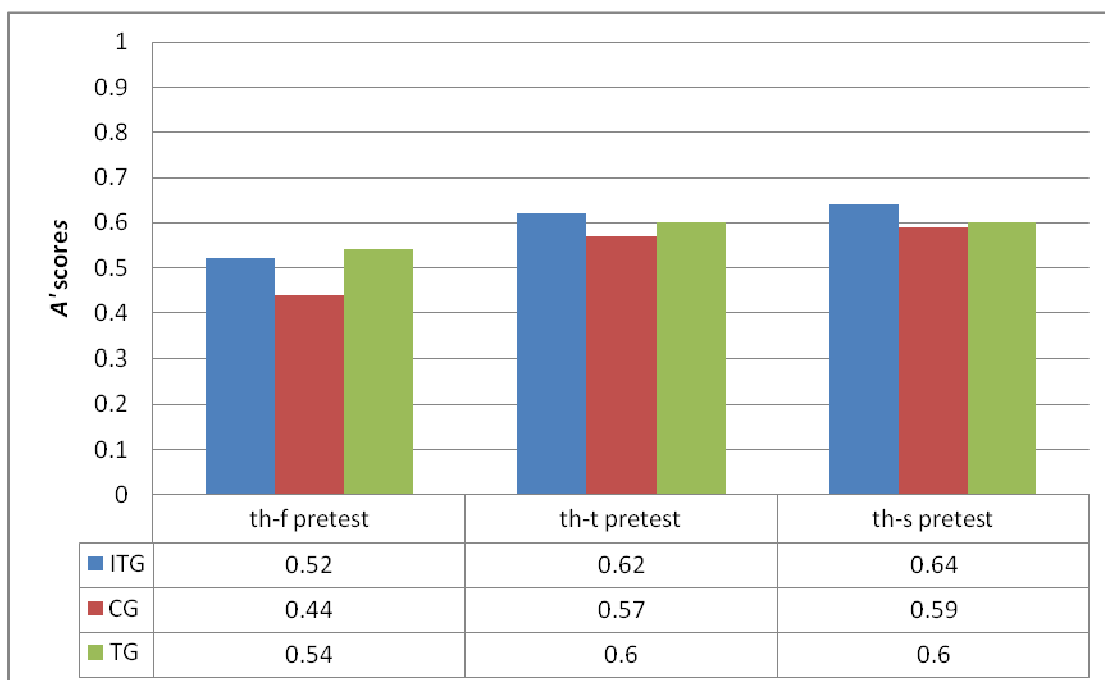
Figure 1. Median of A-prime (*A'*) scores obtained from the three groups for the three voiceless contrasts in the pretest.

Figures 1 and 2 suggest that the contrast with the greatest difference in Median from pretest to posttest was [θ]-[f], in which the TG improved by 0.10, the CG improved by 0.13, but the ITG obtained exactly the same Median in the two tests. However, these differences were not enough to reach statistical significance (Table 3).
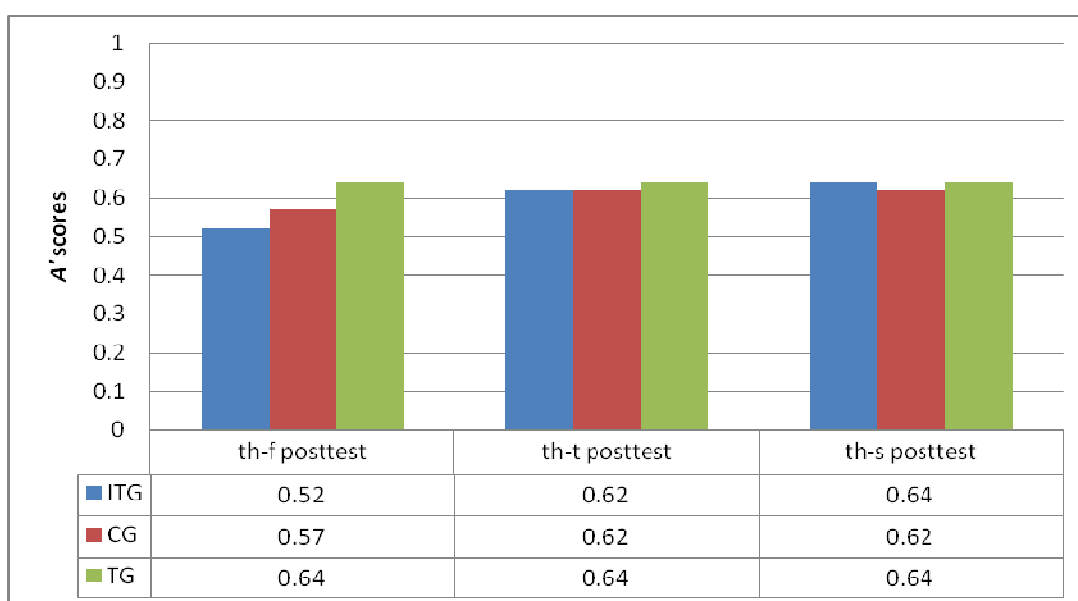
Figure 2. Median of A-prime (*A'*) scores obtained from the three groups for the three voiceless contrasts in the posttest.

Since the data from TG, ITG, and CG were not normally-distributed, the results were analyzed using Kruskal-Wallis, which showed that the groups did not perform differently in either the pretest or posttest, as illustrated in Table 3.

Table 3. Kruskal-Wallis results for comparison of the three groups TG, ITG and CG for the three voiceless sound contrasts.

	[θ]-[f]	[θ]-[t]	[θ]-[s]
Pretest	(X² (2) = 1.212, p = 0.545).	(X² (2) = .718, p = 0.698).	(X² (2) = .171, p = 0.918).
Posttest	(X² (2) = 3.164, p = 0.206).	(X² (2) = 3.681, p = 0.159).	(X² (2) = 3.661, p = 0.160).

Note. ITG= 18 participants; TG = 21 participants; CG = 14 participants.

4.1.2 Between-group analyses for the voiced sound

In order to verify whether there was a difference in analysis among the three groups, the Kruskal-Wallis was used to discover whether there was a difference in performance between the TG, ITG and CG for the voiced interdental. Interestingly, the test revealed that there was a difference in performance in the pretest (X² (2) = 8.176, p = 0.017) among the groups, but this difference was not maintained in the posttest (X² (2) = .934, p = 0.627), as shown in Table 4.

Table 4. Kruskal-Wallis results for comparison of the three groups TG, ITG and CG for the voiced sound contrasts

	[ð]-[d]	[ð]-[v]	[ð]-[z]
Pretest	(X² (2) = 4.556, p = 0.102)	(X² (2) = 4.102, p = 0.129)	(X² (2) = 8.176, p = 0.017)
Posttest	(X² (2) = .858, p = 0.651)	(X² (2) = 2.726, p = 0.256)	(X² (2) = .934, p = 0.627)

Note. TG = 21 participants; CG = 14 participants; ITG = 18 participants.

Figure 3 displays the median *A'* scores for the three contrasts performed by the three groups in the pretest. According to Figure 3, the TG had the highest scores,

followed by the ITG and CG whose performances were similar. Intriguingly, in Figure 4, which presents the results for the posttest, there is a change in the picture. The TG, whose performance was the highest in the pretest, had a worsening in performance in the posttest, scoring very close to the ITG, and the CG improved the most, scoring the highest in the posttest.

	th-d pretest	th-v pretest	th-z pretest
ITG	0.64	0.64	0.66
CG	0.62	0.70	0.70
TG	0.90	0.90	0.90
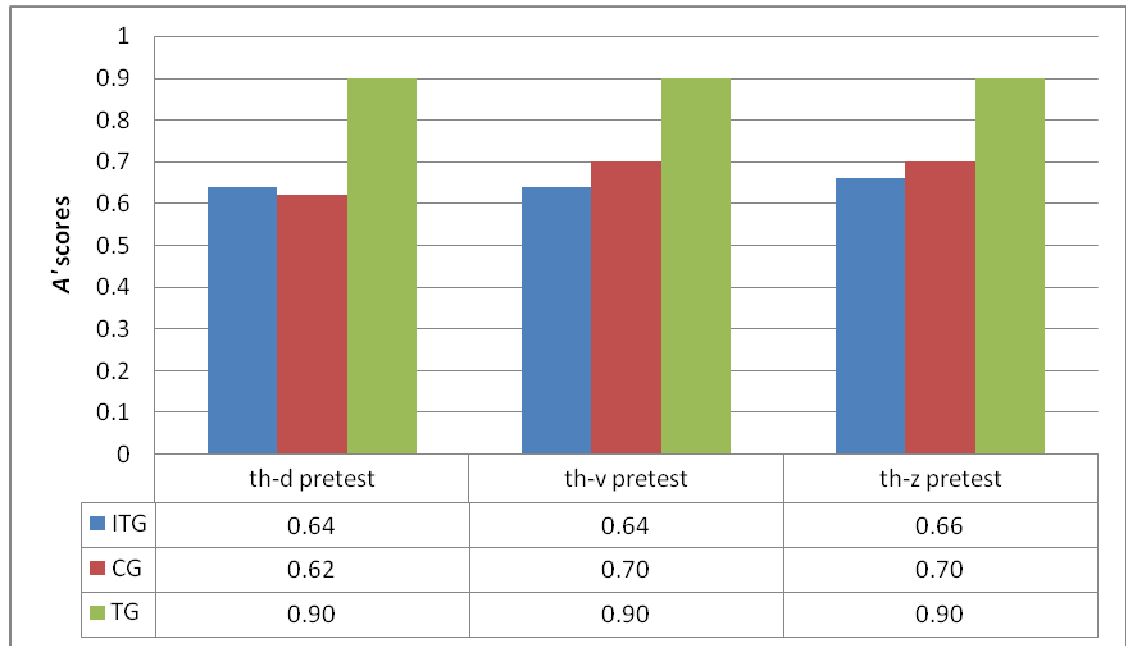
Figure 3. Median of A-prime (*A'*) scores obtained for the three groups for the three voiced contrasts in the pretest.

	th-d postest	th-v posttest	th-z posttest
ITG	0.68	0.62	0.68
CG	0.81	0.83	0.83
TG	0.72	0.72	0.72
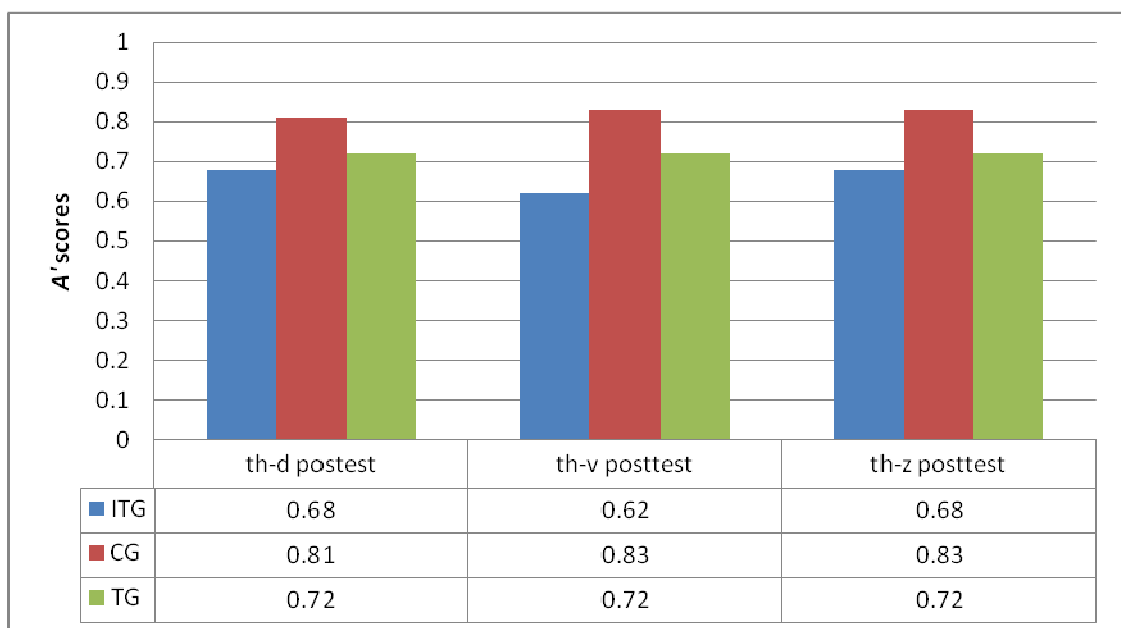
Figure 4. Median of A-prime (*A'*) scores obtained for the three groups for the three voiced contrasts in the posttest.

The results may be explained in the following way. The TG did not have much room to improve, since its performance was much higher and reaching ceiling in the pretest. Thus, training may have affected the prototypes of the sounds already created by the participants in this group, causing confusion because they listened to the sounds without any explanation, and instead of the prototype improving, it worsened, causing a worsening in their performance. On the other hand, the CG and ITG had room to improve. Intriguingly, the CG was the group to improve instead of the ITG, which is difficult to explain, inasmuch as the CG did not receive any treatment. An alternative explanation for this change may be related to the variable teacher, since the teachers in the CG were different from the teacher in the TG and ITG.

4.2 Analyses for the voiceless sound

Once The *A'* scores were calculated, the pretest-posttest differences for the three pairs of sounds [θ-f], [θ-t] and [θ-s] were tested for significance using Wilcoxon, and Friedman was used to verify whether there was a significant difference in performance among the three sound pairs in the pretest and among the same pairs in the posttest.

4.2.1 Training Group analysis

This section presents the results of the perception test from the 21 participants in the (TG) for the voiceless interdental. The hypothesis concerning the TG was that there would be improvement in the discrimination of the interdental fricatives from the pretest to posttest.

Table 5. TG Means and medians for the voiceless interdental contrasts

	[θ]-[f]		[θ]-[t]		[θ]-[s]	
	Pre	Post	pre	post	pre	post
Mean	.60	.58	.67	.67	.64	.65
Median	.54	.64	.60	.64	.60	.64

Table 5 presents the means and medians for the TG, and the comparison between [θ-f] (Figure 5) in the pretest (*Median*=.54, *SD*=.26) and posttest (*Median*=.64, *SD*=.25), as shown by the Wilcoxon, revealed that there was no significant improvement in performance after training for this contrast (z= -.122, p=.903). Similarly, the pair [θ-t] (Figure 6) also did not show a statistically significant improvement from pretest (*Median*=.60, *SD*=.18) to posttest (*Median*=.64, *SD*=.25) as shown by Wilcoxon (z=-.296, p=.768). Finally, the same lack of a statistically significant difference (z=-469, p=.639) was found for the contrast [θ-s] (Figure 7), comparing pretest (*Median*=.60, *SD*=.21) to posttest (*Median*=.64, *SD*=.21).
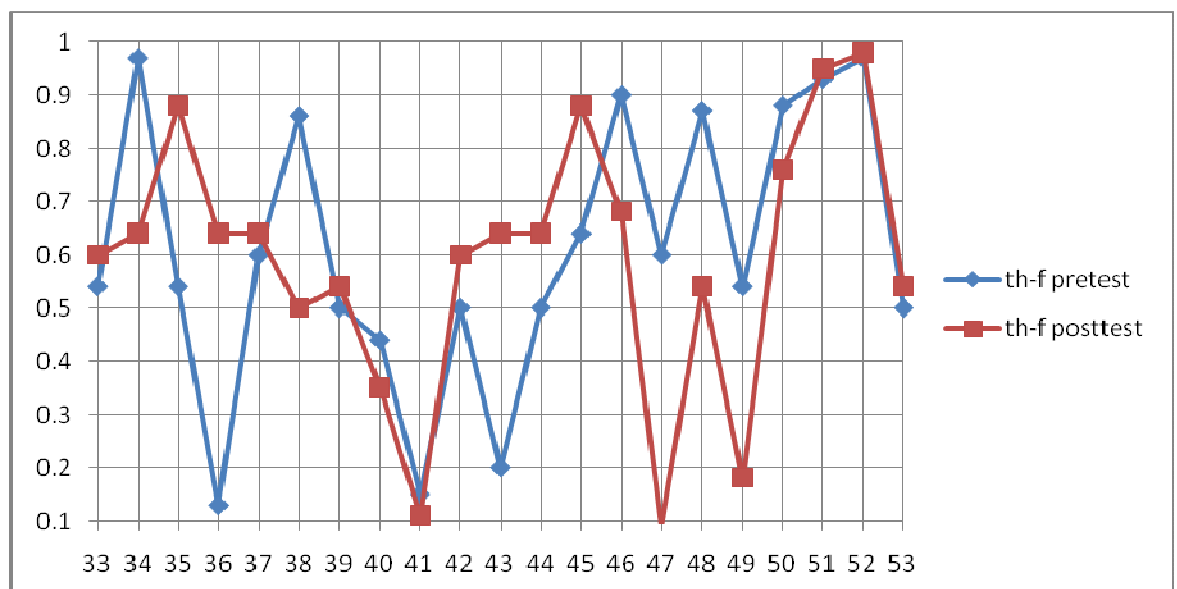
Figure 5. TG performance on the CDT pretest and posttest of the [θ]-[f] contrast.
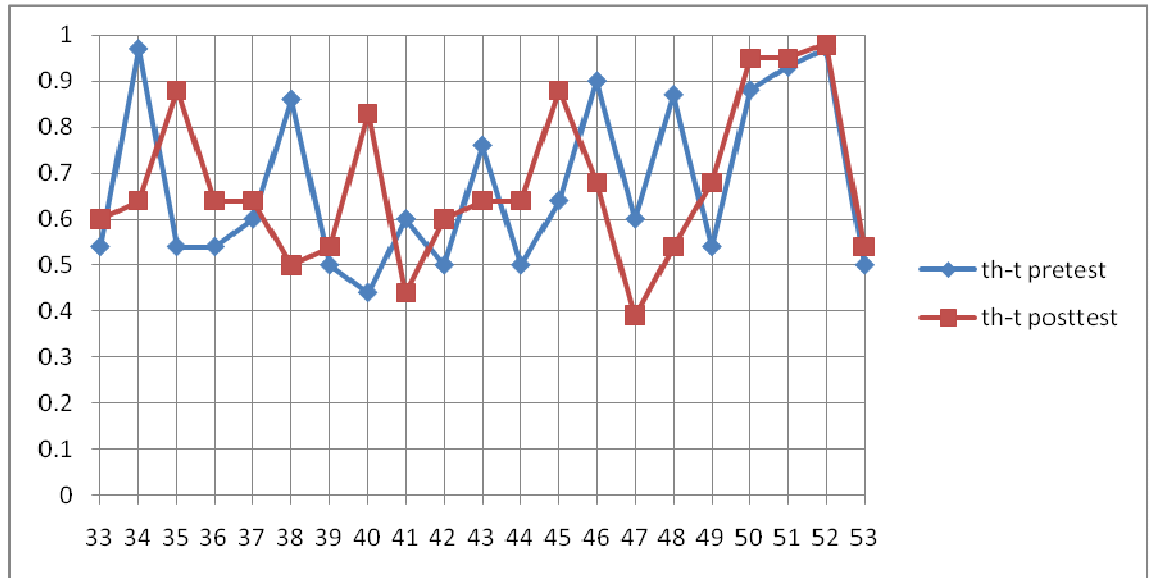
Figure 6. TG performance on the CDT pretest and posttest for the [θ]-[t] contrast.
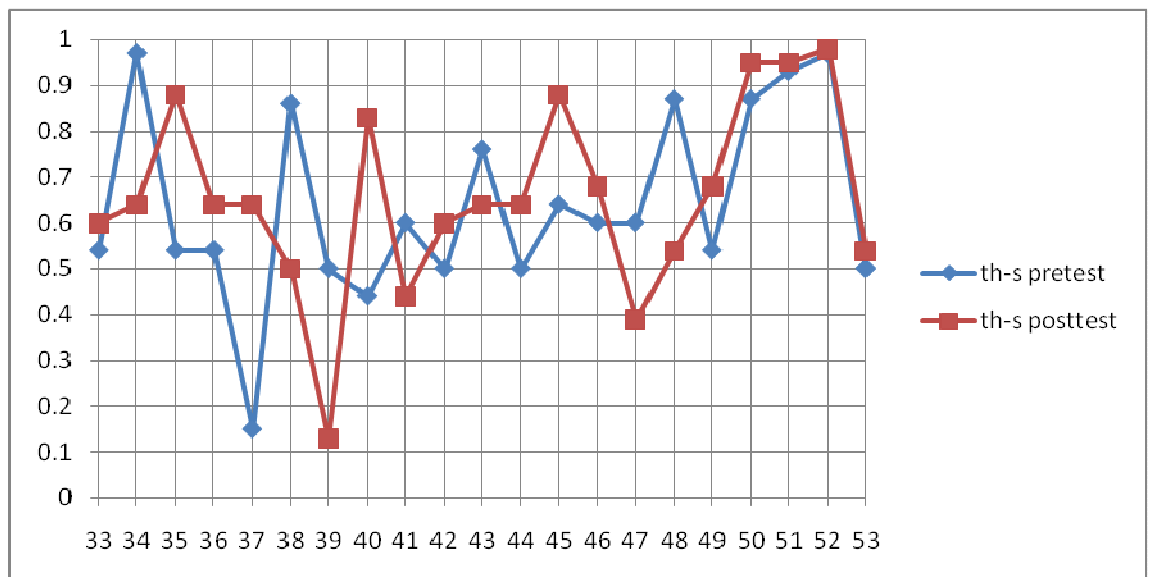
Figure 7. TG performance on the CDT pretest and posttest for the [θ]-[s] contrast.

There was also no statistically significant difference in performance among the three pair contrasts in the pretest as shown by Friedman (X^2 (2, N=21) = 3.000, p=.223). However, there was a significant difference in performance in the posttest (X2 (2, N=2)1 = 7.000, p=.03). In order to pin down where the differences lay, the Wilcoxon test was used one more time, revealing that the posttest differences between [θ-t] and [θ-f] were statistically significant (z=-2.023, p=0.43), but not different

between [θ-s] . This suggests that the training condition may have been more helpful

for the participants to learn to distinguish the [θ] from the [t] than from the [f]. A more

detailed analysis about [f] is presented in section 4.4.

4.2.2 Instruction and Training Group analysis

This section reports the results obtained by the 18 participants in the instruction

and training Group (ITG) for the voiceless interdental in the perception test. The

hypothesis concerning the ITG is that there will be improvement in the discrimination

of the interdental fricatives from pretest to posttest.

Table 6. ITG Means and Medians for the voiceless interdental contrasts

	[θ]-[f]		[θ]-[t]		[θ]-[s]	
	Pre	Post	pre	post	pre	post
Mean	.55	.70	.66	.76	.58	.76
Median	.52	.84	.62	.84	.64	.84

Table 6 presents the Means and Medians for the ITG, and similarly to the

results obtained for the TG condition, the Wilcoxon did not show significant

improvement after treatment for the contrast [θ]-[f] (z=-1.629, p=.103) from pretest

(*Median*=.52, *SD*=.30) to posttest (*Median*=.84, *SD*=.29) (Figure 8). Likewise, the

pretest (*Median*=.62, *SD*=.20) and posttest (*Median*=.84, *SD*=.18) comparison for the

[θ]-[t] (Figure 9) contrast did not reach statistical significance either (z=-1.824,

p=.068). Notwithstanding, the comparison of the pretest (*Median*=.64, *SD*=.31) and

posttest (*Median*=.84, *SD*=.18) for the contrast [θ]-[s] (Figure 10) did yield

statistically significant results as shown by Wilcoxon (z=-2.108, p=.035), indicating a

significant improvement after instruction and training for this contrast.
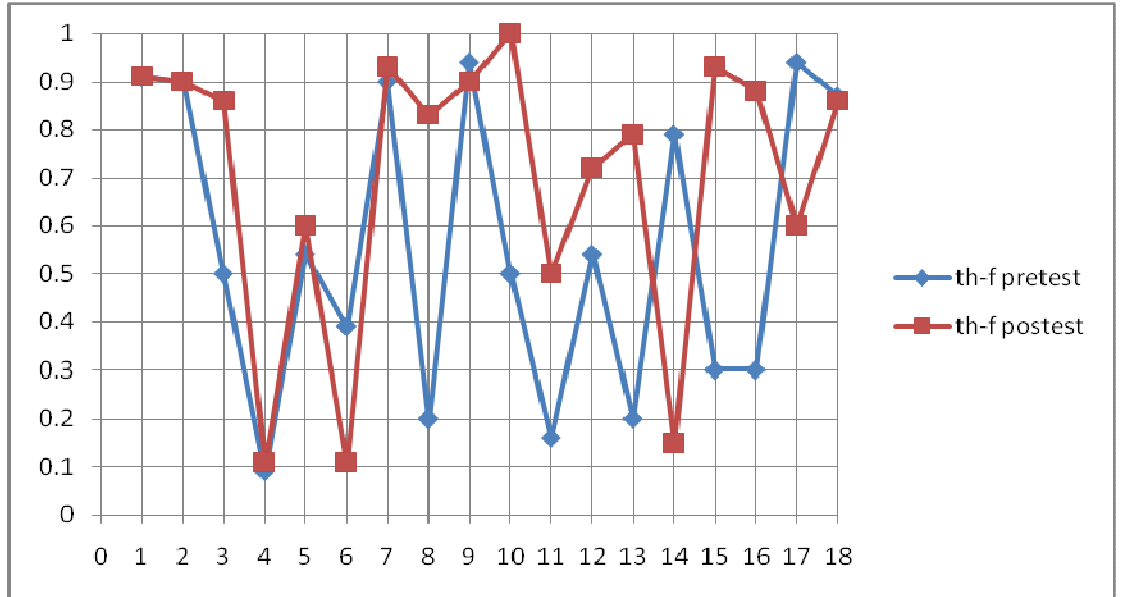
Figure 8. ITG performance on the CDT pretest and posttest of the [θ]-[f] contrast.
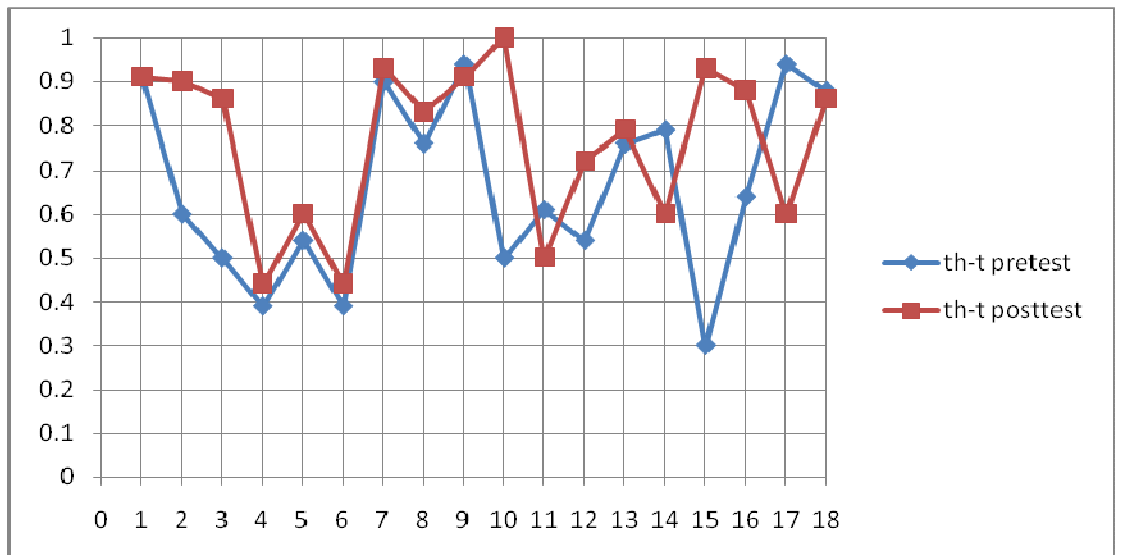
Figure 9. ITG performance on the CDT pretest and posttest of the [θ]-[t] contrast.
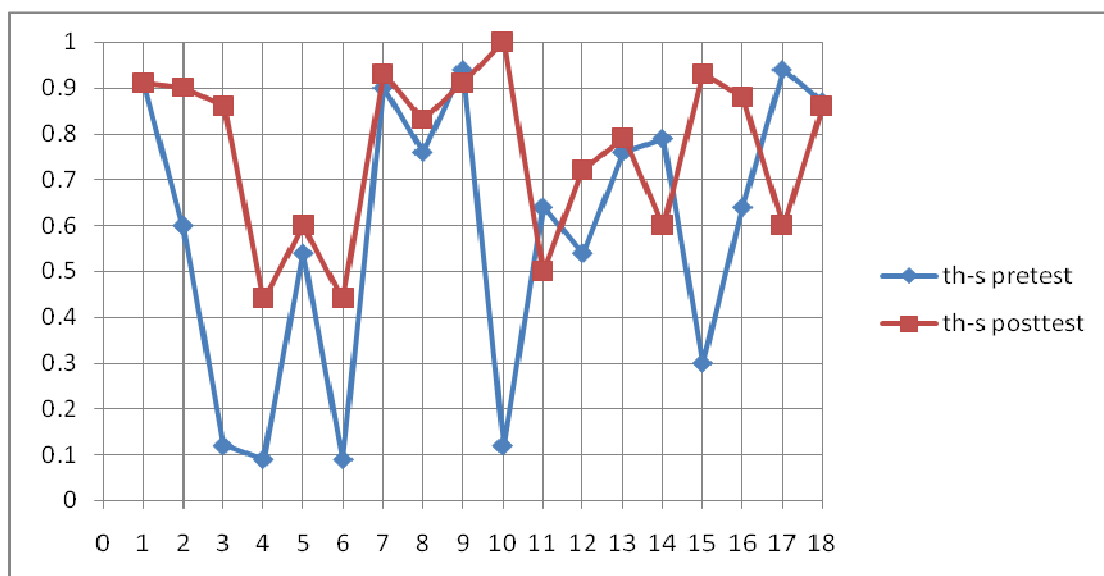
Figure 10. ITG performance on the CDT pretest and posttest of the [θ]-[s] contrast.

Although the results reached statistical significance only for the contrast [θ]-[s], it can be noticed that there were changes from the pretest to posttest for the other contrasts. In order to verify whether the differences in performance were significant among the voiceless contrasts, the Friedman test was used. Results suggest that participants performed very similarly on the three sound contrasts in the pretest (X^2 (2, N=18) = 3.935, p=.140), and that after treatment there was a statistical difference in performance on the three sound contrasts (X^2 (2, N=18) = 10.000, p=.007). Wilcoxon revealed that the sound contrasts [θ-f]-[θ-t] yielded a statistically significant difference (z=-2.032, p=.042), as well as the sound contrasts [θ-f]-[θ-s], which presented the same result. Thus, training and instruction appear to have affected the way participants perceived the sounds.

Differently from the TG, at least one contrast yielded statistically significant improvement after training, which might indicate that instruction on the interdentals based on explicit information and perceptual practice is able to promote a change in participants' perception.

4.2.3 Control Group analysis

This section reports the results obtained by the 14 participants in the Control Group (CG) for the voiceless interdental in the perception test.

Table 7. CG Means and Medians for the voiceless interdental contrasts

	[θ]-[f]		[θ]-[t]		[θ]-[s]	
	Pre	Post	pre	post	pre	post
Mean	.45	.51	.61	.62	.61	.62
Median	.44	.57	.57	.62	.59	.62

Table 7 presents the means and medians of the CG, and similarly to the results obtained for the TG condition, the Wilcoxon did not show significant improvement after treatment for the contrast [θ]-[f] ($z=-.628$, $p=.530$) from pretest (*Median*=.44, *SD*=.31) to posttest (*Median*=.57, *SD*=.31) (Figure 11). Likewise, the same lack of statistical significance was found for the contrast [θ]-[t] (Figure 12) in which the pretest (*Median*=.57, *SD*=.23) and posttest (*Median*=.62, *SD*=.19) comparison yielded ($z=-.850$, $p=.395$) at the Wilcoxon test. Also, the [θ]-[s] (Figure 13) contrast did not reach statistical significance either ($z=-.346$, $p=.730$) from pretest (*Median*=.59, *SD*=.25) to posttest (*Median*=.62, *SD*=.19).
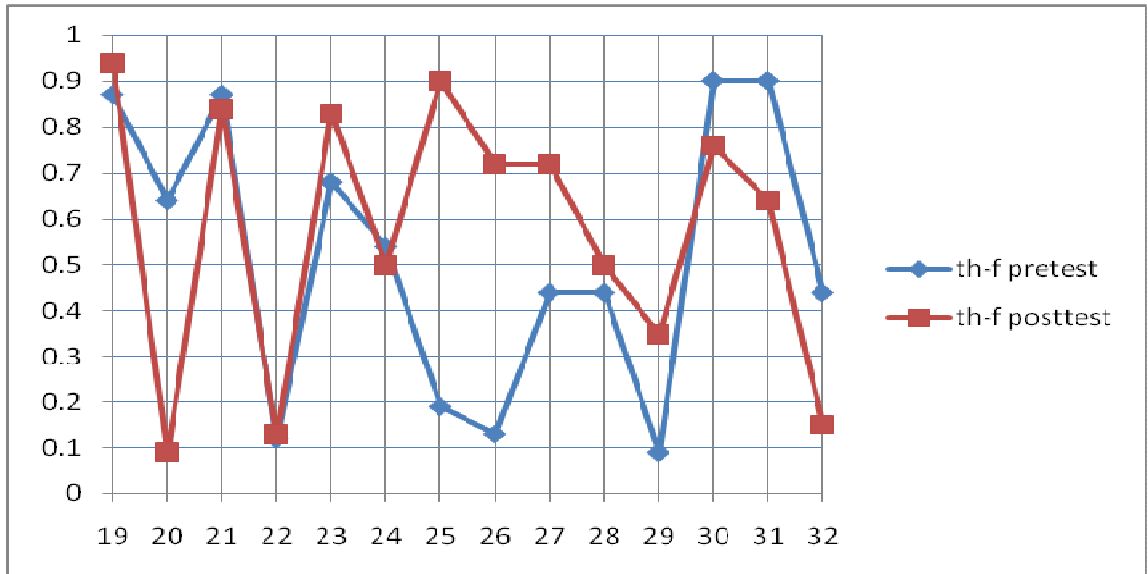
Figure 11. CG performance on the CDT pretest and posttest of the [θ]-[f] contrast.
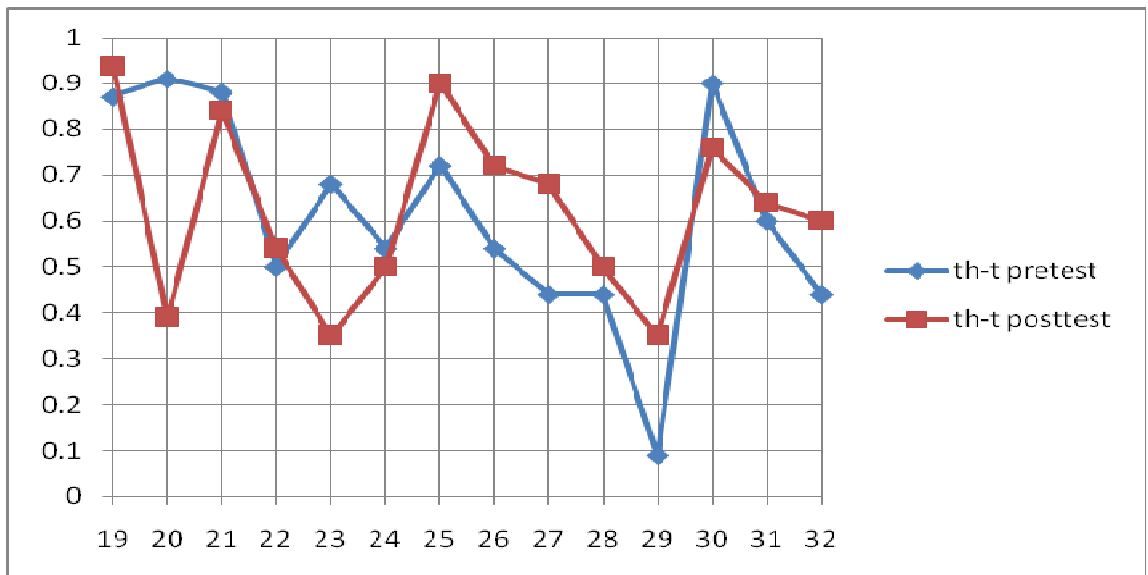
Figure 12. CG performance on the CDT pretest and posttest of the [θ]-[t] contrast.
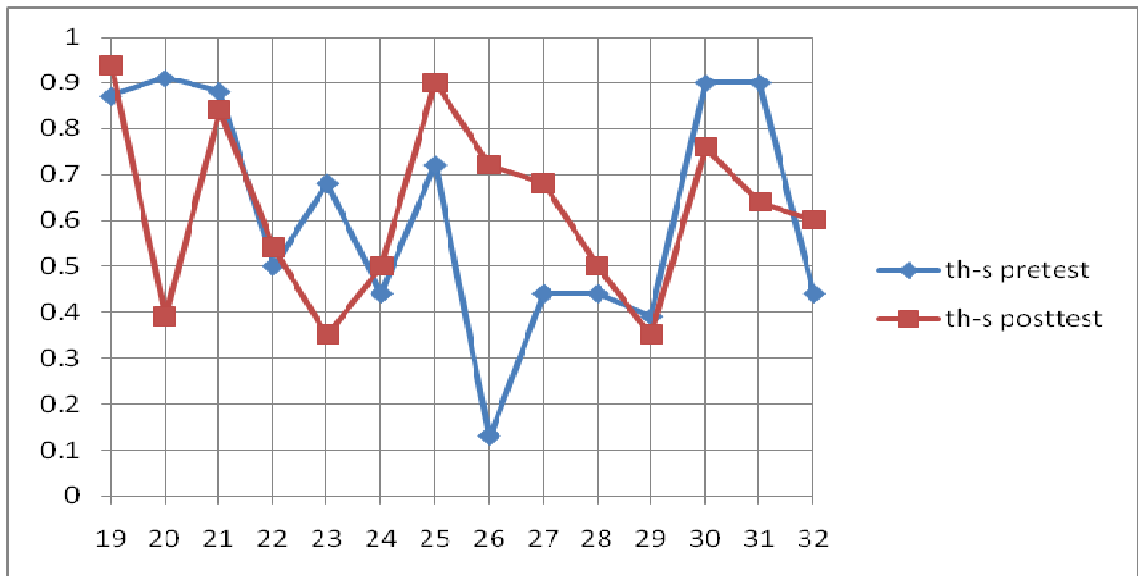
Figure 13. CG performance on the CDT pretest and posttest of the [θ]-[s] contrast.

4.2.4 Training Group / Control Group comparison

Table 8 presents the Means and Medians of the pre and posttests for the TG and CG.

Table 8. TG and CG Means and Medians for the voiceless contrasts

	[θ]-[f]				[θ]-[t]				[θ]-[s]			
	Pre		Post		Pre		Post		Pre		Post	
	TG	CG	TG	CG	TG	CG	TG	CG	TG	CG	TG	CG
Mean	.60	.45	.58	.51	.67	.61	.67	.62	.64	.61	.65	.62
Median	.54	.44	.64	.57	.60	.57	.64	.62	.60	.59	.64	.62

The analysis between the TG group and the CG group using the Mann-Whitney revealed that there were no statistically significant differences between the two groups for any sound-pair in either the pretest or the posttest, as reported below in Table 9, which sheds doubt on the above suggestion. Gain scores were also calculated for each group and each contrast, and the Wilcoxon applied to test the significance of the comparisons.

Table 9. Mann-Whitney results for TG and CG

	[θ-f]	[θ-t]	[θ-s]
Pretest	(z=-1.047, p=.309)	(z=-.830, p=.414)	(z=-.642, p=.538)
Posttest	(z=-.101, p=934)	(z=-.795, p=.434)	(z=-.608, = .561)

Note. TG = 21 participants; CG= 14 participants

Tables 10, 11 and 12 display the gains scores for each contrast in both groups.

Table 10. TG vs. CG gain scores for the contrast [θ]-[f]

Training Group			Control Group	
Participants	Gain score		Participants	Gain score
S33	0.06		S19	0.07
S34	-0.33		S20	-0.55
S35	0.34		S21	-0.03
S36	0.51		S22	0.01
S37	0.04		S23	0.15
S38	-0.36		S24	-0.04
S39	0.04		S25	0.71
S40	-0.09		S26	0.59
S41	-0.04		S27	0.28
S42	0.10		S28	0.06
S43	0.44		S29	0.26
S44	0.14		S30	-0.14
S45	0.24		S31	-0.26
S46	-0.22		S32	-0.29
S47	-0.51			
S48	-0.33			
S49	-0.36			
S50	-0.12			
S51	0.02			
S52	0.01			
S53	0.04			
Total	-0.38			0.82
Mean	-0.02			0.05
Median	0.01			0.03
SD	0.27			0.33
Minimum	-0.51			-0.55
Maximum	0.51			0.71

The Wilcoxon test applied to the gain scores for the contrast [θ]-[f], shown in Table 10, did not show a statistically significant difference between TG and CG (z=-.691, p=.490), which suggests that training alone was not able to influence the perception of this contrast.

Table 11. TG vs. CG gain scores for the contrast [θ]-[t]

Training Group		Control Group	
Participants	Gain score	Participants	Gain score
S33	0.06	S19	0.07
S34	-0.33	S20	-0.55
S35	0.34	S21	-0.03
S36	0.10	S22	0.01
S37	0.04	S23	0.15
S38	-0.36	S24	-0.04
S39	0.04	S25	0.71
S40	0.39	S26	0.59
S41	-0.16	S27	0.28
S42	0.10	S28	0.06
S43	-0.12	S29	0.26
S44	0.14	S30	-0.14
S45	0.24	S31	-0.26
S46	-0.22	S32	-0.29
S47	-0.21		
S48	-0.33		
S49	0.14		
S50	0.07		
S51	0.02		
S52	0.01		
S53	0.04		
Total	0.00		0.82
Mean	0.00		0.05
Median	0.04		0.00
SD	0.20		0.33
Minimum	-0.36		-0.55
Maximum	0.39		0.71

A similar lack of significance was found for the comparison of the TG and CG gain scores for the contrast [θ]-[t], shown in Table 11. The Wilcoxon yielded a non-significant difference between the two groups (z=-.354, p=.723).

Table 12. TG vs. CG gain scores for the contrast [θ]-[s]

Training Group		Control Group	
Participants	Gain score	Participants	Gain score
S33	0.06	S19	0.07
S34	-0.33	S20	-0.52
S35	0.34	S21	-0.04
S36	0.10	S22	0.04
S37	0.49	S23	-0.33
S38	-0.36	S24	-0.04
S39	-0.37	S25	0.18
S40	0.39	S26	0.18
S41	-0.16	S27	0.24
S42	0.10	S28	0.06
S43	-0.12	S29	0.26
S44	0.14	S30	-0.14
S45	0.24	S31	0.04
S46	0.08	S32	0.16
S47	-0.21		
S48	-0.33		
S49	0.14		
S50	0.08		
S51	0.02		
S52	0.01		
S53	0.04		
Total	0.35		0.16
Mean	0.01		0.01
Median	0.06		0.05
SD	0.24		0.22
Minimum	-0.37		-0.52
Maximum	0.49		0.26

The contrast [θ]-[s] was the only one in which the TG had a higher sum in gain scores (Table 12). However, these results were not enough to produce statistically significant differences between TG and CG as shown by Wilcoxon (z=-.101, p=.934).

Based on the results reported in Tables 10-12, it can be concluded that training did not yield significant results. However, it is important to account for the positive results from nine participants from the TG whose performance improved from pretest to posttest in the three contrasts (S33, S35, S36, S37, S42, S44, S45, S51, and S53). In spite of the improvement, it is interesting to notice how different each one of the nine participants performed, their gain scores ranging from 0.01 to 0.51, which might suggest that individual characteristics also played a role. Interestingly, the development of perception for the three contrasts was shown to be different for two participants, whose performance was different for each contrast (S48, S50). In addition, there were participants who had a worse performance in all three contrasts after training (S34, S36, S47).

4.2.5 Instruction and Training Group / Control Group comparison

The CG was included in the analysis in order to investigate whether the two groups performed differently in the pretest and posttest. Table 13 presents the Means and Medians of both groups.

Table 13. ITG and CG Means and Medians for the voiceless contrasts

	[θ]-[f]				[θ]-[t]				[θ]-[s]			
	Pre		Post		Pre		Post		Pre		Post	
	ITG	CG	ITG	CG	ITG	CG	ITG	CG	ITG	CG	ITG	CG
Mean	.55	.45	.70	.51	.66	.61	.76	.62	.58	.61	.76	.62
Median	.52	.44	.84	.57	.62	.57	.84	.62	.64	.59	.84	.62

The Mann-Whitney revealed that there was no statistically significant difference between the results of the two groups on the pretest. Nevertheless, the results from the posttest showed nearly statistical significance in two out of the three contrasts – [θ-t] and [θ-s]- as shown in Table 14.

Table 14. Mann-Whitney results for ITG and CG

	[θ-f]	[θ-t]	[θ-s]
Pretest	(z=-.590, p=.555)	(z=-.647, p=.517)	(z=.000, p=1.000)
Posttest	(z=-1.446, p=.148)	(z=-1.884, p=.060)	(z=-1.884, p=.060)

Note. ITG = 18 participants; CG = 14 participants

Gain scores of the two groups for the three voiceless contrasts were included in order to pin down individual differences and verify this lack of differential improvement between the two groups, given that the posttest scores were so close to significance. Tables 13, 14 and 15 below present the gain scores for the ITG and CG. Although the gain scores are higher for the ITG for the three contrasts, results from Mann-Whitney did not reach statistical significance. The test showed that the difference in gain scores between the two groups for [θ]-[f] (Table 15) yielded (z=-.665, p=.506) which is far from significance, the contrast [θ]-[t] (Table 16) yielded (z=-.475, p=.636). And similarly to the previous two contrasts, results for [θ]-[s] (z=-1.065, p=.287) did not reach statistical significance either (Table 17).

Table 15. ITG vs. CG gain scores for the contrast [θ]-[f]

Instruction Training Group		Control Group	
Participants	Gain score	Participants	Gain score
S1	0.00	S19	0.07
S2	0.00	S20	-0.55
S3	0.36	S21	-0.03
S4	0.02	S22	0.01
S5	0.06	S23	0.15
S6	-0.28	S24	-0.04
S7	0.03	S25	0.71
S8	0.63	S26	0.59
S9	-0.04	S27	0.28
S10	0.50	S28	0.06
S11	0.34	S29	0.26
S12	0.18	S30	-0.14
S13	0.59	S31	-0.26
S14	-0.64	S32	-0.29
S15	0.63		
S16	0.58		
S17	-0.34		
S18	-0.01		
Total	2.61		0.82
Mean	0.14		0.05
Median	0.04		0.03
SD	0.36		0.33
Minimum	-064		-0.55
Maximum	0.63		0.71

Table 16. ITG vs. CG gain scores for the contrast [θ]-[t]

Instruction Training Group			Control Group	
Participants	Gain score		Participants	Gain score
S1	0.00		S19	0.07
S2	0.30		S20	-0.55
S3	0.36		S21	-0.03
S4	0.05		S22	0.01
S5	0.06		S23	0.15
S6	0.05		S24	-0.04
S7	0.03		S25	0.71
S8	0.07		S26	0.59
S9	-0.03		S27	0.28
S10	0.50		S28	0.06
S11	-0.11		S29	0.26
S12	0.18		S30	-0.14
S13	0.03		S31	-0.26
S14	-0.19		S32	-0.29
S15	0.63			
S16	0.24			
S17	-0.34			
S18	-0.02			
Total	1.81			0.82
Mean	0.10			0.05
Median	0.05			0.00
SD	0.24			0.33
Minimum	-0.34			-0.55
Maximum	0.63			0.71

Table 17. ITG vs. CG gain scores for the contrast [θ]-[s]

Instruction Training Group		Control Group	
Participants	Gain score	Participants	Gain score
S1	0.00	S19	0.07
S2	0.30	S20	-0.52
S3	0.74	S21	-0.04
S4	0.35	S22	0.04
S5	0.06	S23	-0.33
S6	0.35	S24	-0.04
S7	0.03	S25	0.18
S8	0.07	S26	0.18
S9	-0.03	S27	0.24
S10	0.88	S28	0.06
S11	-0.14	S29	0.26
S12	0.18	S30	-0.14
S13	0.03	S31	0.04
S14	-0.19	S32	0.16
S15	0.63		
S16	0.24		
S17	-0.34		
S18	-0.01		
Total	3.15		0.16
Mean	0.17		0.01
Median	0.06		0.05
SD	0.32		0.22
Minimum	-0.34		-0.52
Maximum	0.88		0.26

Individual analyses of the ITG participants demonstrate that eight participants improved their performance from pretest to posttest on the three contrasts (S3, S4, S5, S7, S8, S10, S12 and S15). On the other hand, four participants worsened their performance on three contrasts (S9, S14, S17 and S18), and one participant maintained the same results (S1).

4.2.6 Training Group / Instruction and Training comparison

The research question (RQ3) posed here aimed at investigating the relative effectiveness of the treatments in the two groups TG and ITG. Hypothesis 3 stated that the participants in the training and instruction group would perform better than those in the training group, taking into account they would receive besides practice, explicit information about the sounds under investigation. Table 18 presents the Means and Medians in the pre and posttest for both groups.

Table 18. TG and ITG Means and medians for the voiceless contrasts

	[θ]-[f]				[θ]-[t]				[θ]-[s]			
	Pre		Post		Pre		Post		Pre		Post	
	TG	ITG	TG	ITG	TG	ITG	TG	ITG	TG	ITG	CG	ITG
Mean	.60	.55	.58	.70	.67	.66	.67	.76	.64	.58	.65	.76
Median	.54	.52	.64	.84	.60	.62	.64	.84	.60	.64	.64	.84

The *A'* scores from TG and ITG were compared using the Mann-Whitney, which shows no statistically significant difference between the two groups, as displayed in Table 19. According to the results from the three contrasts on the pretest, both groups perform similarly. Although there was a change in performance in the posttest, the difference between groups was far from reaching the statistical significance level set at p<.05, only suggesting that training and training and instruction may have influenced the results.

Table 19. Mann-Whitney results for TG and ITG

	[θ]-[f]	[θ]-[t]	[θ]-[s]
Pretest	(z=-.608, p=.549)	(z=-.085, p=.945)	(z=-.042, p=.967)
Posttest	(z=-1.595, p=.112)	(z=-1.215, p=.234)	(z=-1.300, p=.202)

Note. ITG= 18 participants; TG = 21 participants.

In order to pin down the differences in performance in both groups, gain scores were also included. They are important to understand participants' behavior that may have influenced the results. The gain scores for TG and ITG on the three voiceless contrasts are presented below. Table 20 presents the results for [θ]-[f], Table 21 the results for [θ]-[t], and Table 22 the results for [θ]-[s].

Table 20. TG vs. ITG gain scores for the contrast [θ]-[f]

Training Group			Instruction Training Group	
Participants	Gain score		Participants	Gain score
S33	0.06		S1	0.00
S34	-0.33		S2	0.00
S35	0.34		S3	0.36
S36	0.51		S4	0.02
S37	0.04		S5	0.06
S38	-0.36		S6	-0.28
S39	0.04		S7	0.03
S40	-0.09		S8	0.63
S41	-0.04		S9	-0.04
S42	0.10		S10	0.50
S43	0.44		S11	0.34
S44	0.14		S12	0.18
S45	0.24		S13	0.59
S46	-0.22		S14	-0.64
S47	-0.51		S15	0.63
S48	-0.33		S16	0.58
S49	-0.36		S17	-0.34
S50	-0.12		S18	-0.01
S51	0.02			
S52	0.01			
S53	0.04			
Total	-0.38			2.61
Mean	-0.02			0.14
Median	0.01			0.04
SD	0.27			0.36
Minimum	-0.51			-064
Maximum	0.51			0.63

Table 21. TG vs. ITG gain scores for the contrast [θ]-[t]

Training Group			Instruction Training Group	
Participants	Gain score		Participants	Gain score
S33	0.06		S1	0.00
S34	-0.33		S2	0.30
S35	0.34		S3	0.36
S36	0.10		S4	0.05
S37	0.04		S5	0.06
S38	-0.36		S6	0.05
S39	0.04		S7	0.03
S40	0.39		S8	0.07
S41	-0.16		S9	-0.03
S42	0.10		S10	0.50
S43	-0.12		S11	-0.11
S44	0.14		S12	0.18
S45	0.24		S13	0.03
S46	-0.22		S14	-0.19
S47	-0.21		S15	0.63
S48	-0.33		S16	0.24
S49	0.14		S17	-0.34
S50	0.07		S18	-0.02
S51	0.02			
S52	0.01			
S53	0.04			
Total	0.00			1.81
Mean	0.00			0.10
Median	0.04			0.05
SD	0.20			0.24
Minimum	-0.36			-0.34
Maximum	0.39			0.63

Table 22. TG vs. ITG gain scores for the contrast [θ]-[s]

Training Group		Instruction Training Group	
Participants	Gain score	Participants	Gain score
S33	0.06	S1	0.00
S34	-0.33	S2	0.30
S35	0.34	S3	0.74
S36	0.10	S4	0.35
S37	0.49	S5	0.06
S38	-0.36	S6	0.35
S39	-0.37	S7	0.03
S40	0.39	S8	0.07
S41	-0.16	S9	-0.03
S42	0.10	S10	0.88
S43	-0.12	S11	-0.14
S44	0.14	S12	0.18
S45	0.24	S13	0.03
S46	0.08	S14	-0.19
S47	-0.21	S15	0.63
S48	-0.33	S16	0.24
S49	0.14	S17	-0.34
S50	0.08	S18	-0.01
S51	0.02		
S52	0.01		
S53	0.04		
Total	0.35		3.15
Mean	0.01		0.17
Median	0.06		0.06
SD	0.24		0.32
Minimum	-0.37		-0.34
Maximum	0.49		0.88

The Mann-Whitney test revealed that the gain scores did not yield statistical significant differences for any contrast, [θ]-[f] (z=-1.381, p=.167), [θ]-[t] (z=- .860, p=.390), and [θ]-[s] (z=-1.071, p= .284). Thus, it is only possible to speculate that training and instruction may have had a more positive effect since both groups were similar in the beginning of the treatment, and participants in ITG improved their performance from pretest to posttest more than the participants in TG.

4.3 Analyses for the voiced sound

The same procedure described above was followed for the voiced interdental: *A'* scores were calculated in the same manner, and the Wilcoxon and Friedman tests were used to verify whether there was any improvement in perception of the contrast between the voiced interdental and its most common replacements [d], [v] and [z] in the CDT.

4.3.1 Training Group analysis

Table 23 presents the Means and Medians of the TG in order to compare the pretest and posttest results more effectively.

Table 23. TG Means and Medians for the voiced interdental contrasts

	[ð]-[d]		[ð]-[v]		[ð]-[z]	
	Pre	Post	pre	post	pre	post
Mean	.73	.72	.77	.72	.84	.72
Median	.90	.72	.90	.72	.90	.72

The sound pair [ð]-[d] (Figure 14) did not show any statistically significant improvement from the pretest (*Median*=.90, *SD*=.24) to the posttest (*Median*=.72, *SD*=.24) as shown by the Wilcoxon (z= -.497, p=.619). The same lack of statistical significance was found in the comparison of the pretest (*Median*=.90, *SD*=.20) and posttest (*Median*=.72, *SD*=.23) for the contrast [ð]-[v] (Figure 15) (z=-.675, p=.500). The results for the contrast [ð]-[z] (Figure 16) either did not reach statistical significance (z=-1.808, p=.07) in the comparison of the pretest (*Median*=.90, *SD*=.11) and posttest (*Median*=.72, *SD*=.23).

Figure 14. TG performance on the CDT pretest and posttest for the [ð]-[d] contrast.

Figure 15. TG performance on the CDT pretest and posttest for the [ð]-[v] contrast.
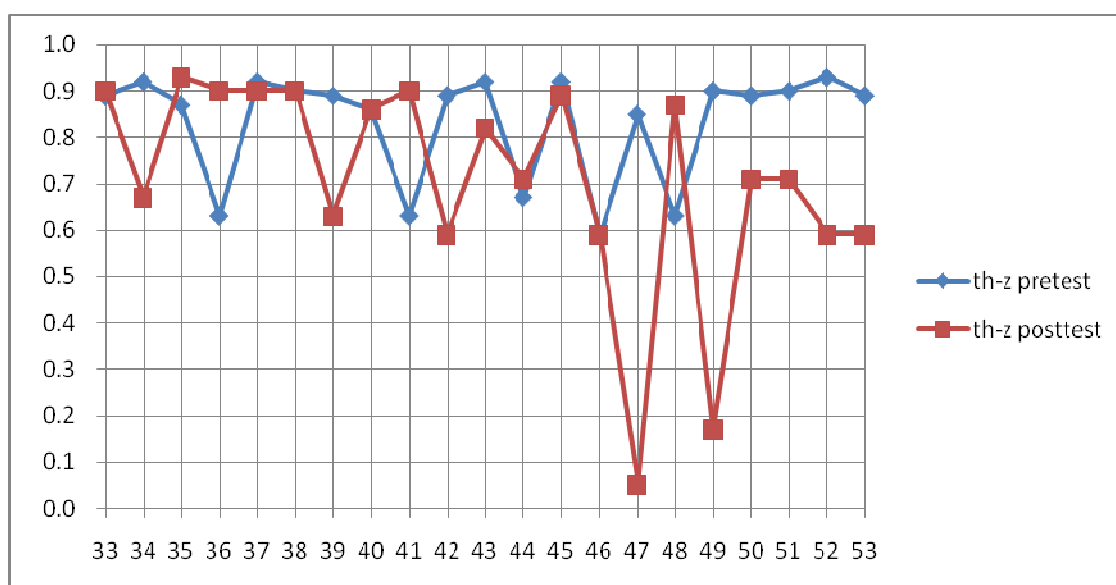
Figure 16. TG performance on the CDT pretest and posttest for the [ð]-[z] contrast.

The three voiced contrasts were compared among themselves using the Friedman test. Results suggest that participants perceived the three voiced contrasts very similarly not only in the pretest (X^2 (2, N=21) = 3.257, p=.196) but also in the posttest (X^2 (2, N=21) = .667, p=.717), suggesting that their perception of the three contrasts was not altered after training.

4.3.2 Instruction and Training Group analysis

Table 24 presents the Means and Medians for the ITG in the pretest and posttest for a more detailed analysis.

Table 24. ITG Means and medians for the voiced interdental contrasts

	[ð]-[d]		[ð]-[v]		[ð]-[z]	
	Pre	Post	pre	post	pre	post
Mean	.64	.70	.66	.69	.71	.69
Median	.64	.68	.64	.68	.66	.68

The comparison of the pretest (*Median*=.64, *SD*=.22) and posttest (*Median*=.68, *SD*=.16) *A'* scores from for the pair [ð]-[d] (Figure 17) did not yield statistical significance (z= -1.139, p=.255). The Wilcoxon also showed no statistically significant difference (z= -.640, p=.522) between the pretest (*Median*=.64, *SD*=.22) and posttest (*Median*=.62, *SD*=.26) for the contrast [ð]-[v] (Figure 18). Following the same tendency, the comparison of the pretest (*Median*=.66, *SD*=.19) and posttest (*Median*=.68, *SD*=.21) for the contrast [ð]-[z] (Figure 19) did not reach statistical significance (z=-.237, p=.813) either. Thus, it cannot be said that training and instruction led to better performance for any of the three sound contrasts.
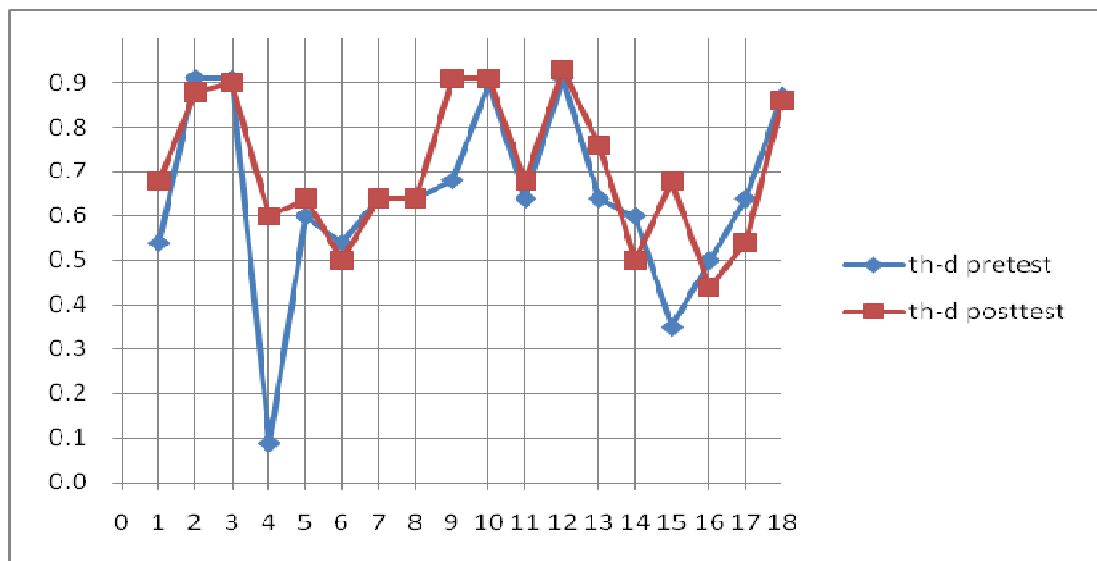
Figure 17. ITG performance on the CDT pretest and posttest for the [ð]-[d] contrast.
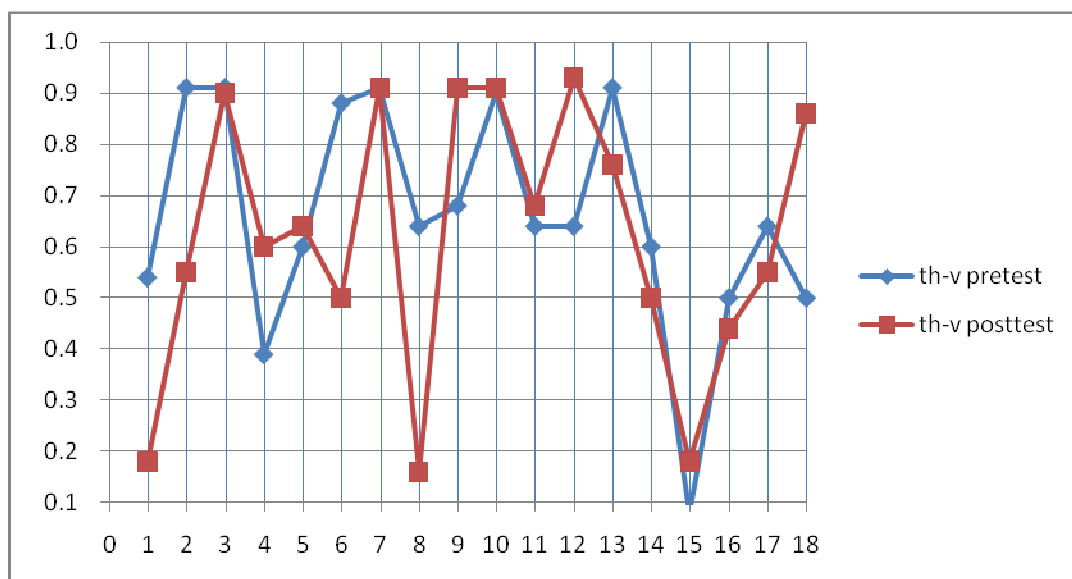
Figure 18. ITG performance on the CDT pretest and posttest for the [ð]-[v]contrast.
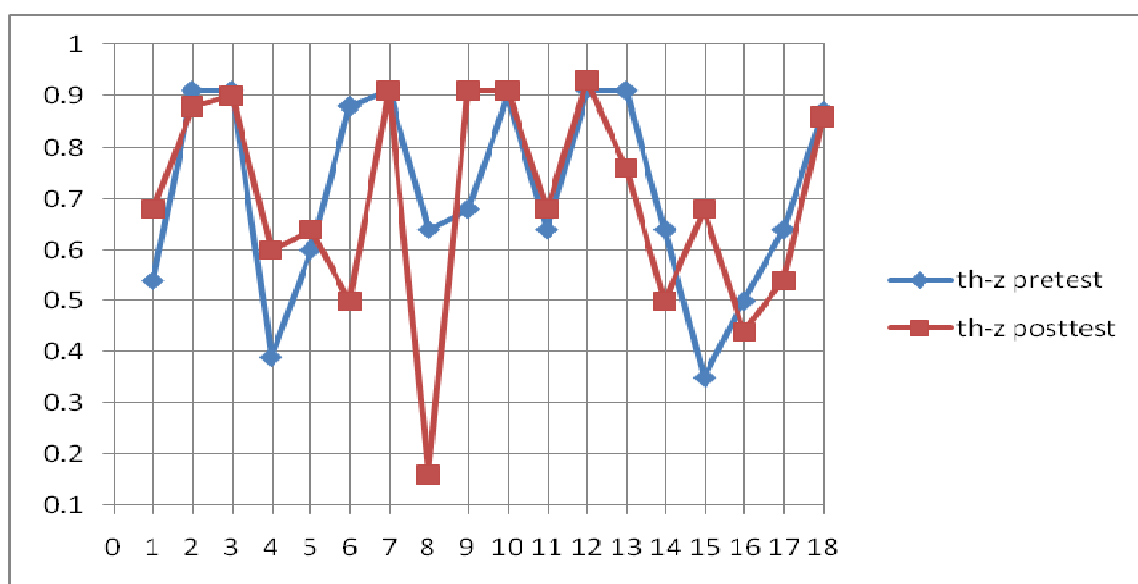
Figure 19. ITG performance on the CDT pretest and posttest for the [ð]-[z] contrast.

The Friedman test was used one more time to verify whether the three sound contrasts were perceived in a similar or different manner in the pretest and posttest. The test revealed that there was no difference in perception among the voiced contrasts

either in the pretest (X^2 (2, N=18) = 5.250, p=.072) or posttest (X^2 (2, N=18) = 1.333, p=.513).

4.3.3 Control Group analysis

Table 25 presents the Means and Medians of the voiced contrasts in the perception test for the CG.

Table 25. CG Means and Medians for the voiced interdental contrasts

	[ð]-[d]		[ð]-[v]		[ð]-[z]	
	Pre	Post	pre	post	pre	post
Mean	.63	.70	.73	.76	.73	.76
Median	.62	.81	.70	.83	.70	.83

The Wilcoxon did not show significant improvement after treatment for the contrast [ð]-[d] (Figure 20) (z=-1.223, p=.221) from pretest (*Median*=.62, *SD*=.20) to posttest (*Median*=.70, *SD*=.15). Likewise, the pretest (*Median*=.70, *SD*=.15) and posttest (*Median*=.81, *SD*=.25) comparison for the [ð]-[v] (Figure 21) (z=-.839, p=.401), and the pretest (*Median*=0.83, *SD*=.17) and posttest (*Median*=0.83, *SD*=.17) for the [ð]-[z] (Figure 22) contrast did not reach statistical significance either (z=-.839, p=.401).
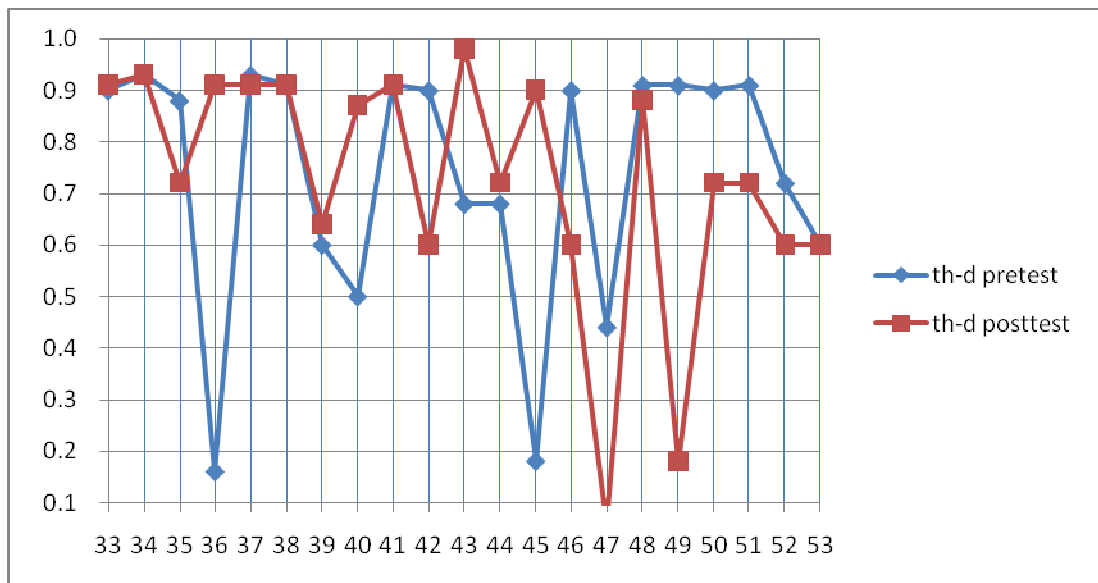
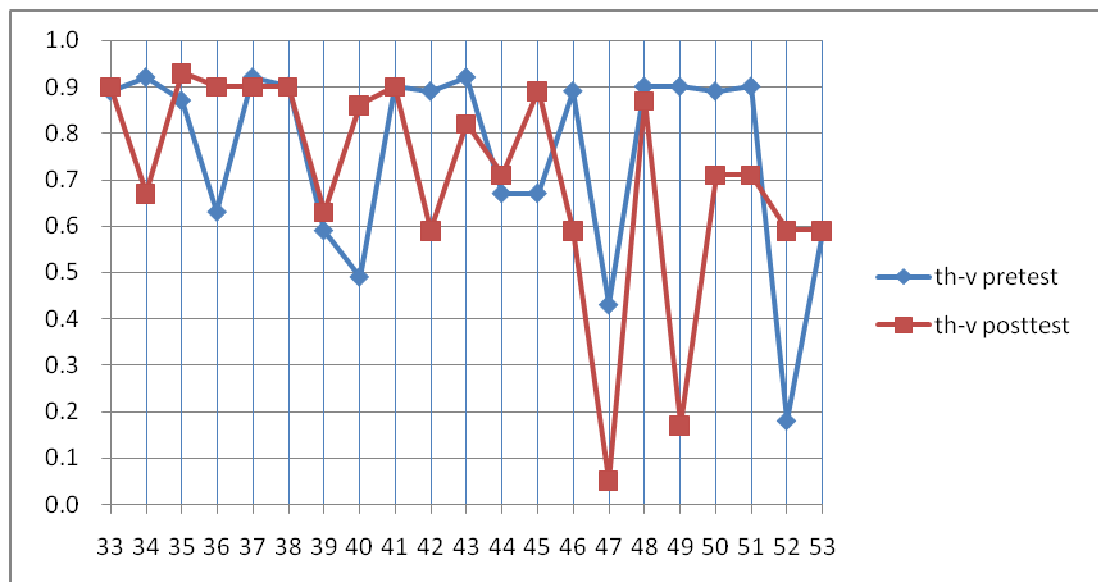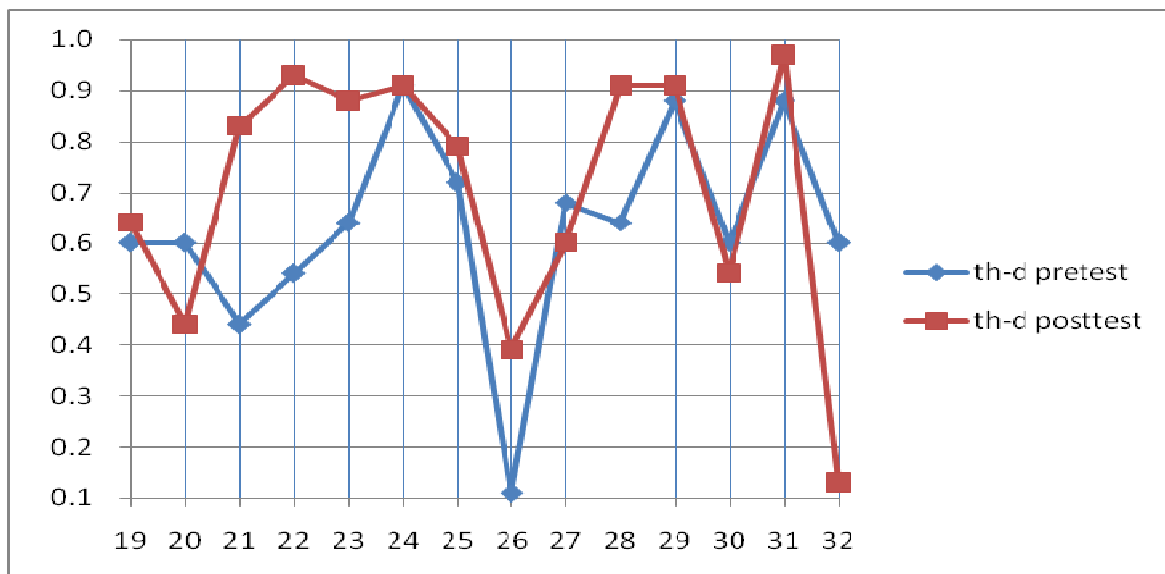Figure 20.CG performance on the CDT pretest and posttest for the [ð]-[d] contrast.
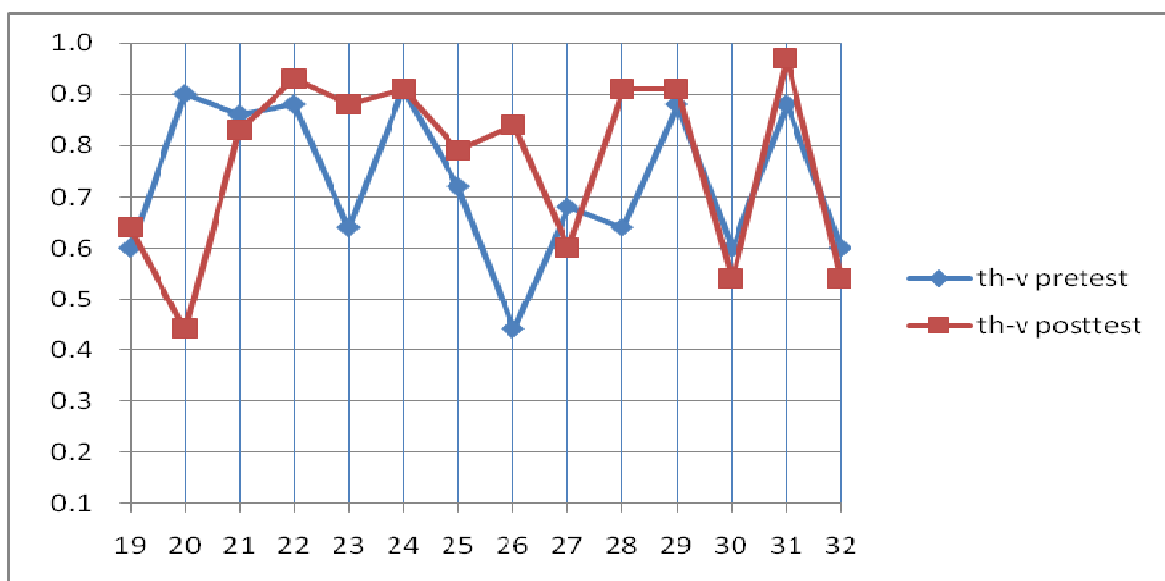
Figure 21.CG performance on the CDT pretest and posttest for the [ð]-[v] contrast.
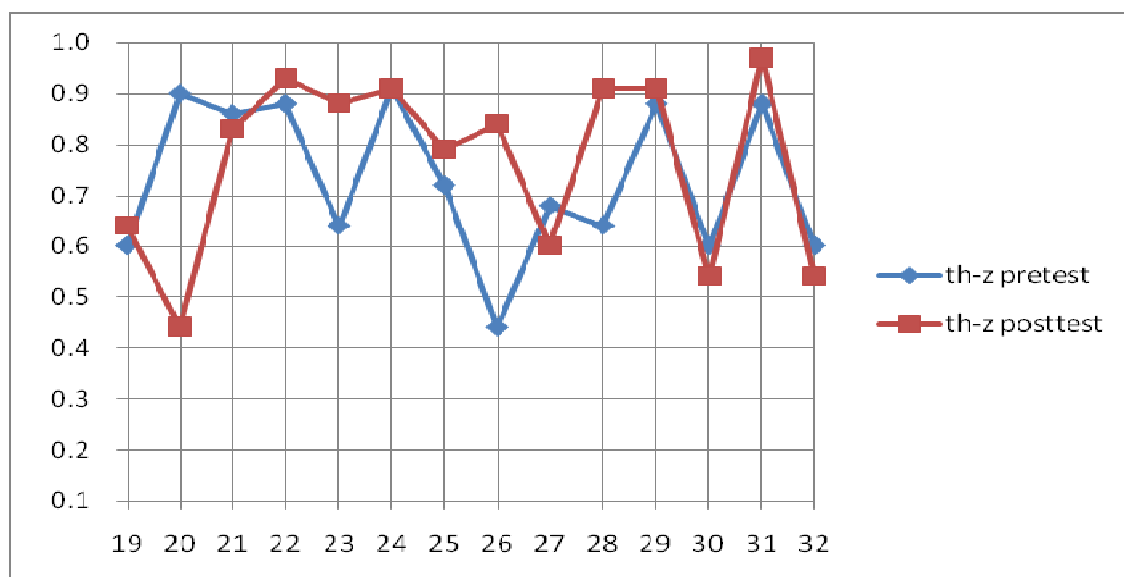
Figure 22.CG performance on the CDT pretest and posttest for the [ð]-[z] contrast.

4.3.4 Training Group / Control Group comparison

Table 26 presents the Means and Medians for both groups in order to understand the direction they differ.

Table 26. TG and CG Means and medians for the voiced contrasts

	[ð]-[d]				[ð]-[v]				[ð]-[z]			
	Pre		Post		Pre		Post		Pre		Post	
	TG	CG	TG	CG	TG	CG	TG	CG	TG	CG	TG	CG
Mean	.73	.63	.72	.70	.77	.73	.72	.76	.84	.73	.72	.76
Median	.90	.62	.72	.81	.90	.70	.72	.83	.90	.70	.72	.83

The analysis between TG and CG using Mann-Whitney revealed that there were statistically significant results for the contrasts [ð]-[d] and [ð]-[z] in the pretest, but showed no difference for the contrast [ð]-[v] as shown in Table 27. However, results from the posttest did not reveal a significant difference for any of the three contrasts.

Table 27. Mann-Whitney results for TG and CG

	[ð]-[d]	[ð]-[v]	[ð]-[z]
Pretest	(z=-1.949, p=.05)	(z=-1.610, p=.110)	(z=-2.644, p=.008)
posttest	(z=-.204, p=.855)	(z=-.373, p=.727)	(z=-.373, = .727)

Note. TG = 21 participants; CG= 14 participants.

The difference in performance can be noted by observing the mean and median results from both groups, as shown in Table 8. These results may suggest that the groups were different at the beginning of the treatment, and the lack of statistically significant results in the posttest might indicate that training did promote a certain change in participants' performance.

The gain scores showing the individual results from TG and CG on the three voiced contrasts are displayed in Tables 28, 29 and 30. The tables unexpectedly show higher gain scores for the CG than for the TG in all three contrasts; however, none of the three comparisons yielded statistical significance, according to the Wilcoxon results. The difference in gain scores of the two groups on the contrast [ð]-[d] (Table 28) did not reach statistical significance (z=-1.434, p=.152) or either did the contrast [θ]-[v] (Table 29) (z=-1.129, p=.259). Interestingly, the difference on the contrast [θ]-[z] (Table 30) was the only one to come close to reaching statistical significance (z=-1.821, p=.069). Although none of these results allows us to say that the CG improved more than the TG, all three certainly fail to support the hypothesis that the TG would improve more than the CG.

Table 28. TG vs. CG gain scores for the contrast [ð]-[d]

Training Group			Control Group	
Participants	Gain score		Participants	Gain score
S33	0.01		S19	0.04
S34	0.00		S20	-0.16
S35	-0.16		S21	0.39
S36	0.75		S22	0.39
S37	-0.02		S23	0.24
S38	0.00		S24	0.00
S39	0.04		S25	0.07
S40	0.37		S26	0.28
S41	0.00		S27	-0.08
S42	-0.30		S28	0.27
S43	0.30		S29	0.03
S44	0.04		S30	-0.06
S45	0.72		S31	0.09
S46	-0.30		S32	-0.47
S47	-0.38			
S48	-0.03			
S49	-0.73			
S50	-0.18			
S51	-0.19			
S52	-0.12			
S53	0.00			
Total	-0.18			1.03
Mean	-0.01			0.07
Median	0.00			0.05
SD	0.34			0.23
Minimum	-0.73			-0.47
Maximum	0.75			0.39

Table 29. TG vs. CG gain scores for the contrast [ð]-[v]

Training Group			Control Group	
Participants	Gain score		Participants	Gain score
S33	0.01		S19	0.04
S34	-0.25		S20	-0.46
S35	0.06		S21	-0.03
S36	0.27		S22	0.05
S37	-0.02		S23	0.24
S38	0.00		S24	0.00
S39	0.04		S25	0.07
S40	0.37		S26	0.40
S41	0.00		S27	-0.08
S42	-0.30		S28	0.27
S43	-0.10		S29	0.03
S44	0.04		S30	-0.06
S45	0.22		S31	0.09
S46	-0.30		S32	-0.06
S47	-0.38			
S48	-0.03			
S49	-0.73			
S50	-0.18			
S51	-0.19			
S52	0.41			
S53	0.00			
Total	-1.06			0.50
Mean	-0.05			0.03
Median	0.00			0.03
SD	0.26			0.19
Minimum	-0.73			-0.46
Maximum	0.41			0.40

Table 30. TG vs. CG gain scores for the contrast [ð]-[z]

Training Group			Control Group	
Participants	Gain score		Participants	Gain score
S33	0.01		S19	0.04
S34	-0.25		S20	-0.46
S35	0.06		S21	-0.03
S36	0.27		S22	0.05
S37	-0.02		S23	0.24
S38	0.00		S24	0.00
S39	-0.26		S25	0.07
S40	0.00		S26	0.40
S41	0.27		S27	-0.08
S42	-0.30		S28	0.27
S43	-0.10		S29	0.03
S44	0.04		S30	-0.06
S45	-0.03		S31	0.09
S46	0.00		S32	-0.06
S47	-0.80			
S48	0.24			
S49	-0.73			
S50	-0.18			
S51	-0.19			
S52	-0.34			
S53	-0.30			
Total	-2.61			0.50
Mean	-0.12			0.03
Median	-0.03			0.03
SD	0.28			0.19
Minimum	-0.80			-0.46
Maximum	0.27			0.40

Individual analyses suggest that participants performed very differently from each other, as they did on the three voiced contrasts. For example, only two participants improved their performance on all three voiced contrasts (S33 and S34), whereas six participants worsened their performance on all three contrasts (S37, S42, S47, S49, S50 and S51). Interestingly, one participant (S38) maintained the same scores in the pre and posttest for the three contrasts, two participants performed differently on all three contrasts (S45 and S 52), and nine participants (S34, S35, S36, S39, S41, S43, S46, S48

and S53) had a different performance on one of the contrasts. Participants S36 and S43 improved on the contrast [ð]-[d], participant S41 improved on the contrast [ð]-[z], participant S39 and S53 worsened their performance on the contrast [ð]-[z], participant S35 worsened performance on [ð]-[d], participants S46 and S48 worsened performance on two contrasts [ð]-[d] and [ð]-[v], and participants S34 worsened performance on [ð]-[v] and [ð]-[z].

The differences in gain scores discussed above between the TG and the CG did not reach statistical significance for either the voiceless or the voiced contrasts, the gain scores for the CG being unexpectedly somewhat better than those of the TG. One possible explanation for this greater gain by the CG is that the TG performed better than the CG in the pretest suggesting that the CG had more room to improve.

Thus, Hypothesis 1 is rejected by this study, indicating lack of effectiveness of training, possibly because training without any explicit information is not sufficient to promote perceptual changes for the interdentals. The results did not show the same positive effects of perceptual training as found in Bettoni-Techio (2008), who investigated the effects of perceptual training on the identification and discrimination of initial /s/-clusters. The findings of the present study are similar to those of Mariano (2009), who investigated the influence of training and instruction on the production of –ed morphemes by Brazilian beginning English learners and did not find training alone to produce statistically significant improvement either.

4.3.5 Instruction and Training Group / Control Group comparison

The analysis of the results of the ITG and CG did not show to yielded statistical significant results. Table 31 presents the Descriptive statistics in order to provide more data for a more detailed analysis.

Table 31. ITG and CG Means and medians for the voiced contrasts

	[ð]-[d]				[ð]-[v]				[ð]-[z]			
	Pre		Post		Pre		Post		Pre		Post	
	ITG	CG	ITG	CG	ITG	CG	ITG	CG	ITG	CG	ITG	CG
Mean	.64	.63	.70	.70	.66	.73	.69	.76	.71	.73	.69	.76
Median	.64	.62	.68	.81	.64	.70	.68	.83	.66	.70	.68	.83

The Mann-Whitney revealed no statistically significant difference between them either in the pretest or the posttest, as shown in Table 32.

Table 32. Mann-Whitney results for ITG and CG

	[ð]-[d]	[ð]-[v]	[ð]-[z]
Pretest	(z=-.230, p=.837)	(z=-.555, p=.587)	(z=-.172, p=.866)
Posttest	(z=-.381, p=.722)	(z=-1.468, p=.142)	(z=-.916, p=.377)

ITG= 18 participants; CG= 14 participants.

Gain scores were also included here in order to pin down participants' individual performance. Table 33, presents the results for the ITG and CG for the contrast [θ]-[d], Table 34 presents the results for [θ]-[v], and Table 35 presents the results for [θ]-[z].

Table 33. ITG vs. CG gain scores for the contrast [ð]-[d]

Instruction Training Group		Control Group	
Participants	Gain score	Participants	Gain score
S1	0.14	S19	0.04
S2	-0.03	S20	-0.16
S3	-0.01	S21	0.39
S4	0.51	S22	0.39
S5	0.04	S23	0.24
S6	-0.04	S24	0.00
S7	0.00	S25	0.07
S8	0.00	S26	0.28
S9	0.23	S27	-0.08
S10	0.01	S28	0.27
S11	0.04	S29	0.03
S12	0.02	S30	-0.06
S13	0.12	S31	0.09
S14	-0.10	S32	-0.47
S15	0.33		
S16	-0.06		
S17	-0.10		
S18	-0.01		
Total	1.09		1.03
Mean	0.06		0.07
Median	0.00		0.05
SD	0.15		0.23
Minimum	-0.10		-0.47
Maximum	0.51		0.39

Table 34. ITG vs. CG gain scores for the contrast [ð]-[v]

Instruction Training Group		Control Group	
Participants	Gain score	Participants	Gain score
S1	-0.36	S19	0.04
S2	-0.36	S20	-0.46
S3	-0.01	S21	-0.03
S4	0.21	S22	0.05
S5	0.04	S23	0.24
S6	-0.38	S24	0.00
S7	0.00	S25	0.07
S8	-0.48	S26	0.40
S9	0.23	S27	-0.08
S10	0.01	S28	0.27
S11	0.04	S29	0.03
S12	0.29	S30	-0.06
S13	-0.15	S31	0.09
S14	-0.10	S32	-0.06
S15	0.10		
S16	-0.06		
S17	-0.09		
S18	0.36		
Total	-0.71		0.50
Mean	-0.02		0.03
Median	0.00		0.03
SD	0.22		0.19
Minimum	-0.48		-0.46
Maximum	0.36		0.40

Table 35. ITG vs. CG gain scores for the contrast [ð]-[z]

Instruction Training Group			Control Group	
Participants	Gain score		Participants	Gain score
S1	0.14		S19	0.04
S2	-0.03		S20	-0.46
S3	-0.01		S21	-0.03
S4	0.21		S22	0.05
S5	0.04		S23	0.24
S6	-0.38		S24	0.00
S7	0.00		S25	0.07
S8	-0.48		S26	0.40
S9	0.23		S27	-0.08
S10	0.01		S28	0.27
S11	0.04		S29	0.03
S12	0.02		S30	-0.06
S13	-0.15		S31	0.09
S14	-0.14		S32	-0.06
S15	0.33			
S16	-0.06			
S17	-0.10			
S18	-0.01			
Total	0.34			0.50
Mean	-0.01			0.03
Median	-0.005			0.03
SD	0.19			0.19
Minimum	-0.48			-0.46
Maximum	0.33			0.40

The gain scores suggest that there was no significant difference in improvement between the ITG and the CG on the three contrasts. Mann-Whitney revealed that the difference in improvement on the contrast [θ]-[d] was (z=-.666, p=.506), on the contrast [θ]-[v] was (z=-1.008, p=.314), and finally on [θ]-[z] the results were (z=-.989, p=.323), all of them far from statistical significance.

Improvement in performance on the three voiced contrasts can be seen for seven participants of the ITG (S4, S5, S9, S10, S11, S12 and S15). On the other hand, six

participants had a worsening in performance on the three sound contrasts (S2, S3, S6, S14, S16 and S17). Interestingly, one participant (S7) maintained the same scores on the three sound contrasts. Participant S8 worsened on two sound contrasts [ð]-[v] and [ð]-[z], participant S13 improved only on the sound contrast [ð]-[d], S18 improved only on [ð]-[v], and S1 worsened only on the sound contrast [ð]-[v].

The findings reported in this section suggest that there was some improvement on perception for the voiceless and voiced contrasts in the ITG. However, only one contrast [θ]-[s] yielded statistical significance, whereas the results of the other two voiceless and three voiced contrasts only showed a small change in performance, thus refuting Hypothesis 2. It is possible to speculate that the treatment based on perceptual practice and explicit information on the articulation of the interdental fricatives influenced participants' performance to some extent. Among previous studies, Mariano (2009) found that training with instruction yielded statistically significant changes in the production of the *–ed* morpheme. Moreover, Silveira (2004) also found explicit instruction to be positive for the production of word-final consonants, but similarly to the present study, Silveira did not find improvement after explicit instruction to reach statistical significance at the perceptual level.

4.3.6 Training Group / Instruction and Training Group comparison

Following the analysis for [θ], the Mann-Whitney test was used to verify whether the two treatment groups were different before and after treatment in their performance for [ð]. Table 36 presents the Means and Medians for the two groups being analyzed in this section.

Table 36. TG and ITG Means and medians for the voiced contrasts

	[ð]-[d]				[ð]-[v]				[ð]-[z]			
	Pre		Post		Pre		Post		Pre		Post	
	TG	ITG	TG	ITG	TG	ITG	TG	ITG	TG	ITG	TG	ITG
Mean	.73	.64	.72	.70	.77	.66	.72	.69	.84	.71	.72	.69
Median	.90	.64	.72	.68	.90	.64	.72	.68	.90	.66	.72	.68

The results displayed in Table 37 show that the TG and ITG performed differently on the contrast [ð]-[z] in the pretest (z=-2.190, p=.03). However, this difference was not maintained in the posttest (z=-.666, p=.512), suggesting that there might have been an influence of treatment. Gain scores for the contrast [ð]-[z] (Table 40) show that ITG gained 0.34 points and the TG lost 2.61, suggesting that practice along with explicit information on this sound contrast worked better for the contrast.

Table 37. Mann-Whitney results for TG and ITG

	[ð]-[d]	[ð]-[v]	[ð]-[z]
Pretest	(z=-1.646, p=.106)	(z=-1.749, p=.0.83)	(z=-2.190, p=.03)
Posttest	(z=-1.020, p=.321)	(z=-1.332, p=.183)	(z=-.666, p=.512)

Note. TG = 21 participants, ITG = 18 participants;

Gain scores for both groups are displayed below in Tables 26, 27 and 28, showing individual performance. The Mann-Whitney revealed that there was no significant difference in gain scores between the two groups on any contrast. The contrast [ð]-[d] yielded (z=-1.282, p=.200), the contrast [ð]-[v] yielded (z=-.085, p=.933) and [ð]-[z] yielded (z=-.745, p=.456). However, overall tendency for ITG participants to obtain higher gain score may be explained by means of explicit instruction on the sounds under investigation.

Table 38. TG vs. ITG gain scores for the contrast [ð]-[d]

Training Group			Instruction Training Group	
Participants	Gain score		Participants	Gain score
S33	0.01		S1	0.14
S34	0.00		S2	-0.03
S35	-0.16		S3	-0.01
S36	0.75		S4	0.51
S37	-0.02		S5	0.04
S38	0.00		S6	-0.04
S39	0.04		S7	0.00
S40	0.37		S8	0.00
S41	0.00		S9	0.23
S42	-0.30		S10	0.01
S43	0.30		S11	0.04
S44	0.04		S12	0.02
S45	0.72		S13	0.12
S46	-0.30		S14	-0.10
S47	-0.38		S15	0.33
S48	-0.03		S16	-0.06
S49	-0.73		S17	-0.10
S50	-0.18		S18	-0.01
S51	-0.19			
S52	-0.12			
S53	0.00			
Total	-0.18			1.09
Mean	-0.01			0.06
Median	0.00			0.00
SD	0.34			0.15
Minimum	-0.73			-0.10
Maximum	0.75			0.51

Table 39. TG vs. ITG gain scores for the contrast [ð]-[v]

Training Group			Instruction Training Group	
Participants	Gain score		Participants	Gain score
S33	0.01		S1	-0.36
S34	-0.25		S2	-0.36
S35	0.06		S3	-0.01
S36	0.27		S4	0.21
S37	-0.02		S5	0.04
S38	0.00		S6	-0.38
S39	0.04		S7	0.00
S40	0.37		S8	-0.48
S41	0.00		S9	0.23
S42	-0.30		S10	0.01
S43	-0.10		S11	0.04
S44	0.04		S12	0.29
S45	0.22		S13	-0.15
S46	-0.30		S14	-0.10
S47	-0.38		S15	0.10
S48	-0.03		S16	-0.06
S49	-0.73		S17	-0.09
S50	-0.18		S18	0.36
S51	-0.19			
S52	0.41			
S53	0.00			
Total	-1.06			-0.71
Mean	-0.05			-0.02
Median	0.00			0.00
SD	0.26			0.22
Minimum	-0.73			-0.48
Maximum	0.41			0.36

Table 40. TG vs. ITG gain scores for the contrast [ð]-[z]

Training Group			Instruction Training Group	
Participants	Gain score		Participants	Gain score
S33	0.01		S1	0.14
S34	-0.25		S2	-0.03
S35	0.06		S3	-0.01
S36	0.27		S4	0.21
S37	-0.02		S5	0.04
S38	0.00		S6	-0.38
S39	-0.26		S7	0.00
S40	0.00		S8	-0.48
S41	0.27		S9	0.23
S42	-0.30		S10	0.01
S43	-0.10		S11	0.04
S44	0.04		S12	0.02
S45	-0.03		S13	-0.15
S46	0.00		S14	-0.14
S47	-0.80		S15	0.33
S48	0.24		S16	-0.06
S49	-0.73		S17	-0.10
S50	-0.18		S18	-0.01
S51	-0.19			
S52	-0.34			
S53	-0.30			
Total	-2.61			0.34
Mean	-0.12			-0.01
Median	-0.03			-0.005
SD	0.28			0.19
Minimum	-0.80			-0.48
Maximum	0.27			0.33

The results reported and discussed above lead to the rejection of Hypothesis 3, since the ITG did not obtain statistically significant gain scores for either the voiceless contrasts or the voiced contrasts.

4.4 Summary and discussion of the perception test results

Although the gain scores from pretest to posttest did not reach statistical significance, and therefore the three hypotheses posed in this study were not confirmed, it is possible to speculate that training and instruction had some influence on the performance of the groups under investigation. However, there was no evidence of instruction and training benefits on the perception of the interdental fricative sounds for either groups. There are some possible explanations for this lack of effectiveness.

The lack of discrimination might be explained according to the Magnet effect in Adults described by Kuhl and Iverson (1995), who propose that

> The magnet effect implies that the area around a phonetic prototype is associated with reduced discrimination sensitivity when compared to areas around nonprototypical members of the category. This, in turn suggests that the perceptual space underlying a phonetic category is distorted so that the perceptual distance around a prototype is reduced (p.130).

According to the explanation, participants did not discriminate the contrasting pairs because they did not perceive a difference. The participants' prototypes of the sounds were somewhat modified, although the results did not reach statistical significance. These results can be explained taking into account Kuhl (1991), who claims that the prototypes seem determined by long-term exposure to language. According to this logic, participants' short-term exposure to the language may have delayed the effect of treatment, thus not promoting a more effective change in perception, because they were students enrolled in level 3, which is considered to be a false-beginner – pre-intermediate level.

Another variable influencing the results might be the characteristics of the sounds themselves, especially the fricative [f] which is known to cause perceptual problems even for native speakers of English because of its acoustic similarity to the interdental fricative [θ]. The picture below, taken from Ladefoged (2001), shows how similar the fricative noise and even the formant transitions of [f] and [θ] are. Therefore, difficulty in the discrimination of these two sounds was already expected. However, neither of the treatments given in this study seems to have helped participants improve the distinction of these sounds.
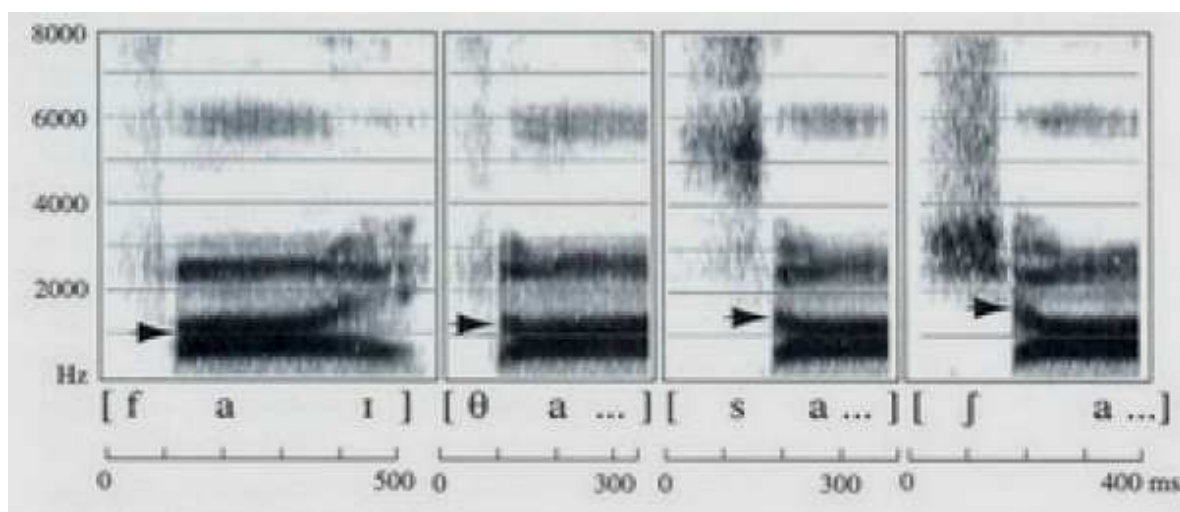
Figure 23. Spectogram of the words fie, thigh, sigh and shy. Ladefoged (2001, p. 182).

The lack of immediate effectiveness on performance of the treatments and even worsening in performance in some cases, although not statistically significant, may be explained by Macdonald et al. (1994), who argues that sometimes the result after teaching is lack of improvement, or even restructuring in performance, improvement appearing only after some time. Interestingly, since improvement is not immediately perceptible, such a lack of improvement may cause teachers to abandon pronunciation teaching in the classroom, either because they think it is not effective, or because they think they have failed to implement it in an effective way. This is why a delayed test

should be administered after a certain period after treatment, so that participants' perception could be measured again and more positive results might be obtained in the area of pronunciation teaching.

In agreement with Macdonald et al. (1994), Silveira (2004) considers that pronunciation instruction does not necessarily yield immediate results but has a more important role; it is a tool that works by helping learners to gradually acquire the L2 phonological system not immediately. Therefore, more significant results from this present study might be found in a later study investigating the residual effects of training and instruction. That is the reason Silveira suggests that teachers should set long-term goals for pronunciation instruction, helping learners move from controlled to automatic performance, and for this to be achieve, pronunciation teaching must encompass the framework proposed by Celce-Murcia et al. (1996) from controlled to communicative practice.

CHAPTER 5

CONCLUSION

5.1 Final remarks

This thesis investigated the effects of training and instruction and only training on the perception of the word-initial interdental fricatives by adult Brazilians EFL learners. In the TG, *training* was restricted to implicit teaching, that is, participants only performed the activities proposed without receiving any explanation on the sounds presented. In the ITG, besides practice, participants also received explicit teaching, that is, explicit information on the sounds that were present in the activities.

The pronunciation manuals used in the present study were composed of chapters of pronunciation books usually used in the *Letras* English course at UFSC and were used in seven sessions throughout the first semester of 2008. The activities in the manuals were the same for both groups (TG and ITG). However, any explicit information on the sounds was excluded from the TG manual.

The participants who took part in this study were 53 EFL students enrolled at the extracurricular English course at UFSC. 39 of them performed all the activities proposed in seven sessions of 30 minutes each, their perception was assessed by means of a Categorial Discrimination Test (CDT), and results were compared between and within-groups.

Results from the pretest and posttest suggest that implicit and explicit teaching may have affected participants' performance on the tests. However, the results were statistically significant for only one contrast – [θ]-[s] – in the ITG, suggesting that

explicit information on the rules and practice may be an effective tool in pronunciation classes.

Within-group analyses revealed that from the six contrasts used in the perception test ([θ]-[f], [θ]-[t], [θ]-[s], [ð]-[d], [ð]-[v], [θ]-[z]), none yielded statistically significant results in the posttest in the TG, thus rejecting Hypothesis 1, which predicted that participants under training would perform better than those participants in the control group.

In addition, similar results were found for the ITG, except for the contrast [θ]-[s], which was significantly better in the posttest. This result demonstrates that instruction and training positively affected participants' perception for this contrast. However, improvement in only one contrast ([θ]-[s]) was not sufficient to corroborate the prediction made by Hypothesis 2, which posed that there would be a positive effect of treatment based on instruction and training.

The third hypothesis stated that participants under the ITG would outperform the TG because they received practice and explicit instruction on the target sounds. However, results only suggest that the ITG performed somewhat better than the TG, but no statistically significant results were found, thus rejecting Hypothesis 3.

The results are not enough to corroborate the idea that implicit knowledge is enhanced through practice as claimed by R. Ellis (2005). However, since Ellis argues that consciousness raising may have a delayed effect, there might be a more effective change in the ITG participants' perception later inasmuch as practice does not guarantee immediate improvement.

5.2 Pedagogical Implications

Since growing attention has been devoted to the area of pronunciation teaching (Morley 1991, 1994), the present study sheds some light on the teaching based on explicit and implicit instruction.

Blevins (2006) argues that although there is a tendency for loss of the interdentals in English, they are important inasmuch as literary and social convention play a role in society. Therefore, pronunciation instruction may help learners improve their pronunciation and thus have more opportunities to be accepted in society (Morley, 1994). However, it is important to highlight that native-like pronunciation is not required, but intelligible pronunciation is. Language learners need to have a good command of the language, not only at the syntactic level, with an accurate speech, they need to master the semantics and also the sounds because no communication is established if the speakers are not able to pronounce what they intend to say.

Perception also plays a role in pronunciation, which makes perceptual teaching an important tool to help learners develop better prototypes of L2 sounds, thus avoiding the replacement of the L2 sounds by sounds learners have in their L1 inventory, as the case of the interdental fricatives (Reis, 2006). Moreover, another factor influencing the perception is the age of learning, as pointed out by Flege (1995), implying that adult learners of English as a foreign/second language would probably face greater difficulty in pronunciation. This factor may also be considered in pronunciation classes, since the majority of English learners in Brazil is adults who need to have fluency for their jobs or for their studies.

The results from this study may give support to the area of pronunciation, inasmuch as pronunciation teaching does not jeopardize the learning of other language components, as suggested by Silveira (2004).

As Silveira and Alves (2006) pointed out, the effects of instruction, especially explicit instruction, may not appear immediately. Thus, long term goals must be set, and pronunciation instruction should not be discouraged from the classroom due to lack of immediate results. And although not immediate, explicit instruction may speed language acquisition (N. Ellis, 2002), because some students take longer to realize how some sounds are produced. That is why providing explicit information on the sounds may speed their learning. Moreover, once the sounds are mastered, they may be able to focus on other aspects of the language.

The results of the present study may follow this tendency of long-term improvement, since the results from the pretest-posttest comparisons did not yield statistically significant results right after the end of the period of treatment, as they did in Bettoni and Koerich (2009), Bettoni-Techio (2008), and Nobre-Oliveira (2007), for instance.

5.3 Limitations of the Study and further Research

Generalizations of the outcomes of this study need to be made with caution, first because only perception was investigated, and second because only a larger and more homogeneous sample would yield more statistically significant results. Therefore, only tentative explanations on the effects of implicit and explicit teaching may be given here.

The effects of training and instruction should also be tested for production, in order to verify whether (1) training and (2) instruction and training on perception would transfer to improvement of the interdentals at the production level. Moreover, the relationship between perception and production after treatment should be tested, so that more consistent results would appear.

In terms of treatment restricted to perception, a retention test should also be administered so that changes in perception could be tested later, and therefore long-term pronunciation goals could also be tested.

Test type may have influenced the results of treatment, since only discrimination was investigated and some results were very similar for some contrasts across groups. The CDT is a demanding test that can cause participants to be tired, losing the focus during the test. In order to avoid it, Reis (2006) made some modification (See section 3.4.2 on the test). However, taking into account the complexity of the sounds, it might be said the test was still demanding for participants, which may have influenced the results. Moreover, since only discrimination was investigated in this study, identification should be tested and compared as in Bettoni-Techio (2008) so as to broaden the scope of the results and to provide grounded interpretations.

Another factor that might have influenced the results is the outliers. Although, the Medians were used to analyze data in this study, the outliers may have influenced the final results. In order to avoid such influence, or to analyze the extension to what their results interfere, they should be analyzed separately.

Another limitation in this study was the number of activities on the voiced fricative. Since it is more frequent in functional words, there are fewer activities devoted to its pronunciation, whether in perception or production. Therefore, the

materials themselves should be analyzed, since the activities were retrieved from pronunciation manual used in the undergraduate course, the effectiveness of the activities proposed should be analyzed and tested, especially for the enhancement of the perception and production of the interdentals.

An important variable to investigate is the influence of the audio-visual cue on the perception and/or production of the interdental fricatives. Audio-visual cues may be an important tool for the development of the perception and production of the interdental fricatives, since only auditory treatment, whether providing no explicit information or providing explicit information, did not demonstrate to be affective. This lack of effectiveness may have been caused by the acoustic similarities between the interdental fricatives and their most common replacements. That is why, it would be important to insert audio-visual cues to the investigation of these sounds.

Finally, training and instruction should be investigated for the interdental fricatives in other word-positions, that is, middle-position and final position at the perceptual and production levels. By investigating the sounds in other positions and by carrying out treatment – training and instruction – it would be possible to have a better picture of the development of perception of these sounds, potentially leading to more effective ways to deal with them.

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APPENDICES

Appendix A
Profile Questionnaire – Portuguese version

Universidade Federal de Santa Catarina
Centro de Comunicação e Expressão
Curso de Pós-Graduação em Inglês e Literaturas Correspondentes
Mestranda: Nadia Karina Ruhmke Ramos
Orientadora: Profª Drª Rosana Denise Koerich

QUESTIONÁRIO SOBRE PARTICIPANTES DE PESQUISA DE CAMPO

Por favor, responda às perguntas abaixo. Este questionário visa somente obter informações que serão utilizadas para direcionar a análise dos dados da pesquisa conduzida pela aluna acima citada. Em nenhuma hipótese os nomes dos participantes serão divulgados. Solicito informar nome, e-mail e telefone somente para, no caso de necessitar alguma informação adicional, poder entrar em contato com você posteriormente.

1. NOME: _____

2. IDADE: _____ 3 SEXO: FEM / MASC   4. TEL. _____

5. E-MAIL: _____

6. NÍVEL E TURMA DE INGLÊS EM QUE ESTÁ MATRICULADO: _____

Responda às perguntas abaixo procurando ser o mais especifico possível sobre o seu contato com a língua inglesa.

7. Fez inglês no colégio? SIM / NÃO   8. Caso 'SIM', em que séries? _____

9. Com qual idade começou a estudar inglês? _____

10. As aulas de inglês exploravam comunicação escrita e oral?

_____

11. Fez curso de inglês além do Extracurricular desta universidade?   SIM / NÃO

12. Caso 'SIM', por quanto tempo? _____

13. Você interrompeu seu estudo de inglês durante algum tempo?   SIM / NÃO

14. Por quanto tempo ficou sem fazer curso de inglês até iniciar no Extracurricular?

15. Tem vivência em país de língua inglesa? (mais de 1 mês)   SIM / NÃO

16. Caso 'SIM', por quanto tempo? _____ 17. Qual sua idade na época? _____

18. Freqüentou escola naquele país?   SIM / NÃO

19. Que tipo de escola/curso? _____

20. Conversa com freqüência em inglês com outros brasileiros?   SIM / NÃO

21. Conversa com freqüência em inglês com falantes nativos?   SIM / NÃO

22. Assiste filmes sem dublagem com freqüência?   SIM / NÃO

23. Ouve música em inglês com freqüência? SIM / NÃO   24. Canta? SIM / NÃO

25. Transcreve (tira) letras de músicas?   SIM / NÃO

26. Estuda, estudou, ou tem contato com outra língua estrangeira?   SIM / NÃO

27. Em que contexto? (escola, na família...) _____

28. Qual língua? _____

29. Marque o quanto você gosta de atividades que exploram as habilidades na lista

	Muito	Não muito	Não gusto
Gramática			
Leitura			
Escrita			
Audição (listening)			
Fala			
Pronúncia			

30. Marque seu grau de dificuldade em atividades que exploram as habilidades na lista

	Muito difícil	Não tão difícil	Fácil
Gramática			
Leitura			
Escrita			
Audição (listening)			
Fala			
Pronúncia			

31. Quantas horas por semana, além do curso, você dedica ao estudo da língua inglesa e à atividades para aperfeiçoar seu inglês?

_____

_____

32. Acrescente qualquer informação que julgar interessante e que não tenha sido contemplada neste questionário

_____

_____

Florianópolis,_____ de_____ de 2008
Obrigada por aceitar participar da pesquisa.
Nadia Karina Ruhmke Ramos

Profile Questionnaire – English version

Universidade Federal de Santa Catarina

Centro de Comunicação e Expressão
Curso de Pós-Graduação em Inglês e Literaturas Correspondentes
Master's candidate: Nadia Karina Ruhmke Ramos
Advisor: Prof Drª Rosana Denise Koerich

Questionnaire about the participants in this study

Please, answer the questionnaire below. This questionnaire will only get information to help in the analysis of the data collected by the researcher mentioned above. Participants' names will not be revealed. Extra info, such as name, e-mail address, and telephone number is required in case any complementary information is necessary, so that the researcher will be able to reach you.

1. NAME: _____

2. AGE: _____ 3. GENDER: FEMALE / MALE 4. PHONE NUMBER: _____

5. E-MAIL ADDRESS: _____

6. ENGLISH LEVEL AND GROUP YOU ARE ENROLLED AT: _____

Answer the questions below trying to be as specific as possible about your English experience.

7. Did you study English at school? YES / NO 8. If 'YES', in which grades? _____

9. How old were you when you started studying English? _____

10. Did your English classes focus on written and oral expression?

_____

_____

11. Did you study at any other language school beside the Extracurricular from this university? YES / NO

12. If 'YES', for how long? _____

13. Have you ever interrupted your English studies? YES / NO

14. How long did it take before you started studying English again at the Extracurricular?

_____

15. Have you ever lived in an English speaking country? (more than one month) YES / NO

16. If 'YES', for how long? _____ 17. How old were you at that time? _____

18. Did you go to school there? YES / NO

19. What kind of school / course? _____

20. Do you often speak English with Brazilians? YES / NO

21. Do you often talk to native speakers of English? YES / NO

22. Do you often watch movies without dubbing? YES / NO

23. Do you often listen to English songs? YES / NO   24. Sing? YES / NO

25. Do you often transcribe lyrics? YES / NO

26. Have you ever studied another foreign language? YES / NO

27. In which context? (school, family....) _____

28. Which language? _____

29. Check how much you like the activities on the list.

	Very much	Not very much	Not at all
Grammar			
Reading			
Writing			
Listening			
Speaking			
Pronunciation			

30. Check how difficult the activities on the list below are you.

	Very difficult	Not very difficult	Not difficult at all
Grammar			
Reading			
Writing			
Listening			
Speaking			
Pronunciation			

31. Besides the English course, how much time do you devote to studying English in order to improve your skills?

_____

32. Add any information you think is important that have not been mentioned in this questionnaire.

_____

Florianópolis, 2008, _____, _____.

Thank you for being part of this study.
Nadia Karina Ruhmke Ramos

Appendix C
Summary of the questionnaire results

1) Age mean 23.

Ranging from 15 to 58.

2) Gender:

Female: 34 (64%) and Male: 19 (35%)

3) Did you study English at school?

45.3% of participants reported that they studied English at junior and high school, 18.9% reported having English only at high school, 17% reported studying English primary school, 13.2% reported studying English only at Junior high, and only 5.7 said never studied English before extracurricular.

4) How old were you when you started studying English?

11 was the age most of students reported having started studying English.

5) Did your classes involve oral and written communication?

85% of participants reported that their classes only involved written English; no attention was devoted to speaking.

6) Did you study at another English school beside extra?

51% of participants answered they had not taken any English course besides extra.

7) Did you stop studying English before going to extra? For how long?

On the one hand, 45.3% of participants answered that they interrupted their English studies for up to 5 years. On the other hand, 28.3% reported that they continued studying English after they finish high school without any interruptions.

8) Did you live abroad? For how long?

Only two participants (3.8%) reported having spent some time abroad, the other 96.2% has never been abroad, excluding variable influence of native speaking country on the acquisition of the interdental fricative sounds.

9) Do you speak English with other Brazilians?

91% of participants said that they do not practice English with other Brazilians.

10) Do you speak English with native speakers?

In addition, 98.1% of them never speak English with native speakers (of English).

11) Do you watch movies in English?

56.6% reported watching movies without dubbing. The results of this question might have been influenced by misinterpretation of the question.

12) Do you often listen to music in English?

88.7% said that they listened to music in English.

13) Do you sing in English?

54.7% reported singing in English.

14) Do you transcribe the lyrics?

Only 26.4% reported transcribing the lyrics against 73.6% who answered no.

15) Do you study or studied another foreign language?

60.4% reported that they had never had contact with a third language. From the 39.6% (21 participants) who answered yes, most of them studied this third language at school, being Spanish the most cited third language, probably because of the amount of foreigners who come to the city are not English speakers, such as the Argentineans.

16) Do you like to study English grammar?

64.2% of participants answered that they do not like grammar very much, followed by 24.5% who answered they really like grammar, and finally 11.3% said they do not like grammar at all.

17) Do you like reading in English?

69.8% of participants answered that they really like reading, followed by 28.3% who answered they do not like really like reading very much, and finally 1.9% said they do not like reading at all.

18) Do you like writing in English?

52.8% of participants answered that they do not like writing very much, followed by 34% who answered they really like writing, and finally 13.2% said they do not like writing at all.

19) Do you like listening to English?

66% of participants answered that they really like listening, followed by 30,2% who answered they do not like really like listening very much, and finally 3.8% said they do not like listening at all.

20) Do you like speaking in English?

47.2% of participants answered that they really like speaking, likewise 47.2 answered they do not like really like speaking very much, followed by 5.7% who said they do not like speaking at all.

21) Do you like English pronunciation?

58.5% of participants answered that they really like pronunciation, followed by 35.8% who answered they do not like really like pronunciation very much, followed by 5.7% who said they do not like pronunciation at all.

22) Grammar difficulty

67.9% of the participants answered that they do not think grammar is difficult, followed by 18.9% who answered they think grammar is very difficult, and finally 13.2% who said grammar is not difficult at all.

23) Reading difficulty

67.9% of participants answered that they do not think reading is very difficult, followed by 28.3% who answered they think reading is not difficult at all, and finally 3.8% said they think reading is really difficult.

24) Writing difficulty

60.4% of participants answered that they do not think writing very difficult, followed by 34% who answered they think writing is really difficult, and finally 5.7% said they think writing is not difficult at all.

25) Listening difficulty

49.1% of participants answered that they do not think listening is very difficult, followed by 35.8% who answered they think listening is really difficult, and finally 15.1% said they think listening is not difficult at all.

26) Speaking difficulty

54.7% of participants answered that they think speaking is very difficult, followed by 41.5% who answered they do not think speaking is very difficult, and finally 3.8% said they think speaking is not difficult at all.

27) Pronunciation difficulty

49.1% of participants answered that they do not think pronunciation is very difficult, followed by 47.2% who answered they think pronunciation is very difficult, and finally 3.8% said they think pronunciation is not difficult at all.

28) Time devoted to English during the week

2.8% of participants reported that they devote at least two hours to English a week.

29) Participants per group

Instruction: 18 participants (34%);

Training: 21 participants (39.6%);

Control: 14 participants (26.4%);

Appendix D
Permission form – Portuguese version

TERMO DE CONSENTIMENTO DE PARTICIPAÇÃO EM PESQUISA

Você está sendo convidado a participar de um projeto de pesquisa que visa estudar a aquisição de um som específico da língua inglesa. Se aceitar participar da pesquisa, você responderá a um questionário e os dados dos exercícios de percepção aplicados em aula serão utilizados como dados de pesquisa. Um método comum de pesquisa na área da percepção e produção dos sons de língua é a utilização de áudio. Sua participação não envolve nenhum risco. As informações fornecidas e o material coletado serão absolutamente confidenciais e não haverá identificação nominal dos participantes em nenhum momento da pesquisa. A participação nesta pesquisa não acarreta, de forma alguma, prejuízo ou privilégio no curso em andamento. O participante pode, a qualquer momento, deixar de participar da pesquisa, informando a pesquisadora sua decisão, a fim de que ela não use mais os seus dados. Se você estiver de acordo em participar desta pesquisa, assine no espaço abaixo.

Atenciosamente,
Nadia Karina Ruhmke Ramos
Mestranda PGI/UFSC
Orientadora: Profa. Dra. Rosana Denise Koerich
Florianópolis, 25 de abril de 2008.

Turma: 3_

Nome completo e legível	RG	Assinatura

Appendix E
Permission form – English version

<u>PERMISSION FORM</u>

I would like to invite you to take part in a research project that aims at investigating a specific English sound. If you accept, you will answer a questionnaire and the data gathered from classroom activities will be used in the study. A very common method in the area of perception and production of sound is based on audio. Your participation involves no risk. The information and the data gathered will be confidential and there will be no personal identification in the results of the study. The participant can leave the study at any moment. However, the researcher must be told/informed about the participant's decision in order not to use his/her data the study. If you agree in participating in this piece of research, please sign below.

Nadia Karina Ruhmke Ramos
Master's candidate PGI/UFSC
Advisor: Prof. Dra. Rosana Denise Koerich
Florianópolis, 2008, April 25.

Group: 3_

Full name	ID number	Signature

Appendix F
Practice session before the test and treatment

• Next you are going to take a perception test.
• Each sequence has 3 phrases that can be identical or not.
• In this answer sheet you have to circle:

(1) If the first word is different from the other two
(2) If the second word is different from the other two
(3) If the third word is different from the other two
(0) If all 3 words are identical

Example:
Listen to the following 4 sequences; they are already answered for you.
Then you can see as the test is going to be.

1.	1	2	3	0
2.	1	2	3	0
3.	1	2	3	0
4.	1	2	3	0

Now you check the best answer for the following sequences.
If you still have doubts after this training, ask please.

1.	1	2	3	0
2.	1	2	3	0
3.	1	2	3	0
4.	1	2	3	0
5.	1	2	3	0
6.	1	2	3	0

Appendix G
The Categorial Discrimination Test
Instructions and test for the voiceless th

PERCEPTION TEST 1.1 – CDT

• Now you are going to listen to 22 sequences.

• According to the training, check the best answer.

• The words you are going to hear are: sigh, thigh, fie and tie.

• DO NOT leave any sequence without answer.

• The sequences are divided in blocks, the first block has 10 and the second black has

12 sequences.

• In this answer sheet you have to check:

(**1**) If the first word is different from the other two
(**2**) If the second word is different from the other two
(**3**) If the third word is different from the other two
(**0**) If all 3 words are identical

1.	1	2	3	0
2.	1	2	3	0
3.	1	2	3	0
4.	1	2	3	0
5.	1	2	3	0
6.	1	2	3	0
7.	1	2	3	0
8.	1	2	3	0
9.	1	2	3	0
10.	1	2	3	0

1.	1	2	3	0
2.	1	2	3	0
3.	1	2	3	0
4.	1	2	3	0
5.	1	2	3	0
6.	1	2	3	0
7.	1	2	3	0
8.	1	2	3	0
9.	1	2	3	0
10.	1	2	3	0

1.	1	2	3	0
2.	1	2	3	0

Sequences heard by participants

	TRIAL			ANSWER
1.	sigh	thigh	thigh	1
2.	thigh	thigh	tie	3
3.	thigh	fie	thigh	2
4.	thigh	thigh	thigh	0
5.	thigh	sign	thigh	2
6.	tie	thigh	thigh	1
7.	thigh	thigh	sigh	3
8.	thigh	fie	fie	1
9.	thigh	tie	thigh	2
10.	sign	thigh	sigh	2

1.	thigh	tie	tie	1
2.	fie	thigh	thigh	1
3.	tie	tie	thigh	3
4.	tie	tie	tie	0
5.	sigh	sigh	sigh	0
6.	tie	thigh	tie	2
7.	fie	fie	thigh	3
8.	thigh	sigh	sigh	1
9.	sigh	sigh	thigh	3
10.	fie	thigh	fie	2

1.	thigh	thigh	fie	3
2.	fie	fie	fie	0

Instructions and test for the voiced th

PERCEPTION TEST 1.2 – CDT

• Now you are going to listen to other 22 sequences.

• According to the training, check the best answer.

• The words you are going to hear are: zee, thee, fee and dee.

• DO NOT leave any sequence without answer.

• The sequences are divided in blocks, the first block has 10 and the second black has 12 sequences.

• In this answer sheet you have to check:

    (1) If the first word is different from the other two
    (2) If the second word is different from the other two
    (3) If the third word is different from the other two
    (0) If all 3 words are identical

1.	1	2	3	0
2.	1	2	3	0
3.	1	2	3	0
4.	1	2	3	0
5.	1	2	3	0
6.	1	2	3	0
7.	1	2	3	0
8.	1	2	3	0
9.	1	2	3	0
10.	1	2	3	0

1.	1	2	3	0
2.	1	2	3	0
3.	1	2	3	0
4.	1	2	3	0
5.	1	2	3	0
6.	1	2	3	0
7.	1	2	3	0
8.	1	2	3	0
9.	1	2	3	0
10.	1	2	3	0

1.	1	2	3	0
2.	1	2	3	0

Sequences heard by participants

	TRIAL			ANSWER
1.	zee	thee	thee	1
2.	dee	dee	dee	0
3.	thee	thee	thee	0
4.	vee	thee	thee	1
5.	zee	zee	thee	3
6.	thee	thee	dee	3
7.	thee	thee	zee	3
8.	vee	thee	vee	2
9.	zee	thee	zee	2
10.	thee	dee	dee	1

1.	dee	dee	thee	3
2.	vee	vee	thee	3
3.	thee	dee	thee	2
4.	vee	vee	vee	0
5.	zee	zee	zee	0
6.	dee	thee	dee	2
7.	thee	vee	thee	2
8.	thee	thee	vee	3
9.	thee	zee	zee	1
10.	thee	zee	thee	2

1.	dee	thee	thee	1
2.	thee	vee	vee	1

Final sounds S, TH, and T Linking with TH

A Final sounds S, TH, and T

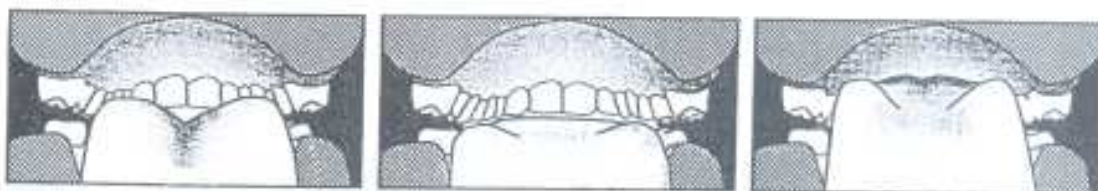**1** Look at these pictures.

S   TH   T

Looking to the front
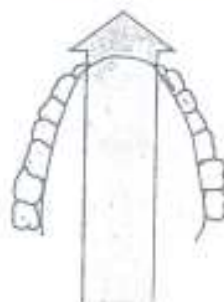
Looking down

mass   math   mat
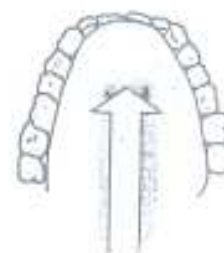
Air continues   Air continues   Air stops

2 Listen for the sound at the end of these words.
<u>Do not say the words.</u>

		STOP
mass	math	mat
bass	bath	bat
boss	both	boat

B *Which word is different?*

1 Listen. Mark the different word.

	X	Y	Z	
1.	....	✔	....	(boat, both, boat)
2.	....	....	....	
3.	....	....	....	
4.	....	....	....	
5.	....	....	....	
6.	....	....	....	
7.	....	....	....	
8.	....	....	....	

2 Listen again.

C *Which word do you hear?*

1 Listen. Circle the word you hear.

1.	both	boat	(both)
2.	path	pat	
3.	mass	mat	
4.	fourth	fort	
5.	force	fort	
6.	nice	night	
7.	rice	right	
8.	face	fate	
9.	with	wit	
10.	race	rate	

2 Listen again.

D Saying final TH

1 Look again at the picture of how to say TH.
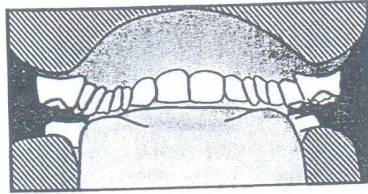
2 Listen.

1. bath
2. both
3. teeth
4. math
5. mouth

E Saying final TH and T/D in numbers

Listen.

1.	first	first
2.	second	second
3.	third	third
4.	fourth	fourththth
5.	fifth	fifththth
6.	sixth	sixththth
7.	seventh	seventhththth
8.	eighth	eighththth
9.	ninth	nineththth
10.	tenth	tenththth

F Saying final sounds S/Z, TH, and T

Listen.

	S/Z	TH	T
1.	bass	bath	bat
	hassss	baththth	bat
2.	mass	math	mat
	massss	maththth	mat
3.	boss	both	boat
	bossss	boththth	boat
4.	fours	fourth	fort
	fourzzz	fourththth	fort

J Linking with TH

1 Listen to these groups of words.

both of them	boththth of them
Fourth of July	Fourthththof July
math and English	maththtand English
both things	boththththings

2 Listen.

1. I want a bath after dinner.   I want a baththafter dinner.

2. It was the Fourth of July.   It was the Fourthththof   July.

3. Both of them came.   Boththof   them came.

4. Sue is studying math and English.   Sue is studying maththand English.

5. Her teeth are very white.   Her teethththare very white.

6. The path over the mountain is hard.   The paththover the mountain is hard.

7. The path through the woods is easy.   The paththththrough the woods is easy.

8. We both think you should come.   We boththththink   you should come.

9. They both thank you.   They boththththank you.

10. He left both things at home.   He left boththwhen things   at home.

Gilbert, J. B. (2001). *Clear Speech from the Start - Basic Pronunciation and listening comprehension in North American English*. USA: Cambridge University Press.

Final sounds S, TH, and T
Linking with TH

Listen for the sound at the end of these words.
Do not say the words.

mass	math	mat
bass	bath	bat
boss	both	boat

B Which word is different?

1 Listen. Mark the different word.

	X	Y	Z	
1.	_____	✔	_____	(boat, both, boat)
2.	_____	_____	_____	
3.	_____	_____	_____	
4.	_____	_____	_____	
5.	_____	_____	_____	
6.	_____	_____	_____	
7.	_____	_____	_____	
8.	_____	_____	_____	

2 Listen again.

C Which word do you hear?

1 Listen. Circle the word you hear.

1. (both)   boat   (both)
2. path   pat
3. mass   mat
4. fourth   fort
5. force   fort
6. nice   night
7. rice   right
8. face   fate
9. with   wit
10. race   rate

2 Listen again.

D _2 Listen.

1. bath
2. both
3. teeth
4. math
5. mouth

E

Listen.

1. first
2. second
3. third
4. fourth
5. fifth
6. sixth
7. seventh
8. eighth
9. ninth
10. tenth

F

Listen.

S/Z	TH	T
1. bass	bath	bat
2. mass	math	mat
3. boss	both	boat
4. fours	fourth	fort

J **Linking**

1 Listen to these groups of words.

both of them

Fourth of July

math and English

both things

2 Listen.

1. I want a bath after dinner.

2. It was the Fourth of July.

3. Both of them came.

4. Sue is studying math and English.

5. Her teeth are very white.

6. The path over the mountain is hard.

7. The path through the woods is easy.

8. We both think you should come.

9. They both thank you.

10. He left both things at home.

K Review: Linking

Listen.

1.

When is the store open?

Will it open before eight?

2.

The bank opens at eight.

I'd like a cup of tea.

3.

She wants fish.

The store's near Main.

4.

Does he ever drink
coffee or tea?

Make the dog go away.

She adores vanilla ice
cream.

5.

Will Lucy arrive soon?

Please stop pushing!

6.

Go away! Far away!

Come again whenever you
want to.

Will it open at ten?

Will it open before nine?

Bob ate all of the fish soup.

Gilbert, J. B. (2001). *Clear Speech from the Start - Basic Pronunciation and listening comprehension in North American English.* USA: Cambridge University Press.

Arthur's mother
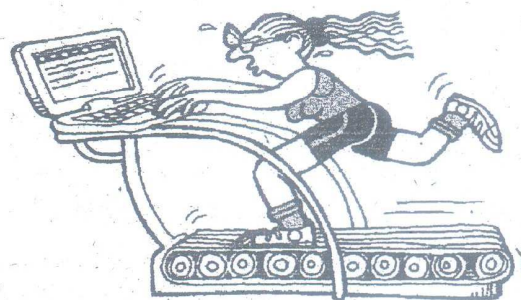# The consonant sounds /θ/ and /ð/

- Listen to the two sounds /θ/ and /ð/. Notice that in /θ/, there is no voice from the throat. Instead, you can feel the air from your mouth on your hand. In the sound /ð/ there is voice from the throat. It is possible to make both sounds long. Look at the mouth diagram to see how to make these consonant sounds.

tongue between
top and bottom teeth
(push air through gap)
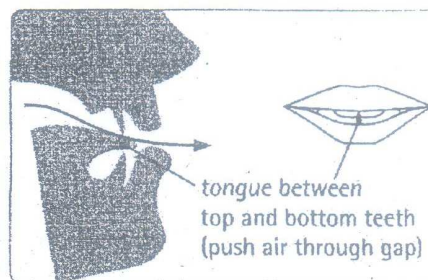
- Now listen to the sound /θ/ on its own.

- Listen to the target sound /θ/ in the words below and compare it with the words on each side.

target /θ/

sick	thick	sick
boat	both	boat
free	three	free

- Listen .

  thank   think   thought
  healthy   birthday   maths
  earth   length   fourth

- Listen to the sound /ð/ on its own.

- Listen to the target sound /ð/ in the words below and compare it with the words on each side.

target /ð/

breed	breathe	breed
den	then	den
van	than	van

- Listen

  these   though   they
  other   weather   clothes
  breathe   with   sunbathe

"Martha Smith's an author and an athlete."
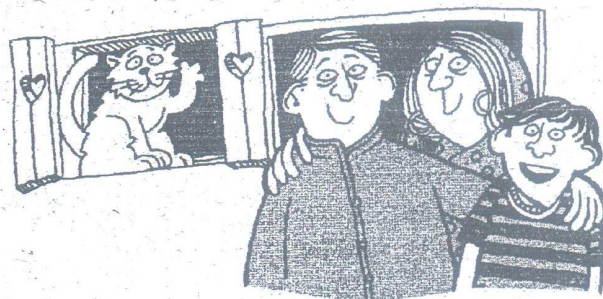
"My father and mother live together with my other brother."

Complete this rhyme using words from the box. Then listen and check.

earth	Heather	~~brother~~	neither	mothers	brothers
~~another~~	together	birth	either		

Arthur had a _brother_

And he didn't want _another_ .

And of the brothers, _____

Wanted sisters _____ .

The last thing on this _____ :

They wanted was a _____ .

So Arthur's mother _____

Got them both _____ ,

And told them all good _____

Should learn to share their _____

Sound pairs 33: /s/ and /θ/, /z/ and /ð/

Listen to the words in the box.

sink – think	worse – worth
bays – bathe	closed – clothed

Listen. The speaker will say two words from the box.
If you hear the same word twice, write S (same).
If you hear two different words, write D (different).

1 _____   2 _____   3 _____   4 _____   5 _____   6 _____   7 _____

Listen. Circle the word you hear.

8 *sing / thing*
9 *breeze / breathe*
10 That's a funny *sort / thought*.
11 Her *mouse / mouth* seems to be smiling.
12 Are they *closed / clothed* yet?

Sound pairs 39: /f/ and /θ/, /v/ and /ð/

Listen to the words in the box.

fin – thin	deaf – death
loaves – loathes	van – than

Listen. The speaker will say two words from the box.
If you hear the same word twice, write S (same).
If you hear two different words, write D (different).

1 _____   2 _____   3 _____   4 _____   5 _____   6 _____   7 _____

Listen. Circle the word or phrase you hear.

8 *first / thirst*
9 I got these *free / three* gifts.
10 It's a *fort / thought*.
11 *What some of us / What's a mother's* first thought.
12 I don't know *Eva / either*.

Sound pairs 35: /t/ and /θ/, /d/ and /ð/

Listen to the words in the box.

tree – three	boat – both
breed – breathe	dough – though

Listen. The speaker will say two words from the box.
If you hear the same word twice, write S (same).
If you hear two different words, write D (different).

1 _____   2 _____   3 _____   4 _____   5 _____   6 _____   7 _____

Listen. Circle the word you hear.

8 *tree / three*
9 *day / they*
10 I don't want your *tanks / thanks*!
11 That's what I *taught / thought*!
12 They couldn't *breed / breathe* very well.

Listen and circle the word you hear.

1 Youth or use?   There's no *youth / use* talking about that.
2 Thought or taught?   I don't know what she *thought / taught*.
3 Free or three?   *Free / Three* refills with each packet!
4 Closed or clothed?   They weren't fully *closed / clothed*.
5 Breeding or breathing?   They've stopped *breeding / breathing*.
6 These are or visa?   *These are / Visa* problems we can deal with later.

Think of a computer which people speak into and it writes what they say. This computer wrote these sentences down wrongly. Correct the underlined mistakes.

EXAMPLE   It's <u>free</u> o'clock. _____ *three* _____

1 A <u>bat</u> is more relaxing than a shower. _____   4 You need a <u>sick</u> coat in winter. _____
2 The train went <u>true</u> the tunnel. _____   5 I don't know; I haven't <u>fought</u> about it. _____
3 Don't walk on the ice; it's very <u>fin</u>. _____   6 It's a matter of life and <u>deaf</u>. _____

	always	notes
/θ/	TH (*three*)	In a few names of places and people, TH is pronounced as /t/ (*Thailand, Thomas*).
/ð/	TH (*then*)	

Hancock, M. (2003). *English pronunciation in use*. Cambridge University Press, UK.

Arthur's mother

Complete this rhyme using words from the box. Then listen and check.

earth	Heather	~~brother~~	neither	mothers	brothers
~~another~~	together	birth	either		

Arthur had a ___brother___

And he didn't want ___another___ .

And of the brothers, _____

Wanted sisters _____ .

The last thing on this _____ .

They wanted was a _____ .

So Arthur's mother _____

Got them both _____ ,

And told them all good _____

Should learn to share their _____ .

Sound pairs 33

Listen to the words in the box.

sink – think	worse – worth
bays – bathe	closed – clothed

Listen. The speaker will say two words from the box.
If you hear the same word twice, write S (same).
If you hear two different words, write D (different).

1 _____   2 _____   3 _____   4 _____   5 _____   6 _____   7 _____

Listen. Circle the word you hear.

8 *sing / thing*
9 *breeze / breathe*
10 That's a funny *sort / thought.*
11 Her *mouse / mouth* seems to be smiling.
12 Are they *closed / clothed* yet?

Sound pairs 39

fin – thin	deaf – death
loaves – loathes	van – than

Listen to the words in the box.

Listen. The speaker will say two words from the box.
If you hear the same word twice, write S (same).
If you hear two different words, write D (different).

1 .... 2 .... 3 .... 4 .... 5 .... 6 .... 7 ....

Listen. Circle the word or phrase you hear.

8 *first / thirst*
9 I got these *free / three* gifts.
10 It's a *fort / thought*.
11 *What some of us / What's a mother's* first thought.
12 I don't know *Eva / either*.

Sound pairs 35:

tree – three	boat – both
breed – breathe	dough – though

Listen to the words in the box.

Listen. The speaker will say two words from the box.
If you hear the same word twice, write S (same).
If you hear two different words, write D (different).

1 .... 2 .... 3 .... 4 .... 5 .... 6 .... 7 ....

Listen. Circle the word you hear.

8 *tree / three*
9 *day / they*
10 I don't want your *tanks / thanks*!
11 That's what I *taught / thought*!
12 They couldn't *breed / breathe* very well.

Listen and circle the word you hear.

1 Youth or use?   There's no *youth / use* talking about that.
2 Thought or taught?   I don't know what she *thought / taught*.
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4 Closed or clothed?   They weren't fully *closed / clothed*.
5 Breeding or breathing?   They've stopped *breeding / breathing*.
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Think of a computer which people speak into and it writes what they say. This computer wrote these sentences down wrongly. Correct the underlined mistakes.

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2 The train went <u>true</u> the tunnel. ....   5 I don't know; I haven't <u>fought</u> about it. ....

3 Don't walk on the ice; it's very <u>fin</u>. ....   6 It's a matter of life and <u>deaf</u>. ....

Hancock, M. (2003). *English pronunciation in use*. Cambridge University Press, UK.

THE CONSONANTS [θ] AND [ð]

Introduction

The sounds [θ] and [ð] are both spelled with *th*. They are the sounds in *thing* [θ] and *this* [ð]. [θ] is voiceless; [ð] is voiced. When you say [θ] or [ð], the tip of your tongue should be between your teeth. Your breath should come out in a hissy sound.

Focus Word

Think is a common word with [θ]. Become aware of when you use this word, and pronounce it correctly.

Practice

➤ 1. LISTEN

Beginning [θ]	Middle [θ]	Final [θ]
1. thing	7. nothing	13. math
2. think	8. author	14. fifth
3. throw	9. method	15. death
4. theory	10. worthwhile	16. north
5. three	11. healthy	17. thousandth
6. thorough	12. sympathy	18. both

➤ 2. LISTEN

Beginning [ð]	Middle [ð]	Final [ð]
1. that	6. together	11. smooth
2. there	7. other	12. breathe
3. these	8. weather	13. bathe
4. those	9. although	14. teethe
5. though	10. mother	15. soothe

IDIOMS AND EXPRESSIONS. *Listen to the th idioms and expressions. Make sure you understand their meanings. Then complete the sentences with the idioms and read a sentence out loud. Remember to make any necessary grammatical changes.*

a. through thick and thin   through good times and bad times
b. back and forth   to and from
c. fall through   fail to happen, not happen
d. goes without saying   is obvious
e. now and then   sometimes
f. make the most of   get some benefit from even bad situations
g. on the whole   mostly
h. think highly of   respect
i. throw a fit   lose control (usually in anger)
j. would rather   prefer

1. When I realized my wallet had been stolen, I got so angry I _____

_____

2. Most couples promise to stay together _____.

3. We had hoped to get away during the vacation, but our plans _____

_____ and we won't be going.

4. For business reasons, he's always going _____

_____ between New York and Washington.

5. It _____ that you won't get into medical school

without good grades in math and science.

6. Workaholics _____ work than play.

7. Although I don't agree with everything in your report, _____

I think it's correct.

8. Leonard Bernstein is one of the best-known American composers, and most people

_____ his work.

9. The situation is bad, but you should try to _____ it.

10. I don't see him regularly, but _____ we get together.

Lane, L. (1993). *Focus on Pronunciation – principles and practice for effective communication,* student's book. New York: Longman.

Practice

➤ 1. LISTEN

1. thing	7. nothing	13. math
2. think	8. author	14. fifth
3. throw	9. method	15. death
4. theory	10. worthwhile	16. north
5. three	11. healthy	17. thousandth
6. thorough	12. sympathy	18. both

➤ 2. LISTEN

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2. there	7. other	12. breathe
3. these	8. weather	13. bathe
4. those	9. although	14. teethe
5. though	10. mother	15. soothe

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b.	back and forth	to and from
c.	fall through	fail to happen, not happen
d.	goes without saying	is obvious
e.	now and then	sometimes
f.	make the most of	get some benefit from even bad situations
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_____.

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Lane, L. (1993). *Focus on Pronunciation – principles and practice for effective communication*, student's book. New York: Longman.

/θ/ thin

– What did you think of the new theatre?
– I thought it would have been better. It cost
thousands to rebuild. But I thought it was
nothing special. What did you think?
– I thought it was really something!

1 Target sound /θ/

To make the target sound /θ/, put your
tongue between your teeth. Blow out
air between your tongue and your top
teeth. *Do not* use your voice. Listen
and repeat: /θ/.

2 Minimal pairs A

Sound 1 /s/	Sound 2 /θ/
mouse	**mouth**
What a sweet little mouse!	What a sweet little mouth!
sum	**thumb**
Is this sum OK?	Is this thumb OK?
sick	**thick**
It's very sick.	It's very thick.
sink	**think**
He's sinking.	He's thinking.
pass	**path**
There's a mountain pass.	There's a mountain path.

65÷10=100

	Sound 1	Sound 2	
	/t/	/θ/	
	tree	**three**	**3**
	It's a big tree.	It's a big three.	
	tanks	**thanks**	
	The President sends his tanks.	The President sends his thanks.	
	sheet	**sheath**	
	The knife was hidden in a sheet.	The knife was hidden in a sheath.	

Tick the words a) or b) that you hear in the sentences.

1 a) sink	☐	b) think	☐
2 a) mouse	☐	b) mouth	☐
3 a) tin	☐	b) thin	☐
4 a) taught	☐	b) thought	☐
5 a) moss	☐	b) moth	☐
6 a) fought	☐	b) thought	☐

Dialogue

a First practise the target sound /θ/ in words from the dialogue below. Read the words aloud or visit the website to practise.

three thirsty **th**ank you **th**ousand Thursday author
Catherine Saman**th**a no**th**ing some**th**ing mathematician
Ruth Roth worth month moth moths

b In this dialogue, each numbered line has a word that is especially important because of Ruth's strong response to what Catherine says. Read the dialogue and underline the most important word in each numbered line. Number 1 has been done as an example.

Gossips

CATHERINE: Samantha Roth is only thirty.

RUTH: (1) Is she? I thought she was thirty-three.

CATHERINE: Samantha's birthday was last Thursday.

RUTH: (2) Was it? I thought it was last month.

CATHERINE: The Roths' house is worth six hundred thousand.

RUTH: (3) Is it? I thought it was worth three hundred thousand.

CATHERINE: Ross Roth is the author of a book about moths.

RUTH: (4) Is he? I thought he was a mathematician.

CATHERINE: I'm so thirsty.

RUTH: (5) Are you? I thought you drank something at the Roths'.

CATHERINE: No. Samantha gave me nothing to drink.

RUTH: (6) Shall I buy you a drink?

CATHERINE: Thank you.

c Check your answers by listening to the dialogue. Notice that the especially important words are much LOUDer and s l o w er, and the intonation goes up.

Baker, A. (2006). *Ship or Sheep?* Cambridge: Cambridge University Press.

Minimal pairs

Sound 1	Sound 2
mouse	**mouth**
What a sweet little mouse!	What a sweet little mouth!
sum	**thumb**
Is this sum OK?	Is this thumb OK?
sick	**thick**
It's very sick.	It's very thick.
sink	**think**
He's sinking.	He's thinking.
pass	**path**
There's a mountain pass.	There's a mountain path.

Sound 1	Sound 2
tree	**three**
It's a big tree.	It's a big three.
tanks	**thanks**
The President sends his tanks.	The President sends his thanks.
sheet	**sheath**
The knife was hidden in a sheet.	The knife was hidden in a sheath.

Tick the words a) or b) that you hear in the sentences.

1 a) sink ☐ b) think ☐
2 a) mouse ☐ b) mouth ☐
3 a) tin ☐ b) thin ☐
4 a) taught ☐ b) thought ☐
5 a) moss ☐ b) moth ☐
6 a) fought ☐ b) thought ☐

Dialogue

three **thirsty** **thank** you **thousand** **Thursday** author **Catherine** Samantha **nothing** **something** mathematician Ruth Roth worth month moth moths

b In this dialogue, each numbered line has a word that is especially important because of Ruth's strong response to what Catherine says. Read the dialogue and <u>underline</u> the most important word in each numbered line. Number 1 has been done as an example.

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Check your answers by listening to the dialogue. Notice that the especially important words are much LOUDer and s l o w er, and the intonation goes up.

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/θ/ (bath) and /t/ (bat)

Listening to /θ/ (bath) and /t/ (bat)

1 Listen to the final sound in each of these words.

   bath   bat   both   boat

2 Listen to the beginning sound in each of these words.

   thank   tank   thought taught

Saying /θ/ and /t/

The sound /θ/ as in "bath" is a continuant, and the sound /t/ as in "bat" is a stop.

1 Look at these pictures of /θ/ and /t/ and notice how the air flows out of the mouth for /θ/, but stops inside the mouth for /t/.
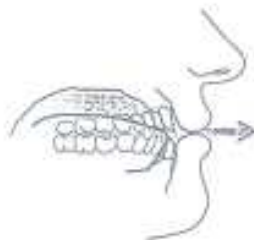
bath /θ/

bat /t/

Looking from the side

Looking to the front

When saying /θ/, the tongue is flat and relaxed. The flat tip of the tongue briefly touches the upper front teeth. You can also make this sound by touching the tip of the tongue to the lower front teeth. Either way, the air must continue to flow out of the mouth.

2 Silently practice the position for /θ/. Breathe out and feel the air moving quietly over the tongue and teeth. If you draw the air back into your mouth, you can feel the cold air over your flat tongue.

3 Raise your tongue and press it against the tooth ridge all around so that the air cannot flow out. This makes the stop sound /t/.

4 Silently change back and forth between the positions for the two sounds. Then practice saying the words "bath" and "bat" out loud.

Which word is different?

Listen. You will hear three words. Mark the column for the word that is different.

	X	Y	Z	
1.	___	___	✓	(bath, bath, bat)
2.	___	___	___	
3.	___	___	___	
4.	___	___	___	
5.	___	___	___	
6.	___	___	___	
7.	___	___	___	
8.	___	___	___	

Gilbert, J. B. (1993). *Clear Speech from the Start - Intermediate Pronunciation and listening comprehension in North American English.* USA: Cambridge University Press.

USING FOCUS WORDS.   The word think is often used to show agreement or disagreement: I think so; I don't think so. Discuss the questions about language learning below with your classmates. Use these expressions to show agreement or disagreement.

EXAMPLE ➤   Yes, I think so because . . .   (No, I don't think so because . . .)

1. Do you think correct pronunciation is as important as good grammar and vocabulary?

2. Do you think the ability to learn another language is a special ability, different from a person's ability to learn other subjects?

3. Do you think you can learn a language well just by living in a country where it's spoken (without studying it)?

4. Do you think some people are just born good language learners?

Lane, L. (1993). *Focus on Pronunciation – principles and practice for effective communication,* student's book. New York: Longman.

Which word is different?

Listen. You will hear three words. Mark the column for the word that is different.

X	Y	Z	
1.	....	✓	(bath, bath, bat)
2.	....	....	
3.	....	....	
4.	....	....	
5.	....	....	
6.	....	....	
7.	....	....	
8.	....	....	

Gilbert, J. B. (1993). *Clear Speech from the Start - Intermediate Pronunciation and listening comprehension in North American English.* USA: Cambridge University Press.

USING FOCUS WORDS.   *The word* think *is often used to show agreement or disagreement:* I think so; I don't think so. *Discuss the questions about language learning below with your classmates. Use these expressions to show agreement or disagreement.*

EXAMPLE ➤   Yes, I think so because . . .   (No, I don't think so because . . .)

1. Do you think correct pronunciation is as important as good grammar and vocabulary?

2. Do you think the ability to learn another language is a special ability, different from a person's ability to learn other subjects?

3. Do you think you can learn a language well just by living in a country where it's spoken (without studying it)?

4. Do you think some people are just born good language learners?

Lane, L. (1993). *Focus on Pronunciation – principles and practice for effective communication,* student's book. New York: Longman.

PARTNER 1

1a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Words for /θ/ and /t/.
PARTNER 1. Use this page. PARTNER 2. Turn to page 119.

DIRECTIONS: First you are the speaker. Say the words to your partner. You see the consonant sound before each word. For example, you say "Number 1 is *theme*." Repeat any words your partner does not understand.

1. /θ/ theme
2. /t/ tie
3. /t/ mat
4. /θ/ threw
5. /θ/ both

6. /θ/ thin
7. /t/ taught
8. /θ/ tenth
9. /t/ boot
10. /t/ tree

Now you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 11 is an example.

11. (tenth)   tent
12. booth   boot
13. thought   taught
14. math   mat
15. three   tree

16. thank   tank
17. threw   true
18. both   boat
19. thigh   tie
20. thin   tin

Now compare answers with your partner.

PARTNER 1

2a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences for /θ/ and /t/.
PARTNER 1. Use this page. PARTNER 2. Turn to page 119.

DIRECTIONS: First you are the speaker. Say the sentences to your partner. You see the consonant sound before each sentence. Repeat any sentences your partner does not understand.

1. /t/   Bob spilled coffee on his TIE.
2. /θ/   Which one is your THEME?
3. /θ/   They want money for THANKS.
4. /t/   Is it TRUE?

Now you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 5 is an example.

5. I'll use a _____ pan.
    a. (thin)   b. tin
6. This is no place for a _____ .
    a. bath   b. bat

7. Joe _____ for many years.
    a. thought   b. taught
8. You can't fit in this _____ .
    a. booth   b. boot

Now compare answers with your partner.

1b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Words for /θ/ and /t/.
PARTNER 2. Use this page. PARTNER 1. Turn to page 108.

DIRECTIONS: First you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 1 is an example.

1. (theme) team
2. thigh   tie
3. math   mat
4. threw   true
5. both   boat

6. thin   tin
7. thought   taught
8. tenth   tent
9. booth   boot
10. three   tree

Now you are the speaker. Say the words to your partner. You see the consonant sound before each word. For example, you say "Number 11 is tenth." Repeat any words your partner does not understand.

11. /θ/   tenth
12. /t/   boot
13. /θ/   thought
14. /θ/   math
15. /t/   tree

16. /θ/   thank
17. /t/   true
18. /t/   boat
19. /t/   tie
20. /θ/   thin

Now compare answers with your partner.

2b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences for /θ/ and /t/.
PARTNER 2. Use this page. PARTNER 1. Turn to page 108.

DIRECTIONS: First you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 1 is an example.

1. Bob spilled coffee on his _____ .
   a. thigh   b. (tie)
2. Which one is your _____ ?
   a. theme   b. team

3. They want money for _____ .
   a. thanks   b. tanks
4. Is it _____ ?
   a. through   b. true

Now you are the speaker. Say the sentences to your partner. You see the consonant sound before each sentence. Repeat any sentences your partner does not understand.

5. /θ/   I'll use a THIN pan.
6. /θ/   This is no place for a BATH.
7. /t/   Joe TAUGHT for many years.
8. /t/   You can't fit in this BOOT.

Now compare answers with your partner.

PARTNER 1

1a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Words for /θ/ and /s/.
PARTNER 1. Use this page. PARTNER 2. Turn to page 121.

DIRECTIONS: First you are the speaker. Say the words to your partner. You see the consonant sound before each word. For example, you say "Number 1 is *sing*." Repeat any words your partner does not understand.

1.	/s/	sing	6.	/θ/	tenth
2.	/θ/	thumb	7.	/s/	mouse
3.	/θ/	theme	8.	/s/	sank
4.	/s/	pass	9.	/s/	worse
5.	/θ/	thick	10.	/θ/	think

Now you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 11 is an example.

11.	(path)	pass	16.	thank	sank
12.	worth	worse	17.	thumb	some
13.	think	sink	18.	thick	sick
14.	mouth	mouse	19.	theme	seem
15.	thing	sing	20.	tenth	tense

Now compare answers with your partner.

PARTNER 1

2a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences for /θ/ and /s/.
PARTNER 1. Use this page. PARTNER 2. Turn to page 121.

DIRECTIONS: First you are the speaker. Say the sentences to your partner. You see the consonant sound before each sentence. Repeat any sentences your partner does not understand.

1. /θ/ Why did they THINK it?
2. /θ/ Dan pointed to the MOUTH.
3. /s/ Did you notice her SIGH?
4. /s/ He thinks MASS is important.

Now you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 5 is an example.

5. Kate is the _____ person in the room.
   a. tenth   b. (tense)

6. I don't know how to spell "_____."
   a. worth   b. worse

7. Mine is _____ than yours.
   a. thicker   b. sicker

8. The house is near a mountain _____.
   a. path   b. pass

Now compare answers with your partner.

PARTNER 2

1b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Words for /θ/ and /s/.
PARTNER 2. Use this page. PARTNER 1. Turn to page 111.

DIRECTIONS: First you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 1 is an example.

1. thing	(sing)	6.	tenth	tense
2. thumb	some	7.	mouth	mouse
3. theme	seem	8.	thank	sank
4. path	pass	9.	worth	worse
5. thick	sick	10.	think	sink

Now you are the speaker. Say the words to your partner. You see the consonant sound before each word. For example, you say "Number 11 is *path*." Repeat any words your partner does not understand.

11.	/θ/	path	16.	/θ/	thank
12.	/s/	worse	17.	/s/	some
13.	/s/	sink	18.	/s/	sick
14.	/θ/	mouth	19.	/s/	seem
15.	/θ/	thing	20.	/θ/	tenth

Now compare answers with your partner.

PARTNER 2

2b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences for /θ/ and /s/.
PARTNER 2. Use this page. PARTNER 1. Turn to page 111.

DIRECTIONS: First you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 1 is an example.

1. Why did they _____ it?
   a. (think)   b. sink

2. Dan pointed to the _____ .
   a. mouth   b. mouse

3. Did you notice her _____ ?
   a. thigh   b. sigh

4. He thinks _____ is important.
   a. math   b. mass

Now you are the speaker. Say the sentences to your partner. You see the consonant sound before each sentence. Repeat any sentences your partner does not understand.

5. /s/   Kate is the TENSE person in the room.
6. /θ/   I don't know how to spell "WORTH."
7. /θ/   Mine is THICKER than yours.
8. /s/   The house is near a mountain PASS.

Now compare answers with your partner.

Beisbier, B.(1994). *Sounds Great - low intermediate pronunciation for speakers of English.* USA: Heinle & Heinle Publishers.

PARTNER 1

1a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice
PARTNER 1. Use this page. PARTNER 2. Turn to page 119.

DIRECTIONS: First you are the speaker. Say the words to your partner. You see the consonant sound before each word. For example, you say "Number 1 is *theme*." Repeat any words your partner does not understand.

1.	theme	6.	thin	
2.	tie	7.	taught	
3.	mat	8.	tenth	
4.	threw	9.	boot	
5.	both	10.	tree	

Now you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 11 is an example.

11.	(tenth)	tent	16. thank	tank
12.	booth	boot	17. threw	true
13.	thought	taught	18. both	boat
14.	math	mat	19. thigh	tie
15.	three	tree	20. thin	tin

Now compare answers with your partner.

PARTNER 1

2a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice
PARTNER 1. Use this page. PARTNER 2. Turn to page 119.

DIRECTIONS: First you are the speaker. Say the sentences to your partner. Repeat any sentences your partner does not understand.

1. Bob spilled coffee on his TIE.
2. Which one is your THEME?
3. They want money for THANKS.
4. Is it TRUE?

Now you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 5 is an example.

5. I'll use a _____ pan.
    a. (thin)   b. tin

6. This is no place for a _____ .
    a. bath   b. bat

7. Joe _____ for many years.
    a. thought   b. taught

8. You can't fit in this _____ .
    a. booth   b. boot

Now compare answers with your partner.

1b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice
PARTNER 2. Use this page. PARTNER 1. Turn to page 108.

DIRECTIONS: First you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 1 is an example.

1. (theme) team		6. thin	tin
2. thigh tie		7. thought	taught
3. math mat		8. tenth	tent
4. threw true		9. booth	boot
5. both boat		10. three	tree

Now you are the speaker. Say the words to your partner. You see the consonant sound before each word. For example, you say "Number 11 is *tenth*." Repeat any words your partner does not understand.

11.	tenth	16.	thank
12.	boot	17.	true
13.	thought	18.	boat
14.	math	19.	tie
15.	tree	20.	thin

Now compare answers with your partner.

2b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice
PARTNER 2. Use this page. PARTNER 1. Turn to page 108.

DIRECTIONS: First you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 1 is an example.

1. Bob spilled coffee on his _____ .
   a. thigh   b.(tie)

2. Which one is your _____ ?
   a. theme   b. team

3. They want money for _____ .
   a. thanks   b. tanks

4. Is it _____ ?
   a. through   b. true

Now you are the speaker. Say the sentences to your partner. Repeat any sentences your partner does not understand.

5.   I'll use a THIN pan.
6.   This is no place for a BATH.
7.   Joe TAUGHT for many years.
8.   You can't fit in this BOOT.

Now compare answers with your partner.

PARTNER 1

1a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice

PARTNER 1. Use this page. PARTNER 2. Turn to page 121.

DIRECTIONS: First you are the **speaker**. Say the words to your partner. You see the consonant sound before each word. For **example**, you say "Number 1 is *sing*." Repeat any words your partner does not understand.

1.	sing	6.	tenth
2.	thumb	7.	mouse
3.	theme	8.	sank
4.	pass	9.	worse
5.	thick	10.	think

Now you are the **listener**. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you **do** not understand. Number 11 is an example.

11.	(path) pass	16.	thank sank
12.	worth worse	17.	thumb some
13.	think sink	18.	thick sick
14.	mouth mouse	19.	theme seem
15.	thing sing	20.	tenth tense

Now compare answers with your partner.

PARTNER 1

2a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice

PARTNER 1. Use this page. PARTNER 2. Turn to page 121.

DIRECTIONS: First you are the **speaker**. Say the sentences to your partner. Repeat any sentences your partner does not understand.

1. Why did they THINK it?
2. Dan pointed to the MOUTH.
3. Did you notice her SIGH?
4. He thinks MASS is important.

Now you are the **listener**. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 5 is an example.

5. Kate is the _____ person in the room.
   a. tenth   b. (tense)

6. I don't know how to spell "_____."
   a. worth   b. worse

7. Mine is _____ than yours.
   a. thicker   b. sicker

8. The house is near a mountain _____ .
   a. path   b. pass

Now compare answers with your partner.

1b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice
PARTNER 2. Use this page. PARTNER 1. Turn to page 111.

DIRECTIONS: First you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 1 is an example.

1.	thing	(sing)	6. tenth	tense
2.	thumb	some	7. mouth	mouse
3.	theme	seem	8. thank	sank
4.	path	pass	9. worth	worse
5.	thick	sick	10. think	sink

Now you are the speaker. Say the words to your partner.
For example, you say "Number 11 is *path*." Repeat any words your partner does not understand.

11.	path		16.	thank
12.	worse		17.	some
13.	sink		18.	sick
14.	mouth		19.	seem
15.	thing		20.	tenth

Now compare answers with your partner.

2b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice
PARTNER 2. Use this page. PARTNER 1. Turn to page 111.

DIRECTIONS: First you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 1 is an example.

1. Why did they _____ it?
   a. (think)   b. sink

2. Dan pointed to the _____ .
   a. mouth   b. mouse

3. Did you notice her _____ ?
   a. thigh   b. sigh

4. He thinks _____ is important.
   a. math   b. mass

Now you are the speaker. Say the sentences to your partner.
Repeat any sentences your partner does not understand.

5. Kate is the TENSE person in the room.
6. I don't know how to spell "WORTH."
7. Mine is THICKER than yours.
8. The house is near a mountain PASS.

Now compare answers with your partner.

Beisbier, B.(1994). *Sounds Great - low intermediate pronunciation for speakers of English.* USA: Heinle & Heinle Publishers.

Session 7

ITG – Instruction and Training

PARTNER 1

1a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Words for /θ/ and /t/. PARTNER 1. Use this page. PARTNER 2. Turn to page 104.

DIRECTIONS: First, you are the speaker. Say the words to your partner. You can see the consonant sound before each word. For example, you say, "Number 1 is *tick*." Repeat any words your partner does not understand.

1. /t/ tick
2. /t/ tree
3. /θ/ booth
4. /θ/ threw

5. /t/ mat
6. /θ/ theme
7. /t/ taught
8. /θ/ faith

Now you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 9 is an example.

9. (thin) tin
10. both   boat
11. thigh tie
12. bath   bat

13. thorn   torn
14. thank   tank
15. thigh   tie
16. with   wit

Now compare answers with your partner.

PARTNER 1

2a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences for /θ/ and /t/. PARTNER 1. Use this page. PARTNER 2. Turn to page 104.

DIRECTIONS: First, you are the speaker. Say the sentences to your partner. You can see the consonant sound before each sentence. Repeat any sentences your partner does not understand.

1. /t/ Your TEAM is very good.
2. /θ/ He was a THINKER.
3. /θ/ She left her money in a BOOTH.

4. /θ/ I don't believe in FAITH.
5. /t/ They TAUGHT about the book.

Now you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 6 is an example.

6. Where's the _____ ?

   a. thread   b. (tread)

7. She has a _____ voice.

   a. thrilling   b. trilling

8. He wants to take a _____ .

   a. bath   b. bat

9. The _____ is green.

   a. three   b. tree

10. The top is _____ .

    a. thin   b. tin

Now compare answers with your partner.

1b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Words for /θ/ and /t/. PARTNER 2. Use this page. PARTNER 1. Turn to page 95.

DIRECTIONS: First, you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 1 is an example.

1.	thick	(tick)	5.	math	mat
2.	three	tree	6.	theme	team
3.	booth	boot	7.	thought	taught
4.	threw	true	8.	faith	fate

Now you are the speaker. Say the words to your partner. You can see the consonant sound before each word. For example, you say, "Number 9 is *thin*." Repeat any words your partner does not understand.

9.	/θ/	thin		13.	/t/	torn
10.	/t/	boat		14.	/θ/	thank
11.	/θ/	thigh		15.	/θ/	thigh
12.	/θ/	bath		16.	/t/	wit

Now compare answers with your partner.

2b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences for /θ/ and /t/. PARTNER 2. Use this page. PARTNER 1. Turn to page 95.

DIRECTIONS: First, you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 1 is an example.

1. Your _____ is very good.

    a. theme   b. (team)

2. He was a _____.

    a. thinker   b. tinker

3. She left her money in a _____.

    a. booth   b. boot

4. I don't believe in _____.

    a. faith   b. fate

5. They _____ about the book.

    a. thought   b. taught

Now you are the speaker. Say the sentences to your partner. You can see the consonant sound before each sentence. Repeat any sentences your partner does not understand.

6. /t/ Where's the TREAD?
7. /θ/ She has a THRILLING voice.
8. /t/ He wants to take a BAT.
9. /θ/ The THREE is green.
10. /θ/ The top is THIN.

Now compare answers with your partner.

1a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Words for /θ/ and /s/. PARTNER 1. Use this page. PARTNER 2. Turn to page 106.

DIRECTIONS: First, you are the speaker. Say the words to your partner. You can see the consonant sound before each word. For example, you say, "Number 1 is *math*." Repeat any words your partner does not understand.

1.	/θ/	math		5.	/θ/	thigh
2.	/θ/	growth		6.	/θ/	faith
3.	/s/	symbol		7.	/θ/	fourth
4.	/s/	sank		8.	/s/	worse

Now you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 9 is an example.

9.	bath	(bass)		13.	think	sink
10.	thought	sought		14.	truth	truce
11.	thing	sing		15.	thick	sick
12.	tenth	tense		16.	path	pass

Now compare answers with your partner.

2a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences for /θ/ and /s/. PARTNER 1. Use this page. PARTNER 2. Turn to page 106.

DIRECTIONS: First, you are the speaker. Say the sentences to your partner. You can see the consonant sound before each sentence. Repeat any sentences your partner does not understand.

1. /θ/ We had THOUGHT it many times.
2. /θ/ He's THAWING the ice.
3. /s/ I admire her FACE.

4. /θ/ How much more is it WORTH?
5. /s/ This one is very SICK.

Now you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 6 is an example.

6. This _____ is brown.
   a. (moth)   b. moss
7. Put the _____ here.
   a. thimble   b. symbol
8. They argued about the _____.
   a. truth   b. truce

9. She did a good job on my _____.
   a. theme   b. seam
10. Here's a book for _____.
   a. math   b. mass

Now compare answers with your partner.

1b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Words for /θ/ and /s/. PARTNER 2. Use this page. PARTNER 1. Turn to page 98.

DIRECTIONS: First, you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 1 is an example.

1. (math)   mass
2. growth   gross
3. thimble   symbol
4. thank   sank

5. thigh   sigh
6. faith   face
7. fourth   force
8. worth   worse

Now you are the speaker. Say the words to your partner. You can see the consonant sound before each word. For example, you say, "Number 9 is bass." Repeat any words your partner does not understand.

9. /s/   bass
10. /θ/ thought
11. /s/ sing
12. /θ/ tenth

13. /s/ sink
14. /s/ truce
15. /θ/ thick
16. /θ/ path

Now compare answers with your partner.

2b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences for /θ/ and /s/. PARTNER 2. Use this page. PARTNER 1. Turn to page 98.

DIRECTIONS: First, you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 1 is an example.

1. We had _____ it many times.
   a. (thought)   b. sought
2. He's _____ the ice.
   a. thawing   b. sawing
3. I admire her _____.
   a. faith   b. face

4. How much more is it _____ ?
   a. worth   b. worse
5. This one is very _____.
   a. thick   b. sick

Now you are the speaker. Say the sentences to your partner. You can see the consonant sound before each sentence. Repeat any sentences your partner does not understand.

6. /θ/   This MOTH is brown.
7. /s/   Put the SYMBOL here.
8. /s/   They argued about the TRUCE.
9. /θ/   She did a good job on my THEME.
10. /θ/ Here's a book for MATH.

Now compare answers with your partner.

1a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Words for /ð/ and /d/. PARTNER 1. Use this page. PARTNER 2. Turn to page 108.

DIRECTIONS: First, you are the speaker. Say the words to your partner. You can see the consonant sound before each word. For example, you say, "Number 1 is *though*." Repeat any words your partner does not understand.

1. /ð/ though
2. /d/ Dan
3. /ð/ loathing

4. /d/ day
5. /ð/ worthy
6. /ð/ then

Now you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 7 is an example.

7. (those)   doze
8. lather   ladder
9. soothe   sued

10. then   den
11. breathing   breeding
12. there   dare

Now compare answers with your partner.

2a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences for /ð/ and /d/. PARTNER 1. Use this page. PARTNER 2. Turn to page 108.

DIRECTIONS: First, you are the speaker. Say the sentences to your partner. You can see the consonant sound before each sentence. Repeat any sentences your partner does not understand.

1. /ð/ THEY'VE called you.
2. /ð/ Is THIS RESPECT what you wanted?
3. /d/ The LADDER isn't good.
4. /d/ Can you spell "DOUGH"?

Now you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 5 is an example.

5. _____ will come soon.
   a. They   b. (Day)
6. Can it _____ ?
   a. breathe   b. breed

7. His contract is _____ .
   a. worthy   b. wordy
8. They _____ her.
   a. soothe   b. sued

Now compare answers with your partner.

1b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Words for /ð/ and /d/. PARTNER 2. Use this page. PARTNER 1. Turn to page 102.

DIRECTIONS: First, you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 1 is an example.

1. (though)   dough   4. they   day
2. than   Dan   5. worthy   wordy
3. loathing   loading   6. then   den

Now you are the speaker. Say the words to your partner. You can see the consonant sound before each word. For example, you say, "Number 7 is *those*." Repeat any words your partner does not understand.

7. /ð/ those   10. /ð/ then
8. /d/ ladder   11. /d/ breeding
9. /ð/ soothe   12. /d/ dare

Now compare answers with your partner.

2b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences for /ð/ and /d/. PARTNER 2. Use this page. PARTNER 1. Turn to page 102.

DIRECTIONS: First, you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 1 is an example.

1. _____ called you.   3. The _____ isn't good.

    a. (They've)   b. Dave   a. lather   b. ladder

2. Is _____ what you wanted?   4. Can you spell _____ ?

    a. this respect   b. disrespect   a. "though"   b. "dough"

Now you are the speaker. Say the sentences to your partner. You can see the consonant sound before each sentence. Repeat any sentences your partner does not understand.

5. /d/   DAY will come soon.
6. /ð/   Can it BREATHE?
7. /ð/   His contract is WORTHY.
8. /d/   They SUED her.

Now compare answers with your partner.

Beisbier, B.(1995). *Sounds Great - Intermediate pronunciation for speakers of English.* USA: Heinle & Heinle Publishers.

PARTNER 1

1a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Words for
PARTNER 1. Use this page. PARTNER 2. Turn to page 104.

DIRECTIONS: First, you are the speaker. Say the words to your partner. .
" For example, you say, "Number 1 is tick." Repeat any words your partner does not understand.

1.	tick	5.	mat
2.	tree	6.	theme
3.	booth	7.	taught
4.	threw	8.	faith

Now you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 9 is an example.

9. (thin) tin   13. thorn torn

10. both boat   14. thank tank

11. thigh tie   15. thigh tie

12. bath bat   16. with wit

Now compare answers with your partner.

PARTNER 1

2a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences
. PARTNER 1. Use this page. PARTNER 2. Turn to page 104.

DIRECTIONS: First, you are the speaker. Say the sentences to your partner.
e. Repeat any sentences your partner does not understand.

1.	Your TEAM is very good.	4.	I don't believe in FAITH.
2.	He was a THINKER.	5.	They TAUGHT about the book.
3.	She left her money in a BOOTH.		

Now you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 6 is an example.

6. Where's the _____?

a. thread   b. (tread)

7. She has a _____ voice.

a. thrilling   b. trilling

8. He wants to take a _____.

a. bath   b. bat

9. The _____ is green.

a. three   b. tree

10. The top is _____.

a. thin   b. tin

Now compare answers with your partner.

1b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice

PARTNER 2. Use this page. PARTNER 1. Turn to page 95.

DIRECTIONS: First, you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 1 is an example.

1.	thick	(tick)	5.	math	mat
2.	three	tree	6.	theme	team
3.	booth	boot	7.	thought	taught
4.	threw	true	8.	faith	fate

Now you are the speaker. Say the words to your partner. You can see the consonant sound before each word. For example, you say, "Number 9 is *thin*." Repeat any words your partner does not understand.

9.	thin	13.	torn
10.	boat	14.	thank
11.	thigh	15.	thigh
12.	bath	16.	wit

Now compare answers with your partner.

2b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice

PARTNER 2. Use this page. PARTNER 1. Turn to page 95.

DIRECTIONS: First, you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 1 is an example.

1. Your _____ is very good.

    a. theme   b. (team)

2. He was a _____.

    a. thinker   b. tinker

3. She left her money in a _____.

    a. booth   b. boot

4. I don't believe in _____.

    a. faith   b. fate

5. They _____ about the book.

    a. thought   b. taught

Now you are the speaker. Say the sentences to your partner.
Repeat any sentences your partner does not understand.

6.   Where's the TREAD?
7.   She has a THRILLING voice.
8.   He wants to take a BAT.
9.   The THREE is green.
10.   The top is THIN.

Now compare answers with your partner.

PARTNER 1

1a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice

PARTNER 1. Use this page. PARTNER 2. Turn to page 106.

DIRECTIONS: First, you are the speaker. Say the words to your partner. ... before each word. For example, you say, "Number 1 is *math*." Repeat any words your partner does not understand.

1.	math	5.	thigh
2.	growth	6.	faith
3.	symbol	7.	fourth
4.	sank	8.	worse

Now you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 9 is an example.

9. bath	(bass)	13. think	sink
10. thought	sought	14. truth	truce
11. thing	sing	15. thick	sick
12. tenth	tense	16. path	pass

Now compare answers with your partner.

PARTNER 1

2a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice

PARTNER 1. Use this page. PARTNER 2. Turn to page 106.

DIRECTIONS: First, you are the speaker. Say the sentences to your partner. . before each sentence. Repeat any sentences your partner does not understand.

1. We had THOUGHT it many times.
2. He's THAWING the ice.
3. I admire her FACE.
4. How much more is it WORTH?
5. This one is very SICK.

Now you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 6 is an example.

6. This _____ is brown.
   a. (moth)   b. moss

7. Put the _____ here.
   a. thimble   b. symbol

8. They argued about the _____.
   a. truth   b. truce

9. She did a good job on my _____.
   a. theme   b. seam

10. Here's a book for _____.
   a. math   b. mass

Now compare answers with your partner.

1b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Words .

PARTNER 2. Use this page. PARTNER 1. Turn to page 98.

DIRECTIONS: First, you are the listener. Your partner will say some words.
Ask your partner to repeat any words you do not understand. Number 1 is an example.

1. (math)   mass
2. growth   gross
3. thimble   symbol
4. thank   sank

5. thigh   sigh
6. faith   face
7. fourth   force
8. worth   worse

Now you are the speaker. Say the words to your partner.
For example, you say, "Number 9 is *bass*." Repeat any words your partner does not understand.

9.   bass
10.   thought
11.   sing
12.   tenth

13.   sink
14.   truce
15.   thick
16.   path

Now compare answers with your partner.

2b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences .

PARTNER 2. Use this page. PARTNER 1. Turn to page 98.

DIRECTIONS: First, you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 1 is an example.

1. We had _____ it many times.
    a. (thought)   b. sought

2. He's _____ the ice.
    a. thawing   b. sawing

3. I admire her _____.
    a. faith   b. face

4. How much more is it _____?
    a. worth   b. worse

5. This one is very _____.
    a. thick   b. sick

Now you are the speaker. Say the sentences to your partner.
Repeat any sentences your partner does not understand.

6.   This MOTH is brown.
7.   Put the SYMBOL here.
8.   They argued about the TRUCE.
9.   She did a good job on my THEME.
10.   Here's a book for MATH.

Now compare answers with your partner.

1a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice

PARTNER 1. Use this page. PARTNER 2. Turn to page 108.

DIRECTIONS: First, you are the speaker. Say the words to your partner. For example, you say, "Number 1 is *though*." Repeat any words your partner does not understand.

1.	though	4.	day
2.	Dan	5.	worthy
3.	loathing	6.	then

Now you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 7 is an example.

7. (those)   doze

8. lather   ladder

9. soothe   sued

10. then   den

11. breathing   breeding

12. there   dare

Now compare answers with your partner.

2a. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice

PARTNER 1. Use this page. PARTNER 2. Turn to page 108.

DIRECTIONS: First, you are the speaker. Say the sentences to your partner. Repeat any sentences your partner does not understand.

1. THEY'VE called you.
2. Is THIS RESPECT what you wanted?
3. The LADDER isn't good.
4. Can you spell "DOUGH"?

Now you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 5 is an example.

5. _____ will come soon.
   a. They   b. (Day)

6. Can it _____ ?
   a. breathe   b. breed

7. His contract is _____ .
   a. worthy   b. wordy

8. They _____ her.
   a. soothe   b. sued

Now compare answers with your partner.

PARTNER 2

1b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice

PARTNER 2. Use this page. PARTNER 1. Turn to page 102.

DIRECTIONS: First, you are the listener. Your partner will say some words. Circle the words you hear. Ask your partner to repeat any words you do not understand. Number 1 is an example.

1. (though)   dough   4. they   day
2. than   Dan   5. worthy   wordy
3. loathing   loading   6. then   den

Now you are the speaker. Say the words to your partner.
For example, you say, "Number 7 is *those*." Repeat any words your partner does not understand.

7.   those   10.   then
8.   ladder   11.   breeding
9.   soothe   12.   dare

Now compare answers with your partner.

PARTNER 2

2b. LISTENING DISCRIMINATION AND SPEAKING. Pair Practice Sentences

PARTNER 2. Use this page. PARTNER 1. Turn to page 102.

DIRECTIONS: First, you are the listener. Your partner will say some sentences. Circle the word you hear. Ask your partner to repeat any sentences you do not understand. Number 1 is an example.

1. _____ called you.   3. The _____ isn't good.

   a. (They've)   b. Dave   a. lather   b. ladder

2. Is _____ what you wanted?   4. Can you spell _____?

   a. this respect   b. disrespect   a. "though"   b. "dough"

Now you are the speaker. Say the sentences to your partner.
Repeat any sentences your partner does not understand.

5.   DAY will come soon.
6.   Can it BREATHE?
7.   His contract is WORTHY.
8.   They SUED her.

Now compare answers with your partner.

Appendix O

Raw scores for the voiceless sound in the perception test

TG			ITG			CG		
Part.	Pretest	Posttest	Part.	Pretest	Posttest	Part.	Pretest	Posttest
33	13	14	1	16	16	19	13	18
34	20	15	2	14	15	20	15	9
35	13	14	3	11	12	21	14	11
36	12	15	4	8	12	22	11	12
37	14	15	5	12	14	23	16	10
38	12	12	6	10	10	24	13	12
39	12	12	7	15	17	25	16	15
40	10	14	8	17	20	26	11	17
41	11	9	9	18	16	27	11	16
42	12	14	10	11	22	28	11	12
43	15	16	11	14	12	29	8	9
44	12	15	12	13	17	30	15	18
45	15	14	13	17	19	31	14	15
46	14	16	14	19	13	32	13	13
47	13	9	15	8	17			
48	13	13	16	15	13			
49	13	15	17	18	14			
50	14	18	18	13	12			
51	17	19						
52	20	21						
53	12	13						

Appendix P

Raw scores for the voiced sound in the perception test

TG				ITG				CG		
Part.	Pretest	Posttest		Part.	Pretest	Posttest		Part.	Pretest	Posttest
33	15	15		1	13	15		19	14	15
34	17	14		2	16	13		20	14	1
35	13	16		3	16	15		21	11	10
36	14.	16		4	8	14		22	13	17
37	17	15		5	14	15		23	15	14
38	16	16		6	13	13		24	16	16
39	15	14		7	15	15		25	18	19
40	16	16		8	15	13		26	10	10
41	12	13		9	16	16		27	16	14
42	15	14		10	15	16		28	15	16
43	17	17		11	15	16		29	14	16
44	16	17		12	15	17		30	14	13
45	15	15		13	15	18		31	14	20
46	15	14		14	14	12		32	13	12
47	9	5		15	7	14				
48	16	14		16	12	11				
49	16	14		17	15	13				
50	15	17		18	12	12				
51	16	17								
52	16	14								
53	14	16								