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L2 LEARNERS' PERCEPTION OF FALLING INTONATION IN ENGLISH WH-QUESTIONS

POR

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Abstract

English intonation presents challenges for learners with different levels of proficiency (Nibert, 2006; Zárate-Sández, 2015). The aim of this study is to determine the ability of learners of English with Spanish as L1 to perceive the default intonation pattern in Wh-questions. The learners' knowledge of English and Perception Test response time were considered as factors that may impact the ability to perceive this default pattern. Two groups of learners with different level of proficiency from a Chilean university participated in this study. A perception test was used to measure the participants' ability to identify the default intonation pattern in Wh-questions. A listening test was used to evaluate the proficiency level of the Beginner Group. Results indicate that the perception ability of both groups is similar, and that knowledge of English does not seem to play a role when identifying the falling tone of the default pattern of Wh-questions. Interestingly, participants scored higher in the identification of tone regardless of the function than the correct identification of tone and function. The difference in response time between groups was not statistically significant, and both groups spent more time on incorrect answers. These findings suggest that the identification of the default pattern of Wh-question is a challenge for these learners regardless of their difference in level of proficiency.

Resumen

La entonación del inglés es un desafío para aprendientes con distintos niveles de proficiencia (Nibert, 2006; Zárate-Sández, 2015). El objetivo de este estudio es determinar la habilidad de aprendientes de inglés con español como lengua materna para percibir el patrón entonacional por defecto de preguntas pronominales. El conocimiento del inglés de los participantes y el tiempo de respuesta de la prueba de percepción fueron considerados como factores que tienen un impacto en la habilidad de percepción del patrón por defecto. Dos grupos de aprendientes con distintos niveles de proficiencia de una universidad chilena participaron en este estudio. Una prueba de percepción fue usada para medir la habilidad de los participantes de la entonación por defecto de preguntas pronominales. Una prueba de compremsión auditiva fue utilizada para evaluar el nivel de proficiencia de los aprendientes elementales. Los resultados indican que la habilidad de percepción de ambos grupos es similar y que el conocimiento del inglés no influye al identificar el tono descendente por defecto de preguntas pronominales. La diferencia en el tiempo de respuesta entre grupos no fue significativa, y ambos demoraron más en las respuestas incorrectas. Estos hallazgos sugieren que la identificación del tono por defecto de preguntas pronominales es desafiante para estos aprendientes independiente de su nivel de proficiencia.

Introduction

During the last decades, studies that deal with the perception and production of L2 speech have been interested in studying suprasegmental features of speech (Gordon & Darcy, 2019). This interest in suprasegmentals may be due to the fact that pronunciation teaching and research has no longer the objective of suppressing foreign accent, but they seek to promote intelligible and comprehensible oral production (Busà, 2008; Berti, 2017). Understanding suprasegmentals includes the analysis of rhythm, stress, connected speech, and intonation (Grant, 2018), in which the last one mentioned has played a bigger role.

English has a default intonational configuration that has been described in detail by some authors (Baker, 2018; Roach, 2009; Wells, 2006). A characteristic of English intonation is that Wh-questions have a default falling tone which starts in the last stressed content word of the utterance (Wells, 2006). In contrast, different variations of Spanish have different configurations for these questions, and in Chile, Wh-questions are uttered with a final rise in the last word (Chela-Flores, 2003; Ortiz et al., 2010). Literature dealing with perception of L2 speech has explored the perception of intonation in different languages, but there is a gap in the study of the perception of intonation by learners of English with Chilean Spanish as L1.

The aim of this study is to measure the ability of learners of English with Spanish as L1 to perceive default tone in Wh-questions. To achieve this objective, a Perception Test was created and presented to two groups of participants with different level of L2 proficiency, along with a proficiency test given to the Beginner Group, to determine if knowledge of English has an impact in the perception abilities of learners.

In the first chapter of this thesis, the reader will find the theoretical information that describes the status of pronunciation in the teaching of English as L2, a detailed description of English and Spanish intonation, and previous studies that have dealt with the topic of L2 speech perception. In the second chapter, the research questions and objectives are presented. Then, chapter three deals with the method that was used to obtain the data for this study, including a description of the participants, material, and the procedure. Chapter four analyses the data obtained, and finally, a discussion of the results is presented in chapter five. References are provided at the end of this volume

1. Literature Review

1.1 A brief history of English pronunciation teaching

Pronunciation has had a complex history which is marked by the different degrees of importance given by the current methods in each period. As a result of that, the role of suprasegmentals was overlooked until recent years, and it was mainly not considered for more than a hundred years (Baker, 2018; Celce-Murcia et al., 1996; Murphy & Baker, 2015). To comprehend this issue, it is necessary to explore the history of English pronunciation teaching and the role that suprasegmentals have played.

The history of pronunciation teaching can be divided into five periods which cover from the XVIII century to the current days (Baker, 2018; Levis, 2019; Murphy & Baker, 2015). In the first half of the XVIII century, the classical approaches did not see pronunciation as significant due to the importance given to written expression over oral skills (Baker, 2018; Celce-Murcia et al., 1996; Chun, 2002). However, certain practice on listening and imitation of the target phones was promoted, but this included no further analysis of the sounds (Celce-Murcia et al., 1996). This perspective on pronunciation continued in the next period, the First Wave, which included most of the XIX century (Baker, 2018; Murphy & Baker, 2015). No further mention of suprasegmentals was found.

In the Second Wave (1880s – early 1900s), two milestones for pronunciation occurred: i) the creation of the International Phonetic Association and the later development of its alphabet, which encouraged the analysis of pronunciation over its mere imitation (Celce-Murcia, et al., 1996); and ii) the inclusion of listening training in pronunciation teaching. The latter could be considered as a first approach to the importance of listening and perception in pronunciation training. Later, the Audiolingual method put pronunciation in the first

place, maintaining the analytical perspective of the Second Wave (Celce-Murcia, et al., 1996), but this importance decreased during the early second half of the twentieth century (Chun, 2002; Derwing, 2009). Later in this period, the Silent Way emerged and returned the emphasis on the pronunciation, but mainly focused on individual sounds (Richards & Rogers, 2001). The concept of intelligibility as the goal of pronunciation teaching also emerged during this period (Baker, 2018; Bowen, 1972; Hill, 1961) as a precedent of more modern perspectives of pronunciation. A final milestone at the end of the Second Wave was the introduction of phonological hierarchies, which moved the traditional focus on segmental features of speech towards suprasegmentals (Baker, 2018).

The Communicative Approach or Communicative Language Teaching (CLT), which overrode other methods that were applied during the second half of the twentieth century, marked the third wave of pronunciation teaching (Murphy & Baker, 2015; Richards & Rogers, 2001). Although the central role of CLT was aiming at developing communicative competence, pronunciation was almost completely ignored (Euler, 2014). CLT proposed that learners must reach a baseline level of pronunciation so that oral communication was not hindered (Celce-Murcia et al., 1996), but proponents of this approach did not specify the role of pronunciation nor strategies to teach pronunciation communicatively, leaving teachers with little guidance to improve their students' oral production (Celce-Murcia et al., 1996; Derwing, 2009; Levis & Sonsaat, 2018).

Murphy & Baker (2015) proposed the existence of a Fourth Wave or the modern era of pronunciation teaching, which is the current approach that started in the 1990s and has evolved during these last decades. This wave includes a renewal of pronunciation teaching which recovers some principles that appeared during the second wave and combines them with the principles of CLT, mainly based on current research. The first principle is that nativeness is not essential and that the aim of every teacher and learner should be intelligibility and

comprehensibility (Levis, 2005). Although at first intelligibility and comprehensibility were concepts that were needed only for international teacher assistants in American and British universities, this has expanded to a larger group in which every learner of English is included (Levis & Sonsaat, 2018). Another important aspect that marks the so-called Fourth Wave is the importance of suprasegmental features of speech, which are prioritized over segmental aspects. Teachers and researchers have noted that suprasegmental features of the language, if used incorrectly, could be detrimental for the communication process (Busà, 2008; Celce-Murcia et al., 1996; Chun, 2002; Derwing, 2009; Eghlidi, 2016; Mennen, 2007). In spite of the contribution of suprasegmental features, there seems to be a lack of interest in suprasegmental features of language (Cardinali & Barbeito, 2018). Chun (2002) notes that from 1980 to 2000 only twenty-six articles dealing with pronunciation were published, but only seven of them dealt with intonation or suprasegmentals. The same author indicates that recent handbooks, for the period, included a partial focus on stress and intonation (p.112), in which it has not been deeply discussed (Toivanen, 2003). This is also reflected in the classroom, where suprasegmental features of language play a minor role (Gut et al., 2007).

Fortunately, research on intonation has increased in recent years (Cardinali & Barbeito, 2018). New technologies, the development of inexpensive (or even free) real-time Fundamental Frequency (F0) detection software, large open databases and corpuses, video techniques, among others, have revived the interest in researching and including intonation in language teaching (Vaissière, 2008), which has resulted into new perspectives of study, such as the interaction and pragmatic functions of suprasegmental features of the language. The studies that have been carried out in the area of pronunciation have also included experimental and quasi-experimental investigations, and also researchers are interested in studying the perceptions of teachers regarding pronunciation in the

classroom (Murphy & Baker, 2015). As a general overview of these studies, Murphy & Baker (2015) listed the themes that have been studied in this Fourth Wave, in which we can find the effects of segments and suprasegmentals in intelligibility and comprehensibility, the effects of sociocultural factors in intelligibility and comprehensibility, the impact of instruction and feedback on learner intelligibility and comprehensibility, pronunciation strategies for oral communication, learner's preferences and awareness regarding pronunciation, and teacher's beliefs and knowledge about pronunciation instruction, among others.

1.2. Segmental and suprasegmental teaching

Research on pronunciation has taken two major paths, either analyzing segmental or suprasegmental features of speech (Baker, 2018). Segmental features of speech refer to the individual parts in which a stream of sound can be divided (Crystal, 2003; Roach, 2009), and also to the production of individual sounds categorized as vowels and consonants (Avery & Ehrlich, 1992; Celce-Murcia et al., 1996). Suprasegmentals, on the other hand, refer to those contrasts in speech that exist and extend over more than one segment (Celce-Murcia et al., 1996; Grant, 2018; Roach, 2009), in which rhythm, stress, intonation (Avery & Ehrlich, 1992), thought group, connected speech, and prominence are included (Grant, 2018).

During the last decades, the studies which have dealt with the perception and production of pronunciation of speech have shown an increasing interest in the study of suprasegmentals (Gordon & Darcy, 2019). At the beginning of the twenty-first century, these studies were fewer in comparison to those that dealt with the segments of speech (Gordon & Darcy, 2019; Trofimovich & Baker, 2006). This new interest in suprasegmentals may be due to the fact that pronunciation teaching and research has no longer the objective of suppressing foreign accent

(Busà, 2008). Instead, they seek to promote intelligible and comprehensible oral production which is in line with what was being proposed since the early twentieth century, and received a stronger focus with the communicative approach (Baker, 2018).

Intelligibility refers to the degree in which a listener can understand an oral utterance, while comprehensibility is defined as the subjective estimation of difficulty for a listener to understand an utterance (Derwing & Munro, 2009). It is important to consider that these terms are highly related, but they are independent (Munro et al., 2006). If the speech of a non-native speaker (NNS) of English is not intelligible and comprehensible enough, this speaker will neither be able to communicate effectively with a native speaker (NS) nor with a NNS of English (Wei & Zhou, 2002). Mennen (2007) suggests that not being able to communicate under these parameters increases the chances of causing misinterpretation of the message.

Suprasegmental patterns are important as they are deeply stored in the brain of human beings, as these features are acquired during the first months of life of the newborn (Yang, 2016). Furthermore, some studies support the idea that while babies are in the womb, they can perceive sounds from the exterior, and the only signals that reach them are suprasegmentals such as intonation and rhythm (Gervain & Werker, 2008). Evidence suggest that babies use suprasegmental cues to start developing their phonetic inventory, and to identify segments and words in speech (Kuhl, 2004).

Research on English as L2 suggests that learners who have been under suprasegmental training are able to produce much more intelligible and comprehensible speech than those who have been trained only on segmental aspects of speech (Anderson-Hsieh, 1990; Gordon & Darcy, 2016; 2019; Gordon et al., 2013; Levis & Muller Levis, 2018; Rasier & Hiligsmann, 2007). An early

study carried out by Anderson-Hsieh (1990) examined the impact of suprasegmental training on Korean and Chinese chemistry teaching assistants using field-specific material focused on stress, rhythm, and intonation. These materials were tested with some participants who significantly improved their presentation and oral skills in comparison with the results of a pre-test. More recent studies have found similar results. Gordon et al. (2013) studied explicit pronunciation instruction with learners of English. Their research included two experimental groups, one of them was trained in segments whereas the other was trained in suprasegmentals. This study also included a control group which was implicitly trained in both segments and suprasegmentals. The results suggest that the group of participants who were explicitly trained in suprasegmentals improved comprehensibility more than the other two groups. Similarly, Gordon and Darcy (2016) studied explicit suprasegmental and segmental training in L2 learners. The results showed that these learners' comprehensibility improved significantly when they were trained with suprasegmentals in comparison with segmental training. Levis and Muller Levis (2018) also studied the effects of suprasegmental training on international learners of English. Results showed that the participants improved significantly in comprehensibility but not in fluency in this experiment.

There are also other studies which show that suprasegmentals have a bigger impact on comprehensibility or intelligibility than segmentals. Anderson-Hsieh et al. (1992) investigated the judgments of NSs of English who rate oral speech in tests. The results of the analysis of speech samples and ratings showed that although all of the aspects of speech had an effect on comprehensibility, suprasegmentals have a stronger effect. Hahn (2004) analyzed the memory and comprehensibility rate in American listeners who were exposed to L2 speech of international teaching assistants. Results showed that listeners retain more information and better comprehend speech samples when stress and intonation are correctly produced. Isaacs and Trofimovich (2012) found similar results when analyzing speech samples of 60 French learners of English. Along

suprasegmentals, grammar and discourse also were factors that had an impact on listeners' comprehensibility of non-native speech. Accentedness has also been related to suprasegmentals. Munro and Derwing (1999) studied native speakers' perception of L2 speech. Linguists analyzed the errors in these speech samples and found that foreign accent is influenced by suprasegmental mispronunciations. Kang, Rubin and Pickering (2010) also studied accentedness of L2 speech, but they used computer analysis instead of raters. They found that suprasegmentals determined more than 50% of accented speech than segments. According to the authors, these results can be considered more accurate, as they lack human rating judgements.

Learners who have poor suprasegmental skills, who are not intelligible nor comprehensible, may face different problems. NSs of English are not used to listening to speech rhythm that is different to theirs, and they may react negatively towards NNSs because of impatience, not having experience with L2 learners, or prejudice (Munro et al., 2006). Wei and Zhou (2002) reported that learners whose prosodic pronunciation is too dissimilar to a native pronunciation may be considered to belong to a "lower class". NSs may downgrade NNSs' personality only based on their poor suprasegmental skills, which sometimes is an unconscious process (Hanh, 2004). Other authors have stated that speech which is poor in intelligibility and comprehensibility leads to problems in conveying pragmatic meaning accurately (Busà, 2008), the message being misinterpreted (Mennen, 2007), and not fully achieving the speakers' communication goals (Ward & Gallardo, 2017). Furthermore, Monroy (2003) points out that NSs of English have certain allowance of mispronunciation related to segments, but they do not allow suprasegmental mistakes and errors in the same way, probably because they do not know that it is possible to make mistakes in suprasegmentals (Wells, 2006). Considering that suprasegmentals play a crucial role in communication, learners need to understand the prosodic features of the foreign language, and they also need to be given oral tools to avert miscommunication

(Valenzuela, 2013); moreover, emphasizing suprasegmentals in pronunciation instruction would allow less frustration in learners, as they can determine their own learning progress (Childs, 2012).

In spite of all the evidence provided by research on the contribution of suprasegmental features, they are not given the expected importance in classroom practice. It has been suggested that suprasegmentals do not play a relevant role in lessons mainly because language teachers do not feel confident about their pronunciation proficiency (Puga et al., 2017), even considering that suprasegmentals have an impact on how segmentals are produced (Gilbert, 2008; Kainada & Lengeris, 2011). Chela-Flores (2003) claimed that the lack of relevance of suprasegmentals in English language teaching is due to a general difficulty to teach them. In the Chilean context, non-native teachers of English may be less confident about their correct pronunciation of suprasegmentals (Puga et al., 2017). In the Chilean national curriculum for English as L2, the development of proper English pronunciation is promoted mainly at the segmental level and some suprasegmental aspects, such as intonation and stress, are sometimes mentioned; however, clear guidance of how to promote suprasegmentals is not clearly presented (Ministerio de Educación, 2015a; 2015b; 2016a; 2016b). In summary, suprasegmental features of English as an L2 have gained importance in the last years. However, independent of the impact that it has on intelligibility and comprehensibility of speech, teachers seem to feel unsure of their own pronunciation skills. As a result, the learning of suprasegmentals is not promoted in the classroom.

1.3 Intonation

Suprasegmental features of speech have taken a more prominent role in the teaching and research of second language acquisition since the last decades

as there have been different aspects of suprasegmental pronunciation which have been studied in recent years, being intonation one which has been one of the most studied suprasegmental features. Depending on the author or researcher, intonation has been defined differently. For Roach (2009), there is no satisfactory definition of intonation, as this is a concept that is too complex to be completely defined. In his explanation, the author includes the concept of pitch, and makes a precision about it. Pitch refers to the auditory sensation perceived by the hearer, and not to the movement of the vocal folds, as this vibration is defined as fundamental frequency (F0). Besides, the author also states that pitch differences must be perceptible, as there may be differences in the frequency which can be measured, but not perceived by the listener. Nevertheless, if the difference is understood, the term of pitch can be employed for both the perception of the vibration and the measurable frequency.

Celce-Murcia et al. (1996) also relate the concept of intonation with pitch, which is the relative high or low movement of the voice. Another similar conceptualization of intonation is proposed by Wei and Zhou (2002), who define it as the variation of voice pitch in falls and rises. Other authors provide a simple definition for intonation, stating that intonation is the melody of the language (Avery & Ehrlich, 1992; Gilbert, 2008; Levis, 1999; Nikolić, 2018; Wennerstrom, 2001; Wells, 2006).

Some other authors, like Cantero (2002), Gut et al. (2007), and Levis (1999), have elaborated on the definition of intonation stating that this concept also cover terms such as tempo, voice quality and loudness, tone, stress, intensity and duration of the F0. Vaissière (2008) also considers the variation of F0 to convey information at different levels of speech, such as words, phrases, utterances, paragraphs, and discourses, in which intonation plays a different role in each of them. Other researchers have expanded the definition of intonation to the pragmatic area, namely, Valenzuela (2013) claims that intonation is strongly

linked to emotions and acts of speech. As a result, intonation can be defined depending on the interests of the authors, and also taking into consideration the different functions that intonation may have.

In terms of function, conveying meaning has been regarded as the main role of intonation. As a result, intonation has received great relevance in the study of all languages in the world (Avery & Ehrlich, 1992; Cardinali & Barbeito, 2018; Cruz-Ferreira, 2002). Gilbert (2008) refers to intonation as melody, and states that the main function of melody, along with rhythm, is to work as "road signs" to help the listener understand the speaker's ideas and intentions. The author claims that the functions can be summarized into one main idea: intonation provides cohesion and contrasts to the meaning of the speaker, and this is how through intonation the speaker says how the ideas connect and relate.

Nafà (2005) provides an ample account of the functions of intonation, categorizing these into six main groups. The first function is the syntactic (Nafà, 2005), grammatical (Cardinali & Barbeito, 2018; Nikolić, 2018) or structural (Eghlidi, 2016) function, which refers to the pitch movements and contrasts that occur in certain utterances. This happens when specific grammatical forms are produced, which was described by Halliday (1967), who related the phenomenon of intonation to the grammatical aspects, such as tense, number, or mood. Avery and Ehrlich (1992) and Wells (2006) describe the intonational pattern of declarative and wh-questions in terms of grammar as a fall, while polar questions are usually pronounced with a final rise. Roach (2009) and Wells (2006) describe another grammatical use of intonation which makes relation to the disambiguation of sentences. There are written sentences which can be ambiguous to the reader; one example of these sentences is given by Roach (2009, 195): "*Those who sold quickly made a profit".* The meanings of "*a profit was made by those who sold quickly"* and "*A profit was quickly made by those who sold"* are possible depending on the intonational pattern that is used to produce this utterance.

The second function (Nafà, 2005) is the informational function of intonation, which refers to the subdivision of intonation in tonality, tone, and tonicity (Halliday, 1967; Wells, 2006). Through this function some parts of the utterances are brought into focus, which is done by the work that tonality, tonicity, and tone convey together. Roach (2009) defines tonality an accentual function of intonation which seems quite similar to the informational function presented by Nafà (2005). For Roach (2009), the placement of the tonic syllable in the utterance is of great importance, as this has a major linguistic function. Wells (2006) describes a similar function with the name of focusing function. The concepts of tone and tonicity will be defined and described in section 1.4.

The third function (Nafà, 2005) refers to how intonation plays a role in the textual organization of speech or the discourse function of intonation, in which intonation shapes the oral discourse (Cardinali & Barbeito, 2018; Eghlidi, 2016). Nafà (2005) claims that intonation is similar to the writing system of punctuation and paragraph organization, but tone groups, pitch sequences, pause duration, and onset syllable cover this function in oral production. This function is similar to the discourse function described by Wells (2006, p.11).

The fourth function (Nafà, 2005) of intonation refers to the communicative function in which the use of different intonational contours is related to some specific functions of speech, such as asking for information, persuading, commanding, etc. (Nafà, 2005). Roach (2009) describes two other situations in which intonation is relevant in what he describes as the discursive function of intonation: i) when marking contrast or information that is more relevant or new; and ii) marking turns of speaking in a conversation, and the role that each speaker takes and how this affects their intonation.

The fifth function refers to the attitudinal function of intonation (Cardinali & Barbeito, 2018; Eghlidi, 2016; Monroy, 2003; Wells, 2006), which enables

speakers to express their attitudes or emotions through intonation. Roach (2009) establishes that emotions can be expressed either voluntarily or involuntarily, and also that an attitude could be towards a listener and not towards what is being said. These aspects make this function of intonation difficult to describe and teach to or learn by foreign learners. Tone is in charge of expressing attitude and emotions when speaking (Wells, 2006); however, intonation by itself is not enough, as other aspects such as gestures, word selection, and voice quality play an important role as well (Brown et al., 1980).

Finally, Nafà (2005) proposes that intonation has a stylistic function, which allows the recognition of different communicative events, such as the mass at church, a political debate, a sport game, a lesson, among other types of communicative events.

To these functions of intonation described by Nafà (2005), there are two other which are described by Wells (2006). The first of them is the psychological function of intonation, which is in charge of making parts of speech easy to be perceived and memorized. This function considers the capacity of our working memory to process information in chunks. One example of this is when we memorize and say telephone numbers in which we tend to group them in different intonational phrases. The other function described by Wells (2006) is the indexical function of intonation, which is similar to the stylistic function described by Nafà (2005), but this one relates more to social or personal identities marked by a determined intonational contour or pattern used by speakers. For example, mothers and newsreaders can be identified as such using the intonational patters that characterizes them.

Intonation, as it is a suprasegmental feature of speech, also plays a crucial role in intelligibility and comprehensibility (Fakuade, 1991). Graham (1978) and Nikolic (2018) forewarns that incorrect intonation may impede effective

communication, and that L1 intonational knowledge may interfere with the interpretation of utterances in English. Patterns of intonation that are used in the L1 will be transferred to the L2; this process is called negative transfer or interference, and it has been largely reported in different studies (Cruz-Ferreira, 2002; Fakuade, 1991; Grabe et al., 2003; Jun & Oh, 2000; Kainada & Lengeris, 2011; Ortega-Llebaira & Colantoni, 2014; Wells, 2006). These problems usually occur with languages which are dissimilar, and they may happen in terms of tone movement, and choice of focus; however, it has not been largely analyzed whether these problems occur in terms of the division of the stream of speech (Wells, 2006). Taking into consideration the attitudinal function of intonation, there is a risk of misunderstanding if the learner of English uses an intonational pattern which is too different from the expected by the native speaker or another non-native speaker of English (Avery & Ehrlich, 1992). NSs of English expect that the attitude which the speaker reflects through their intonation is the one intended to be used, regardless of the particular meaning of the utterance itself (Wells, 2006). On the other hand, similar assumptions may occur and NNSs of English may not fully understand what is being said due to differences in the L1 intonational patterns stored in their brains (Wells, 2006). Gilbert (2008) claims that communication breakdowns occur when the speakers are thinking about avoiding grammar or vocabulary mistakes, so they become unaware of employing correct intonation when speaking; this is common for both NSs and NNSs of English. From the listener's perspective, Gilbert (2008) points out that NNSs usually do not recognize the intonational cues that may help them to fully understand a message when communicating, and that if the burden between the listener's and the speaker's intonational systems stored in their minds is too great, they will just stop listening.

Breakdowns in communication can occur because of the misuse of different aspects of intonation. Nafà (2005) claims that, based on the ideas of Shlesinger (1994), a defective segmentation of speech may transmit uncertainty,

due to the use of non-functional pauses; a defective selection of prominence may cause failure in message conveying, causing misinterpretations; and that a non-natural choice of tone may block the comprehension of the listener. Among these problems, it is possible to find issues related to an inappropriate lexical and utterance stress, which have been reported to hamper communication (Childs, 2012; Horgues, 2013). Anderson-Hsieh (1990) reported that NNSs of English usually have intonation and suprasegmental problems which cause them to fail proficiency tests required to work in an English-speaking country. Another similar situation is described by Gumperz (1982) in which NNSs of English have problems working as waiters as they use a different intonational pattern to ask questions, which annoys their listeners. However, for authors like Graham (1978) what is more serious is that sometimes the learner may be unaware that the L1 and L2 intonational systems are different, making these errors happen unconsciously. The necessity of making learners aware of the importance of intonation when learning an L2 seems to be mandatory (Valenzuela, 2013), nevertheless, the role of intonation in the classroom seems to be not as relevant as it is expected.

Teachers consider that intonation is too difficult to teach because of its complexity and variability of functions (Puga et al., 2017; Thompson, 1995; Wei & Zhou, 2002). The average teacher seems to be uncomfortable with intonation, as it is difficult to describe, isolate and study (Thompson, 1995) and they do not feel completely prepared to incorporate it to the their lessons (Derwing, 2009). When teachers have to cover some aspects of English intonation in the classroom, they tend to consider it unimportant, thus devoting little or no time to this task, besides, learners may feel uneasy when producing intonational patterns which are too different to those of their L1 (Gilbert, 2008). Other educators expect that their student pick intonation up unconsciously, but many will not be able to do it (Wells, 2006). The implementation of intonation instruction in the classroom will not only enhance the intelligibility and comprehensibility in learners' speech, but it will also

improve their perspective towards English learning, as they will feel more confident at speaking, and their general pronunciation will improve (Gilbert, 2008).

1.4 English intonation

English has been considered a stress-timed language, in which there is a tendency for accented syllables to occur on regular intervals of time which mark the rhythm of English (Avery & Ehrlich, 1992; Halliday, 1967). This implies that intonation does not work similarly to other languages which are not within this category of stress-timed languages. Other languages, such as Spanish and Portuguese, are considered to be produced with a similar time in every syllable (syllable-timed languages). This notion of languages occurring at similar intervals of time, whether referring to stress-timed or syllable-timed languages, has been questioned since there is no satisfactory evidence that supports this notion, and it seems that languages have the tendency to be more or less syllable-timed or stress-timed (Harris, 2015; Scott et al., 1985).

English intonation has been described by different theoretical models. One of them is the one described by Halliday (1967), and although this model is strongly rooted in the systemic functional grammar, it has an impact on discourse analyses (Nafà, 2005). Two main conceptualizations are relevant for Halliday (1967): 1) intonation is highly influenced by the grammatical forms of the utterances, and 2) the function of intonation in English is clearly not lexical. Halliday (1967) also claims that intonation is based on three "decisions" that a speaker must make at the moment of articulating an utterance. These decisions affect the intonation of the utterance as a whole, and they are the main components of the three sub-systems of English intonation, which are strongly linked: tonality, tonicity, and tone.

The first decision to make in an utterance proposed by Halliday (1967) is called tonality. The stream of speech is divided into smaller parts which are called intonational phrases (IP) (Wells, 2006), tone group (Cruz-Ferreira, 2002; Halliday, 1967) or tone units (Brazil, 1994; Nikolic, 2018; Roach, 2009). It has been claimed that the IP's boundaries are the same of a clause, as this is the default mark of tonality in an utterance (Halliday, 1967). However, Wells (2006) describes that an IP may encompass more than a clause, or there are other cases in which more than one IP is found in a single clause (Halliday, 1967). It is possible to find IPs' boundaries after a phrase, a word or even in the middle of a word; these are illustrated in the following examples taken from Wells (2006, p.187), in which i) represents default tonality, ii) division after single words, and iii) divisions within a word:

    i)   *Milk comes from cows, | and wool comes from sheep.*
    ii)   *Delicious | cool | milk.*
    iii)   *Bor|ing!*

It is important to mention that the division of the stream of speech in IPs depends on the speakers and their intentions (Wells, 2006), and that this division happens mostly unconsciously (Tuan, 2012).

This processes, which is known as *chunking,* is quite commonly transferred from an L1 to an L2, and it may cause almost no problems to EFL learners. Wells (2006) claims that tonality helps to disambiguate utterances which have two or more possible meanings. The following are examples taken from the same work (p.188):

    i)   *I was talking to a chap I met in the pub.*
    ii)   *I was talking to a chap I met | in the pub.*

In i) the clause coincides with one IP, and the meaning of this utterance is that the chap was met in the pub. On the other hand, ii) is divided into two IPs whose meaning implies that the chap was not met in the pub, but somewhere else, and that the action of talking happened in the pub.

Brazil (1994) describes other functions of tone units as structures that help manage the interpretation of the utterance as it is divided into smaller parts, and grouping the message in parts which are easier to be understood by the hearer. The characteristics of the IP, according to Celce-Murcia et al. (1996), are the following: 1) the boundaries are marked by pauses, which can cause a change of meaning depending on where they are placed (Tuan, 2012); 2) each IP contains an element which is prominent in comparison to the others; 3) it has its own intonation contour; and 4) it has a grammatical inner structure which is coherent. The length of an IP depends completely on the intentions of the speaker (Tuan, 2012), but is has been reported that each IP may last between 1 and 2 seconds (Tench, 1996). If one speaker desires to be taken as more close to their audience, it is probable that they will divide their speech into more IPs (Celce-Murcia et al., 1996). Using a lot of smaller IPs may carry extra intonational meaning to a short utterance, as when a presenter wants to thank the performance of a choral group in the following manner (Wells, 2006, p. 192):

Have you | ever heard | such | a marvelous | anthem?

For the author, a division of the speech stream in many IPs may seem strange and unconventional during casual conversation, and they may cause the feeling of being out of place. Although IPs tend to be longer in written materials than in conversations, in spontaneous private speech they may be short, but they include few accented syllables (Wells, 2006). The concept of accent in the IPs is a relevant one, and it is part of the second decision and sub-system of intonation.

Roach (2009) describes the components of the IP or tone unit, and claims that the most salient part of it is the tonic syllable, which carries the tonic stress or prominence of the IP and it is perceived as louder and longer (Tuan, 2012) making it a more noticeable syllable than others (Brazil, 1994). This selected syllable is the one that is most particularly important for the meaning of the IP and bears the nucleus or nuclear accent (Wells, 2006). This distinction of prominence is known as tonicity (Avery & Ehrlich, 1992; Halliday, 1967; Nafà, 2005, Wells, 2006). Wells (2006) explains that the accent is marked in the stressed syllable of the word that is more important, and that this word generally is a content word, such as nouns, most verbs, adjectives, and most adverbs. However, the neutral or default mark of prominence or focus in English always occurs in the last content or lexical word of the IP (Avery & Ehrlich, 1992; Cruz-Ferreira, 2002; Fakuade, 1991; Halliday, 1967; Nafà, 2005; Wells, 2006) which is marked by a change or a movement of pitch (Tuan, 2012; Wells, 2006). Nevertheless, content words do not always take the position of the last word of the IPs, and in those cases the prominence is taken by the content word that is immediately before it (Wells, 2006). Similarly, if the last word in an IP is an adverb of time, the content word that is before it will take the prominence (Chela-Flores, 2003; Wells, 2006). Some examples are presented in Wells (2006:95, 97), in which all of them mark tonicity in the last content word, whether it is the last word of the utterance or not:

i)   I ˈwant to buy a ˈ<u>le</u>mon.
ii)   The ˈbridge is about to colˈ<u>lapse</u>.
iii)   I ˈcan't ˈ<u>hear</u> you.
iv)   ˈAsk her what that ˈ<u>noise</u> is.

In terms of annotation system, accented syllables (syllables that belong to a content word) are marked with a ˈ before them, but only the nucleus, the syllable that carries the prominence (Roach 2009; Wells, 2006) is underlined. In different

words, an IP may have more than one accented syllable, and if that happens, the last of them is the one to carry the prominence.

Regarding to compound nouns, it is important to consider that most of them are single-stressed in English (Wells, 2006). That is to say, that the main stress usually goes on the first element of the compound noun, as in the following examples (p.101):

i)   ˈDon't look at the ˈ<u>key</u>board!
ii)   I've ˈlost my ˈ<u>cred</u>it cards.

Marked sentences (not default) usually place prominence in a different syllable, based on what the speaker wants to highlight as more important (Avery & Ehrlich, 1992), this is known as emphatic stress (Celce-Murcia et al., 1996; Tuan, 2012). Besides, marked prominence also occurs in other two situations: 1) when the marked element is in contrast, and 2) when the element has not already been given and it provides new information (Halliday, 1967). Wells (2006, p.109, 119) provides the following examples, in which i) shows the contrast between the verbs start and finish; and ii) shows how new information is presented after a question:

i)   You ˈmay have <u>start</u>ed your essay, | but ˈhave you <u>fini</u>shed it?
ii)   "Who doesn't want to dance?"   "ˈ<u>Bill</u> doesn't want to dance".

Stress marking new information may be difficult for learners of English, as this is not always completely clear in statements (Tuan, 2012). Besides, contrast accent can be placed in any syllable of any word, regardless of whether this is a content word or not. This distinction is made as contrastive stress occurs when the information usually contrasts with other that may or may not be present in the stimulus utterance (Tuan, 2012). Contrast marked on function words can be

appreciated in the example below taken from Wells (2006, p.121), in which there is contrast of two people in the reply.

What did you think of the Smiths? I aˈdored <u>her</u>, | but I ˈcouldn't stand <u>him</u>.

A third marked situation of tonicity occurs in Wh-questions in English, as the prominence can be placed in their regular position at the near end of the IP (neutral or default tonicity) or it can be placed in the Wh-word itself (Halliday, 1967). The latter happens when the information may be forgotten or the speaker did not clearly hear the information. The examples in Halliday (1967, p. 24):

ˈ<u>What</u>'s it ˈcalled?

The example shows the use of marked tonicity as the speaker forgot the name of "it". Besides, in this example, there is another sub-system which is not acting in its default form, which is tone.

Tone is defined as the rising or falling movement that the pitch makes at the end of the IP in the prominent syllable (Wells, 2006). Considering this definition, some authors propose different categories for the types of tones. Wells (2006) claims that English has only two categories for tones: falls and non-falling tones. Wei & Zhou (2002) claim that English has the same categorization and that if the pitch of the voice decreases it will produce a falling tone; while if the pitch of the voice rises or falls and then rises again, it will produce a non-falling tone. Roach (2009), in comparison, proposes that English has two classifications for tones: simple and complex. Among simple tones, it is possible to find moving tones, which includes falling and rising tones, and level tones; and among the complex tones, it is possible to find fall-rise, and rise-falls. In early studies of intonation, Esser (1978) describes that English only has falling and rising tones, similarly to what Cruz-Ferreira (2002) describes.

There is a general consensus that statements are usually produced with a final falling tone, while questions are produced with a rise (Wells, 2006; Nafà, 2005). This is partially true in English, as statement can sometimes be produced with a final rise or a fall-rise tone, and some questions are produced with a fall in some cases. By default, a falling tone, when the voice starts relatively high and then it moves downwards, is employed in the following cases: i) statements, ii) when there is nothing else to say, iii) exclamations, iv) Wh-questions, v) commands, and vi) insistent polar questions (Avery & Ehrlich, 1992; Valenzuela, 2013; Wells, 2006). Some examples from Wells (2006, p.25, 46, 60):

i)   ˈThis is a \pen.
ii)   We're \ready.
iii)   What a ˈgood i\dea!
iv)   ˈHow did it get \broken?
v)   ˈTell me the \truth.
vi)   A: ˈHave you come /far?
        B: /Sorry?
        A: I ˇsaid, | ˈhave you come \far?

On the other hand, the default use of rising tones, when the pitch of the voice starts relatively down and then moves upwards, is used in the following cases: i) encouraging statements, ii) uptalk, iii) polar questions, iv) declarative questions, and v) independent elliptical questions (Avery & Ehrlich, 1992; Graham, 1978; MacDonald, 2011; Nafà, 2005; Valenzuela, 2013; Wells, 2006). Some examples can be found in Wells (2006: p. 25, 36, 37, 52):

i)   A: ˈHave a cup of \tea.
        B: That's ˈvery /kind of you.
ii)   \Sorry. | I ˈjust wanted to use the /phone.
iii)   ˈAre you /ready?

iv) You'll be ˈcoming to /<u>dinner</u>?

v) A: I'm ˈthinking of taking a \<u>break</u>.

B: /<u>Are</u> you?

English Wh-questions have already being stated to have a final falling tone in unmarked utterances –utterances with a default intonation pattern (Avery & Ehrlich, 1992; Cruz-Ferreira, 2002; MacDonald, 2011; Wells, 2006), as they are lexically marked with a question word at the beginning (Chen & Mennen, 2008). Wells (2006) describes that Wh-questions may finish in a rise when gentleness, kindness or encouragement is implied.

English intonation plays an important role for communicating, as its three main sub-systems have different functions and they work integrated with each other. Intonation may cause communication breakdowns if patterns from the L1 are used (Graham, 1978; Gilbert, 2008). In the context of non-native speakers, it is also important to understand the L1 intonation system to be able to predict and understand possible conflicts between English and the L1 system of the learner.

1.5 Spanish intonation

English and Spanish intonational patterns have similarities and differences. A first similarity is that both languages are labeled as intonational languages, which means that they use intonation to convey pragmatic meaning and the speakers' attitude (Face, 2004; Henriksen, 2009). The typology of languages as tonal and intonational has resulted unsatisfactory, as some languages cannot be classified in any of these two categories; as a result, others typologies have been suggested, such as accented and non-accented languages (Goldsmith, 1981). Regardless of the typology, English and Spanish are usually classified in the same group.

The tone contours that were described for English (falling, rising, fall-rise, rise-fall) also occur in Spanish intonation. However, the fall-rise complex tone does not commonly occur in Spanish, whereas it often happens in English (Navarro Tomás, 1966). Another aspect which is shared by both languages is that the final tone movement used in declarative utterances corresponds to a falling tone, while polar interrogative utterances are produced with a final rise (Graham, 1978).

In terms of interrogativity, Wh-questions in Spanish employ a higher pitch accent placed in the Wh-word, which do not occur in unmarked (default) questions in English (Colantoni et al., 2016; Henriksen, 2009). Another difference between English and Spanish is the placement of prominence. As it has been previously described, English places prominence in the last or near last content word of the IP (Wells, 2006); however, Spanish places prominence in the word further to the right (the last word), independently if this is a content word or not (Chela-Flores, 2003). The examples i) and ii) depict the prominence placement in English and Spanish respectively (Chela-Flores, 2003 p.4):

i)   John asked me to <u>talk</u> to him.
ii)   John me pidió que hablara con <u>él</u>.

In i) it is possible to see that "talk" is the last content word of the IP, so it carries prominence. However, in ii) prominence is placed in the last word of the utterance which in this case is not a content word (*él* is a pronoun in Spanish).

The differences in the prominence placement in both languages are also present in the form in which English and Spanish mark focus. English marks focus phonologically with prominence, that is to say, a higher pitch and tone movement occurs in the accented syllable of that word (Wells, 2006). Whereas, Spanish tends to mark prominence syntactically, by moving the focused word to a different

position of the utterance, or adding an extra phrase, which includes this focus word, to the utterance (Chela-Flores, 2003). Chela-Flores (2003, p.9) exemplifies this difference:

i)	John lent me his <u>bi</u>cycle.	iv)	Juan me prestó su bici<u>cle</u>ta.
ii)	John lent me <u>his</u> bicycle.	v)	Juan me prestó la bicicleta de <u>él</u>.
iii)	John lent <u>me</u> his bicycle.	vi)	A <u>mí</u> me prestó Juan su bicicleta.

The examples i), ii), and iii) seem to be the same utterances, but the real meaning of them is marked with the focus on different syllables. On the other hand, the Spanish equivalents of these utterances are different, as the focus is marked by a new phrase in different parts of the utterances.

The early theory of Spanish intonation presented by Navarro Tomás (1966; 1999) claims that intonation has four main functions: i) intonation has a logical aspect which reflects the speaker's intentions when producing utterances; ii) intonation has an emotional aspect, in which the utterances do not only reflect intentions, but they also reflect emotions and feelings; iii) intonation has a volitional aspect in which the speaker's intentions are reflected in the intonation; and finally, iv) intonation has a dialectal aspect in which the inner phonological characteristics of different nationalities and dialects are expressed through intonation.

Navarro Tomás (1966) worked in the analysis of the intonation of sentences as the biggest structure of language, and most of the examples used in his works were taken from literary works. This is considered by some authors as a limitation of Navarro Tomás' work, as more modern models of intonation work with oral discourse as the main text of analysis (Nafà, 2005). In spite of this, Navarro Tomás (1966) described different processes that occur in Spanish intonation. The author claims that utterances are divided into smaller units called *unidades melódicas* (melodic units), which occur between pauses and whose

number depends on the intention of the speaker (p.41). This process is similar to *tonality* described by Wells (2006).

Navarro Tomás (1966) also described the final tone movement at the end of utterances, which is called *tonema* (toneme). Four possible tonemes at the end of utterances are suggested: *cadencia* (falling tone to a very low tone), *semicadencia* (falling tone to a lower tone), *anticadencia* (rising tone to a very high tone), and *semianticadencia* (rising tone to a higher tone). Navarro Tomás proposes the existence of a level tone, *tono de suspensión*, which depends completely on the speaker's pitch range (p.69). The author also states that the *anticadencia* toneme has five semitones of difference with the level tone of the speaker (Navarro Tomás, 1966).

One important aspect for this research is to consider what the default tonemes for Spanish are. Navarro Tomás (1966) claimed that the default toneme for Spanish in declarative utterances is the *cadencia* toneme, that is to say, a final falling tone, and some interrogative utterances may generally finish with a final rise (*anticadencia*). There are also other possible configurations of final tone movement for Wh-questions which depend on the type of question or the intentions of the speaker. Three main configurations for this type of question are described: i) falling tones for default Wh-questions, ii) rising tone for softened or polite Wh-questions, and iii) circumflex tone (rise-fall tone) for questions with amazement or surprise implication (Henriksen, 2009; Navarro Tomás, 1966; 1999; Sosa, 2003, Velásquez-Upegui, 2014). Furthermore, Navarro Tomás (1999) described that Wh-questions mark a higher pitch in the Wh-word, which is the focus and prominence of the questions, and then the intonation will gradually fall until it reaches a final sudden fall in the last word. Polar questions (*preguntas absolutas* in Spanish) have a similar configuration as in English: they finish with a final rise (*anticadencia*) (Navarro Tomás, 1966; 1999).

Quilis (1980) compared English and Spanish intonation in terms of their functions and uses, and three perspectives to analyze and understand Spanish intonation were described. The author claims that, due to the multiple and interweaving functions of intonation, it should be studied from: i) a linguistic level, ii) a sociolinguistic level, and iii) an expressive level. At the linguistic level, intonation has a certain relation with grammar (Halliday, 1967; Roach, 2009; Wells, 2006), but there are still some grammatical structures and forms which do not have a defined intonational pattern (Quilis, 1980). In terms of interrogativity, intonation in Spanish works as an indicator of this function of speech, only when there are no other elements that indicate interrogativity in the utterance (Quilis, 1980; 1993). That is to say, in Wh-questions the default intonation should be a fall, as there is a pronoun at the beginning which indicates that the utterance is a question. This does not occur in polar questions in Spanish, as in some cases only intonation makes them different. Quilis (1993) agrees with the three main tones described by Navarro Tomás (1966) for Wh-questions, and two more tones are added, the emphatic Wh-question and the reiterative Wh-question. However, the author differs from Navarro Tomás' description of the falling movement of tone. For Quilis, the falling movement in Wh-questions occurs in the pronominal word (Wh-word) and it extends to the end, while Navarro Tomás describes the tonal movement in the last word of the utterance.

Sosa (2003) suggests a possible sixth configuration of Wh-questions, considering the dialectal variations of Spanish. In this configuration, the Wh-question does not have an initial peak in the Wh-word, but the pitch movement starts relatively low and then it gradually increases. This is different from the softened polite question described by Navarro Tomás (1966) and Quilis (1993) in which there is a pitch peak in the Wh-word at the beginning of the questions, then the pitch gradually falls and finishes with a rise in the last word. Sosa (2003) analyzed the production of Wh-questions in read and spontaneous speech with NSs of Spanish from Mexico, Venezuela, Colombia, and Puerto Rico. The results

from the read speech test showed that the Mexican and Colombian participants produced between 66% and 88% of the Wh-questions with a final rise. This did not happen with the Puerto Rican and Venezuelan speakers as they produced between 88% and 94% of the Wh-questions with a fall. Although the spontaneous speech test also showed that the participants tended to use both rising and falling tones at the end of the Wh-questions, the author concluded that generally, the default configuration for Wh-questions in these four dialects of Spanish was final falling tone.

Although there is evidence that suggests that the final tone in Wh-question in Spanish is a fall, this intonational pattern has been questioned in the last decades. Valenzuela (2013) studied and compared the production of Wh-questions in English and Spanish with Venezuelan speakers. The participants were asked to produce questions in a semi-spontaneous task. They produced Wh-questions in English ending in a final fall, while the Spanish equivalents of those questions were produced with a final rise by the same speakers. Willis (2007) studied the production of declarative and interrogative utterances in NSs of Spanish from the Dominican Republic. The participants read a text to contextualize the task and then they were asked to produce polar questions, Wh-questions and declarative utterances about the text. These participants produced Wh-questions mostly with a final rise. Henriksen (2009) studied the production of utterances with speakers of Castilian Spanish in three different elicitation tasks, which included a linguistic questionnaire, a task-oriented dialog, and a computerized reading task. 70% of the Wh-questions were produced with a final rise in the reading task. Wh-questions produced with a final rise in the task-oriented dialog were the majority, but they only reached 57% of the occurrences. The default final falling tone described by authors such as Navarro Tomás (1966; 1999), Quilis, (1980; 1993), and Sosa (2003) was only produced in the 13% (24 utterances) of the Wh-questions in this study, and only one informant produced 17 of them. Henriksen (2009) concludes that the task type used to elicit the data

from the speakers has a certain influence in the final production of Wh-questions which is important to be considered in future studies. O'Rourke (2010) studied the production of statements, polar questions, and Wh-questions with NSs of Spanish from Ecuador. The author concludes that the configuration of the final tone used by these speakers was a rise, which is different from the results of other varieties of Spanish. However, the author notes that courtesy might play some role in the production of these Wh-questions. Mexican speakers were studied by De la Mota et al. (2010) who found that Wh-questions are produced with a final fall-rise contour. However, this tone is slightly risen, in comparison to the clear rise produced by these speakers in polar questions. Velásquez-Upegui (2014) studied the production of different types of utterances in Colombian Spanish. The author found that the different dialects within the country use different configurations for questions: speakers from Bogotá and Cartagena use a final rising contour to produce Wh-questions as the default configuration.

Concerning the intonation of the Chilean Spanish dialect, in a study of the production of three Chilean speakers of Spanish from the south of the country (Urrutia, 1988), the results showed that all Wh-questions produced by these speakers ended with a final rise. Similar results were reported by Cepeda and Roldán (1995) in a study of the production of interrogative utterances in female speakers from Valdivia. These results showed that 85% of the Wh-questions were produced with a final rise. More recently, Ortiz et al. (2010) studied the production of men and women from Santiago producing spontaneous speech. The configuration used in Wh-questions was a final rise as default. These speakers produced Wh-questions with a final fall in the marked situations in which a more urgent reply was requested. These findings contrast with what was described by Navarro Tomás (1966; 1999), Quilis (1980; 1993), and Sosa (2003), but they agree with previous research with Chilean variation of Spanish (Cepeda & Roldán, 1995; Urrutia, 1988).

1.6 Perception and production link

Studies in L2 speech have taken two major paths. One of them deals with the study of segments in the perception of speech. The other focuses mainly on the production of speech, or a combination of both. Although, it is discussed whether perception or production training enhances learners' skills, evidence support that having a perception centered approach may be more effective to improve L2 speech (Lee, Plonsky & Saito, 2020).

Perception and production of speech had been largely studied separately, giving no account of a relation between them (Casserly & Pisoni, 2010) until the Second Wave of the teaching of pronunciation introduced the importance of listening and perceptual skills (Baker, 2018). This latter view suggested a possible link between the ability to produce and perceive oral speech. There are two speech models that have influenced speech perception and production theories in their relation to learning an L2: the Speech Learning Model (SLM) (Flege, 1995), and Perceptual Assimilation Model (PAM) (Best, 1995; Best & Tyler, 2007). SLM describes the perception and production of an L2 by experienced listeners. This model suggested the existence of a direct link between perception and production skills. SML suggests that learners will perceive L2 categories that are similar to L1 categories, and if these do not exist, they will be created. Flege (1995) also indicates that experience or knowledge of the language is relevant when perceiving L2 speech. On the other hand, PAM firstly described the perception abilities of naïve monolingual listeners (Best, 1995), and in its revision it described the perception abilities of L2 learners (Best & Tyler, 2007). This model suggests that the perception of non-native categories will be assimilated into L1 categories (Best, 1995; Best & Tyler, 2007; Boomershine, 2013). This model deals only with perception. Establishing a link between perception and production

has been a complex task as the link has being questioned (Bradlow et al. 1999; Flege & Wayland, 2019; Hattori & Iverson, 2010), but there is some insight into it. Evidence from speech perception training studies in L2 shows that when speech perception is improved via training, there is an impact on speech production, and both of them are enhanced (Akahane-Yamada et al., 1996; Bradlow et al., 1997; Flege et al., 1997).

An L2 Intonation Learning theory (LILt) has been proposed, which reflects the main characteristics of the SLM and PAM. LILt proposes that L1 interferes in L2 production of intonation in four different dimensions: i) the systemic dimension that deals with the distribution of phonological elements; ii) the realization dimension that deals with the implementation of the phonological elements; iii) the semantic dimension which reflects the function of dimension; and iv) the frequency dimension that deals with how often these phonological elements are used (Mennen, 2015). In comparison to PAM and SLM, LILt covers two more aspects, the dimensions iii) and iv), which have not being fully explored by the other models.

Yamada et al. (1994) studied the perception and production skills of Japanese learners of English. Results suggest that there is a relation between the ability to perceive English /r/ and /l/, and the intelligibility of the speech produced by these participants. Akahane-Yamada et al. (1996) also studied the perception and production abilities of Japanese learners of English. The authors used a pre-test and training sessions in perception. The participants improved both their perception and production abilities after training, and this improvement was maintained over six months. Similarly, Bradlow et al. (1997) studied the production and perception skills of Japanese learners of English. The overall results showed improvement in both their perceptual and productive skills after perceptual training. This suggested the existence of a link between perception

and production. Flege et al. (1997) studied the perception and production abilities of experienced and inexperienced learners of English. The participants in this study were German, Spanish, Mandarin, and Korean. They were recorded when producing the English vowels /i, ɪ, ɛ, æ/, and these recordings were lately rated by native speakers of English. The participants identified these phonemes in synthetic continua. Results showed three main findings: i) experienced NNSs of English scored higher than the inexperienced NNSs of English in both perception and production tasks; ii) there is a relation between the scores of the accuracy to produce and perceive the assessed English sounds; and iii) L1 background influences the perception and production relation, suggesting the existence of cross-linguistic interference.

The results and conclusions of these studies suggested the existence of a relationship between perception and production abilities in the L2 context; however, other studies suggest that these abilities seem to be uncorrelated. Although Bardlow et al. (1997) found an overall improvement in both abilities, individual variations showed that some participants improved on production, without improving their perceptual abilities. In more recent studies, individual differences were studied by Hattori and Iverson (2010), who assessed NS of Japanese in their English production of /l/ and /r/. The subjects participated in identification, discrimination, best exemplars, and production tasks. The results of these tasks showed a moderate link between identification and production tasks, but the other two perceptual tasks showed to be poorly correlated to the results of the production tasks, which suggests that the link between perception and production may not be direct. Herd et al. (2013) studied the perception and production of Spanish /d, ɾ, r/ with NSs of English. The participants received three training modalities: training only in perception, training only in production, and a combination of both. The perception and the production training modalities showed similar results in which the participants improved their perception and production, the former improved more than the latter. However, those who

participated in the perception-production modality made gains in production and made no significant improvement in perception.

So far, studies regarding the perception and production of segmental features of speech have been mentioned. It is important to know about the results of studies which have dealt with perception and production studies of suprasegmental features of speech, which are going to be described in the following section.

1.7 Research on perception and production of suprasegmentals

Currently, the number of studies regarding intonation is constantly increasing. The studies in intonation have dealt with different features such as tone selection, and prominence placement. Some of these studies have also compared the perception and production of intonation by NSs and NNSs of English.

There have been studies dealing with the perception of intonation with monolingual speakers. Evidence from these studies suggests the existence of a universal perceptual mechanism of language. Grabe et al. (2003) studied the perception of English intonation in three groups of monolingual participants. Taking into consideration the assumption that native language affects the perception of suprasegmental features of speech, the researchers tested the perception of English suprasegmentals with participants from English, Cantonese, and Spanish backgrounds. The informants were able to discriminate between falling and rising tones in two tasks, one using natural speech and the other using synthetic modulated tones. The results showed that cross-linguistic interference was present only in the first task, and not in the other, suggesting that the universal perceptual mechanism of language can process this intonation. A

similar study was carried out by Gussenhoven and Chen (2000). They tested the perception capacities of monolingual speakers of Hungarian, Standard Chinese (i.e. Mandarin), and Dutch. For these authors, there is a widespread consensus that a rising final tonal contour indicates interrogativity, while a falling contour indicates statements; apart from that, in an interrogative utterance, there are certain features other than tone which may be universal to the languages of the world. Based on these findings, the authors argue that the universal perceptual mechanism of language would identify the interrogativity regardless of the language background of the listener. In their experiment, monolingual listeners with Dutch, Hungarian, and Chinese as L1 listened to made-up stimuli in a language that they did not know (naïve listeners). Even though these three languages express interrogativity differently, the participants were able to identify questions based on higher peaks, later peaks, and higher final pitch. These results suggest that the underlying perceptual mechanism processes these features as part of interrogative utterances regardless of participants' L1. The authors also indicate that L1 background influences in the strategies used by the listeners to perceive another language's intonation. The influence of L1 interference has been largely studied in the area of grammar, vocabulary, etc.; however, not much research has been conducted to explore the impact of L1 interference on the perception and production of L2 prosody (Rasier & Hiligsmann, 2007).

In terms of perception, there have also been studies focused on the abilities of speakers of different L1s to perceive L2 suprasegmentals. Horgues (2013) studies the perception of French-accented utterances by native speakers of English. English and French have different suprasegmental features; for example, accent in French plays a more relevant role in the accentedness of the utterance more than in the word, which contrasts with English stress system in which some words may have different meanings depending on the syllable that is stressed (Horgues, 2013). The author hypothesized that NSs of English would identify English utterances produced by intermediate and advanced learners of French,

based solely on prosodic cues. The results suggest this hypothesis was true, as the listeners' perception of lexical and utterance stress helped them to differentiate between native and non-native stimuli, and L1 background influences in the perception of L2 speech. A similar earlier study was carried out by Lehiste and Fox (1992) who studied the perception of the prominence of utterances with participants from Estonian and English linguistic backgrounds. The focus of this study was to analyze how well these participants could perceive prominence of English utterances. The results indicated that English participants tend to perceive the amplitude of pitch to determine prominence, while Estonian participants focused on duration. These results may suggest that the L1 background plays a role in the perception of foreign prosodic features.

There is another group of studies that have dealt with intonation with a focus on how NNSs of English perceive English prosody. Speakers of German as L1 have been studied by Puga et al. (2017). Advanced learners of English participated in a test to perceive different intonational patterns in different types of utterances. The participants read a text and listened to the same text read by a NS of English. They were asked to mark the intonational patterns that they perceived in different parts of the text. The results indicated that the participants had problems to perceive the intonation in question tags and the expression of sarcasm. The authors attributed this to the fact that there is no question tag equivalent in German and that sarcasm is not expressed syntactically, suggesting that learners pay attention to syntactic forms when perceiving intonation. A recent study conducted by Cardinali and Barbeito (2018) examined the perception and production of English intonation by university pre-service teachers of English with Argentinian Spanish as L1. This study used a pre-test to establish the perception and production ability of the participants, whose results indicated that they had difficulties in both abilities, probably caused by L1 interference. In the pre-test they went through three tasks: i) demographic survey to obtain general information of the participants; ii) a perception test to measure tone, tonality, and tonicity; and

iii) a production test in which they were recorded. Then, the participants took part in training sessions with awareness-raising activities and reading out loud texts in English, while they had specific instruction on segmental and suprasegmental features of English. Finally, the participants went through a post-test whose results indicated that they improved their perception and production abilities, but the last one was only improved in read speech. The results indicate that implementing perceptual and production training helps learners to enhance their suprasegmental skills, similarly to what happens with the segments.

Zhang et al. (2010) studied the perception of English suprasegmental features by 58 Chinese learners of English. The authors recorded an American speaker of English to produce the perceptual material used in their test. English and Chinese are different languages, as English uses intonation to convey mainly pragmatical meaning, and Chinese uses intonation to convey semantic meaning (Zhang et al., 2010). The Chinese participants showed problems to perceive word stress in long words or groups of words, which was attributed to L1 cross-linguistic interference of the tonal system of Chinese. Interestingly, the participants scored highly in perceiving the falling tone of English Wh-questions, and the rising tone of polar questions. These results were explained by the participants' high knowledge of the default intonational configuration for English interrogativity which was reported in a survey. This may suggest that knowledge of the language is a factor that affects how well NNSs perceive English intonation in natural speech utterances.

Research focusing on the production of suprasegmental features of speech have also been constantly increasing in number. Some of these studies have dealt with different types of utterances, including different types of questions as well. English intonation has also been analyzed in different L1 contexts. Busà (2008) studied the production of English intonation in a reading task by eight NS of Italian. English and Italian are languages with differences at the

suprasegmental level, such as the syllable structure, rhythm, no vowel reduction in Italian, and prominence is marked syntactical in Italian (Busà, 2008). The author recorded different types of utterances, such as Wh-questions, polar questions, and salutations, which were later analyzed and annotated using Praat. At first, the participants produced English utterances using Italian intonational configuration, for example, polar questions were produced with a level tone, the same as salutations, while Wh-questions were produced with a final rise and three prominences. The participants went through intervention, in which they used Praat to observe their intonation and the target English intonation. The post-test results indicate that the use of audio-visual feedback helps learners to improve their intonation and overcome cross-linguistic interference.

Another study with Italian speakers was conducted by Chen and Mennen (2008) studied the production of declarative and Wh-questions in untutored learners of English in spontaneous and semi-spontaneous tasks longitudinally. The participants came from different regions of Italy, in which intonation is used differently for questions. The results indicated that all the participants used rising tones in declarative and Wh-questions, but this was more common in the declarative questions. The final fall was more prominently used by some speakers in both Wh-questions and declarative questions. Individual differences suggested that Italian dialects influence differently the production of Wh-questions and that cross-linguistic differences are present.

Eghlidi (2016) studied the production of a variety of utterance types with speakers of Persian as L1. Most of the intonational configuration of Persian is very similar to English, and the only salient features that are different are the location of prominence, which in Persian occurs in the first accented word and not in the stressed syllable of the last content word, and the use of specific configuration for question tags (Eghlidi, 2016). The overall results showed that the participants produced Wh-questions in English mainly with a falling tone, but they

had errors in the production of the final fall in tag questions which look for agreement, and the rise-fall tone in sentences that contain two clauses. These were attributed to L1 interferences.

Kainada and Lengeris (2011) studied the production of English intonation by speakers of Greek as L1. Unlike English, Greek intonation in polar questions uses a fall or a rise-fall at the end of the IP (Kainada & Lengeris, 2011). Young learners of English served as participants in this study, who were asked to read polar questions in both languages, they also read the Cinderella story in both languages to obtain pitch range measures. The control material for this experiment was taken from an online corpus. The results of this study suggest that there is L1 suprasegmental transfer to the L2 in terms of tone, and prominence placement.

Puga et al. (2018) studied the English perception and production of speakers of German as L1 as a follow-up study of Puga et al. (2017) in which only perception was studied. The German participants were compared with a group of native speakers of British English, and both took a perception and production test. In the production test, the participants were asked to read a story out loud, which included different types of sentences. The overall results show that the German participants scored better in production than in perception. In terms of utterance type, the German participants scored poorly in tag questions and checking questions. However, these participants scored better than native speakers in the production of the default intonation of polar questions and declarative questions.

Rozaimee (2018) studied the production of English intonation with speakers of Malay as L1. The participants were forty learners of English who were asked to complete a map task. The aim was to measure and analyze the intonational contour of different types of utterances, such as questions and statements. The results of this experiment indicated that the participants had

problems to produce polar and declarative questions in English as both of them were generally produced with a final falling tone. Wh-questions, on the other hand, were also produced with a final falling tone. The author concluded that the reason for polar and declarative questions being problematic for speakers of Malay is that the rising intonation is not common in that language, so their L1 is interfering in the production of L2 intonation.

Zárate-Sández (2015) studied the perception and production of English-native speakers with Spanish as L2. Three different levels of proficiency were included in this study. The perception experiment included an imitation task in which the participants located tonal events in utterances, while the production activity was the reading of a passage and a storytelling session. Two relevant findings in this study were that the author suggests that there is a strong link between perception and production, and that during the perception of boundary tones, L1 interference seemed to be more predominant in beginner speakers, whereas the more advanced learners were not highly influenced by their L1 and their responses were similar to those of heritage speakers of Spanish. Chaira (2015) also reported that the performance of L2 learners at an initial stage is highly interfered by their L1, while more advanced learners tend to use more their knowledge of the language. This results were reported in a study of segmental sounds of English.

Nibert (2006) studied the acquisition of perception ability by three groups of learners of Spanish as L2 with different level of proficiency. They were given a perception test. Beginner learners were able to perceive intonation, and to provide a possible meaning of the utterance they heard. Level of English playing a role in the perception was also observed, as more advanced and intermediate participants showed responses which were more influenced by their knowledge of the language. L1 interference was observed for beginner learners, and the level

of interference was inversely proportional to the level of proficiency of the participants.

The interest in the production of English intonation by speakers of Spanish as L1 has also increased, however, studies in this subject are still limited. In an early study, Backman (1978) analyzed the intonation of Venezuelan learners of English. The participants were asked to produce utterances in a conversation. The overall results indicated that participants produced the utterances with the prominence placed in the last word of the utterance; that is to say, using the default Spanish prominence placement. Most of the participants produced utterances with errors (78%), and this was corrected by 15% after intervention. The author points out that the participants produced some Wh-questions ending with a final rise, and it was attributed to the expression of gentleness during the conversation. A more recent study conducted by Ortega-Llebaria and Colantoni (2014) compared the production and perception of prominence with a group of speakers of Spanish as L1 and another group of speakers of Mandarin as L1. A control group with NSs of English was also used in this study. Results indicated that the speakers of Spanish as L1 differ considerably from both the control group and the Mandarin-speaking group. Furthermore, the speakers of Spanish included pauses after the prominent word in the utterances, which was attributed to L1 interference.

Colantoni et al. (2016) studied the English intonation of speakers of Spanish as L1. A group of Mandarin speakers was also part of this research. The authors studied different types of utterances, in which polar questions, statements, and declarative questions were included. The participants took part in a delayed repetition task and a semi-spontaneous production task. The results showed that in the delayed repetition task, the overall Spanish-speaking group produced questions with a higher initial pitch, which is similar to the Spanish intonation of questions. In the same task, the Mandarin-speaking group did not

differ significantly from NSs of English. In the semi-spontaneous task, the Mandarin-speaking group produced questions with major pitch movements, attributed to Mandarin being an intonational language. The Spanish-speaking group produced declarative questions with a higher pitch accent at the beginning of the questions, imitating the intonational configuration of Spanish. The researchers concluded that the type of task may influence the degree of L1 interference. L1 interference has also been reported in studies that deal with the testing and training of not only suprasegmentals features of speech, but also segmentals.

Valenzuela (2013) studied the differences and similarities in pitch, intensity, and final contour in the intonation of questions. Six speakers of Spanish as L1 who were learning English participated as participants in this study, and a group of NSs of English as a control group. The participants were recorded reading a set of questions (polar, declarative, tag, and Wh-questions) taken from Celce Murcia et al. (1996) without practice. The Spanish-speaking participants read the questions also in Spanish. The results indicated that in terms of Wh-questions the participants produced them with a high initial pitch and ended them with a falling tone, similar to the production of default Wh-questions in English. Interestingly, the participants produced Wh-questions in Spanish with a final rising tone, indicating that they overcame L1 interference regarding this aspect. Tag questions were produced mainly with a rise at the end by the Spanish-speaking participants. In this case, it was observed that L1 interferes in the production of this type of questions, as some tag questions in English are produced with a final falling tone when they look for agreement. Declarative questions and polar questions were produced with a rising tone in most of the cases, and in some of them the Spanish-speaking participants produced a falling tone; this was attributed to the possible use of irony, surprise or amazement, and it would be a case of L1 interference of Spanish.

Although response time has been a factor explored in speech perception studies, there is no general agreement about the role of it in the analysis of results. In an early study of perception of segments, Pisoni and Tash (1974) concluded that response time depends largely on the type of stimulus presented to the participants. The participants listened to two stimuli, and they had to identify whether these were the same or different. Response time for stimuli that were the same was minor in comparison to the response time for stimuli that were different, this is explained for the major need of processes required to compare two or more stimuli. Berti (2017) studied the perception of speech capacity of children. The participants listened to a stimulus and chose a picture. Response time was measured in this study, and this was shorter for correct answers than for incorrect answers. Rönnberg et al. (2014) studied the response time in a perception task of sounds in noise. The results indicate that the difference of time between correct and incorrect answers is significant, which was attributed to the difficulty of the task. Chen (2002) explored the perception of English intonation, focused mainly in the response time. Conclusions indicate that response time is shorter for within-category identification, and longer for across-category identification. Schneider et al. (2011) conducted an experiment to test the perception of intonation of questions and statements in German. Response time values were used to support conclusions. Difficult tasks took longer reaction time to me answered, and easier tasks took less time. The authors concluded that response time is an important factor to be considered at the moment of analyzing information.

2. Research questions and objectives

In the light of the literature review, this study has established the following Research Questions, General Objective and Specific Objectives:

2.1 Research questions

- To what extend are learners of English with Spanish as first language (L1) able to perceive default final falling tone in Wh-questions?
- What is the relation between correct identification of tone and function of tone in Wh-questions and knowledge of the language of learners of English with Spanish as L1?
- How are identification response time and correct identification of tone and function in Wh-questions related?

2.2 Research objectives

- **General objective:**
  - To determine the degree of perception of default final tone in Wh-questions of learners of English with Spanish as L1.

- **Specific objectives:**
  - To assess learners' ability to identify default final falling tone in Wh-questions.
  - To explore whether there is a relation between the learners' knowledge of English and the ability to perceive the default final tone in Wh-questions.
  - To explore whether there is a relation between learners' response time with their ability to identify the default final tone in Wh-questions.

3. Method

This section deals with three main areas of the method. First, the participants that took part in the current study are described; then a depiction of the materials that were used is elaborated, and finally a description of the procedure to collect is given.

3.1 Participants

The participants in this study were 63 learners of English with Spanish as L1 who were current students at the teacher of English training program at Universidad de Concepción, Chile. Their age ranged between 19 and 23 years old. The participants were divided into two groups. The first group included 34 participants who were in their first year of training. At the moment that the date was obtained, they had had less than a year of training. All of the participants are in a course in which they must reach B1-level based on the Common European Framework of Reference (CEFR). This group is called the Beginner Group in the current study.

The second group included 29 participants who were in their third year of training at the moment they participated in this study. These participants have taken different courses of English, including phonetics and phonology. Similarly, they also have knowledge about the default configurations of tone for English questions. The level of English of this group is B2 based on the Common European Framework of Reference (CEFR), as they need to pass a B2 mock test to advance in their major. This group is be named the Advanced Group in the current study.

All of the participants from both groups attend to English lessons regularly from March to December. Most of the courses that they attend are delivered in English, and only the courses which deal with educational topics are taught in Spanish. All of the participants are constantly encouraged to use English during and between lessons.

The participants in the current study were volunteers, and they received no reward for their participation. Participants with severe hearing or language impairment were not included in this study. Before the participants took the test, they received a printed copy of the consent form. They were given time to read the consent form and complete their personal information as signature. Those students who were willing to participate in this study handed back the consent form with their information. This study was also approved by the Ethics Committee of the Vicerrectoría de Investigación y Desarrollo at Universidad de Concepción.

3.2 Materials

For this study, a perceptual test was created to collect data about the perception ability of the participants. Also, a standardized English test was used.

3.2.1 Perception Test

An identification test was created to measure the ability of the participants to perceive falling and rising tones in English Wh-questions, and also to identify the correct grammatical function of the tone in this context (Wells, 2006). The test included 10 stimuli in the practice phase, followed by 40 Wh-questions with falling intonation and 40 Wh-questions with modified rising intonation. Additionally, 5 polar questions were included as distractors. The questions included in this test

were taken and adapted from English textbooks that cover the levels A2 and B1. Only questions which actually sought for information were included.

Recording sessions were made in a quiet room using a microphone connected to a laptop and the software Audacity (Audacity Team, 2019). Each stimulus was recorded twice randomly and later analyzed with Praat (Boersma & Weenik, 2019) to check the falling tone of Wh-questions and rising tone of polar questions. Then, using Praat, the intonational contour of the 40 Wh-questions was manipulated manually. The falling tone of the last content word of each Wh-questions was modified to a rising tone considering a difference of five semitones between falling and rising tones described by Navarro Tomás (1966). To calculate the semitones in hertz, a conversion table of musical notes based on the piano octaves was used. Thus, 40 Wh-questions with rising tone were obtained. Polar questions were not manipulated. Figure 3.1 shows an example of a Wh-questions with falling intonation; and Figure 3.2 depicts the same questions after the tone manipulation.

After manipulating all of the recordings of Wh-questions, only the best and clearer tracks were chosen. Later, the recordings were transferred to a platform for perception tests called TP (Rauber et al., 2012). For each stimulus, there were four possible answers to choose in the test interface: fall correct, fall incorrect, rise correct, rise incorrect. Participants could read the following instruction in the practice phase and when the test started: "*You will hear questions with different intonation. Look at the four possible answers and choose the one that describes the tone you hear (fall or rise) and whether that tone is the correct for the type of question you hear.*" The Perception Test in TP had these instructions written in English, and the stimuli presented in randomized order.
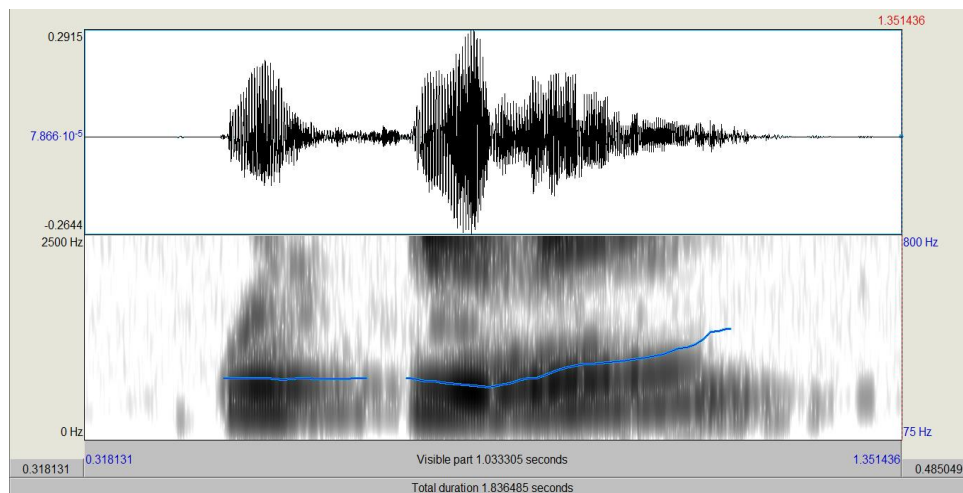
Figure 3.1

Intonation produced by the native speaker.
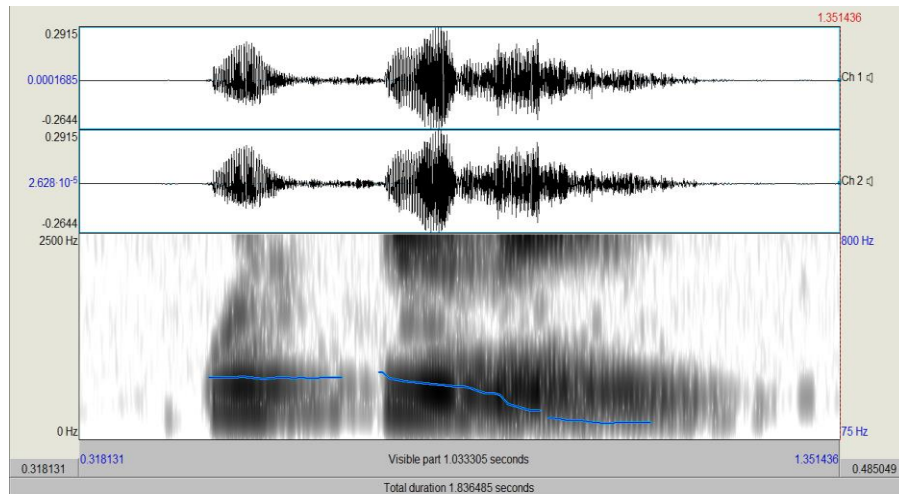
Note. Praat screenshot of *"What's your name?"* produced by the female American native speaker of English without modification.

Figure 3.2

Modified intonation produced by native speaker.

Note. Praat screenshot of "What's your name?" produced by the female American native speaker of English after modification.

The Perception Test was piloted with a group of 6 in-service teachers of English. They took the test and provided some comments on the difficulty of the questions, the clarity of the items, and how easy or difficult the test was. Some modifications were made afterwards. The new version of the test was first given to the third-year participants who also provided some feedback about the test.

3.2.2 Listening Proficiency Test

A Listening Proficiency Test was given to the Beginner Group to obtain a measure of their level of English. The listening part of the Oxford Placement Test 2 (OPT2) (Allan, 1992) was chosen based on the following criteria: i) the test takes no more than 12 minutes to be taken; ii) the test is already validated, and it can be given to learners with different level of English, from A1 to C2 (Oxford University Press, n.d.); iii) OPT2 measures listening sub-skills such as segmental discrimination, word recognition, and word pronunciation in connected speech (Winster et al., 2009; Zoghlami, 2014); iv) the results obtained with OPT2 have shown to be normally distributed, which does not happen with other tests such as First Certificate in English (FCE) listening section (Zoghlami, 2014).

This test has 100 sentences played only once with two words or phrases as possible answers. These can be minimal pairs by segments or stress pattern. This is a paper based test, so each participant had a copy of the four-page document. Then, each item is given one point as score, and then turned into percentage. These are questions 11, 20, and 50 from the actual test (Allan, 1992):

11. She | likes | lacks | that little extra bit of class.
20. Most of the | new wavebands | new-wave bands | sound really good.
50. Do you know if this text is | copyright | copied right |?

3.3 Procedure

3.3.1 Perceptual test

The Perception Test was presented to participants using the TP platform (Rauber et al., 2012) in one separate session per group of participants. This was needed due to the maximum capacity of the laboratory and the number of participants per group.

Before the testing session, TP was installed in every computer of the Phonetics Laboratory at Facultad de Humanidades y Arte, at Universidad de Concepción. Then, the test was uploaded to every computer and it was checked that it worked properly. The day of the test, every participant received a consent form written in Spanish so that there were no misunderstandings about the research project. If the participants were willing to participate, they completed their personal information. Then, the participants were given the instructions and had time to clarify doubts. The test took between 8 – 12 minutes. Every participant used an individual desktop computer with headsets (circumaural; 15 Hz – 25000 Hz) to complete the test. Once the participants left the room, the results of the test were saved and backed up online.

3.3.2 Listening Proficiency Test

This test was given to the participants in a separate session per group, a week later. Each participant received a paper-copy of the OPT2. After the instructions were explained to them, the audio track was played using the loudspeakers of the laboratory, emulating a real listening assessment session. Participants did not use headsets this time. They were not allowed to ask questions during the test, as any noise could have affected the result of the

evaluation. The test papers were collected once the participants finished their test, and the results were saved online in an Excel file.

3.4. Data processing

Results obtained from the Perception Test were in the format of correct and incorrect answers; these results were transformed into binary coding, using 1 for correct answers, and 0 for incorrect answers. Then, all the correct answers were transformed into percent correct scores (1 – 100%) for each item and participant. Answers were analyzed and classified into four variables: Perception of Falling tone and correct function (FTCF), Perception of Rising Tone and Incorrect Function (RTIF), perception of Falling Tone regardless of the function (FT), and perception of Rising Tone regardless of the function (RT). The average scores of FTCF and RTIF were coded as General Identification of Tone and Function (GITF); similarly, the average values of RT and FT were coded as General Identification of Tone (GIT).

Response Time (RespTime) was obtained in each stimulus in the Perception test. The time values obtained from the TP files included the duration of each stimulus and response in seconds. The duration time of each stimulus, obtained using Praat (Boearsma & Weenink, 2019), was subtracted from the total initial response time. This provided a more precise response time.

4. Results

4.1 General results of the perception test

The data collected from the perception test was coded in six variables depending on the response given by participants in the test. The stimuli identified as Wh-questions with default falling tone and correct function (FTCF), the stimuli identified as Wh-questions with rising tone and incorrect function (RTIF), the correct identification of falling tone only (FT) and the correct identification of rising tone only (RT). Additionally, to obtain an overall measure of the capacity of the participants to identify correct tone (fall, Rise) and function (correct, incorrect), the scores of the FTCF and RTIF were merged into a new variable for general identification of tone and function (GITF). Finally, FT and RT were merged to obtain an overall measure to account for the identification of tone only (GIT).

The data for the six variables was checked for normality of distribution using the Shapiro-Wilk analysis. Out of the six variables, five variables (FTCF, RTIF, RT, GITF, GIT) had values above significant range, with normal distribution of the data and only one (FT) showed significant values (p<.05), with data without being normally distributed (Appendix n°1).

The six variables were used to run a multivariate analysis of variance (MANOVA) using SPSS. The dependent variables were FTCF, RTIF, FT, RT, GITF and GIT, with group (Beginner, Advanced) as fixed factor. The results showed that there was a significant difference between groups for FT and no significant difference per group for any of the other variables (table n°1). The descriptive figures and variability of the data will be presented with boxplots below.

Table 4.1

MANOVA Results for Dependent Variables

Variable	Results	
Group *FTCF	$F(1,61)=3.071$,	$p=0.085$
Group *RTIF	$F(1,61)=.001$,	$p=0.977$
Group * FT	$F(1,61)=5.608$,	$p< 0.05$
Group *RT	$F(1,61)= .201$,	$p=0.656$
Group *GITF	$F(1,61)=1.050$,	$p=0.310$
Group *GIT	$F(1,61)=2.104$,	$p=0.152$

The data for the overall measure of General Identification of Tone and its Function (GITF) is illustrated in the boxplots in Figure 4.1 for the Beginner and Advanced group. The values for the mean, standard deviation, minimum and maximum scores were obtained for each group. The Beginner group (n=34) obtained a mean of M: 58.9 percent correct (SD: 18) with scores that ranged between 20% and 91.3%. The Advanced group (n=29) obtained a mean of M: 63.6 percent correct (SD: 18.7) with scores that ranged between 27.5% and 90%. As presented in Table 4.1 above, the difference in means was not significant.
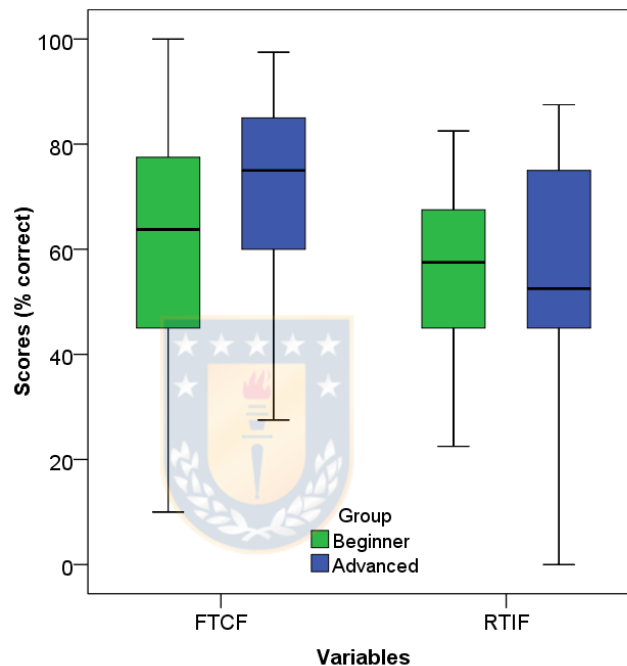
Figure 4.1

Perception Test: GITF.
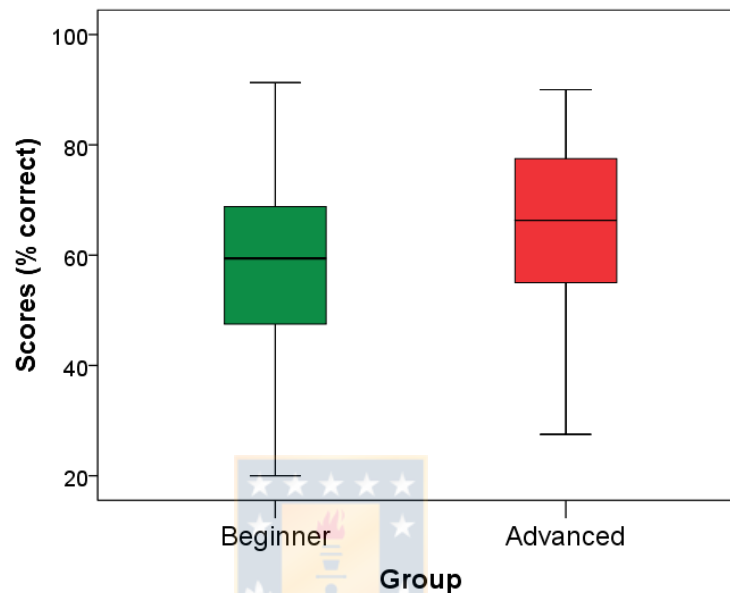
Note. Overall results for the general identification of tone and function by Beginner and Advanced groups.

The data for Falling Tone and Correct Function (FTCF) is represented in the boxplots in Figure 4.2 for both groups. The values for the mean, standard deviation, minimum and maximum values were obtained for each group. The Beginner Group (n=34) obtained a mean of M:62 percent correct (SD: 16.5) with scores that ranged between 10% and 100%. The Advanced Group (n=29) obtained a mean of M: 71.7 percent correct (SD: 19.3) with scores that ranged between 27.5% and 97.5%. As presented in Table 4.1 above, the difference in means was not significant. The data for Rising Tone and Correct Function (RTCF) is also illustrated in the boxplots in Figure 4.3 for both groups. The same values were obtained for this variable. The Beginner Group (n=34) obtained a mean of M: 55.7 percent correct (SD: 16.6) with scores that ranged between 22.5% and 82.5% The Advanced Group (n=29) obtained a mean of M: 55.5 percent correct

(SD: 23.5) with scores that ranged between 0% and 87.5%. The difference in means was not significant.

Figure 4.2

Perception Test: FTCF and RTIF

Note. This figure shows results for Falling Tone Correct Function (FTCF) and Rising Tone Incorrect Function (RTIF) for the Beginner and Advanced groups.

The data for General Identification of Tone (GIT) regardless of the function is shown in the boxplots in Figure 4.3 for the Beginner and Advanced groups. Descriptive statistics were obtained for each group. The Beginner Group (n=34) obtained a mean of M: 76.3 percent correct (SD: 15.7) with scores that fluctuated between 92.5% and 38.8%. The Advanced Group (n=29) obtained a mean of M: 81.4 percent correct (SD: 11.8) with scores that ranged between 96.3% and 50%. As presented in Table 4.1 above, the difference in means was not significant.
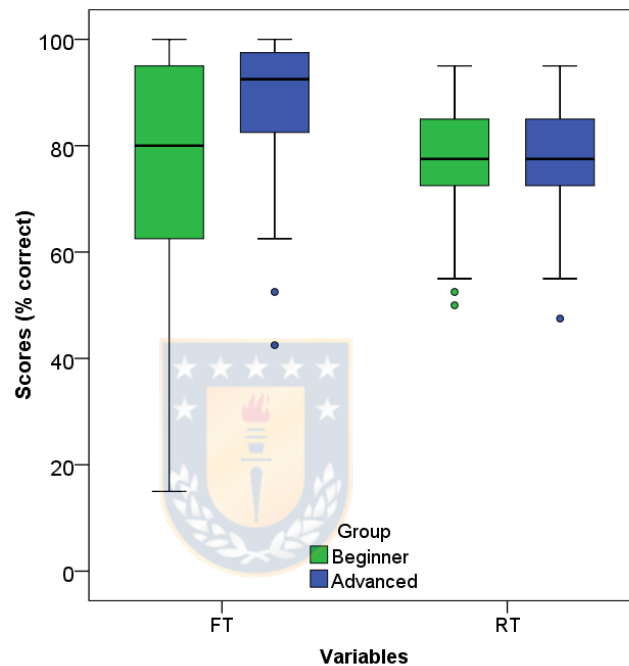
Figure 4.3

Perception Test: GIT.
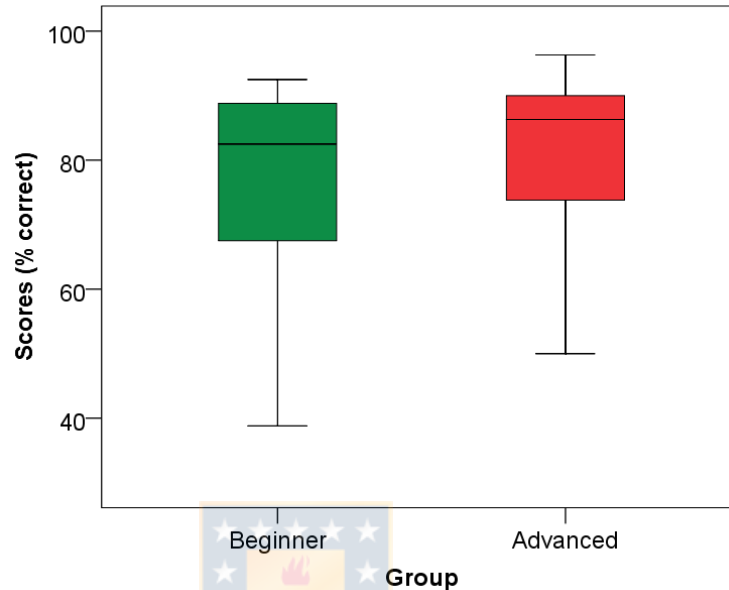
Note. This figure shows results for Identification of Tone Regardless of the Function (GIT) for the beginner and advanced groups.

The data for Falling Tone (FT) regardless of the function is illustrated in the boxplots in Figure 4.4 for the Beginner and Advanced groups. The values for the mean, standard deviation, minimum and maximum scores were obtained for each group. The Beginner Group (n=34) obtained a mean of M: 75.2 percent correct (SD: 22,5) with scores that ranged between 100% and 15%. The Advanced Group (n=29) obtained a mean of M: 86.9 percent correct (SD: 15.2) with scores that ranged between 100% and 42.5%. As presented in Table 4.1 above, the difference in means was significant. The data for Rising Tone (RT) regardless of the function is also represented in the boxplots in Figure 4.4 for both groups. The values for the mean, standard deviation, minimum and maximum scores were obtained for each group. The Beginner Group (n=34) obtained a mean of M: 77.3 percent correct (SD: 11.8) with scores that ranged between 95% and 50%. The Advanced Group (n=29) obtained a mean of M: 76 percent correct (SD: 12,5) with

scores that ranged between 95% and 47.5% As presented in Table 4.1 above, the difference in means was not significant.
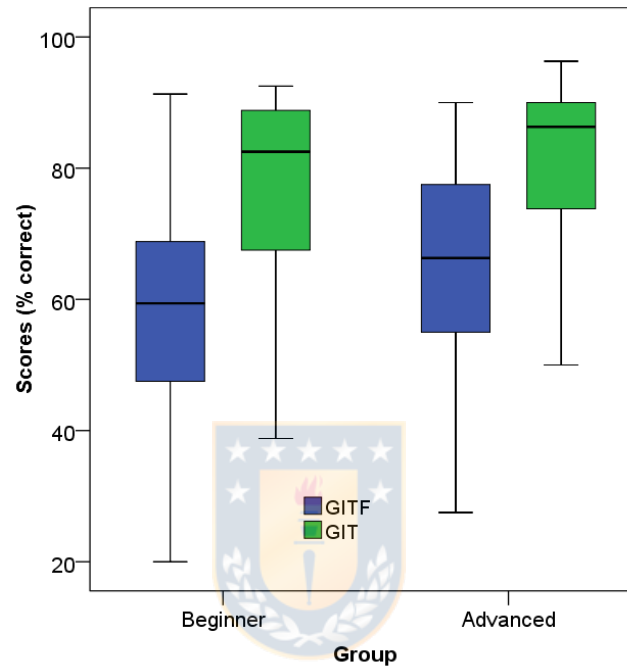
Figure 4.4

Perception Test: FT and RT

Note. This figure shows results for Falling Tone (FT) regardless of the function and Rising Tone (RT) regardless of the function by Beginner and Advanced groups.

To analyze the differences per group between GITF and GIT, a t-test was run. For the Beginner Group the results were t= 9.421, gl=33, p< 0.001. The mean for the Beginner Group in GITF was M: 58.9 and in GIT was M: 76.3 percent correct. The Advanced group's results of the t test were t= 8.270, gl=28, p< 0.001. The mean for the Advanced Group in GITF was M: 63.6 and in GIT was M: 81.4. A comparison and distribution of these values can be observed in Figure 4.5 below.

Figure 4.5

Perception test: GITF and GIT

Note. This figure compares the results of General Identification of Tone and Function (GITF) and General Identification of Tone (GIT) regardless of the function.

To explore whether there is a relation between GITF and GIT, a pearson-moment correlation was run with these values separately for each group of participants following Cohen (1992). The results for the Beginner Group were $r=$ 0.805, n=34, $p < 0.001$ (Fig. 4.6), and the results for the Advanced Group were $r=$ 0.802, n= 29, $p < 0.001$ (Fig. 4.7).

Figure 4.6

Correlation between GITF and GIT of the Beginner Group.
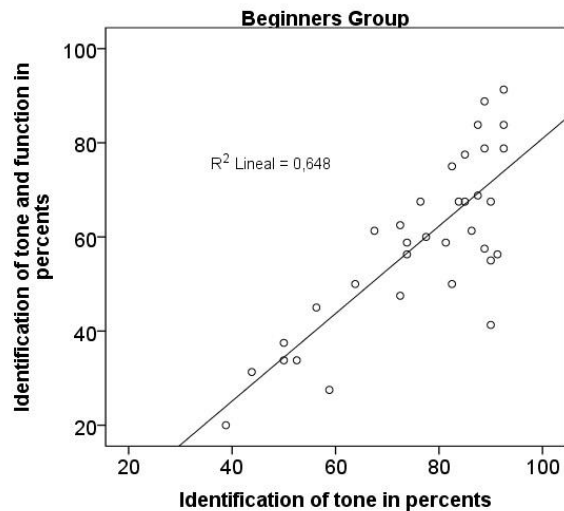
Note. The scatter-plot graph shows the correlation between General Identification of Tone and Function (GITF) and General Identification of Tone (GIT) for the Beginner group.
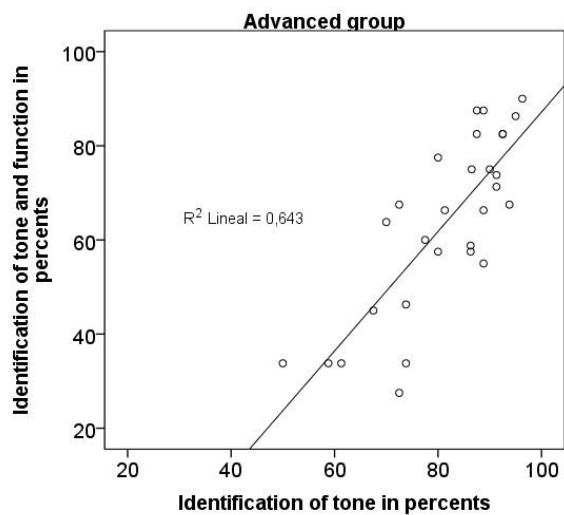
Figure 4.7

Correlation between GITF and GIT of the Advanced Group

Note. The scatter-plot graph shows the correlation between General Identification of tone and function (GITF) and General Identification of Tone (GIT) for the advanced group

4.2 Listening Proficiency Test

To explore a relation between the proficiency level measured with the Listening Proficiency test (Oxford Placement Test 2) and the results in the identification of GITF obtained by the Beginner Group, a pearson-moment correlation analysis was used following Cohen (1992). The results were r= 0.174, n=34, p= 0.325. The correlation of the Listening test OPT2 scores and GIT was r= 0.004, n= 34, p= 0.983.
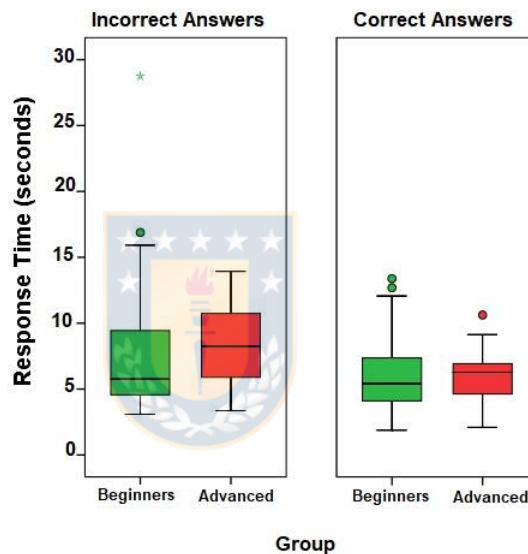
4.3 Response time

Response time for each answer was calculated by subtracting the duration of the stimulus from the total response time (seconds) in the Perception Test. Some participants responded before the audio of the stimulus ended, so these answers were left out for the Response Time (RespTime) analysis. A total of 54 out of 5680 responses were not considered in this analysis (29 responses from the Beginner Group and 25 responses from the Advanced Group), regardless whether their answers were correct or incorrect.

To explore whether there is a significant difference between the RespTime for correct and incorrect answers for the General Identification of Tone and Function (GITF) for the two groups of participants (Beginner Group, Advanced), a multivariate analysis of variance (MANOVA) was run using the individual means for RespTime of correct and incorrect answers per group. The results for the comparison of RespTime for correct answers for GITF were $F(1.61)$=0.015, p= 0.902. The results for the comparison of RespTime for incorrect answers for GITF $F(1.61)$=0.011, p= 0.917. The RespTime mean for correct answers for the

Beginner Group was M: 5.95 sec. and for the Advanced Group was M: 5.87 sec. The RespTime mean for incorrect answers for Beginner Group was M: 8.08 sec. and for the Advanced Group was M: 8.20 sec. The distribution of time is shown is Figure 4.8.

Figure 4.8

Perception Test: RespTime for Incorrect and Correct Answers

Note. This figure shows the response time of correct and incorrect answers per groups expressed in seconds.

To find whether response time for incorrect and correct answers was significantly different, a t-test was used and the result for the Beginner Group was t=2.328, gl=33, p<0.05. The RespTime mean for correct answers was M: 5.95 sec. and for incorrect answers was M: 8.08 sec. The results for the Advanced Group were t= 3.654, gl= 28, p< 0.01. The RespTime mean for correct answers was M: 5.87 sec and for incorrect answers was M: 8.20 sec (Fig. 4.9).

Figure 4.9

Perception Test: RespTime by group of participants
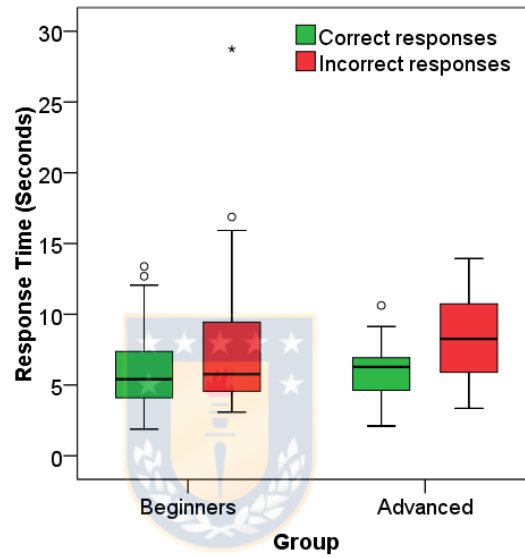
Note. This figure shows the response time within each group of participants expressed in seconds.

5. Discussion

5.1. Perception test

In recent decades, intonation has taken more relevance as a result of research on intelligible and comprehensible speech (Gordon & Darcy, 2019). Evidence from studies dealing with suprasegmentals suggests that the use of wrong intonational patterns may hinder communication between speakers and listeners (Anderson-Hsieh, 1990; Childs, 2012; Gumperz, 1982; Horgues, 2013; Munro et al., 2006; Shlesinger, 1994; Wei & Zhou, 2002), and in some cases, miscommunication directly affects the daily life of the L2 speakers (Anderson-Hsieh, 1990; Gumperz, 1982). Similarly, errors in intonation have also been reported to cause problems in interpreting speakers' intentions, and may express insecurity or block the listener's comprehension (Nafà, 2005; Shlesinger, 1994). These issues may be avoided by using the default intonational pattern of English (Roach, 2009; Wells, 2006).

The aim of the current study was to measure learners of English with Spanish as L1 perception of the default final falling tone in Wh-questions. A perception test was used to measure this ability. First, the results of this test revealed no significant difference between the Beginner Group and Advanced Group in the General Identification of Tone and Function (GITF), in the identification of Falling Tone and Correct Function (FTCF) and in the identification of Rising Tone and Incorrect Function (RTIF). These findings suggest that a difference in knowledge of the language between groups does not seem to be a factor that influences the identification of tone and function of Wh-questions. This is surprising as it was expected that the Advanced Group would have benefited from having a higher proficiency level (B2-level or higher), as they have studied

English for longer that the Beginner Group in a semi immersion system. Individual differences were observed in both groups though. These findings divert from studies in L2 speech perception that have reported that knowledge of the language is a factor that impacts the perception of suprasegmentals (Chen, 2002; Nibert, 2006; Zhang et al., 2010) and segments (Chaira, 2015).

The Perception Test results also provided information about the capacity that these learners have to perceive tones in Wh-questions regardless of their function. A significant difference was found for both groups of participants in the comparison of General Identification of Tone and Function (GITF) and General Identification of Tone (GIT). The values of GIT were significantly higher. These results suggest that participants have the capacity to identify the tone presented in questions and that this single task was easier for both groups than the identification of tone and function. These results are in line with what was found by Grabe et al. (2003) and Gussenhoven and Chen (2000) in which participants were able to correctly identify tones in different types of utterances having little or no knowledge of the target language. In these studies, the authors referred to the existence of innate mechanisms that every human has, and which allows people to perceive intonation. Besides, in the current study, participants were presented with rising and falling tones which are familiar to them because they exist in the L1.

The comparison of results for GIT between groups revealed no significant difference although the Advanced Group scored higher and had more homogeneous distribution of results. These results provide more evidence that knowledge of English does not seem to be an advantage for higher proficiency learners in the identification of tones regardless of their function, similarly to what was observed for GITF. The values for GIT comprise two measures: the perception of Falling Tone (FT) and Rising Tone (RT) regardless of their function.

The Advanced Group showed more easiness to identify FT in Wh-questions and had more homogeneous scores, obtaining a significant difference between groups. Interestingly, the results for the identification of RT do not follow the same trend as both groups performed similarly. A certain advantage of the Advanced Group can be observed in this aspect, as they scored significantly higher for FT, considering that this is a pattern that is not used in default Wh-questions in the Chilean variation of Spanish (Ortiz et al., 2010). This advantage may be attributed to the higher proficiency level of the Advanced Group. However, results from other variables suggest that knowledge of the language is not a determining factor for these groups participants. This leads to consider that the Beginner Group may be highly influenced by the intonational patterns of their L1 and this caused more mistakes in the identification of FT. This group had been part of the English program for one semester only, thus their amount of exposure to English and knowledge of the language was considerably lower than the Advanced Group. Results in previous studies indicate that the lower the English level of learners, the more they are influenced by the patterns of their L1 (Chaira, 2015; Chen, 2002; Iverson et al., 2003; Nibert, 2006; Zárate-Sández, 2015). The scores obtained by the Beginner Group seem to be in line with these findings.

To explore whether there is any relation between General Identification of Tone and Function (GITF) and General Identification of Tone (GIT), the data for the two groups of participants was analyzed separately. For the two groups, the correlation between both variables is strong, revealing that hose participants that had a high score in GITF also obtained a high score in GIT. This suggests that the ability to identify rising and falling tones contributes to the better identification of tone and function.

5.2 Listening Proficiency Test

Only the Beginner Group was given a listening test to measure proficiency level (the listening component of the Oxford Placement Test 2). The results from this test were considered as a measure of proficiency. No relation was found between the proficiency level of the Beginner Group and their ability for General Identification of Tone and Function (GITF). That is to say, the participants who scored higher in GITF did not necessarily obtain high scores in the Listening Proficiency Test. At the early stage of learning that these participants are, perception of tone and function of Wh-questions may be influenced by L1 patterns more than their knowledge of the L2, as it has been previously suggested (Chaira, 2015; Chen, 2002; Nibert, 2006; Zárate-Sández, 2015). Considering that the default intonation for Wh-questions in Chilean Spanish is a rise (Cepeda & Roldán, 1995; Ortiz et al., 2010; Urrutia, 1988), these results may be indicative of L1 interference. Evidence of this interference of intonation patterns has been reported in previous perception studies (Cardinali & Barbeito, 2018; Horgues, 2013; Lehiste & Fox, 1992).

5.3 Response Time

Response time (RespTime) is another important factor to consider when analyzing perception data, as this variable provides information about how easy or difficult the task is for participants (Scheneider et al., 2011). The response time for General Identification of Tone and Function (GITF) for correct and incorrect answers was compared between groups, obtaining no significant differences between them. These results suggest that identifying the default falling tone for Wh-questions was equally challenging for Beginner Group and Advanced Group. Within the groups, RespTime measures for correct and incorrect answers were

also compared. Results indicate that both groups of participants took longer time when answering a question which resulted in an incorrect choice. Previous studies regarding the perception of speech have found that RespTime is longer when answering tasks that are perceived as more difficult (Scheneider et al., 2011), and that shorter time is used for responses that result in correct answers (Berti, 2017). However, no statistically significant differences have been reported, suggesting that other factors may also play an important role (Rönnberg et al., 2014).

From a general perspective, the results of the current study may be used to inform those who make methodological decisions concerning the contents and emphasis on pronunciation teaching. Although the more advanced participants in this study have already had courses on phonetics and phonology, their overall identification scores were not significantly higher than those of the Beginner Group. Research suggests that acquiring L2 prosody is difficult for late learners, as people acquire these patterns during the first month of their lives in their L1 and they become deeply ingrained in their brains (Gervain & Werker, 2008; Kuhl, 2004; Yang, 2016). Alternatively, L1 suprasegmental patterns may act as a barrier to perceive (and produce) L2 prosody appropriately in a similar way as it has been suggested for L1 segments when perceiving L2 sounds (Chaira, 2015; Iverson et al., 2003). It seems that L1 interference has affected not only the Beginner Group of participants in this study but also the more advanced group to some degree. The more knowledge of the language does not help them to perform better in identifying the default falling tone of the Wh- questions.

Most English programs and materials start from a segmental perspective and slowly move towards a more suprasegmental approach (Wang, 2020). This can be observed in the school national programs for English education in Chile (Ministerio de Educación, 2015a; 2015b; 2016a; 2016b) in which

suprasegmentals are less promoted. Evidence suggests that training learners in suprasegmentals improve not only prosody, but also segmental skills (Anderson-Hsieh, 1990; Gordon & Darcy, 2016; 2019; Gordon et al., 2013; Levis & Muller Levis, 2018; Rasier & Hiligsmann, 2007), and although this idea was proposed long ago, it seems that English programs do not regard it as important. Training perception of suprasegmentals will allow learners to identify the variability of segments in words, to understand L2 rhythm, and identify grammatical markers (Gilbert, 2008). Giving segments and suprasegmentals equally importance when designing the pronunciation curriculum may lead to better perception and production abilities in learners of English (Wang, 2020).

The current study dealt with default or unmarked intonational configuration of Wh-questions in English, but different contexts and other configurations also exist and are commonly produced by native speakers (Wells, 2006). More emphasis needs to be given to default and non-default intonational patterns and explicit instruction when training L2 learners is suggested (Yang, 2016). It is important to consider that all of these intonational configurations carry specific meaning which varies from language to language, thus knowing to perceive and produce them correctly seems to be beneficial. These suggestions may impact the form in which pronunciation is taught in different contexts, but devoting time to work with suprasegmentals may provide new opportunities to L2 learners.

Conclusion

Generally speaking, the intonation patterns for Wh-questions are included in the syllabus of beginner learners and they are assumed to be acquired by more advanced learners. The results in the current study present evidence of a need for adjustment in the contents of more advanced courses which need to incorporate intonation patterns for Wh-questions.

The results of the current study may shed light on possible interference of L1 intonation patterns deeply ingrained in the learners' perceptual space which behave as a barrier when learners hear intonation patterns of an L2. Finally, the task of identifying the default pattern for Wh-questions showed to be cognitively challenging for learners with different levels of proficiency.

A limitation in this study may be the number of participants. It remains to be seen whether these findings are confirmed with a larger group of learners with different proficiency level. Another issue to consider is the fact that more recent studies regarding L2 speech perception include a section that deals with speech production. In the future, this comparison may reveal interesting findings to explore the relation between L2 speech perception and production in the field of intonation patterns.

In summary, the current study aimed at measuring how learners of English with Spanish as L1 perceive default final tone in Wh-questions. The beginner and advanced learners of English in this study showed some ability to perceive the default final tone of Wh-questions without significant differences. More experienced learners did not show an advantage even when they have been learning English for two more years than the Beginner Group. Unlike other studies that have reported that knowledge of the language plays a role when perceiving

intonation in L2 speech (Zhang et al., 2010). These results are in line with previous studies that have found that advanced learners showed problems to identify suprasegmentals features that are not present or are used differently in their L1 (Puga et al., 2017).

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Appendixes

Appendix 1: Normality Test and Levene's Test Equallity for Error of Variance

Normality Test

	Group	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Estadístico	gl	Sig.	Estadístico	gl	Sig.
FTCF	A	,114	29	,200*	,947	29	,150
	B	,142	34	,081	,970	34	,449
RTIF	A	,145	29	,123	,941	29	,104
	B	,102	34	,200*	,961	34	,263
FT	A	,205	29	,003	,816	29	,000
	B	,186	34	,004	,896	34	,004
RT	A	,184	29	,013	,929	29	,052
	B	,135	34	,123	,946	34	,096
GITF	A	,117	29	,200*	,931	29	,057
	B	,091	34	,200*	,978	34	,722
GIT	A	,211	29	,002	,906	29	,014
	B	,184	34	,005	,864	34	,001
Correct Time	A	,095	29	,200*	,981	29	,865
	B	,105	34	,200*	,914	34	,011
Incorrect Time	A	,095	29	,200*	,961	29	,345
	B	,202	34	,001	,771	34	,000

*. This is a lowe bound of the true significance.

a. Lilliefors Significance Correction

Levene's Test of Equality of Error Variances^a

	F	df1	df2	Sig.
FTCF	,655	1	61	,422
RTIF	4,171	1	61	,045
FT	5,907	1	61	,018
RT	,152	1	61	,698
GITF	,158	1	61	,692
GIT	2,583	1	61	,113

Tests the null hypothesis that the error variance of the dependent
variable is equal across groups.

a. Design: Intercept + Group