

Developing Teaching Materials for Spanish Heritage Speakers with Hearing Loss

by

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Abstract

The purpose of this thesis is to address the challenges of teaching gender agreement to Heritage Speakers (HS) of Spanish with a mild, moderate, and moderately-severe hearing loss. I discuss a series of combined approaches (TBL) and strategies (Input Enhancement) that can be implemented to create instructional materials to facilitate the perception and processing of gender agreement cues in the auditory modality. The aim of this interdisciplinary study is to provide resources and materials to instructors that teach HS who are Deaf and Hard of Hearing (DHH) by presenting a sample didactic unit that was connected to the student's environment and experience. Moreover, this thesis is innovative because the methods used in the didactic unit are not only beneficial for HS who are DHH, but also for L2 learners with normal hearing levels. If we consider that both groups face similar difficulties in the processing of gender agreement in Spanish, the strategies employed in this thesis to emphasize the key elements for processing gender, such as Cued Speech, prosodic stress, and color-coding notation, could also be useful, if adapted, to L2 learners who may have different learning styles (e.g., visual, auditory, and kinesthetic).

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Table of Abbreviations

DHH Deaf and Hard of Hearing

HS Heritage Speakers

TBL Task-Based Learning

L2 Second language

SL Sign Language

1 Introduction

The purpose of this thesis is to address the challenges of teaching gender agreement to Heritage Speakers of Spanish with a mild, moderate, and moderately-severe hearing loss. I discuss a series of combined approaches that can be implemented to create instructional materials to facilitate the perception and processing of gender agreement cues in the auditory modality. The goal of these materials and the didactic unit is to promote language development among this specific type of learners. *Heritage speakers* (HS) are individuals who grew up in an environment where a non-English language is spoken. In the context of the United States, these are bilingual individuals who grew up speaking the minority language (e.g., Spanish) at home, but were raised in a predominantly English-speaking environment outside the home. HS' experiences with Spanish in early childhood often align in their acquisition context to that of monolingual speakers, who grew up in countries where Spanish—the majority language—is spoken (Tesser et al., 2003). However, these individuals may show different degrees of command in their minority language due to a limited exposure outside of the familiar environment, reduced input conditions or under pressure from another language in a bilingual environment. Due to their early exposure to the language, HS may show advantages in aural tasks (Carreira & Kagan, 2018; Montrul, 2015; Montrul et al., 2013; Polinsky, 2015) when compared to learners of Spanish as a second language (L2 learners). On the other hand, given that HS acquire language in a predominantly aural mode, they may display lower levels of linguistic competence in written tasks and in their metalinguistic knowledge of the heritage language than L2 learners do (Montrul et al., 2008).

Consequently, HS may benefit from formal instruction in the written modality to further develop their linguistic competence outside the familiar domain. As previously mentioned, the

primary focus of this thesis is on HS of Spanish that are *Deaf and Hard of Hearing* (DHH). HS with hearing loss deal with more challenges than their normal hearing counterparts because of their hearing handicap while, at the same time, receiving most of the input through the aural modality at home. Because of their hearing loss, they may not be able to take advantage of the whole aural stimulus provided and may benefit from certain instructional accommodations that may not be readily available at home. Taking this into consideration, HS with mild, moderate, and moderately-severe hearing loss may face similar challenges to L2 learners in terms of processing certain grammatical structures auditorily. One of these challenging structures is gender agreement in Spanish. Processing gender agreement auditorily in adjectival clauses such as (1) is not very problematic, as failure to process gender agreement between the adjective *oscuro* ‘dark’ and the noun phrase *el pelo* ‘the hair’ does not affect the general comprehension of the adjectival clause.

- (1) El pelo oscuro
 The.MASC hair.MASC dark.MASC
 ‘the dark hair’

As I will discuss later, Vergara & Socarrás (2021) point out that auditorily processing gender agreement in adjectival relative clauses with two potentially competing nouns as antecedents like (2) is challenging for HS of Spanish. This is because, in these cases, the gender information that is encoded in the adjective provides the relevant information needed to determine which of the two nouns the adjective in the relative clause is modifying. Thus, in order to accurately process gender agreement in a sentence like (2), one must first perceive the masculine and feminine gender cues in the endings of the nouns *foco* ‘light bulb’ and *mesa* ‘table’ as well as the feminine ending in the adjective *rota* ‘broken’, and then establish that the adjective agrees in gender with the second noun and not the first. However, it is possible that HS fail to process the gender agreement cues in (2)

due to lack of Spanish proficiency or their hearing loss. This processing failure would render the sentence in (2) completely ambiguous because both nouns would be coreferential with the adjective in the relative clause.

(2) El foco de la lámpara que
the.MASC light.bulb.MASC of the.FEM lamp.FEM that
está rota
is broken.FEM
‘The light bulb of the lamp that is broken’

If structures such as (2) are already challenging to process auditorily for HS of Spanish without hearing loss, then we should expect them to pose even more of a challenge to HS with hearing loss. This is because their condition may affect the information that they perceive and, ultimately, comprehend. In general, these speakers have difficulties phonologically perceiving certain sounds of the language that are less salient. For instance, they may struggle auditorily perceiving morphological gender markings at the end of nouns and adjectives (e.g., the feminine [a] and the masculine[o] sounds) (Schwegler et al., 2010). Consequently, they must put forth more effort to perceive these types of sounds to be able to follow an ordinary conversation by using complementary strategies like lip-reading, which is quite demanding and can cause them to lose interest in the conversation.

Although this type of HS may have hearing loss, it is important to teach them how to process certain grammatical information, i.e., gender cues, that is crucial for sentence comprehension and provide them with visual and auditory processing strategies (e.g., Cued Speech, signing, gestures form-meaning association) to help them resolve language ambiguities in an effective manner. The proposed methods for instruction and materials, could potentially inform

heritage language practitioners of students with hearing loss and assist them in their teaching of complex grammatical structures. In the context of Spanish gender agreement, for instance, providing students with the mentioned methods, may facilitate the differentiation between canonical feminine and masculine nouns and understand how gender interacts with different elements of the sentence (i.e., determiners and adjectives), and how this interaction helps with general sentence comprehension (Montrul et al. 2008, 2013; Vergara and Socarrás, 2021). Given that some HS with hearing loss do not use sign language as their main source of communication, my proposed method of instruction creates a complex system of aids with the goal of facilitating language development. In many cases, sign language alone cannot accommodate these learners, because their hearing remains useful enough to communicate with hearing aids and the stimulation they receive. Ultimately, these instructional adjustments should also help with integration in the language classroom.

The remainder of this thesis is organized as follows. In Section 2 I present the theoretical background, which discusses our target population—HS with hearing loss, gender agreement in Spanish as well as in American and Spanish sign languages. Section 2 also discusses several theoretical approaches to language learning such as Cued Speech, Input enhancement, and Task-based Learning. Section 3 discusses previous studies on the auditory processing of gender in Spanish by HS and L2 learners, as well as the instructional support for HS with hearing loss. Section 4 introduces my predictions about the instructional needs that my HS target population may have based on the conclusions from previous studies. Section 5 explains the methodological considerations that should be considered in the design of the teaching materials and activities. Section 6 explains the target population and the language assessment before the didactic unit implementation. Then, the didactic unit with the resources and strategies used are described. In

Section 7, it is discussed the importance of this study and the didactic unit created. Finally in Section 8, the conclusion where sum up the main ideas of this project.

2 Theoretical Background

2.1 HS who are Deaf or Hard of Hearing

To date, the topic of hearing loss has been unexplored regarding heritage language development and maintenance. This is a very relevant topic because DHH individuals have the right to develop their minority language. As language practitioners, it is our responsibility to provide adapted teaching materials to assist these individuals in their heritage language development. In addition, congenital hearing loss is particularly prevalent among Hispanic American, as stated in Sagas et al. (2008). HS with hearing loss are individuals who grew up in the US speaking a minority language at home (i.e., Spanish) and have a range of moderate to severe hearing loss. This population often needs hearing aids or cochlear implants for hearing, which often makes it more difficult to develop and maintain their heritage language because they never will aurally perceive the language as normal-hearing HS. These individuals speak or understand the minority language to a certain degree and show some variation in their level of Spanish proficiency based on the surrounding environment, age of acquisition, type of educational program, input, birthplace, and economic background (Escobar & Potowski, 2015). For instance, it is more likely that the individuals who develop in an environment where the minority language is spoken will show a higher competence in their heritage language because they grew up in an area with more speakers of the heritage language (Escobar & Potowski, 2015). According to Hammer et al. (2009) the Spanish language used at home aided in the development of receptive vocabulary development in young bilinguals, but the increased use of English at school slowed the growth of children's Spanish vocabulary.

In the same way, a study by Potowski et al. (2009) examining the differences between L2 students and HS after grammatical instruction showed that, after exposure to L2 instruction, HS manifested significant improvements in processing and tasks production such as judgment task and sentence completion. This finding follows from the fact that L2 learners' previous classroom experience allows them to perform better in grammatical activities. On the other hand, HS need more emphasis on reading, writing, and metalinguistic knowledge, which is because they are predominantly exposed to the language aurally and in a familiar domain. As such, their knowledge about the heritage language comes from informal oral interactions with family members about a restricted variety of topics. For this reason, it has been suggested that HS may benefit from explicit instruction (Au et al., 2002; Montrul et al., 2013; Potowski et al., 2009).

Another main factor to consider is the age of exposure to the heritage language. According to Sebastián-Gallés et al. (2005), the development of the language is different for an individual who starts learning the minority and the majority languages simultaneously (i.e., simultaneous bilinguals) than one who acquires the minority language sometime after acquiring the majority language (i.e., sequential bilinguals). In this project I will focus on simultaneous bilinguals that belong to the second (G2) and third generation (G3). HS belonging to the G2 were either born in the US or arrived in the US before the age of six, and who have Spanish-speaking parents belonging to the first generation. On the other hand, HS belonging to the G3 were born in the US to G2 parents or one first-generation parent and another G2 (Silva-Corvalán, 1994). Therefore, HS belonging to the G2 often have more opportunities to use and develop their heritage language than HS belonging to the G3 due to their upbringing. Thus, the context of an acquisition is a crucial factor that determines HS' baseline competence in the heritage language. It is important to consider that HS do not form a homogenous linguistic group, and they will likely show different levels of

linguistic competence in production and comprehension abilities in the heritage language classroom.

This thesis focuses on HS with some degree of hearing loss. Therefore, it is relevant to consider several factors that affect their auditory processing. These factors include the degree of hearing loss, the types of hearing impairment, the age of onset of the hearing impairment, and the environment in which the hearing impairment developed. These aspects make HS with hearing loss an even more heterogeneous group than that of HS without hearing loss. As a result, they may exhibit different degrees of competence in the heritage language than what is expected from their hearing counterparts due to a more reduced input in the heritage language (Juliarena, 2012). Because of their hearing limitation, these individuals may feel insecure and unconfident dealing with social environments and in their use of the minority language, which affects them emotionally, psychologically, and socially (Schow & Nerbonne, 2018).

2.2 Hearing Loss

From an educational perspective, individuals with hearing loss are classified into two groups: hard of hearing students and those who are deaf. The former can perceive speech due to hearing aids, and their hearing is functional for their daily life (Egbert & Deppermann, 2012). The sounds and speech they acquire depends on their degree of hearing loss (Gómez, Royo y Serrano, 2018) although they may show difficulties in their phonological, morphological, or syntactic language aspects (Schow & Nerbonne, 2018). For instance, they may experience difficulties perceiving gender agreement cues as these appear last in canonical nouns (Gordon-Salant et al., 2010). The latter are deaf students whose hearing loss may prevent them from acquiring language orally and utilize non-verbal communication systems such as sign language, body language, and gestures.

2.2.1 Types of hearing loss

The American Speech-Language-Hearing Association (ASHA) categorizes six different levels of hearing loss measured in decibels (dB) (Holstrum et al. 2009). Most of the time, the sound is perceived; however, the pathway is impaired, which will affect how a person hears.

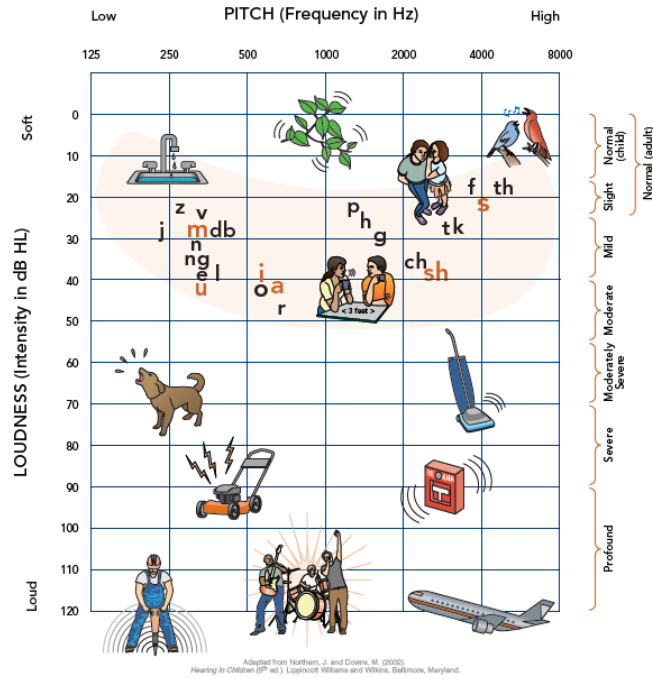
ASHA breaks down hearing loss into six categories. The first one is normal hearing; it is where the hearing threshold is less than 21 dB for an adult. The sound is perceived, and language is understood without difficulty. Secondly, a slight hearing loss consists of a threshold between 16-20 dB (this is for the pediatric population only). In this case, these individuals can miss up to 10 % of speech, especially word endings and emphasized sounds. They face learning difficulties, but with the appropriate hearing aid and/or with personal FM systems, they typically can take advantage of their residual hearing. Thirdly, it is considered mild hearing loss when the thresholds are between 21-40 dB, and individuals can miss 25-40 % of the speech signal. They will not perceive unstressed words and consonants, especially when a high-frequency hearing loss is present. These individuals often need support of their auditory skills, speech, language development, and speechreading in the language classroom. The next degree is moderate hearing loss. Their threshold is between 41-55 dB, and the amount of the speech signal missed can be 50%. These individuals are likely to have delayed or disordered syntax, limited vocabulary, imperfect speech production, and a flat voice quality. They need hearing aids and the support of visual communications system to supplement the hearing. The most common educational accommodation is amplification, which consists of hearing aids and FM systems. The next category is moderately-severe hearing loss. The threshold is between 56-70 dB. Without amplification, the conversation must be very loud to be understood; up to 100 % may be missed of speech information without functioning amplification. If hearing loss is not identified before

one year of age and appropriately managed, it is likely to derive into reduced speech intelligibility and a flat voice. The use of hearing aids and early speech intervention is necessary for a successful development of speech and their heritage language development.

The next category is severe hearing loss. The threshold is between 71- 90 dB. Finally, the last category is profound hearing loss. The threshold is beyond a 91 dB. These individuals are typically unable to perceive speech sounds enough to discriminate them, even with hearing aids. They may use sign language to communicate. In this project the focus will be on learners with mild to moderately severe hearing loss since students with severe hearing loss may not benefit from second language oral instruction. In other words, they need a different type of instruction using alternative communication systems. Figure 1 presents a visual summary of how the degree of hearing loss affects the perception of the different sounds of speech according to their pitch and loudness.

Figure 1

Familiar sounds audiogram



Note. Retrieved from Central Institute from deaf. Adapted from Northern, J. and Downs, M. (2002). *Hearing in Children* (5th ed.). Lippincott Williams and Wilkins, Baltimore, Maryland.

To summarize, in this thesis, I will focus only on those students who have acquired a spoken language and can hear using hearing aids. The students that I will focus on are HS of Spanish that have mild and moderately severe hearing loss with hearing aids. After having described the types of hearing loss that HS may experience, I will now turn to explain how these individuals acquire a minority language according to the studies in Pritchard (2016) and Malec (2016).

2.3 Acquiring a Heritage Language with Hearing Loss

One may pose the question of whether individuals with significant hearing loss or people who are deaf are able to learn a second language. According to the studies by Marentette & Mayberry (2000), Baker & Woll (2008), and Pichler et al. (2018), deaf bilinguals not only can be

fluent in their native sign language (L1), but many are also able to achieve high levels of proficiency in their second (spoken) language (L2). They use visual cues such as “mouth representations of written words” (Hosemann et al., 2020). We need to keep in mind that language development in HS who are DHH happens at a much slower pace than their typically developing bilingual peers (Kohnert, 2010). For this reason, it is relevant to study the language development of HS who are DHH to understand these individuals’ learning processes and explore effective teaching practices that facilitate language acquisition.

Research conducted by Pritchard (2016), based on her experience teaching English to Norwegian L2 learners, shows that DHH students miss out on a lot of incidental learning that typically happens when overhearing others in a conversation (e.g., watching TV). Therefore, the researcher decided to provide visual support during the lessons using the Signed English method and other forms of language visualization (mime, gestures) to aid with perception and understanding. The DHH students showed their comprehension by following instructions while acquiring a new language. The method they used is called *chaining*, which provides sensorial experiences that are connected to a concept by the student. Some examples are: (i) seeing the written word, (ii) hearing the spoken word, (iii) showing the articulation action to produce that phoneme, (iv) spelling the word using ASL. By using these techniques, the learners showed other alternatives to visualize language using communication games, *Total Physical Response* (TPR), and the *Direct Method* that support the student’s perception and understanding. These method and approaches effectively work through the association of speech with gestures, mimics, natural objects, and the communicational environment.

Another example of language teaching to a DHH population comes from Malec (2016), who taught English to DHH students at Lublin University. Her study revealed that at the beginning

level, learners must deal with different affective and cognitive factors (i.e., a negative attitude towards the language, lack of motivation and attention, and difficulties with memorization). The instructor used an oral communication approach to teach English, but when it was needed, she put into practice input enhancement using Polish sign language, fingerspelling, natural gestures, and lip reading to enhance comprehensibility. She taught students individually and in small groups, to get to know them better and focus on their needs and difficulties. In her article, she underlined the importance of having personal contact with the students in the teaching/learning process. Thanks to this interaction, the instructor was able to break down barriers not only related with communication but also with motivation, attention, and memory. Additionally, she developed a lesson plan for the elementary level in a one-to-one environment, where she used animated presentations including videos, images, and audio. The visual effects helped the student understand the content and kept the motivation at a high level. She also personalized the activities to encourage students to reflect on their experience. Malec's (2016) article suggests that multimedia supports the learning of DHH by (i) making the content educationally accessible, (ii) promoting skill development, and (iii) creating discovery learning experiences.

Regarding the type of specific instruction to HS with hearing loss, it is necessary to understand that these individuals need to focus on the speech production through the perception of specific linguistic cues (Swisher, 1989). According to Langston & Maxwell (1988), DHH students acquiring English as a first language are like L2 learners of English. They experience problems learning determiners, prepositions, the copula, and markers for verb tense. These issues lead to difficulties in complex structure formation. One of the disadvantages that these students often face when studying the language is the impoverished input they received. The reduced input through

auditory and visual channels often leads to students working with fragmented information for interpretation and comprehension purposes which results in a reduced level of proficiency.

After discussing the few relevant studies about the type of instruction used with HS who are DHH and some examples of its application, in the next section I will explain the target structure that I intend to teach to HS who are DHH using the auditory modality: Spanish gender agreement. I will also discuss how gender works in *American Sign Language* (ASL) and *Spanish Sign Language* (SSL). These are communication systems with which HS who are DHH may be familiar and could either assist them in their learning of gender agreement in Spanish or influence their processing of gender cues.

2.3.1 Spanish Gender Agreement

Unlike the English language which lacks grammatical gender markings, Spanish uses a binary gender marking system classifying nouns, determiners, and adjectives as either feminine or the default, non-marked, masculine (Alarcón, 2011; Carroll, 1989). Gender is assigned to every noun in Spanish either arbitrarily—in the case of inanimate nouns—or based on biological sex—in the case of animate nouns. Biological sex is a semantically inherent property of the nouns, whereas grammatical gender is assigned at the syntactic level and often participates in agreement relations with surrounding determiners and adjectives.

The canonical inflection for gender in Spanish is either an *-o* for masculine (e.g., *el bolígrafo* ‘the pen’) or *-a* for feminine (e.g., *la manta* ‘the blanket’). However, other nouns are non-canonical, having as an ending *-e* (e.g., *el coche*, ‘the car’; *el peine* ‘the comb’) or *empty set* ending with a consonant (e.g., *el camion* ‘the lorry’). In these cases, the gender cannot be inferred through their ending, so it is necessary to pay attention to the determiners and adjectives surrounding the noun to determine its gender.

In Spanish, all nouns are arbitrarily assigned gender in the lexicon that is represented with $[\pm f]$. Feminine nouns are represented with $[+f]$ such as *silla* ‘chair’ and masculine and neutral nouns with $[-f]$ like *cuadro* ‘picture’¹(Carroll, 1989; Carstens, 2000). As shown in the examples in (3)-(4) below, gender inflections on adjectives and determiners must always agree with the reference noun.

(3)	La	silla	pequeña
	$[+f]$	$[+f]$	$[+f]$
	The.FEM	chair.FEM	small.FEM

(4)	El	cuadro	famoso
	$[-f]$	$[-f]$	$[-f]$
	The.MASC	picture.MASC	famous.MASC

As pointed out in Vergara & Socarrás (2021) the gender agreement structures in (3) and (4) do not cause any type of comprehension problems in the auditory modality, even if the structures themselves contain gender agreement errors. However, the correct auditory processing of gender agreement in relative clauses with complex noun phrases as antecedents such as (5) becomes more relevant for comprehension purposes.

(5)	<i>Nuestros</i>	<i>amigos</i>	<i>ven</i>	<i>anuncios</i>	<i>de</i>	<i>películas</i>	<i>que</i>
	our	friends	watch	commercials. MASC	of	movies.FEM	that

¹ There are also infrequent irregulars such as masculine nouns ending in -a (e.g., *el problema* ‘the problem’) or feminine nouns ending in -o (e.g., *la mano* ‘the hand’).

son divertidos

are **fun.** MASC

‘Our friends watch (the) commercials of (the) movies that are fun.’

Example (5) shows that the noun phrase *anuncios* ‘commercials’ [-f] and the adjective *divertidos* [-f] ‘fun’ agree in gender as they are both masculine. Thus, to process gender agreement in relative clauses such as (5) one must first process gender cues in determiners (in the case of non-canonical nouns), nouns, and adjectives, and then identify the referent, i.e., the noun phrase, that agrees in gender with the adjective in the relative clause. In the case of a sentence like (5), correctly processing gender agreement is essential for identifying the right referent of the adjective. Failure to process gender agreement correctly may lead to the erroneous interpretation that the masculine adjective *divertidos* modifies the feminine noun *películas*, which is not the case. As the reader may have noticed, these types of sentences are completely ambiguous in English due to the lack of gender agreement in this language. This highlights the importance of developing methods and techniques to teach HS who are DHH to process complex Spanish gender agreement structures like (5) in the auditory modality to improve general sentence comprehension and help them resolve potential ambiguities caused by auditory processing difficulties in the heritage language.

Now that we have discussed the crucial target structure that may affect comprehension when presented in the auditory modality to HS who are DHH, I will now review how gender works in SSL and ASL.

2.3.2 Gender in Spanish Sign Language

Gender agreement in *Spanish Sign Language* (SSL) is not the same as in the spoken Spanish language; there is no gender agreement, and mostly all the signs are gender neutral. Inanimate adjectives and nouns are invariable words, although animate nouns are sex-

differentiated (feminine and masculine). There are different ways in SSL to biological sex (Morales López et al., 2020):

Male sex in this sign language is neutral, which means that if the sex is not signed, then the animate noun is automatically presupposed to be male, like in the case of all inanimate nouns such as objects. On the other hand, animate nouns of the female sex need to be accompanied by the female sign.

Figures 2

Sign for teacher



Note. For signing the word “teacher”, an image of a “hook” is formed by using the index finger and thumb and placed above the ear while motioning wrist back and forth towards the receptor. The female sign is produced by pinching the earlobe between the index finger and thumb. Adapted from LSE Fácil (2104).

There are some exceptions to this rule, such as kinship relationships (e.g., mother/father). As shown in Figure 3, kinship nouns are signed differently than nouns classified by their biological sex. This is also present in spoken Spanish, where there are heteronyms that show the difference in gender through lexical opposition, as in *madre* ‘mother’ or *padre* ‘father’.

Figure 3

Kindship nouns: mother and father



Note. The father sign consists of using a flat hand, with thumb tucked under palm, similar to how a hand is formed for a “salute”, that you touch first to the forehead and then to the chin. With the same hand formation, with fingers pointed upwards, you touch the right cheek followed by the left cheek. Retrieved from *Aprendelenguadesignos* (2019).

While the dactylogical alphabet would allow for gender to be specified, for example, spelling out *Ti-O* (uncle) or *Ti-A* (aunt) to emphasize the “o” masculine ending or “a” feminine ending, using the dactylogical alphabet to spell out words that are normally signed is not common in SSL. However, more recently it has become more common to see the technique of signing a particular word ending with the sign for the letter “a” or “o” from the dactylogical alphabet to indicate gender among individuals belonging to the younger generation (Garcia et al., s. f.).

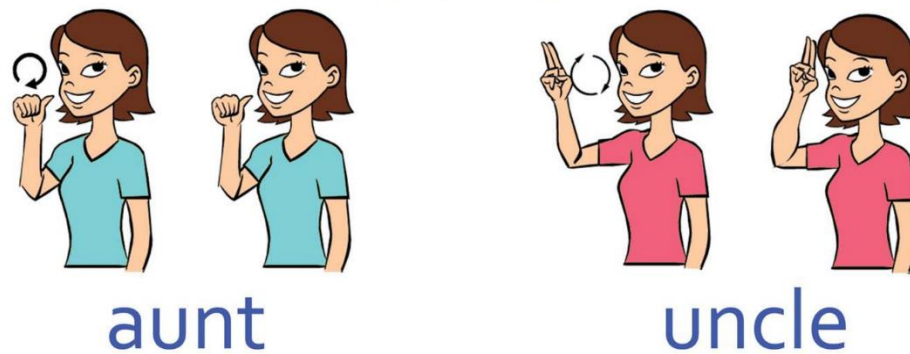
2.3.3 Gender in American Sign Language

Another sign language to take into consideration in this thesis is *American Sign Language* (ASL). The gender system in ASL, just as in SSL, it is neutral for inanimate nouns but displays

biological sex by adding an extra sign after the noun sign (Wilbur, 1995). However, ASL differs from SSL in the gesture configurations for the male and female sex, as seen in Figure 4.

Figure 4

Aunt and uncle in American Sign Language



Note. The sign for the word “uncle”, a biologically male sign, is signed by placing the index and middle fingers on the forehead and moving the hand in a circular motion. The sign for the word: “aunt”, a biologically female sign, is signed by placing the thumb near the chin and moving the hand in a circular motion. Retrieved from Frombirds (2022).

In summary, it is important to understand that both SSL and ASL are gender-neutral languages but allow for specification of gender through certain signs. This aspect of these sign languages could be utilized in instruction to support HS of Spanish who are DHH. Now I will discuss the previous studies related to processing gender agreement for normal hearing HS of Spanish and L2 learners.

2.4 Listening Comprehension

In this section, I will discuss the Cognitive Model of Listening Comprehension according to Vandergrift and Goh (2012). This model explains the learner’s strategies and mechanisms used to link linguistic hearing sounds and their meanings. Listeners must discern the spoken signals apart from surrounding sounds, segment them into units which will then become words, grasp the syntax of the utterance, and apply their linguistic knowledge to provide an appropriate response. These

subskills do not operate in isolation; they are in fact simultaneous, which is testimony to the complexity of listening comprehension. Hence, there are several reasons why listeners might fail to understand: they cannot perceive the utterance satisfactorily, divert their attention voluntarily or involuntarily or have difficulties understanding the syntax and semantics of the second language.

2.5 Input Processing

To develop their heritage language, HS must receive input from the target language through spoken or written modality. The type of input that an individual receives can vary depending on the context in which they acquire language. This input could take place in contexts like informal environments, such as at home or in their surrounding community, or in formal environments, such as the classroom. This factor will influence their proficiency of the heritage language. VanPatten (2002) proposed a model to explain the learner's strategies and mechanisms used to link linguistic forms and their meanings. In this theory, forms are extracted from input, which the model considers to be the main source of linguistic data. VanPatten, Williams and Rott (2004) define forms more specifically as the surface features of language, and these can be lexemes, inflections (nominal, verbal, or adjectival alike), complementizers, determiners, and language-specific particles. Meaning, on the other hand, can refer to concrete—a real-world object such as a table—displaced referential meaning—the same object taking a new meaning—sociolinguistic meaning—the meaning that an object acquired for a sociolinguistic community—or pragmatic meaning—a context-specific meaning the object acquires in an exchange of information. On the other hand, input theory from VanPatten (2012) is not intended as a complete model of language acquisition because it involves multiple processes—namely input processing, accommodation, and restructuring—which in turn contain subprocesses themselves. Input processing, for instance,

encompasses two subprocesses: making of the form-meaning connection and parsing. In this sense, Input Processing addresses only the first stage, as it intends to be a model of what happens during real time comprehension, at the beginning stages of acquisition. Consequently, in this model processing can also not be equated with perception, but one can assume then that it has already happened. VanPatten (2002) also gives a theoretical framework for teaching input through Processing Instruction, which is the idea that learners receive explicit information of target grammatical forms briefly, and this guides them to mentally process meaning manifested in the use of certain grammatical forms. This author agrees that input in the context of instruction must be comprehensible as well, and he gives the example of a teacher pointing, using gestures, and drawing on the board to “facilitate learner comprehension” and make the message comprehensible for the students (p. 33). The author also mentions the importance of using visuals to accompany input by explaining how “visuals such as photos and drawings ‘anchor’ the input in the here and now, making the idea and references to it more concrete” and how a visual piece “serves as the common ground” between the teacher and learner (p. 39). Regarding the current study, the explicit input that may be comprehensible for a HS of Spanish without hearing loss may not be comprehensible for the same type of students with hearing loss. Therefore, it is important to explore the ways that instructors can make input and explicit instruction comprehensible for these students. Consequently, in this study I will include visual elements, as the authors suggest, through the use of cued speech, natural gestures, sign language, and pictures. Since we know that DHH students already struggle to hear and understand input even more than the average student, implementing these teaching techniques may help make the input these learners receive more comprehensible and, eventually, facilitate learning of gender agreement patterns in Spanish.

2.5.1 Theoretical Foundations for the Roles of Attention and Awareness in Language Acquisition

There are different theoretical foundations with respect to the roles of awareness in language acquisition. For acquisition to happen, it is necessary for learners to be exposed to comprehensible input to fill in the gap between what the learners already know and what they are learning (Krashen, 1992). This hypothesis states that acquisition requires meaningful interaction between individuals in the target language, where learners are focused on conveying a message to someone and understanding the message they are receiving. Once the gap in information is filled, the next step is to restructure. Restructuring is the process by which learners reconfigure aspects of language and form new hypotheses in their minds as they receive correct input that differs from the language they already know (Leow, 2015). Also, according to Krashen (1992) the Input Hypothesis asserts “that we acquire more language only when we are exposed to comprehensible input.” (p.198). This refers to the language that contains a structure that is ‘a little beyond’ a learner’s current level of competence ($i + 1$), but which is comprehensible through extralinguistic cues directed to the learner. This means that the learner must be able to understand most of what the speaker is saying if acquisition is to happen (VanPatten, 2002). Besides, processing instruction implies (i) input, (ii) some sort of internal mental architecture and (iii) processing mechanisms that mediate between (i) and (ii).

One process that is a part of the language processing is noticing. According to the Schmidt’s noticing hypothesis (2012), noticing is the conscious awareness of the target language and its subsequent storage in a long-term memory. However, noticing is not just sufficient for learning, there are cases where a form is noticed and used in a certain moment that later never repeat that tense (Leow, 2017). In Schmidt’s Hypothesis (2012), attention is crucial for learning

and the focal attention to the new content, accompanied by noticing. Namely, for input to become intake (input that is comprehended and that impacts the learner's developing linguistic system) to happen some level of awareness is necessary. There are other hypotheses for the role of attention and awareness in SLA that are important to mention in this thesis. Tomlin and Villa (1994) explained that awareness doesn't play a role in the preliminary processing of input into intake during exposure. But some level of awareness in the immediate memory needs to be involved in the process of noticing that allows linguistic data to be taken in (Tomlin and Villa, 1994). In contrast, according to McLaughling's Cognitive Theory (1987) input processing may require different amounts of cognitive effort or level of processing depending on the difficulty of the task and the amount of controlled or automatic processing involved. Therefore, activating old information will require minimal attention. Robinson's Model of the relationship between attention and memory (1987) is similar to Schmidt's model (2012). There are different phases: first detection, then noticing, and lastly intake. In this model, the role of prior knowledge is involved in conceptually driven processes during the processing of intake.

Lastly, I want to explain the N.C. Elli's Construction-based, Rational, Exemplar-driven, Emergent, and Dialectic CREED theoretical framework (2007), according to the Construction-based perspective of language learning, the individual is making form-meaning connections during language acquisition. That connections are done in diverse format of construction; it could be from lexical items or abstract construction. In other words, the students learn and recycle language units than link lexical, morphological, and syntactic forms and structures with its corresponding function. For the purpose of this essay, this theoretical framework could be adapted to HS that have been exposed to the target language in their surroundings. For HS' learning this hypothesis

is important because it assumes that learning occurs from the construction of the frequency-based patterns they extract from multiple repeated associations created during the language use.

Some authors, like Gass et al. (2020), propose that for learning to occur, the student must be actively involved and interact with the target language. They suggest that the student must be conscious of what they are learning, like the concept of “noticing” proposed by Schmidt’s Hypothesis (2012). Other authors, such as Leung & Williams (2012) propose that learning requires the establishment of form-meaning connections, which is to say that they must be able to not only recognize and understand the forms presented to them, but also the meaning behind the message they are hearing for learning to take place. However, due to the fact that the mapping of form-meaning connections in the brain is systematic and too difficult to be assimilated using just implicit learning, the Leung & Williams (2012) propose that learning depends on declarative memory, long-term memory related to the events that the learners can recall. For this HS who are DHH population the connection between the visual support and the written representation will be a strategy that supports students noticing and, ultimately, their processing as well. In addition, Hopp (2020) suggests that learning a second language involves parsing, or the breaking up of sentences into separate components. This strategy is used by learners to detect and reject ambiguity in the input they are receiving (Hopp, 2020).

To sum up, input perception facilitates processing of the input. In this project, it is necessary to point out that HS who are DHH need comprehensible input based on visual support such as cued speech. They also need to be active and interactive learners of the language, aware of what they are learning, and make form-meaning connections to further develop their heritage language. As we know, HS usually only receive input through the familial environment. As a result, the formal instruction they receive must recognize their needs and provide them with support. These

means of support often include equipping them with strategies to use outside of the classroom that can help them in their development of their heritage language (i.e., noticing, making form-meaning connections, and restructuring). Next, I will discuss TBL as an approach to teaching language and explore how it could be beneficial to teach HS who are DHH process gender agreement auditorily in ambiguous relative clauses.

3 Previous Studies

To date, no research has investigated the phenomenon of auditory processing of gender agreement in HS populations who are DHH. Nonetheless, in this section, I will discuss a few studies on gender agreement processing by HS and L2 learners with normal hearing. My goal is to draw predictions from these studies that can inform the development of effective materials aimed at teaching how to use Spanish gender agreement information for comprehension to HS who are DHH.

3.1 Studies on Gender Agreement Processing in Spanish

In the article from Vergara & Socarrás (2021), the authors examined the auditory processing of gender agreement in 20 HS of Spanish and 20 intermediate L2 Learners of Spanish. As in the present research, the participants in this study were instructed to listen to stimuli containing two nouns with gender mismatches in the main clause, and an adjective in the relative clause that only agreed in gender with one of the nouns. Noun-adjective agreement accuracy was measured through an auditory forced-choice task where participants had to choose between two images. The image that they chose represented their gender agreement choices and whether they considered that the adjective agreed with the first or the second noun. The study found differences between HS and L2 learners in the processing of gender agreement in the auditory modality. Overall, HS performed

better at this task than L2 learners, however, both groups were more accurate when the adjective agreed with the first noun than with the second one. Additionally, their findings revealed that language proficiency and age of target language onset were significant predictors of gender agreement accuracy in HS but not in L2 learners. In other words, this research provides evidence that proficiency and age of Spanish onset are relevant factors to consider when dealing with HS who are DHH. Their study also shows that task modality favors HS over L2 learners. However, the fact that both groups were more accurate processing gender agreement auditorily when the adjective agreed with the first noun, suggests that it is important to teach students second noun *noticing* strategies. By noticing, I refer particularly to a surface level phenomenon that require students' attention with a low level of awareness (Mackey, 2006).

Another article related to gender agreement is by Montrul et al. (2008) where they examined oral production, written comprehension, and written recognition. In this experiment, HS had to perform three different tasks. The first task was in the written modality focusing on reading comprehension. In that experiment they tested recognition of nouns based on gender agreement on determiners and adjectives in noun drop structures. In the second task they tested the opposite, the written recognition of the correct masculine or feminine form of determiners and adjectives based on the ending of the noun. When compared to native speakers, over 50% of L2 learners scored within the same range as native speakers, while only 46% of HS performed in that range. The third experiment consisted of an oral picture description task where the participants used the structure (det+ noun+ adj). HS had better performance in oral production than in written comprehension. The study asserts that HS better performance was due how they acquired language, which is predominantly in informal environments, such as at home or in their surrounding community. Overall, considering the three tasks, HS were more accurate with masculine canonical nouns

because their processing appeared to be more automatized. The authors suggest that automaticity increases with competency. Conversely, the most difficult were the non-canonical gender formations that learners must memorize, especially the feminine forms for example: *la población* “the population”. Montrul et al. (2008) attribute HS lower performance to issues of transfer, as their participants showed an overgeneralization of masculine forms. Given that English is not specified for gender, HS tend to default to the masculine form in Spanish. Finally, the authors conclude that modality and the kind of nouns used (canonical/non-canonical) are important predictors of HS gender agreement accuracy.

Furthermore, an ERP study by Dowens et al. (2010) observed a correlation between proficiency and sensitivity to gender agreement violations. The study found electrophysiological evidence (i.e., P600 effects) during the processing of gender agreement violations in advanced L2 learners of Spanish. This suggests that even when grammatical gender is absent in their L1, proficient L2 learners of Spanish show the same electrophysiological response as native speakers. Dowens et al. (2010) also found that immersion experience in the L2 was correlated with a higher sensitivity to gender agreement violations. Alarcón (2011); Keating (2009); Sagarra & Herschensohn (2010) found similar results using several online tasks; a matching task, an eye-tracking, and a moving window reading task respectively. Alarcón (2011) observed that HS of Spanish exhibited difficulties processing gender in feminine non-canonical nouns, which she attributed to a potential reduction of Spanish input during childhood. Keating (2009) found that some gender agreement errors are made by L2 learners due to their deficits in processing, not underlying the competence (Keating, 2009). Finally, Sagarra & Herschensohn (2010) showed that proficiency and working memory have an influence on the sensitivity of gender agreement

violations by L2 learners. These studies observed that sensitivity to gender agreement violations develops steadily in the L2 and may be detected in intermediate and advanced learners of Spanish.

Lew-Williams & Fernald (2010) performed a similar study using the look-while-listening technique, which included three tasks. This study examined L1 English-L2 Spanish and how they respectively processed gender in determiners. They found that the presence of a congruent gender-marked determiner immediately preceding a noun sped up lexical processing in native speakers but not in L2 learners of Spanish. A subsequent auditory study with L2 learners of Spanish by Dussias et al. (2013) employing the same looking-while-listening technique as in Lew-Williams & Fernald (2010) found that learner's sensitivity to gender marking on the determiner was subject to proficiency effects. Higher proficiency L2 learners showed native-like patterns in using the gender cues in the determiner to speed up processing regardless of the gender of the determiner. This effect, however, was not found in lower proficiency L2 learners.

In summary, previous studies have observed that several grammatical factors may facilitate gender agreement processing, such as the default gender, noun canonicity (Montrul et al., 2008, 2013; Vergara & Socarrás, 2021), and gender marking on the determiner (Dussias et al., 2013; Lew-Williams & Fernald, 2010). Notice that all these studies focus on investigating L2 learners', and to a lesser extent, HS learners use of gender cues to determine their sensitivity to gender agreement violations (Dowens et al., 2010; Dussias et al., 2013; Lew-Williams & Fernald, 2010; Montrul et al., 2008; Sagarra & Herschensohn, 2010). Moreover, several studies (Alarcón, 2011; Dowens et al., 2010; Keating, 2009; Sagarra & Herschensohn, 2010; Vergara & Socarrás, 2021) revealed that proficiency plays an important role in gender agreement processing. As Montrul et al. (2008) point out, HS may have an advantage over L2 learners in oral tasks. Based on the previous

studies discussed in this section, I will consider the educational and spatial accommodation in the classroom for HS who are DHH.

3.2 Classroom Support for HS with Hearing Loss

The most common support for DHH students is to provide linguistic input through reading. However, as suggested by Shiman & Conrad (1977) and Moreno-Pérez et al. (2015), these learners have lower reading levels than students with normal hearing, not just lower listening levels. Because of that it will not be sufficient to give additional input just in the writing format to DHH. At the same time, speech alone is not a sufficient input for a DHH individual. Their communication skills need to be complemented by contextual clues as mentioned in Kushalnagar et al. (2011). Consequently, it is necessary to provide some visual support. According to Pritchard (2016) sign language could be an option by providing effective and efficient teaching at a pace that maintains their attention and motivation.

It is also important to provide accessory facilitators for DHH learning, which include adequate access to language, an accommodating environment, and confidence-building instruction. To engage, it is necessary for learners to have access to linguistic input in ample amounts to foster language acquisition. In addition, the environment should be low stress in order to ensure that students feel comfortable enough to practice. The instructor should help increase learner self-confidence, encouraging them to put into practice the knowledge they already have and use varied language learning strategies. These additional facilitators will promote an environment where learners will be willing to work together and sense a growing feeling of confidence in their language skills. Furthermore, setting day to day goals to promote achievement is essential so that students feel that what they learn on a daily basis is useful and that they will have the opportunity to use their knowledge practically. For the present study, the teacher should

take advantage of the prosodic stress of words to bring attention to the inflectional morphemes at the end of words. Grammatical gender morphemes in Spanish are usually found in this position and are not stress, which makes them acoustically less salient.

In addition, we must take into consideration spatial adaptations inside the classroom. For example, DHH students need to be strategically positioned in the classroom in order to enable the easy perception of sign language and speech reading (Malec, 2016). Learners should often work in small groups to avoid the interference of background noise. Instructors can also use teaching materials to visualize the information for the learners, such as films, animation, and smartboard programs that include subtitles. Finally, instructors should provide varied activities during a lesson to give the students a chance to change focus and rest their eyes (Gibbons, 2015).

Now that the basic educational conditions have been explained, I will discuss some experiments done with DHH students while acquiring a target language. According to Malec (2016), the support that should be included in the foreign language classroom is lipreading, the bimodal method, sign language, and visual aids. Students' abilities to lipread will depend on the level of hearing loss and their level of competency in the minority language (Giese, 2018; Hage & Leybaert, 2005). In addition, the bimodal method is a combination between spoken and signed languages, following the rules from the oral language. It is also used in educational environments and interacts with other resources such as lipreading (Monfort y Juárez, 1982). According to Domagała-Zyśk, (2013), HS who are DHH benefit from using visualization techniques through the use of sign language, pictures, cued speech, films, mind maps, posters and try to personalize the material for exercises. Therefore, peer interaction should be an appropriate and helpful accommodation for learners who are DHH.

Taking into consideration spoken languages, the study of Most et al. (2010) shows that students with hearing loss that use spoken language as their main source of communication had developed a pragmatic skill. Unlike their normal-hearing peers, they had developed specific strategies for coping with the difficulties they find during communication, such as turn taking, repair strategies, and preserving conversational flow. This finding shows the great significance of including interaction as part of the language teaching process—not only the student's interaction with the teacher but also among the students themselves.

To sum up, it is necessary to provide the students with tools to promote their language development in the classroom. Due to their hearing limitation, it is necessary to complement teaching materials with visualization strategies. Some strategies that will be useful for this project are the augmentative methods of Cued Speech, lipreading, and peer cooperation. I will now move to stating the predictions that can be extracted from previous studies regarding the teaching of gender agreement in the auditory modality to HS who are DHH.

4 Teaching Approaches and Strategies for HS who are DHH

In this section, I will discuss the teaching methods that are the most effective for HS who are DHH. I will center the discussion on how these methods can be implemented in the heritage classroom to aid those individuals with hearing loss. Based on Cornett (1967), Henry et al. (2009), Brandl (2008), and Kisselev et al. (2020) these are the main macro-approaches and strategies I am going to focus on: *Cued Speech*, *Input Processing* and *Task-Based Instruction (TBL)*. First, I will introduce Cued Speech because it is method that facilitates instruction by making language more visual. This method introduces gestures that can represent phonemes, which allows students to visualize gender inflection as it is uttered. Second, the Input Processing as stated by Henry et al. (2009) has two main processes: making form-meaning connections and parsing. These concepts

are further developed in the next section. Third, according to Nunan (2010) TBL principles are scaffolding, task dependency, recycling, active learning, integration, reproduction to creation, and reflection. This approach ensures students have the tools to complete the task. At the same time, this teaching approach is followed by the principle of learning by doing, cooperative learning, the use of the target language as well as students' previous knowledge.

4.1 Input Enhancement

4.1.1 Spanish Cued Speech

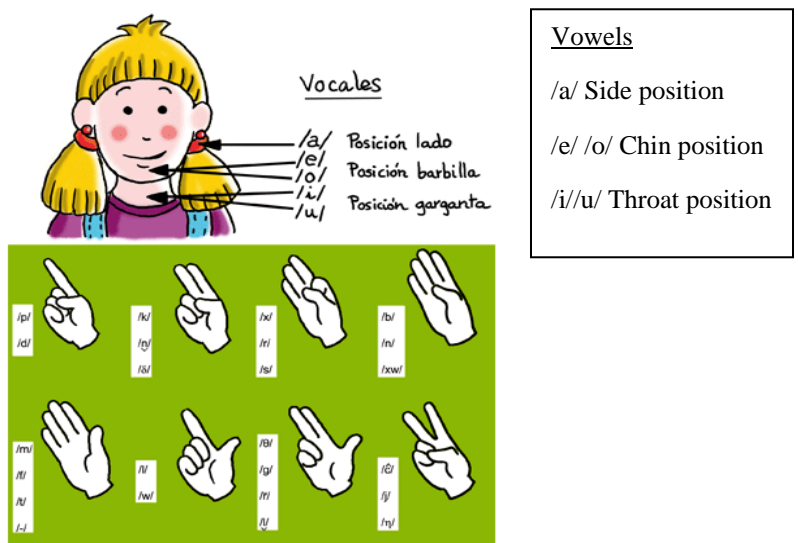
Cued Speech is a visual system created in 1965 by Dr. Orin Cornett to distinguish certain sounds and words that are indistinguishable when seen on the lips. This oral method consists of pairing handshapes with sounds, and by using this method near the mouth in conjunction with speech, spoken language can attain a visible form. Thanks to this support, DHH individuals are not dependent just on lipreading, but they also have visual access to the spoken language to help them distinguish the different phonemes (Giese, 2018). According to Cornett (1967), the goals that cued speech achieves are facilitating rapid learning and effective communication, eliminating, or reducing the emotional and mental distress produced by the fruitless efforts to communicate orally, and raising the level of clarity in the learning environment. Thanks to this method, the individual will feel more confident because potential ambiguities may be eliminated or reduced, due to the visual support provided by the hand, the lips, and facial expressions (Hage & Leybaert, 2006).

The main objective of this method is to complement the lipreading with eight hand configurations which are executed in three different positions next to the face. The handshape configurations (kinemas) identify the consonants through three parameters: position (base, larynx, chin, mouth), shape, and hand movement. All consonant cues are made with the palm toward the speaker; the speech reader, receiver, sees the back of the hand. While the vowels correspond to the

different places near the face where sounds are articulated, the consonants are referred to by the hand shape. Mouth-hand coordination must be combined with speech because each of these kinemas alone does not have any meaning. Furthermore, phonemes that do not look alike on the lips, e.g. /b/ and /n/ are coded with the same handshapes. The consonant sounds that look alike on the lips look different on the hands, and the group of consonants of each handshape looks different on the lips (Cornett, 1967). This system takes time to automatize while speaking. Figure 5 represents the different positions and the hand configuration to be able to use Cued Speech in the Spanish language:

Figure 5

Cued Speech in the Spanish Language



Note. Illustration taken from Llanos (2011).

Cued Speech is an enriching method to integrate into a heritage language classroom with students who are DHH. It could be used to develop different aspects of the language: phonological and morphological. This method helps the learners identify the phonemes with hand visual support. Furthermore, the individual has more information about the words morphologically because this

system makes visual the bound morpheme, which is basic for the grammatical gender agreement. In this project, I consider an augmentative method to be defined as the different forms of expressions to the objective to increase the level of expression (augmentative) and/or compensate (alternative) for the communication difficulties that some people present in the target language (Gómez et al., 2018). In the case of gender agreement, the augmentative method will help HS who are DHH differentiate between the canonical masculine ending ‘-o’ or the feminine ‘-a’ in Spanish nouns in the auditory modality. This method is supported by a study from Podlowska (2016) who stated that adults with severe to profound hearing loss were more eager to acquire English as a foreign language using cued speech. She also realized that the more cued speech exposure the students received, the higher their foreign language speech intelligibility was recorded to be. Thus, introducing these methods to our HS who are DHH will be extremely beneficial as it may help them identify phonologically less salient sounds that nonetheless carry important grammatical meaning. Recall that my teaching materials will be targeted to HS with mild, moderate, and moderately-severe hearing loss. Given that these populations’ hearing loss will be less than that of the students from Podlowska (2016), we can assume that they will greatly benefit from cued speech as they can also take advantage of their residual hearing with hearing aids. Finally, I also assume that my HS population will also have some previous language experience, which may facilitate acquisition. In the following paragraphs, I will provide specific examples of how cued speech works as well as how it can be operationalized in the heritage language classroom. Cued speech is used in each syllable of the word, as shown in Figure 6 with the word “*bola*/ ball”.

Figure 6

Ball in Cued Speech



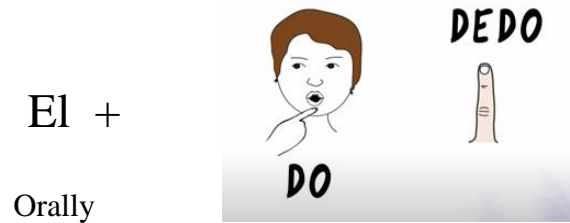
Note. The word “Bola” is two-syllabled: “bo + la”; the kinemas for this sound are represented above. The hand motion for “bo” is created by placing four fingers on the chin as the speaker pronounces the syllable. The hand motion for “la” is made by pointing a hand in the shape of a “check mark” towards the mouth as the syllable is pronounced. Illustration taken from Muñoz (2014).

However, as stated in Cornett, (1967), it is recommended to start introducing the vowels in cued speech and, after a few months, the consonants. In order to effectively use cued speech as an instructional support, it is necessary to adjust to the students’ level of hearing loss, oral comprehension, and familiarity with cued speech. This could be done by using cued speech more or less depending on these factors. For example, if a student has a higher level of oral comprehension, they may only need cued speech alongside certain types of words like determiners in the case of non-canonical nouns to be able to successfully perceive gender cues. This method will help HS who are DHH to perceive the phonemes that are associated with the gender of different words. In order to bring these phonemes to their attention, the instructor can utter the word aloud and make the hand configuration for the last syllable that emphasizes gender. An

example for the word *el dedo* “finger” would be saying aloud [el] with hand configuration for “el” followed by [dedo], as shown in Figure 7.

Figure 7

Adaptation from Cued Speech

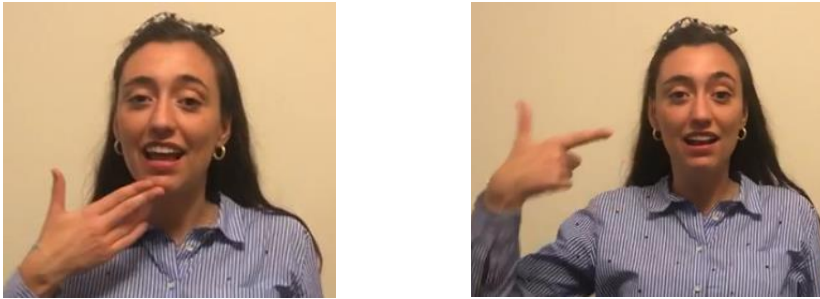


Note. The syllable “do” is emphasized by placing the forefinger on the chin as the syllable is pronounced. Illustration taken from Munoz. (2014).

According to the rules of Cued Speech, I will use kinemas to create signs for the determiners that precede nouns: one for the masculine determiner *el* and the other for the feminine determiner *la*. These gestures are shown below in Figure 8. When the hand configuration shown in the first picture is followed by the hand configuration shown in the second, the instructor can create the visual representation for the masculine determiner *el*. Following a similar pattern to the one in Figure 8, I will configure the kinemas for the feminine determiner *la*, shown in Figure 9.

Figure 8

Kinemas for “EL” (E + L) determiner



Note. The first picture shows the hand configuration of the vowel “E” and the second of the consonant “L”. For the masculine determiner, the kinema for the vowel [e] is made by placing the tips of your fingers on your chin. Then, the hand configuration for the consonant [l] is formed by pointing out your index finger and thumb in the shape of a “check mark”.

Figure 9

Kinema for “LA” determiner



Note. The hand configuration with the lipreading shows the consonant “L”, and where she points her hand represents the vowel “A”. The kinema for [l] is formed by pointing out your index finger and thumb in the shape of a “check mark”. This hand gesture points the cheek to indicate the vowel [a].

Additionally, the correct acoustic perception of the inflectional morphemes for gender (“-o” and “-a”) may help students identify gender cues in canonical/non-canonical nouns and adjectives and allow them to establish gender agreement relationships between them. The successful

implementation of this method will try to reduce processing problems by allowing HS who are DHH to process gender agreement relationships correctly even when there are two competing nouns. In addition to cued speech, I will take advantage of using prosodic stress, which is the strategy of emphasizing certain words in a sentence through stress in the voice. In the research by Defior et al. (2012), the authors analyzed the stress awareness and lexical prosodic skills on the spelling of isolated words, and this is translated into phonological awareness. According to the study just mentioned stress awareness plays an important role in the reading, spelling and provides phonological awareness in Spanish. Therefore, in my teaching materials I will use prosodic stress with cued speech in order to facilitate the processing of gender cues. This facilitative effect for a faster automatization of the processing of gender agreement for HS who are DHH.

4.2 Task-Based Learning

TBL is a pedagogical approach to language instruction whose main goal is to introduce real-world tasks that are connected to the needs of the learner ((Doughty & Long, 2005; Ellis, 2006; Nunan, 2010), among others. This approach prepares the learners to work in groups to perform the task successfully with the skills they already have acquired. According to this model, TBL has three different phases that have to be educationally adapted according to the students' needs and their language proficiency. In this case, it will need to be adapted to HS who are DHH. These phases (pre-task, during task, and post-task) reflect the chronology of a task-based lesson (Ellis, 2006). Many tasks-based models have been proposed: Brandl (2008), Nunan's (2005) and Ellis (2006). I decided to use Ellis' (2006) model because the sequencing of content is predictable for the students.

The first, "pre-task," is where the teacher prepares the students for the main task. This usually consists of pedagogical activities where students receive target-language input in the

classroom. The pre-task uses scaffolding, which is the technique that consists of the structuring activities to follow a logical order from input to output. During this phase, students receive temporary support in order to help them develop new concepts, new understanding, and new language abilities on their own. The scaffolding of these activities facilitates acquisition of the language. Dörnyei (2003) explains the importance of presenting the task in a way that motivates the student.

Pre-tasks are presented in four possible ways: (i) by providing students with an activity similar to the task they will develop in the next phase; (ii) by asking students to create strategic planning to face the task; (iii) by showing a model of how to perform the task; and (iv), by providing non-task activities that prepare them for the task. In other words, the main aim of this first phase is to scaffold learners' performance of the task that provides self-regulation so that they are able to complete the main task on their own. In the present project, I will use this method of task preparation. I will introduce the topic of gender agreement in canonical nouns through images, where the gender agreement between different determiners, nouns, and adjectives is presented with the support of cued speech and prosodic stress. The goal of this step is to teach them to "notice" gender visually in nouns, adjectives, and determiners. Once they recognize the gender agreement relationships in the phrases, it allows them to establish form-meaning connections, which facilitates the formation of a hypothesis about how the gender agreement system works in Spanish. Following these steps, the students will need to identify the potentially competing referent in sentences. For example, in a sentence like *Julia recuerda las canciones de los restaurantes que son nuevos* 'Julia remember the songs of the restaurants that are new', students will need to identify the gender cues in the feminine and masculine determiners in *las canciones* 'the songs' and *los restaurantes* 'the restaurants' as well as the masculine gender in the adjective *nuevos* 'new'. This

will allow them to process that the masculine adjective *nuevos* agrees with the second noun *los restaurantes* and not the first one.

The second phase, “during the task,” focuses on the task itself. There are three options for instructors to conduct this task. The first element to consider is time management. If the teacher chooses to set a time limit, students have to work under the pressure of time. This variable influences the nature of the language students produce and it affects in the performance’s accuracy. Secondly, students need to have access to a comprehensible input. This allows the students to access the input from the instruction while the task is being completed, which can “influence the complexity of the task” (Ellis 2006 p. 86). Lastly, it is important to introduce a surprise element into the task. This option could potentially add complexity to the task but allows students to form hypotheses about the content being presented to them. For example, in this project the surprise element could be to add a non-canonical noun in a sentence because in that didactic unit did not find that type of noun before. This could be included while students are reviewing a topic that they already know such as gender agreement in canonical nouns. The students will have to form hypotheses implicitly to determine how gender agreement works for non-canonical nouns and share these with the rest of their classmates. Then, in the next class, the teacher will provide more information about gender agreement in non-canonical nouns. This surprise element is a way to introduce new content while connecting their previous knowledge. How well the learners perform the task will depend on the students’ prior experiences, their motivation, and how the language-learning beliefs of the teacher that are brought to the specific task (Cheng et al., 1999).

The third and last phase is the “post-task,” which consists of the procedures following the task performance. There are two major pedagogical goals: (i) to repeat the task providing another opportunity to reflect on the task performance and (ii) review the contents that may prove

problematic. When learners repeat a task, their performance improves in varying degrees, thus, in this phase, it is important to increase the complexity of the activity. Willis & Willis (1996) suggests that reflecting on the tasks should be the last step of this phase. Student-reflections may have the form of a report that summarizes the outcomes of the task and allows them to evaluate their performance.

I decided to follow TBL because it is a teaching method supported by many research studies (González-Lloret & Nielson, 2015; Philp et al., 2006; Truscott, 1998; Gibbons, 2015; Bao & Du, 2015). TBL uses real-world tasks that the instructor both adapts to satisfy individual student needs, while also providing a wide variety of resources. Since TBL promotes speaking and interaction among learners, HS who are DHH will be able to practice their language skills while not having heightened anxiety, since they are provided with extra support and can interact in small groups. Another advantage of this method is that it maintains the perspective that it is better to use the Spanish language as a vehicle for communication, rather than as an object of study. Therefore, students do not just focus on grammatical explicit instruction, but they solve language puzzles by cooperating and interacting with each other, while having the teacher as a co-operator, facilitator, and resource. At the same time, since the main task of the activity is divided into different sections, it is easier to follow the students' progress and identify their strengths and weaknesses.

For example, if a student struggles when it comes to recognizing the gender in non-canonical nouns, which might be part of the pre-task, the teacher can provide different alternatives to address this weakness. These alternatives could include gathering the students in groups to perform activities or to create language hypothesis. TBL also allows for the inclusion of additional instructional support such as visual clues, cued speech and gestures. In addition, TBL provides

flexibility to focus on different skills and grammatical forms, as well as helping the language practitioners realize which aspects of the future lessons need to be revised.

Utilizing the TBL method in this thesis will allow me to create different activities that focus on teaching HS who are DHH how to perceive gender cues in nouns, determiners, and adjectives, along with helping them to process gender agreement patterns across sentences in the auditory modality. Since the pre-task is where preparation for the main task occurs, it is very important to provide HS who are DHH with needed support, such as cued speech, images associating the lipreading with the grapheme, and gestures to be able to successfully perform the activities in this section. This type of instruction takes the focus off the teacher and allows students to be active participants in their learning.

To sum up, based on the predictions outlined in the previous section, in this section, I have drafted guidelines for creating a curriculum to help HS who are DHH process gender agreement in the auditory modality. This curriculum follows Cued Speech, Input Enhancement, and TBL. Cued Speech and other visual clues such as pictures and videos, will provide clarity for an otherwise language segments that could not be processed. I expect that by making language more visual, I will not only be able to help HS who are DHH, but also normal hearing L2 learners. Using Input Enhancement, the students will create hypotheses after being exposed to comprehensible input. On the other hand, TBL is a method that facilitates the scaffolding of activities for HS who are DHH. Following this method, these students will be able to perform real-world activities to put into practice in the community context. By interacting with multiple groups students will be able to better develop their language processing.

In the next section, I outline the methodological considerations related to teaching materials for HS who are DHH based on previous research in order to address the auditory processing of gender agreement.

5 Predictions

Based on our previous research, I formulate the following predictions for teaching gender agreement auditorily to HS who are DHH:

- The findings from Montrul et al. (2008) show that HS benefit from oral tasks due to the type of input that they have been exposed to at home and in their daily lives. Therefore, I predict that the auditory processing of HS who are DHH would be similar to L2 learners because both of these groups have difficulties processing gender agreement in the oral modality. In the case of HS who are DHH, they have difficulties perceiving the last morphemes of the words (Giese, 2018). These phonemes are the bound morphemes “a” and “o” that provide the basic information to mark the feminine or masculine gender. Consequently, HS who are DHH may have difficulties if the gender is necessary to process the information they receive correctly, so I predict that if visual support is provided alongside an oral message, they will process this information more accurately. The visual support will consist of Cued Speech. In this way, the students will be guided to learn to perceive more accurately the different word phonemes and therefore reduce the gender ambiguity by understanding the gesture that indicates gender.
- According to Montrul et al. (2008), HS face difficulties with gender agreement with non-canonical nouns. Therefore, it is reasonable to assume that HS who are DHH will also follow this pattern. As a result, I predict that by providing visual support such as the last

word kinema from Cued Speech alongside canonical nouns, HS will process gender agreement with these types of nouns more accurately. At the same time, it is important to provide the determiner before non-canonical nouns along with pictures to afford them the opportunity to make connections between the determiner and the noun. Fostering processing as the students learn.

- According to Montrul et al. (2008), HS face specific difficulties with gender agreement in feminine nouns. Therefore, I predict that HS who are DHH will also have difficulties processing gender agreement with feminine nouns since they are also HS. In addition, I predict that providing visual support through the use of Cued Speech will reduce the difficulty of processing gender agreement in feminine nouns. If during instruction and language processing the instructor and the learners use kinemas (visual support provided by our hands) to represent determiners and bound morphemes, alongside feminine nouns and adjectives, this strategy will facilitate HS processing of gender agreement more accurately. As the hand configuration and the lipreading provides visual information about the gender of nouns and adjectives, this may help reduce potential ambiguities when processing gender agreement in the auditory modality in cases in which there are two nouns preceding the adjectival relative clause.
- Taking into consideration Vergara and Socarrás (2021), HS are better at auditory processing gender agreement when the adjective agrees with the first noun. I predict that HS who are DHH will face this same challenge and I will need to teach them how to use noticing strategies for identifying agreement in the second noun as well.
- Taking into consideration the research by Malec (2016) and Podlowska (2016), we predict that DHH students who receive instructional accommodations, including cued speech,

natural gestures, written support, and peer interaction, will be better prepared to process grammatical gender in the sentences that they hear. This support will allow them to better identify gender agreement patterns between the adjective in the relative clause and two competing nouns in the auditory modality.

- As suggested by Montrul et al. (2008) and, Vergara and Socarrás (2021), factors such as proficiency and language onset are predictors of HS' accuracy processing gender agreement. For this reason, I predict that considering factors such as proficiency and language onset will allow me to establish a baseline of heritage language proficiency among my HS who are DHH and adapt my teaching materials according to their needs.

6 Methodology

In previous chapters, I have broadly described the teaching methods as well as instructional strategies that are most beneficial for HS who are DHH. In the following sections, I will explain the methodological issues that need to be considered when dealing with this specific population in the classroom. Based on the educational strategies and approaches that I presented in Section 3 and 4, I will also introduce and discuss the didactic unit designed to facilitate the processing of gender agreement in relative clauses in the auditory modality by HS who are DHH.

6.1 Target Population

This thesis is focuses on students who are HS of Spanish with mild to moderate hearing loss. Subjects with an auditory deficiency cannot be considered a homogenous group since there are multiple variables such as the level of hearing loss (Holstrum et al., 2009), the type of input received (Pritchard, 2016), and the age of detection, which depend on the specific disability of the individual (Juliarena, 2012). The students that I will be focusing on are those individuals who are

studying intermediate-level Spanish. As I mentioned before, these individuals are bilinguals who grew up speaking Spanish at home and are familiarized with using everyday familial vocabulary and expressions. Because of their hearing limitation, the Spanish of these individuals may show a high degree of variability, and it is for this reason that practitioners should assess their language skills, dominance, and degree of hearing loss before instruction can begin. I will describe these assessment procedures in the following subsections.

6.2 Language Assessment

Considering that we are dealing with students who are DHH, practitioners should determine the degree of hearing loss of these students as well as their language dominance to establish a baseline and tailor their instructional materials to their specific linguistic needs. The tests that I will be discussing are audiograms, the Hearing Handicap Inventory (HHI) (Newman et al., 1991), and the Bilingual Language Profile (BLP) (Birdsong et al., 2012).

Before implementing the tests, I recommend that language practitioners conduct an interview to understand the students' profiles. Each student has their own characteristics, family background, and attitudes towards the target language that can positively inform language-teaching practices in the classroom. Additionally, any information that the instructor can gather about the students' previous academic performance in Spanish language courses will be beneficial to create an engaging and collaborative learning environment.

As part of the interview process, students will fill out the BLP questionnaire (Birdsong et al., 2012). This test assesses students' language dominance through self-reports, and as a result, outputs a continuous dominance score and a general bilingual profile considering the following modules: language history, language proficiency, language use, and language attitudes. Their responses to the questionnaire generate a score for each language. The subtraction of the English

language score to the Spanish one determines whether the students are more English dominant—negative score—or Spanish dominant—positive score. The score is calculated from 218 to -218, where “0” indicates balanced bilingualism. These results will predict linguistic competence, production, and perceptive accuracy in the language. The score and the questionnaire answers will determine which holistic language aspects need special attention so the instructor can adapt the content and the teaching accordingly.

In addition, practitioners should also use the HHI from the Northwestern University Audiology Clinic Test (Newman et al., 1991). The purpose of this test is to identify the effects that hearing loss has on the student through the completion of a questionnaire. The student has to describe how they hear without the hearing aid with “Yes”, “No” or “Sometimes”. Also, students may provide an audiology test in which the hearing level, the accommodation needed, and history of impairment (age of detection, type of hearing loss, etc.) are described. Instructors should also consider students’ methods of communication; that is, whether they employ an augmentative method (Cued Speech) or are familiar with sign language in their daily lives. Instructors should adapt to the type of academic accommodation needed for each student based on these results. For example, they could use Cued Speech to visualize spoken speech. If this is not sufficient, the instructor and the students can provide support via written format. Additionally, the instructor could use sign language for clarification.

A Spanish proficiency test may not be strictly necessary, given that the students are already enrolled in an intermediate language course. However, language practitioners should consider administering one, as the language background of these students may vary significantly, especially if we also consider their hearing impairment. Practitioners should also consider assessing the students’ familiarity with the Spanish gender and gender agreement system. These considerations

aid in the creation of activities that are tailored to their specific needs and facilitate the introduction of gender agreement in more complex structures, i.e., adjective relative clauses.

6.3 Discussion of Target Didactic Unit

The following didactic unit is designed with the goal of directing the students' attention to certain language features and procedures that may go unnoticed without explicit instruction, specifically, gender agreement between canonical and non-canonical nouns and an adjective. Given the specific disability of our target HS student population, it will be necessary to provide additional audio-visual and multimedia support such as Cued Speech, vocabulary charts, and videos to increase perception and ultimate processing of gender. These supports will be provided in the form of interactive and collaborative materials that allow students to become familiar with the target language structures in a safe, encouraging, and comfortable environment. The overall goal of each session is to help students broaden their vocabulary while providing them with strategies that facilitate the noticing of gender cues, which may ultimately aid them with the processing of gender agreement in adjective relative clauses with two competing nouns. Ideally, these materials will also help strengthen their bond with their heritage language and their community. The students' background knowledge of Spanish is highly influenced by their personal experience with the language in their families and the communities in which they grew up. These students have certain knowledge of familial Spanish which is related to the environment in which they grew up. Since the sample topic for this unit is about "the city and university campus," there may be new vocabulary that is unfamiliar to them. Therefore, the added supports in place are necessary to help them acquire this new, unfamiliar vocabulary.

The main objective of this didactic unit is to provide visual associations for gender morphemes to help students to perceive gender cues and then process gender agreement in the

auditory modality. This method is most useful for relative clauses that are ambiguous, like the sentences previously mentioned in Section 2.3.1. The input used is a combination of Cued Speech and visual support such as charts, color notation, and Spanish oral language, all aimed to assist student learning under the conditions of an auditory deficit. Cued Speech will provide visual support through the form of gestures for the gender morphemes in determiners, nouns, and adjectives. Moreover, the use of charts hanging on classroom walls will allow students to obtain essential and practical information. When necessary, ASL with mouth representation phonemes or images may be provided. The instructor will use a variety of strategies, such as confirmation and comprehension checks, non-linguistic input through body language, repetition, enhanced enunciation, and a slower speech rate to adapt to each student.

As mentioned in Section 4, this didactic unit utilizes a combination of approaches and strategies such as TBL, processing instruction, and perception. It is necessary to keep in mind that as the students are heritage speakers, social interaction and cooperative learning are key to advancing their oral communication skills. Due to this fact, the classroom will be broken into small groups where communication is promoted. As the students are exposed to comprehensible input and work in groups, they will eventually create their own language hypotheses about gender agreement using the visual resources given by the instructor. All the activities developed in this unit have the objective of achieving goals that are useful in the real world outside the classroom, such as learning to perceive gender cues to facilitate the auditory processing of gender agreement, with which HS who are DHH may struggle given the relatively low saliency of gender morphemes in Spanish.

For this didactic unit, the instructor will begin the instruction by using familiar words related to their close community, eventually advancing to novel vocabulary relating to the

university and their current surroundings. Thus, the lessons in this didactic unit will be presented to students in the following manner: During the first week, the instructor will introduce Cued Speech and connect it to gender cues. Throughout the second week, the instructor will introduce gender agreement using Cued Speech in familiar canonical nouns, and unfamiliar canonical nouns followed by an adjective. The instructor will also introduce non-canonical nouns, adding them in the vocabulary chart. In both cases, the students need to become familiar with the process of gender agreement and be able to operationalize it using Cued Speech. In the case of canonical nouns, these students will be taught to focus their attention on the determiner, gender markings on the noun and also in the adjective to process gender agreement. On the other hand, in non-canonical nouns, they will focus their attention on the determiner and the gender marking on the adjective. In the following paragraphs, I discuss the materials and procedures that will be used each day during the two-week didactic unit.

First Day

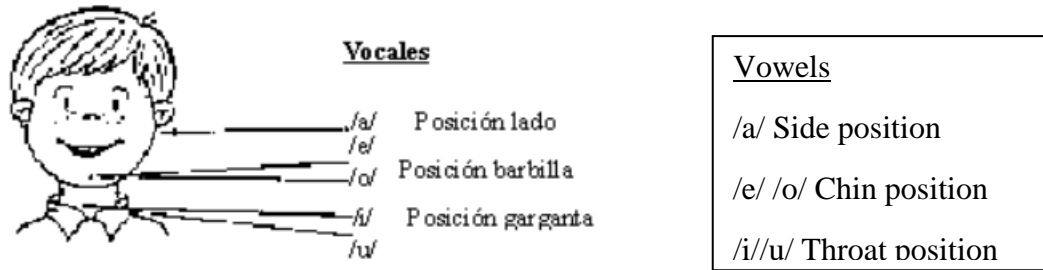
The goal of this lesson is to familiarize the students with gender morphemes in noun endings through oral emphasis and Cued Speech. The instructor will first introduce the Cued Speech system to facilitate grammatical gender perception as explained in Section 5.1. Cued Speech allows visual access to the spoken language, which helps distinguish phonemes for the hearing impaired. As the students might not be familiar with Cued Speech, the instructor should start with some basic notions.

Initially, the instructor should provide training on how to form vowels using Cued Speech, which is the simplest cue. This is achieved in two steps. First, the vowel kinemas will be explained, as shown in Figure 10. The second step involves pairing the hand configuration with the correct face position for the vowel, which may be achieved using videos (Munoz, 2014). Later, the

language practitioner will provide an example using this system to represent gender in familiar canonical nouns using Cued Speech.

Figure 10

Vowel Cued Speech Chart



Note. Vowel Cued Speech Chart. Retrieved from Montfort et al., (1992).

Cued Speech may also be supplemented with pictures of the canonical familiar nouns with their corresponding written graphemes using color notations (red for feminine and blue for masculine) for the last vowel. To bring these phonemes to attention, the instructor should emphasize the last vowel of the noun. The students will initially repeat the vowel normally then proceed to use the Cued Speech kinema and the prosodic stress for the additional repetitions, as shown in Figure 11. By the end of this session, the students should already be familiar with the use of Cued Speech to represent gender cues.

Figure 11

Kinema for vowel [a]



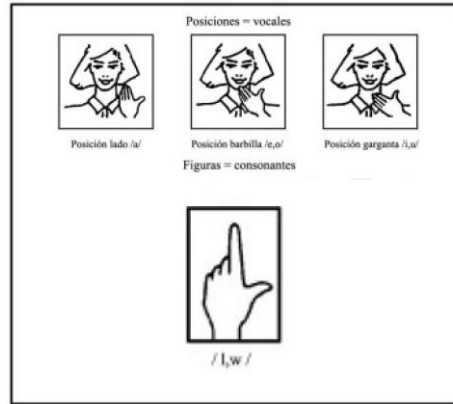
Note. Hand configuration of the Spanish feminine morpheme [-a],

Second Day

After the students have been introduced to the use of Cued Speech to mark gender in nouns, the goal of the second day is to use Cued Speech to introduce gender markings on determiners. The students will also learn about gender agreement between the noun and the determiner. To introduce the masculine determiner *el* and feminine *la*, the students will first need to learn how to gesture the phoneme [l] using Cued Speech followed by the vowel phonemes that they had learned in the previous lesson, as illustrated in Figure 12. The last vowel of written vocabulary words will have the aforementioned color notations. The instructor should also support the lesson with a visual aid: the chart from the phonemes studied in the previous lesson and a video from the [l] phoneme (Montfort et al., 1992).

Figure 12

Cued Speech Chart for the Phoneme [l]



Note. Cued Speech Chart. Adapted from Montfort et al., (1992)

Figure 13 shows an example of this new determiner addition using Cued Speech for the feminine determiner *la*. For this noun phrase, students will produce the determiner *la* aloud along with its hand configurations for the determiner, followed by the noun *bola* ('bowl') with its corresponding hand configuration for the feminine gender morpheme *-a*, which was previously illustrated in Figure 11.

Figure 13

Kinemas for the Spanish determiner la and the [-a]



Note. First image is [la] from the feminine determiner, and then the second image is from the last vowel of ‘bola’.

Third Day

The objective for this day is to help students notice gender agreement in phrases. To this end, once the student is confident using Cued Speech for the determiners and nouns, an agreeing adjective will be introduced to familiarize students with the process of gender agreement in phrases. The teacher will provide a color-coding notation to help students notice the gender morphemes in determiners, nouns and adjectives. In addition, students will gather in small groups to brainstorm and make hypotheses about which phrase elements participate in gender agreement in Spanish and share it with the classroom.

Subsequently, the teacher will produce the phrase *la bola mojada* (‘the wet ball’) and will ask the students in response to utter this sentence implementing Cued Speech. Later, students will be asked to create their own clauses using familiar words with the following new structure: DET + NOUN + ADJ. Then, they will be asked to produce them using Cued Speech and prosodic stress for the gender morphemes in the determiner, noun, and adjective.

Fourth and Fifth Day

The goal of this lesson is to help students perceive gender cues in determiners, canonical nouns, and adjectives in the auditory modality and allow them to participate in gender agreement error correction.

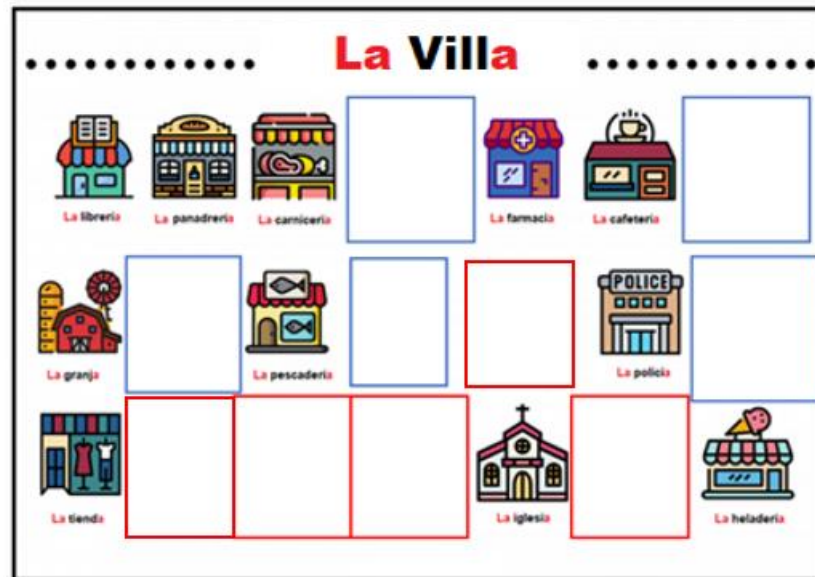
The lesson will begin with the instructor reviewing gender agreement with familiar nouns from the previous session by pairing them with Cued Speech and prosodic stress. The instructor will provide flashcards to the students that illustrate the target vocabulary and intentionally utter these phrases: DET + NOUN+ ADJ.

Once the students have had some practice with perceiving gender agreement in phrases with canonical nouns, they will be asked to create their own phrases following the same structure and share them with a partner using Cued Speech and prosodic stress for gender markers. If there are mistakes, the students are expected to correct their partner's utterance. The instructor will supervise and if there is confusion will help and guide them with correction, providing feedback, making the student focus their attention on gender cues or giving examples from different correct sentences.

On the next day, the instructor will introduce familiar vocabulary from the new unit *La Villa* 'The City.' This transition will be executed through a brainstorming activity. In this activity, the students will be asked to say aloud the words that come to mind with relation to the city while using Cued Speech in the determiner and noun endings as shown in Figure 13. The instructor will focus only on canonical nouns such as *la cafetería* 'the café' or *la iglesia* 'the church.' The students will be asked to classify the nouns using the color-coded frame for gender like the one in Figure 14; these pictures will be accompanied by their written support.

Figure 14

Canonical nouns chart related to the didactic unit



Note. Chart from the vocabulary from the unit. Adapted from Arche (2020).

For the last step of the session, the instructor will add images depicting the unfamiliar target vocabulary containing canonical nouns, such as *la granja* ‘the farm,’ *la sinagoga* ‘the synagogue.’ The students will be asked to say aloud the Spanish name from the pictures provided. Then they will classify these nouns according to their gender in a color-coded chart similar to the one provided in Figure 14. The goal is to engage and motivate the students to use the new vocabulary.

Sixth Day

The goal of this session is to introduce a surprise element, which are the non-canonical nouns, because it will allow students to become aware that non-canonical nouns do not have a gender morpheme at the end of the word, but that their gender is marked in the determiner preceding the noun. Because of that, the instructor will implement a new learning strategy to help the students perceive gender in the nouns’ determiner. Now the students will concentrate on the

determiner for perceiving the word's gender. Additionally, new vocabulary words will be added to the chart from Figure 14, focusing on non-canonical nouns. First, the instructor will bring a map of their university '*Mapa de la Universidad,*' seen in Figure 15.

Figure 15

Map from the university



Note. Map from the university campus, material for the seventh session. This material is retrieved from Álvarez (2016).

The map in Figure 15 allows language practitioners to introduce familiar non-canonical nouns, such as *la ciudad* 'the city,' *la cárcel* 'the prison,' *el cine* 'the movie theatre.' The students will be asked to say the name of the buildings aloud and the instructor will emphasize the determiner using prosodic stress and Cued Speech. After this, the instructor will uncover the non-canonical nouns from Chart 14. Once all the nouns are uncovered, the chart will look as in Figure 16.

Figure 16

Target Vocabulary Chart



Note. Chart from the vocabulary from the unit. Adapted from Arche (2020).

The goal is that the students acquire new vocabulary while paying attention to the determiner that precedes the non-canonical noun. For that, they will do a gap activity in the auditory activity where they ask questions to each other in order to complete their city chart by filling in the remaining buildings in Figure 14, since each student within a partnership will only have half of the completed chart. Students will need to ask questions to one another to guess the words that are missing in their charts. For example, *¿Dónde está el edificio?* ‘Where is the building?’ *¿Está cerca de la cafetería?* ‘Is it near the cafe?’. The color-coded frame provided in Figure 14 will allow students to perceive and process whether the noun is feminine or masculine and assign the correct determiner. Therefore, as the students write down the determiner and the non-canonical noun, they will operationalize gender agreement between these two elements, thus, increasing the perception of gender and allowing them to establish form-meaning connections.

After completing the aforementioned activity, the instructor will ask the students to work in groups to create a hypothesis about how gender agreement works with these non-canonical nouns. Once the students form their hypotheses, the group needs to check that the hypothesis works before sharing it with the rest of the class.

Seventh Day

Once the students feel confident using non-canonical clauses, they will be challenged to play a game to practice sentences with both canonical and non-canonical nouns. Before the game starts, the instructor will propose a vocabulary brainstorming activity related to the new vocabulary introduced in the sixth session. The students will also be encouraged to use visual support by drawing the new words mentioned in the brainstorming activity.

After the brainstorming, the students will carry out an activity similar to the game *Guess Who*, but using the vocabulary studied in this didactic unit. The students will be provided with the game board, which will have different pictures of buildings and familiar objects (canonical and non-canonical nouns), as shown in Figure 17. Working in pairs, the students will need to guess the building that the other person has chosen among the options they have on their board. To ask or give a description, the students will need to use the structure just learned and practice gender agreement with both types of nouns. For example: *¿Es la cárcel pequeña?* ‘Is the prison small?’, *¿Hay un árbol alto?* ‘Is there a tall tree?’. It is expected that the students will support all their questions with Cued Speech because they have already practiced speaking while using this technique. Overall, the goal of this activity is to allow students to operationalize gender agreement in canonical and non-canonical phrases while reviewing the target language vocabulary.

Figure 17

Guess Who Activity Board



Note. *Guess Who* board game. Retrieved from Teach and Learn (n.d).

Eighth Day

The goal of this session is to check if the students are able to perceive gender agreement cues in adjectival clauses containing canonical and non-canonical nouns. The students will be provided with the same university map in Figure 16 that was shown in the sixth lesson. In this activity, the language practitioner will utter directions to the students that will lead them to a specific location on the map provided. For these instructions, the language practitioner will use the structure (DET+ NON-CANONICAL/CANONICAL NOUN + ADJ) while also applying support through Cued Speech, prosodic stress, and visual cues such as gestures. An example of an instruction the language practitioner can provide can be *Sigue recto hasta encontrar el edificio amarillo* ‘Continue straight until you find the yellow building,’ *gira a la derecha en el centro estudiantil moderno* ‘turn right at the modern student center.’ The instructor will monitor the activity and evaluate the student’s ability to monitor gender agreement in the oral modality.

This activity will allow students to practice their perception of gender agreement through the establishment of form-meaning connections. As a follow-up activity students may pair up with another peer and give each other directions using the structure just mentioned. The aim of this second activity is not only to focus on gender agreement but also in the direction the individual is giving. Therefore, if the students are able to produce the correct gender agreement, then it can be assumed that the student has been familiarized with gender agreement. In the case that they make mistakes, the students will review the sentence and if they cannot find the error by themselves, the students will work with a partner to identify the error. They will use the following support, firstly they will read aloud their sentence using the prosodic stress focusing on the gender cues, as the last step they will write the sentence using the color-coding technique. It is expected by using these strategies they will be able to fix the error. If they are still unable to produce the correct utterance, the instructor will provide support and explicit feedback with a correct example.

Ninth day

The goal of the ninth session is to implement the strategies learned in the previous lessons for processing gender in relative clauses with two canonical competing nouns. The students will be gathered in groups and will read a relative clause sentence like *El profesor enseña en el gimnasio de la escuela que está limpio* ‘The professor teaches in the gym of the school that is clean’. The written modality is chosen to allow students to resort to visual support from the graphemes and color-coding strategy. This helps them focus on one modality at a time, so once they have mastered gender processing in relative clauses in the written modality, processing gender in the auditory modality should be easier (Montrul et al., 2008).

Once the students read the aforementioned sentence, they would be asked the question *¿Qué está limpio?* ‘What is clean?’. The goal is to answer the question identifying the sentence’s referent

without the instructor's help. It is expected that the students implement the strategies previously learned such as reading aloud using the Cued Speech and the prosodic stress, and if needed using the color-coding. Each group will share with the class their strategies and steps taken to identify the referent in the sentence given by the instructor. For example, one group could come up with these strategies:

1. Utter the sentence aloud.
2. Repeat the sentence aloud using the prosodic stress and kinemas from Cued Speech.
3. If there is doubt, write the sentence and pay attention to the ends of the words.
4. Use the color coding mentioned, circling in red the feminine gender morphemes and in blue the masculine from the determiners, nouns, and adjective.

Following these steps, the students will increasingly notice gender. Ideally, this is an independent activity, but the instructor will provide guidance when needed.

Once the students understand that the referent from that relative clause is *gimnasio* 'gym,' and not *escuela* 'school' because the ending of *limpio* 'clean' is masculine, they have successfully used a strategy to identify the referent in relative clauses with two canonical competing nouns. Having the strategies to process relative clause, they will be ready to start playing the *Puzzle Game*. The following activity will evaluate if the students have familiarized themselves and are able to perceive gender agreement in relative clauses with two competing canonical nouns. Additionally, the activity would also encourage students to produce their own relative clauses.

PUZZLE ACTIVITY

In this activity, the students will have different puzzle pieces where the canonical feminine nouns and adjectives are red and canonical masculine ones are blue. For this activity, the students

need to review this relative clause structure: DET + NOUN + *DE* + DET+ NOUN+ *QUE* + VB+ ADJ. It is expected that the students have seen this structure before. Now, the instructor will only focus on the gender agreement processing in this type of sentence.

(6) El edificio de la villa que
the.MASC buildingMASC of the.FEM town.FEM that
es viejo
is old.FEM

‘The building of the city that is old’

Once the students are familiarized with the relative clause structure, the individuals will gather in pairs. Then they will ask each other to create sentences following the structure they just learned while paying close attention to the sentence’s referent.

An alternative activity using the puzzle pieces related to this target vocabulary is one where one student chooses the adjective, and another must create a sentence with the puzzle pieces in his/her possession following the structure of the relative clause explained before. For example, the first student chooses the adjective *nueva* ‘new,’ so his partner must create a relative clause sentence using the canonical nouns and the target vocabulary from this unit. As an example, he could say aloud: *el niño compra el libro de la librería que es nueva* ‘the child buys the book from the shop that is new.’ Then the partner must check if he/she processed the gender agreement correctly paying attention to the gender cues using the support of Cued Speech, prosodic stress, and the color-coding.

10th Day

As they have created their relative clauses with canonical nouns in the previous session, the goal for this lesson is to make the students perceive gender agreement using the written modality.

For this activity, an individual reads the sentence like the one in the example in (7)². The instructor will then ask a question like *¿Qué está sucio?* ‘What is dirty?’

(7) *La muchacha limpia la ventana de el departamento que está sucia*

La muchacha limpia la ventana de el departamento que está sucia

‘The girl cleans the window from the department that is dirty’

To answer that question the students can read aloud the sentence using the Cued Speech support that will help them process gender agreement and identify the referent of the adjective. Students can employ the color-coding technique used previously to underline the gender cues, once the students see the gender cues, they will find the sentence’s referent.

After the students understand gender agreement between adjective and canonical nouns, the instructor will now introduce non-canonical nouns in relative clauses. The instructor will provide relative clauses with two competing non-canonical nouns like the sentence in the example 8. In groups, students will decide what the referent of the sentence is. This activity is like the previous one where the student will implement the same strategies than for the canonical relative

² Please note that in Spanish the preposition *de* ‘of’ fuses with the masculine determiner *el* forming *del* ‘of the’. However, I chose to purposefully separate the preposition and the determiner to facilitate the students’ perception of these two elements as distinct meaningful units.

clauses to notice the gender cues. In this case, they just need to pay attention to the determiners and the end morpheme in the adjective.

(8) *Esas estudiantes no arreglan el reloj de la pared que es amarilla*

Esas estudiantes no arreglan el reloj de la pared que es amarilla

‘These students do not repair the clock from the wall that is yellow’

By the end of the session, the students would be able to identify the referent in relative clauses comprised of canonical and non-canonical nouns in the written format. This strategy will help the students to perceive gender cues from the end of the words in the auditory modality. This written support makes the student perceive gender agreement and will help them process gender in the auditory modality.

11th Day

Once the students perceive gender cues in canonical and non-canonical relative clauses, the instructor will assess the gender processing through both canonical and non-canonical sentences in the auditory modality. The instructor will use a PowerPoint presentation with images depicting different sentences (canonical and non-canonical nouns in relative clauses). As the students have had the written support previously, it is expected that the students will be able to put into practice what they have learned using only the auditory modality while also implementing aural strategies such as prosodic stress and Cued Speech.

After the instructor reads the sentence aloud, she will show two images as options for the possible referent from the sentence presented. Then, in the same PPT slide, a question will be asked relating to the adjective from the sentence: ¿QUÉ ES/ESTÁ + ADJ (Adjective from the sentences heard)? “WHAT IS +ADJ?”. The students use their fingers to point at the correct

referent, while they process the determiners and the gender morphemes from the words they have just heard.

- (9) The instructor says “*La muchacha limpia la ventana de el departamento que está sucia*”
‘The girl cleans the window from the apartment that is dirty’.

The instructor will ask: “¿*QUÉ ESTÁ SUCIA?*” ‘What is dirty?’

Figure 18

Pictures from the Powerpoint



LA VENTANA



EL DEPARTAMENTO

Note. This is an example from the images that are in the Power Point Slides. Retrieved from Pyshnograï (n.d).

First, the sentences will be provided in the auditory modality, however students can still use the images as support. They will still need to point to the images to choose the referent of the sentence (i.e., the noun that agrees in gender with the adjective). The learners will have to process the gender of the word by themselves just by listening to the sentence provided.

Another activity is using the Kahoot app. The activity goal is to help with the processing of gender agreement using the strategies learned to be able to recognize the sentences’ referents.

The instructor must prepare a wide variety of canonical and non-canonical relative clauses that could be read aloud with no visual support provided. Some sample sentences are:

- (10) *Esas estudiantes no arreglan el reloj de la pared que es amarilla* ‘Those students do not fix the clock from the wall that is yellow.’
- (11) *La policía no inspecciona el hospital de la ciudad que es pequeña.* ‘The police don’t inspect the hospital from the city that is small’
- (12) *El estudiante visita la urbanización de el parque que es famoso.* ‘The student visits the neighborhood from the park that is famous’

(More examples of canonical and non-canonical relative clauses are provided in the Appendix 9.1.)

The students will be divided into groups of four and will be provided with one iPad per group to submit their answer. The objective is to check whether students are able to process gender by applying the strategies they learned in the previous sessions. As they are using the Kahoot app, a new factor is added: the limit of time. The students will have one minute after the instructor reads the sentence to decide the referent of the sentence. According to Ellis (2006) time limit will increase the student’s anxiety and this will be reflected in the answer that might be less accurate than with unlimited time. However, adding a time limit can also help students with automatizing the processing of gender agreement.

By the end of this session, the desired outcome is that students will have become familiar with gender agreement by using strategies such as prosodic stress and Cued Speech. By noticing both the determiners and the gender cues from the adjective, the students will put into practice

their processing of gender agreement to identify the correct referent in ambiguous relative clauses in the auditory modality comprised of canonical or non-canonical nouns.

7 Discussion

This didactic unit explained and implemented a combination of strategies to facilitate HS who are DHH to process gender agreement in relative clauses with two competing nouns. During the whole didactic unit, the instructor will focus on helping students develop their processing of gender agreement in both the written and auditory modalities to best support HS learning. Firstly, the students will be introduced to Cued Speech, which emphasizes and helps students visualize the less salient sounds in nouns, adjectives, and determiners. This information is key because it allows students to notice gender cues and facilitates the processing of gender agreement. The second part of this didactic unit focuses on grammatical gender agreement. The students through cooperative learning will start making hypotheses of gender from the simplest phrases with adjectives and canonical nouns, and later, using non-canonical nouns followed by an adjective. To continue, the students are introduced to relative clauses with two competing nouns, first with canonical and then non-canonical nouns. It is necessary to have this scaffolding from phrases to relative clauses because it is beneficial students benefit from one aspect at a time and later be able to make their own hypotheses with the previous and the newly acquired content. This unit uniquely encourages the students' autonomy in their learning by having them make their own hypotheses, which encourages the retention of what they have learned (Schow & Nerbonne, 2018). Thanks to this scaffolding, the students might be able to process more effectively gender agreement. Additionally, this lesson plan caters to the students' unique hearing limitation, which can cause these individuals to feel insecure or unconfident communicating in their less dominant language in social environments. These feelings can affect them emotionally, psychologically, and socially. Also,

since the students are attending university while learning this new content, they are more likely to be motivated to learn this topic because it is related to their current environment. The fact that this unit implements the inclusion of student background knowledge will allow the students to play a more active role in the classroom and in their learning while reinforcing the bond they have with their community.

Based on research mentioned in the background such as Dörnyei (2003), Dussias et al., (2013), and Vergara& Socarrás (2021) the students will be able to process gender agreement more efficiently if they use and work with strategies both in the auditory and in the written modality. In the auditory modality, the support provided is the Cued Speech and prosodic stress, which emphasize and visualize the speech. In the written modality, the strategies are color-coding (used to increase the noticing at the end of the words and the determiners), images, and videos. These strategies will help the student to perceive of the gender cues from the key words. The addition of cued speech to the images provides a unique learning experience for HS who are DHH. Conversely, the classroom can be beneficial for the student because it allows them to be more conscious of the language through the visualization of the written representations of words; and take advantage of the classroom space itself to create a cooperative learning environment.

Finally, there has not been much research in recent years focusing on HS with DHH or their language learning and maintenance, so this project present an innovation by combining language acquisition with deafness.

8 Conclusion

This study is relevant because little to no research have been carried out on the language acquisition and/or processing of HS who are DHH. The aim of this interdisciplinary study was to provide resources and materials to instructors that teach HS who are DHH by presenting a sample

didactic unit which was connected to the students' environment and experiences. This would support their maintenance of the minority language and their bond with their community and identity as Spanish speakers.

Moreover, this thesis is innovative because the methods used in the didactic unit are not only beneficial for HS who are DHH, but also for L2 learners with normal hearing levels. If we consider that both groups face similar difficulties in the processing of gender agreement in Spanish, the strategies employed in this thesis to emphasize the key elements for processing gender, such as Cued Speech, prosodic stress, and color-coding notation, could also be useful, if adapted, to L2 learners who may have different learning styles (e.g., visual, auditory, and kinesthetic).

Although the proposed didactic unit has the potential to help Spanish HS and L2 learners alike in their processing of gender agreement, it is not without limitations. One possible limitation for HS instruction could be the variation in students' language competence. Depending on the language learning context in which the students grew up, they can develop different levels of competence in the minority language. The materials provided in this study are aimed at students with an intermediate level of conversation or speaking, which unfortunately, leaves out more advanced language learners. However, it is important to keep in mind that relative clauses follow a complex structure, and consequently, even more advanced individuals may also struggle with processing and producing these types of sentences.

Finally, another limitation is related to the language skills that are targeted throughout the unit, which in this case are speaking and listening skills. The desired outcome for students after working through this unit would be that they could extend inductively what they have acquired to both writing and reading.

9 Appendix

9.1 Sample sentences used in didactic unit

Canonical gender nouns

High attachment masculine

El profesor enseña en el gimnasio de la escuela que está limpio.

‘The teacher teaches at the gym from the school that is clean’

High attachment feminine

La muchacha limpia la ventana de el colegio que está sucia

‘The girl cleans the class from the school that is dirty ’

Low attachment masculine

Me gusta la cafetería de el pueblo que es pequeño

‘I like the café from the town that is small’

Low attachment feminine

Ese hombre descansa en el suelo de la oficina que es vieja

‘That man rest on the floor from the office that is old’

Non canonical gender nouns

High attachment masculine

Él visita el café de la ciudad que es oscuro

‘El estudiante pasea por el estanque de la universidad que es pequeño’

High attachment feminine

El estudiante visita la urbanización de el parque que es famoso

‘The student visits the neighborhood from the park that is famous’

Low attachment masculine

Nuestra amiga nunca visita el jardín de el ayuntamiento que es hermoso

‘Our friend never visits the garden from the town hall that is beautiful’

Low attachment feminine

La policía no inspecciona el hospital de la ciudad que es pequeña.

‘The police don’t inspect the hospital from the city that is small’

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