Auditory Processing in Learners of Spanish as an L2: The Role of Redundancy

by

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Abstract

The purpose of the study is to assess the effects of redundancy on global perception and comprehension in sentences, as well as the processing of the meaning of morphological markers by learners of Spanish as a second language. The study followed an experimental design, and overt subject-verb agreement redundancy was chosen as the target structure. A total of 63 English-speaking learners of Spanish completed the experiment, which consisted of a written recall task to measure perception, a translation task to measure comprehension, and a sentence interpretation task to measure input processing. The experimental sentences featured an overt subject, while control sentences featured a null subject. The results of the input processing task suggest that the inclusion of an overt subject; that is, redundancy, had a facilitative effect on the processing of morphological markers. The results of the remaining tasks are inconclusive regarding the role of redundancy on perception and comprehension. These findings contribute to the body of research centered around the Input Processing theory and the distinct phases of the listening comprehension process.

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It’s thanks to my family that I have achieved past and present goals. For this one, I’d like to thank Dr. Gilda Socarrás for her support, timely feedback, and the afternoon snacks that made work meetings fly by. I’m also grateful to Dr. Daniel Vergara and Dr. Allison Plumb, members of the committee, for their valuable contributions to this project. One final word of gratitude goes out to Auburn classmates, coworkers, and friends who made this a one-of-a-kind experience.

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1. BACKGROUND AND THEORETICAL FRAMEWORK

1.1. Introduction

In the field of second language acquisition (SLA), it is generally agreed that listening is an undervalued and under-researched skill, as compared to reading, and specially speaking and writing (Bloomfield, Wayland, Blodgett, & Linck, 2011; Field, 2008; Vandergrift, 2007), despite progress made over the last two decades. More specifically, there is scant research about listening comprehension, most notably a lack of empirical research on the factors that might affect second language (L2) listening comprehension. Moreover, most second language comprehension research has focused on reading instead, which is seen as a skill that is easier to observe and manipulate in experimental settings (Bloomfield at al., 2011). Nonetheless, listening comprehension plays a vital role in interpersonal communication, without comprehension, no information can be exchanged; hence the need for research to shed light on this process.

The paucity of research might also have to do with listening often being perceived "alongside reading, as a passive language skill" (Anderson & Lynch, 1988, p. 6). The authors consider this a misconception given that listeners are not passive agents who are merely limited to perceiving. On the contrary, they must activate several sources of knowledge and simultaneously apply them to the acoustic signals they are receiving, with the aim of understanding the message the speaker is conveying.

Field (2008) adds that, since listening takes place in the listener's mind, it is more difficult to assess. Speaking and writing are tangible, while reading passages are easier to manipulate. The consequence is that listening comprehension is often undervalued in the list of priorities in language-learning settings. An additional difficulty, he adds, is erroneously equating first

language (L1) and L2 listening competence. In a language-learning context, for instance, it is assumed that the L2 learner will automatically acquire the skill, with little to no classroom intervention. However, listening takes place in real time. For L2 listeners, particularly beginners, a stretch of speech that was not properly understood cannot be reheard unless it is repeated. This is not the case with reading texts, since the reader can easily go back to the sentence that was not processed accurately. Failing to connect a speech string to words with meaning because of limited proficiency and working memory might then lead to a loss of confidence and motivation to learn the language. In short, listening plays a capital role and, as a skill, it is just as important as reading, writing, and speaking.

In this study, redundancy is singled out as a passage-related factor that might affect listening comprehension and whose potential effects will be assessed. The present section is an overview of the relevant theoretical framework and background of this study. Section 2 introduces the purpose, research questions, and hypotheses. The methodology chosen for the study is detailed in section 3, while the results are presented in section 4 and discussed in section 5. Finally, general conclusions and future avenues for research are outlined in section 6.

1.2. Theoretical framework

1.2.1. The listening comprehension process

Having underlined the key role listening comprehension plays in L2 acquisition in the introduction, it is important to define the processes and phases that make up this construct. Anderson and Lynch (1988) propose that there are several subskills involved in the listening process: 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 providing an appropriate response. These subskills do not operate in isolation; they are in fact simultaneous, which is testimony to the complexity of listening comprehension, as seen in Figure 1. 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. The specific processes and phases involved in listening comprehension are presented in Figure 1 below and outlined in the following discussion.

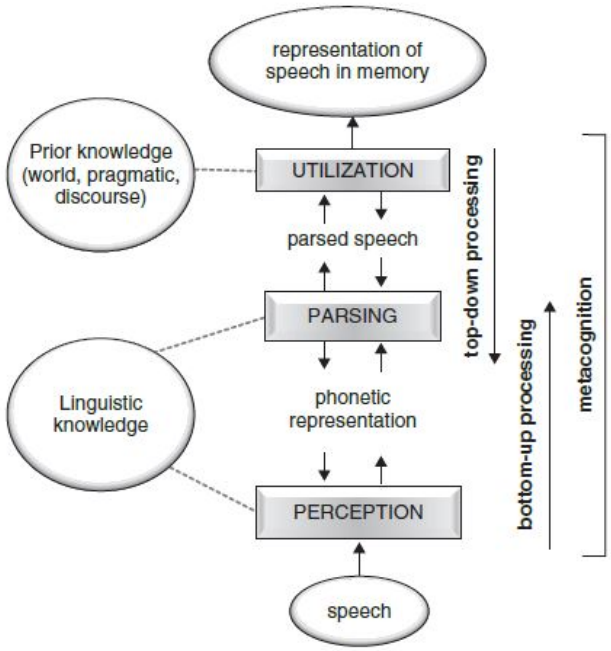

Figure 1. Cognitive Processes and Knowledge Sources in Listening Comprehension

(Vandergrift & Goh, 2012, p. 27)

1.2.1.1. Types of information processing

Vandergrift and Goh (2012) provide an up-to-date overview of the processes involved in listening comprehension, which they define as a cognitive skill of a complex nature that must

operate automatically for processing to be efficient. The first distinction to be made is between two types of processing: bottom-up processing and top-down processing. In bottom-up processing, the sound stream is segmented into meaningful units. Listeners then build the meaning of the message through accretion, all the while basing their interpretation on their knowledge of the segmentals and suprasegmentals of the language they are using. Hence, the knowledge applied in bottom-up processing is mostly linguistic; be it phonological, lexical, or syntactic knowledge (grammar). In top-down processing, on the other hand, listeners apply their knowledge and context to the interpretation of the message. This knowledge can be of an experimental (prior), pragmatic, cultural, or discursive nature, and it is stored in the listeners' long-term memory.

While they may seem to be separate entities, top-down and bottom-up processing are in fact interdependent. The degree of use of one type of processing over the other will depend on the purpose for listening; i.e., to gain new information or to test a hypothesis or an assumption, among others. It is this purpose that will decide what the prevailing type of processing will be, while the success of the overall process will depend on the degree to which listeners coordinate the two types. This poses no major difficulty to L1 listeners since they have already acquired the competence to do so in their native language. However, L2 listeners, particularly those in the beginning stages, have limited linguistic knowledge. In addition, because of varying speech rates and the assumed limited working memory capacity, L2 listeners might not be able to keep up with the speech stream. As a result, they cannot process everything they perceive as efficiently. Therefore, they might have to consciously choose to focus on a specific element of the input, such as content words.

1.2.1.2. Phases of the listening comprehension process

Based on Anderson (1995), Vandergrift and Goh (2012) propose their own model of three phases involved in the listening comprehension process: perception, parsing, and utilization. Perception refers to the listener's recognition of acoustic signals as words or meaningful units of language. During this phase, through bottom-up processing, listeners recognize sounds, pauses, and emphases to store them in working memory.

The information perceived is later transferred to parsing, the second phase in this model, which refers to the segmentation of the speech stream according to syntactic structures or semantic cues to create a mental representation of the words and their meaning. Finally, in the utilization phase, the parsed mental representation is linked to the listener's long-term memory knowledge, the context and tone of the message, the information about the speaker that is known, and any other relevant information. During this last phase, the listener primarily applies top-down processing to a speech stream that has been parsed to transition from the literal meaning that has been decoded previously to the intended meaning of the speaker's message.

As we have seen in the previous discussion, listening comprehension is a very complex cognitive process, even more so in an L2. It requires the decoding of an acoustic signal perceived by the auditory system, the construction of meaning of that original signal and the interpretation of the parsed message using the available knowledge sources.

Regarding the factors that might affect L2 listening comprehension, Bloomfield, Wayland, Rhoades, Blodgett, Linck, and Ross (2010) provide a comprehensive overview that divides the factors into three main categories related to the following elements: the listener, the passage, and the testing conditions. The first category encompasses factors such as working memory, proficiency and previous experience with the L2, as well as anxiety. Passage-related

factors go from length, density, redundancy, and complexity to organization and auditory features. Finally, the testing conditions encompass time limits, repetition of the passage, and note-taking. The present study singles out redundancy, a passage-related factor. The following discussion addresses Input Processing theory from the field of SLA that would serve as the framework to assess redundancy effects in L2 auditory processing.

1.2.2. Input Processing

A central goal of cognitive linguistics in SLA is to explain how learners acquire a second language. This stems from a common assumption in this field that humans have a limited cognitive processing capacity. In particular, research has focused on addressing input processing and the factors that might intervene in this process. Within the input processing framework in SLA, VanPatten (1996, 2002, 2004, 2007) has proposed a model to explain the learner's strategies and mechanisms used to link linguistic forms and their meanings, the Input Processing theory (IP)[1].

In the IP 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 such as "*y*" (here/there/to) and "*en*" (about, some) in French. Meaning, on the other hand, can refer to concrete, e.g. a real-world object such as a table, or displaced referential meaning, e.g. the same object taking a new meaning, sociolinguistic meaning, e.g. the meaning that object acquired for a sociolinguistic community, or pragmatic meaning, e.g. a context-specific meaning the object

[1] The term is also not to be confused with Processing Instruction (PI), which is a type of explicit grammar instruction informed by the findings of IP.

acquires in an exchange of information. As for the connections that can be established between form and meaning, meaning can be attached to only one form, a form can convey several meanings; or the same meaning can be shared by several forms. An example of this last case is illustrated in sentences like “I will study tomorrow”, where both “will” and “tomorrow” indicate that the action will be performed in the future.

VanPatten (2004) states that the IP theory is not intended as a complete model of second 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, IP 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.

The input that has been processed in working memory is later turned into intake; i.e., the resulting set of input that will then be available for further processing. This means that IP is also not meant to be a final state model, but rather a model of how sentences are processed online and how forms may or may not be connected to a meaning. In doing so, it accounts for the processing of input into intake; whether intake is accommodated into the learner’s developing system and later restructured is outside the scope of the model. Figure 1.2. below illustrates IP’s place in the acquisition process.

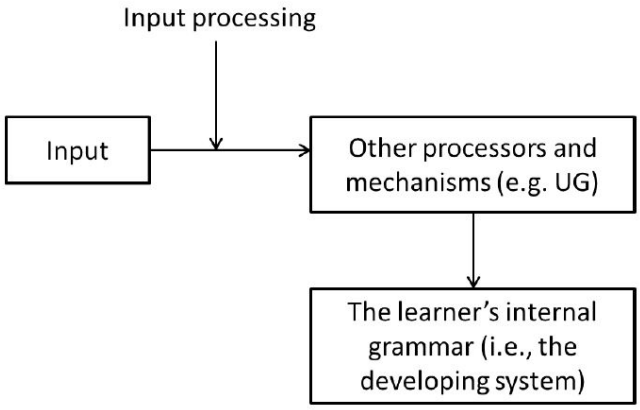

Figure 1.2. Where IP fits into an acquisition scheme (VanPatten, 2007, p. 117).

VanPatten's (2007) IP model makes several elemental assumptions to explain and make predictions about the strategies learners adopt when making form-meaning connections. First, learners are mainly focused on the extraction of meaning while comprehending input. Second, listening is effortful for L2 listeners in the beginning stages because of cognitive processing and working memory load limitations. Third, L2 learners have a limited processing capacity because they cannot process and store information as quickly as a native speaker would. Fourth, learners might resort to both universal and L1-specific parsers.

1.2.2.1. The principles

Based on the assumptions enumerated in the previous discussion, the IP model presents a series of principles meant to account for what happens when L2 listeners are exposed to a stream of speech and start making form-meaning connections. The principles are highly interdependent and interactive; although they might also override each other in specific cases. There is a total of ten principles outlined in the most recent update of the IP model (VanPatten,

2007), which are not presented here in order of importance, but rather in terms of how they relate to each other. They can be divided into two groups; namely, main principles and principles that might override previous ones. As a fundamental part of the IP theory, the role of the principles in this study is to help make predictions about the strategies listeners will adopt to comprehend and process aural input. The following is an overview of the principles and the predictions they make:

1) The Primacy of Content Words Principle: the guiding principle of the IP model states that "[l]earners process content words in the input before anything else" (Van Patten, 2007, p.117). This means that upon hearing the speech stream, learners will first process the words that carry meaning; in other words, forms that are not grammatical. For instance, if they hear a sentence along the lines of "the boy is eating," they will first single out the meanings of BOY and EAT, and then, move into processing form. In addition, learners are also aware that there is a difference between content lexical items (*boy* and *eat*) and noncontent lexical items (*the* and *is*). Learners are more likely to process content words before noncontent words and inflections on nouns and verbs. As can be seen from the example, the connections will mostly be lexical.

2) The Lexical Preference Principle: this principle accounts for what will happen if two forms—one lexical and one grammatical—encode the same meaning in an utterance In this scenario, the IP model predicts that learners are more likely to process the lexical form instead of the redundant grammatical marker, given that the learner's attentional resources are focused on processing the content words first. In the sentence "I walked to school yesterday," both the *-ed* tense suffix and the adverb *yesterday* encode the meaning of pastness; this means that learners will likely process the adverb over the grammatical form, i.e., the past tense suffix. This principle

has two consequences. Firstly, if the lexical form is incorporated into the learner's developing system, attentional resources will be freed, and they will be able to process the grammatical form. A second consequence is that learners may start depending on lexical forms exclusively for the extraction of meaning, to the detriment of grammatical forms that may never be processed. In either case, the prediction is that learners will continue to favor the lexical form if comprehension remains effortful, and the grammatical form will be processed later.

3) The Preference for Nonredundancy Principle: this principle arises from a fundamental distinction**:** not all grammatical markers are redundant. In other words, if the meaning is not encoded lexically, learners will have to turn to the grammatical form to extract meaning. For instance, in order to know that the action is in progress in a sentence like "the boy is eating", learners need to process the *-ing* suffix, that is, the learner will have to connect the meaning to the grammatical form.

4) The Meaning Before Nonmeaning Principle: the third principle deals only with grammatical markers that are meaningful. This principle accounts for grammatical forms that do not carry any meaning, e.g., words that link two sentences, such as *that* in "she thinks that you are ready." The implication is that learners are more likely to process language features to which a meaning can be attached before formal ones.

5) The First Noun Principle: this principle takes the IP model into the phase of parsing, defined in this model as the assignment of syntactic categories to words comprehended in the speech stream. The model proposes two alternative answers for the following question: How do learners parse in the L2? It is a question worth asking since they do not have a developed parser like that of their L1. The first possibility is that they apply a universal parsing strategy. For

example, in the case of the subject, the universal parsing strategy would assign the role of the subject to the first noun of the sentence. This might cause difficulties when a learner is processing an L2 with flexible sentence structure, as is the case of an English-speaking learner of L2 Spanish. For example, this learner might interpret the subject of a sentence like "*A Ramón lo lleva Marisol"* ("Marisol takes Ramon") to be *Ramón* (the object) instead of *Marisol* (the subject) because English has a strict subject-verb-order (SVO) order, whereas in Spanish object-verb-subject (OVS) order is possible. The consequence of such a misinterpretation is that the form-meaning connections made by the learners will be erroneous. The second possibility to account for parsing in an L2 is addressed in the next principle.

6) The L1 Transfer Principle: this principle has the same starting point as the previous one, the difference is that it assumes learners transfer their L1 parser into their L2, instead of using universal parsing strategies. This would make the principle language-specific, given that learners whose L1 has a similar structure to that of their L2—Spanish and Italian, for instance—are already equipped with a parser that can handle sentences that do not follow a rigid SVO structure. Both the universal parsing strategy and the L1 parser transfer positions are tenable; however, empirical research is still needed to determine whether one prevails over the other.

7) The Event Probability Principle: this principle and the next two tackle other factors that influence parsing. In this case, the IP model prediction is that the First Noun or the L1 Transfer Principle might be overridden by real-life scenario probabilities. If it is unlikely that the first noun in a sentence could be the subject in real life, it is possible that learners will reparse and interpret it correctly, e, g., a patient giving a recommendation to a doctor in a medical appointment.

8) The Lexical Semantics Principle: in this case, it is lexical semantics that might override the First Noun (universal parsing) or the L1 Transfer principle. If the first noun is uncapable of performing the action (not unlikely), it is possible that the learner will reparse and assign the role of the subject to the right word, e.g., an animal performing an action that could only be performed by a human being in a particular context.

9) The Contextual Constraint Principle: in the IP model, context is another factor that can have an impact on parsing. If the context provided in the sentence makes the assignment of the subject role to the first noun in a sentence unlikely or outright impossible, the First Noun or the L1 Transfer Principle might be overridden.

10) The Sentence Location Principle: one final area that the IP model covers is the location of the words in a sentence. In this sense, it is predicted that items in initial position will be processed first, followed by items in final position and, finally, items in medial position. It follows that learners will use their attentional resources to process the first elements of the speech stream, which might leave working memory depleted and, consequently, elements in the middle of the sentence will not be processed. Later, resources might be freed and hence be available to process the elements at the end, e.g., in a long sentence like “She will take you to school in the morning,” an L2 learner might initially fail to make a form-meaning connection between the forms “to school” and their meaning of location in this sentence.

In sum, the aim of these principles is to account for what happens when L2 listeners are exposed to a stream of speech and start making form-meaning connections. They are a suitable companion to the listening comprehension process model in that they might help elucidate the

reasons why listeners are able or unable to perceive and understand a sentence, on the one hand, and associate a grammatical form with its meaning, on the other hand.

1.2.2.2. Redundancy in the IP model

Redundancy has been defined in the literature as the degree to which a piece of information is repeated in a passage (Bloomfield et al, 2011). This repetition can be exact or be conveyed by other methods, such as synonyms, hyperonyms, and paraphrasing (Chaudron, 1983). For the purposes of this thesis, I will further delineate this concept and adhere to the definition of redundancy within the IP model (VanPatten, 1996, 2002, 2004, 2007); namely, the degree to which a meaning is encoded in more than one form in the utterance.

Redundancy concerns mainly two principles of the IP model: the *Lexical Preference Principle* and the *Preference for Nonredundancy Principle*. In accordance with these principles, the more redundant a form is, the less likely it is to be processed, especially when the learner's attentional resources are strained, i.e., when the number of units coming in is higher than the number of units the learner can currently store (Harrington, 2002). This will also naturally depend on the redundant forms that are coexisting in the utterance and context wherein it is said. VanPatten and Leeser (2006) highlight that this might be true particularly for forms that are rare or have little salience, such as the English third-person grammatical marker *-s* in "she works."

On a more critical note, Harrington (2002) further qualifies the role of redundancy in the IP model. He underlines that redundancy is common in human language. It renders communication easy by decreasing the amount of new information the speaker's system must deal with. When there is noise, redundancy might help the listener still make meaning out of the

utterance. The difficulty is that the role of redundancy is not clear when learners have never been exposed to the input. If one assumes that redundant forms will only be processed when they no longer strain the learner's resources, it is implied that that the learner is able to tell whether the form is indeed redundant. The answer to this question is unclear and is, hence, in need of further research.

1.3. Empirical research

1.3.1. Research on the effects of redundancy on listening comprehension

Several studies have been conducted to assess the effect of redundancy on listening comprehension. One landmark study is that of Chaudron (1983), who examined redundancy as a form of modified input on L2 listening comprehension. For this purpose, simulated lectures were created in the aural modality, and five forms of redundancy were added: exact repetitions, synonyms, repeated nouns, topicalizing rhetorical questions, and if-clauses. After listening to the passages, the participants completed a recall and recognition test. The conclusion drawn was that high-proficiency listeners had fewer difficulties processing the most complex forms of redundancy, such as rhetorical questions and if-clauses. Low-proficiency learners did not benefit significantly from anything other than plain repetition of the nouns.

Pica, Young and Doughty (1987) studied redundancy as the repetition of content words in previously modified and interactionally modified input. The repetition could be exact (the same word said twice) or semantic (a word or a phrase and a synonym). The purpose of the study was to compare the effects of two linguistic environments for acquisition on the comprehension of nonnative speakers. The first environment presented input that had been modified previously by adding repetition or paraphrasing, restricting vocabulary, adding boundary markers and

reducing sentence length and complexity (fewer subordinate clauses). The second environment provided opportunities for the nonnative speakers to interact with a native speaker. Participants (learners of L2 English) had to place items on a board upon listening to a native speaker's directions, and the measure of comprehension was the number of items chosen and placed correctly. The conclusion drawn from the results was that interactionally modified input was more effective in terms of enhancing comprehension. Results revealed that the comprehension of difficult directions was assisted by an increase in the amount of input due to the repetition of relevant content words. When interaction did not aid comprehension, there were fewer repetitions of words; redundancy was hence found to be an important factor in comprehension. In contrast, pre-modification of the text showed no significant results.

Chiang and Dunkel (1992) conducted a study dealing with three factors interfering with the comprehension of L2 English learners: limited proficiency, lack of prior knowledge, and lack of modified speech (containing elaborated or redundant information). Redundancy in this experiment consisted of repetitions and paraphrasing, while comprehension was tested by means of a 30-item multiple choice test. The participants were learners of L2 English who were divided into two proficiency groups. The results showed that only high-proficiency listeners benefitted significantly from the modifications. The conclusion drawn from this is that the redundant information gave them time to further process the information. However, the authors acknowledge that this result is limited by the types of modification included. It may also be that unfamiliarity with the vocabulary prevented low-proficiency listeners from fully taking advantage of redundancy.

Cervantes and Gainer (1992) explored the effectiveness of syntactic simplifications and redundancy in the form of repetition on L2 listening comprehension. For this purpose, three versions of a passage were prepared: an unmodified version, a syntactically modified version and a third version with repetition. Comprehension was tested by means of a cloze test and/or dictation. The results showed that the groups hearing the syntactically simplified version performed better. However, there was no significant difference between the syntactically modified version and the unmodified version with repetition, which suggests a facilitative effect for the latter, in line with previous studies.

Teng (2001) examined the effects of syntactic modifications and speech rate on listening comprehension. He prepared eight versions of the same listening passage, according to the inclusion of each modification (unmodified, paraphrasing, simplified sentences, and mixed modifications) and the speed (average speed at 160 words per minute and slow speed at 110 words per minute). Learners had to complete a cloze test after listening to the passage. The results showed that participants hearing the passage with mixed modifications at a slower speed performed the best. This study falls in line with previous ones proving the positive effect of syntactic modifications, while it also provides empirical evidence for the importance of speech rate as a factor in listening comprehension.

Overall, research examining the effects of redundancy on listening comprehension suggests a facilitative effect, especially for the repetition or paraphrasing of a piece of information in the passage (Chaudron, 1983; Chiang & Dunkel, 1992; Cervantes & Gainer, 1992; Teng, 2001). Pica et al. (1987) only found a facilitative effect on interactionally modified input, but this might be due to the nature of the task used in the experiment. Nonetheless, the

effectiveness varies in the studies according to the definition of redundancy used and the proficiency of the listeners. This could be attributed to learners not being able to recognize forms as effectively redundant, as put forth by Harrington (2002). An additional difficulty might be the limited working memory capacity identified in both the listening comprehension model (Vandergrift & Goh, 2012) and IP model (VanPatten 1996, 2002, 2004, 2007) discussed previously. The prediction for this study is that learners will be able to recognize subject-verb agreement redundancy and hence it would serve to facilitate listening comprehension purposes.

1.3.2. Research on input processing and listening comprehension

Given that this study focuses on auditory processing of redundant forms in the input received by L2 learners, I will now turn to discuss those studies that have examined input processing on its own. The first study was conducted by VanPatten and Houston (1998), whose goal was to determine if the inclusion of explicit context could override the effects of the First Noun Principle, that is, that learners automatically assign to the role of the subject to the first noun of the sentence. Using the latest update of the IP model, their aim was to provide empirical evidence for the effects of the *Contextual Constraint Principle*. For this purpose, a series of sentences in Spanish were manipulated to include embedded clauses with object-verb-subject (OVS) structure, which were immediately preceded by main clauses that contained either neutral or constraining context (limiting the assignment of the role of the subject to only one of the words in the sentence), e.g. "*Ricardo me dice que lo insultó Susana en la reunion*" ("Richard tells me that Susan insulted him at the meeting") as opposed to "*Ricardo está enojado porque lo insultó Susana en la reunion*" ("Richard is ticked off because Susan insulted him at the meeting"). The hypothesis was that the added context would prevent learners from misinterpreting the subject

and hence the overall meaning of the sentence. The participants were English-speaking learners of Spanish as an L2 who were enrolled in their third semester of college studying Spanish. During the experiment, they heard a series of 20 sentences (with or without context) that were randomized among 40 distracter sentences. After this, they completed a sentence interpretation task, identifying the subject and the agent of the sentence. All the sentences were similar in length. The results showed that context had a significant effect, since the participants misinterpreted the sentences three times as much as when no context was provided. However, the participants did not use context effectively across the board, since its effect for low-proficiency learners was not significant. The conclusion drawn from the results was that even if context is available, learners at a low level of proficiency may not be able to keep it stored in their working memory long enough for it to interact with the information contained in the embedded clause.

Another influential study is that of Lee, Cadierno, Glass and VanPatten (1999), who conducted a study that brought comprehension and input processing together into one experimental design, given the overlap there is between the two processes despite their differences (Lee and VanPatten, 1995). Perception and parsing are both phases that the two processes share, however, it is the end result that differs: listening comprehension ultimately leads to utilization, while successful input processing leads to the making of a form-meaning connection. The purpose of the study was to assess the effects of lexical and grammatical cues on comprehension and input processing using past tense as the target structure. Learners in the experimental group were exposed to a listening passage including both past tense grammatical suffixes and lexical cues, while those in the control group were exposed to input that only

contained the former. Two tasks were designed for the experiment; the first task required learners to reconstruct propositional content (in their native language), while the second task required the learners to recognize whether a piece of information from the text referred to an action that was explicitly stated to be performed in the past in the passage. The participants were English-speaking learners of L2 Spanish enrolled in three different semester-level—first, third, and fifth—Spanish courses.

Lee et al. (1999) found that learners (first, third, and fifth-semester college Spanish students) performed better in the comprehension task when there were lexical cues to past temporal reference. However, no significant effect was found for first-semester learners, which may be attributed to language proficiency. Performance on the tense identification task was overall higher than that of the comprehension task as well. However, lexical cues did not have a significant effect on it. The authors conclude that learners, especially higher proficiency ones, detect and pay attention to grammatical cues when they are processing for meaning, but said cues are not as helpful for the reconstruction of propositional content. These two previous studies provide a background for studies centered around the IP model, including my own, in that they provide empirical evidence for the validity of the IP principles. In addition, they also provide evidence for the effect of modifications such as restraining context and (redundant) lexical cues on listening comprehension.

A gap found in the review of the relevant literature is that previous studies focused on redundancy in the IP model are better categorized as Processing Instruction (PI) studies (Atchley, 2015; Benati, 2004); learners received explicit instruction on a form and were later tested on comprehension and/or production. In addition, previous studies focused solely on IP have studied

the effects of adverbial time markers (Lee, Cadierno, Glass & VanPatten, 1999) and contextual cues (VanPatten & Houston, 1998), but not on an overt subject.

2. RESEARCH QUESTIONS AND HYPOTHESES

2.1. Purpose of the study

The purpose of this study is to assess the effects of redundancy on sentence-level listening perception and comprehension, on the one hand, and the processing of grammatical markers, on the other hand, in learners of Spanish as an L2. More specifically, the target structure chosen for this study is subject-verb agreement redundancy in Spanish.

The study is comprehension-oriented given the relationship that exists between comprehension and acquisition, since the former can be seen—to a certain extent—as a byproduct of the latter (VanPatten, 2007). The study also seeks to contribute to the body of research on IP by conducting an empirical study focused on the *Lexical Preference* and the *Preference for Nonredundancy Principle*, which are currently under-researched.

Finally, the study aims at filling the research gap discussed previously by providing empirical evidence for the effects of redundancy on listening perception and comprehension, as well as input processing, thereby also exploring the relationship between the three. The target structure chosen for this study was subject-verb agreement, as seen in (1):

(1)	a.	*Yo*	*como*	*ensalada.*
		I	*eat*	*salad.*
		(1st, sing. Pers.)	*(Pres, 1st, sing. Person)*	*(Object)*
	b.		*Como*	*ensalada.*
		(I)	*eat*	*salad*
			(Pres, 1st, sing. Person)	*(Object)*

Subject-verb redundancy is clear to a native speaker because the rich morphology of the verb encodes the subject information (1a), hence making it possible and desirable to drop the

subject (1b). Moreover, this structure is easy to manipulate experimentally and has been understudied under an IP model.

2.2. Research questions

This study seeks to add to the current understanding in the areas of listening perception and comprehension processes and the IP framework. In particular, the goal of the experiment is to assess the effect of subject-verb agreement redundancy in all three. This leads me to formulating the following research questions:

a. Does subject-verb agreement redundancy have an effect on L2 learners' global acoustic perception in sentences as measured by a written recall task?
b. Does subject-verb agreement redundancy have an effect on L2 learners' global comprehension in sentences as measured by a written translation task?
c. Does subject-verb agreement redundancy have an effect on L2 learners' processing of grammatical markers as measured by a sentence interpretation task?

2.3. Hypotheses

The review of the relevant theoretical framework and previous empirical studies focused on redundancy in listening comprehension and/or IP suggests that this factor has a facilitative effect on listening comprehension and processing. This effect, however, varies according to the type of redundancy included and the proficiency of the listeners. The assumption of this study is that adding subject-verb agreement redundancy to the experimental sentences should have a

facilitative effect on both listening comprehension and the processing of morphological markers. Based on this assumption, the hypotheses of the study are the following:

a. Subject-verb agreement redundancy will positively affect the performance of L2 Spanish learners in the experimental group in the perception task.
b. Subject-verb agreement redundancy will positively affect the performance of L2 Spanish learners in the experimental group in the comprehension task.
c. Subject-verb agreement redundancy will positively affect the performance of L2 Spanish learners in the experimental group in the sentence interpretation task.

3. RESEARCH DESIGN AND METHODOLOGY

The experimental design in this study was chosen to address the role of redundancy in the auditory processing of learners of Spanish as an L2. In addition, it goes hand in hand with previous studies in the field, such as those of Chaudron (1983); Pica, Young, and Daughty (1987); Chiang and Dunkel (1992); Cervantes & Gainer (1992); VanPatten and Houston (1998); Lee, Cadierno, Glass and VanPatten (1999); and Teng (2001). The present experiment is partially based on that of Lee et al. (1999), in that it brings input processing and listening comprehension together in an experimental design and assesses each of them with a task of their own.

3.1. Participants

Participants were recruited from Spanish classes taught at Auburn University during the Spring 2018 semester. In order to control for language proficiency, participants were recruited from first-year (elementary), second-year (intermediate), and third-year (upper-level) Spanish courses. The participants of the study were offered extra credit as an incentive, provided they completed all the requirements for the study.

A total of 66 Auburn University students (21 male, 45 female) enrolled in a Spanish course successfully completed all the requirements of the study. Out of this figure, 43 participants were enrolled in the elementary Spanish classes (I or II), 5 were enrolled in intermediate Spanish classes (I or II), and 18 were enrolled in upper-level Spanish classes (see Appendix A).

On the corresponding background questionnaire, one of the participants reported being a native speaker of both English and Spanish. Another two participants did not follow instructions during the experiment. The inclusion of data from these three participants would have skewed the results, so their scores were excluded from the statistical analysis. The remaining 63

participants were all native speakers of English, with varying levels of previous Spanish-learning experience. The average age at the time of the experimental sessions was 20.03 (*SD* = 1.39). Participants were split evenly between a control group (N = 31) and an experimental group (N = 32). In addition, no participant reported having a hearing impairment. To ensure the validity of the experimental tasks, the participants received a complimentary hearing test. Noise levels in the testing room were checked prior to the hearing screening procedure. The participants were screened at frequencies of 1,000, 2,000 and 4,000 Hz. No hearing impairments were reported by the audiologist either.

3.2. Experimental sessions

The experiment consisted of two sessions. Following recruitment, a first session comprised an orientation to the study and those students who decided to participate in the study signed an informed consent form. Then, participants completed a background questionnaire about previous second language learning experience and a Spanish proficiency standardized test (Versant™). The participants were then assigned a number that would serve as an anonymizer to protect their privacy. Once they had received an anonymizer, the participants completed the Spanish proficiency standardized test administered online.

The experiment was administered in the second session. In order to accommodate the different schedules of the participants; three alternate dates and times were offered. The participants completed the experimental task individually in a previously reserved Auburn University computer laboratory. They were evenly distributed between the control and the experimental group as they arrived at the location.

3.2.1. Experiment

Since this study seeks to assess Spanish L2 listening comprehension and perception and input processing separately to explore a possible relationship between the three, a total of three tasks were administered to the participants (see Appendix B).

The general instructions and all the prompts were written in English. The first task was a written free recall task and it was aimed at measuring perception; i.e., the recognition of acoustic signals as words or meaningful units of language in the sentence. The second task was a written translation task to measure comprehension, or the output of the utilization phase, following the model proposed by Vandergrift and Goh (2012). The third task was a sentence interpretation task, meant to measure the effect of redundancy on the processing of grammatical markers.

All the experimental materials were administered through a Qualtrics survey completed by the participants on a computer equipped with headphones. In addition, to facilitate access to the experimental materials, the researcher designed and published a WordPress website that contained links to the different surveys. The website was preloaded in the computer laboratory and the links were only accessible at the time and date on which the experimental sessions were held.

3.3. Materials

A total of 56 sentences were created for the study; 28 for the experimental group survey and 28 for the control group survey (see Appendix C). To control for length and speed rate variable effects, all sentences had a length ranging from 8 to 10 syllables. They were recorded by a Peruvian native speaker of Spanish in a soundproof booth and later edited to ensure that all

the sentences had an equivalent length (approximately 2 seconds); the researcher and the thesis director were always present to monitor the quality of the recording. In addition, sentences are in the present indicative tense to control for the variable of tense and aspect and did not contain a subordinate clause.

The experimental sentences were manipulated to include an overt subject, hence creating subject-verb redundancy. This means that the participants from the experimental groups listened to sentences with an overt subject, while participants in the control group listened to the same sentence but with null subject. As a result, the participants in the control group had to rely on the grammatical markers to process the meaning. Three types of subject were included to assess if there would be a variation in scores according to the type of subject used in the sentence: personal pronouns (13 sentences), common nouns (8 sentences), and proper nouns (7 sentences). Gender and number were also considered, so female and male subjects, as well as singular and plural subjects were all included in the experimental treatment (see Appendix D for a categorization of all the experimental syllables).

All recordings were uploaded to the SoundCloud distribution platform, so they could be embedded in the corresponding questions on the Qualtrics surveys. Each question was presented separately. As there were 28 sentences and three tasks, participants had to respond to a total of 84 questions. Since each sentence was used three times—one for each task—the order of sentences was randomized to minimize priming effects. The same task was also never presented consecutively. The surveys were designed so that no question could be skipped to avoid answers left blank.

In order to divert the participant's attention from the goals of the experiment, three types of distracters were created and included in both surveys: matching a picture to the correct word, matching a word to the correct picture, and matching a color to the right picture. There was a total of 16 blocks of questions, each block with 5 to 6 questions and one distracter at the end (see Appendix E for distracter samples). A total of 16 distracters were included, this means that there was a distracter for every block. The object stimuli used in the distracters were taken from Brady, Konkle, Gill, Oliva and Alvarez (2013).

Lastly, participants were also trained on the mechanics of the Qualtrics survey system so that unfamiliarity with it would not become a factor. For this purpose, three new and unrelated sentences as well as three new distracters were prepared and placed at the beginning of the experiment to serve as training materials. These questions were not scored and hence not included in the statistical analysis.

3.3.1. Perception task

Separate perception and comprehension tasks were created to account for the complexity of the listening comprehension process, as discussed in section 1.2.1. The first of these tasks is a written recall task requiring the participants to listen to a given sentence and then write it verbatim using the computer's keyboard. Once a full answer was provided, the participants would move on to the following question. The aim of the task was to verify that the participants were able to perceive all the sounds in the speech stream, which is a key step in the auditory process.

3.3.2. Comprehension task

Similarly, this written task required a translation to the L1—English in the case of all the participants included in the statistical analysis— of what the participants understood from the sentence they heard. The aim of the task is to verify if they could understand the meaning of sentence.

3.3.3. Input processing task

Finally, in this sentence interpretation task, participants listened to the recording and were then presented with a multiple-choice question. They were asked about the performer of the action in the sentence—the subject—and had to choose the correct answer among four options.

3.4. Data processing and analysis

A quantitative method was used to process the data. For this purpose, the researcher created an Excel spreadsheet that included all the participants' answers for each question in the Qualtrics survey. They were awarded 1 point for each correct answer and 0 points for each incorrect answer. As there were 28 sentences included in the analysis, there were 28 questions per task. This adds up to a total of 28 answers per participant in each task, and 84 answers for all three tasks. Each answer to the perception and comprehension task was individually evaluated and scored by the researcher.

To receive a score of 1 in the perception task, no sound could be missing—or added to—from the participant's orthographic transcription. This means that answers that were only partially correct received a score of 0. Answers with spelling mistakes that did not change the meaning of the sentence or the pronunciation of the word in Spanish ("*lijera*" instead of "*ligera*",

"*abitacion*" instead of "*habitación*", or "*embia*" instead of "*envía*") received a score of 1 nevertheless.

In the comprehension task, any meaning changes from the original sentence received a score of 0. This means that answers that featured a change in tense ("I reserved a room" instead of "I reserve a room") were considered erroneous. Spelling mistakes that did not change the meaning of the sentence were also awarded a score of 1. Given that the input processing task was formatted as a multiple-choice question, it was scored automatically by means of an Excel IF function written for each question.

From the quantitative analysis, one data set was collected from each task and its corresponding group, which accounts for six data sets in total. Once all the scores were tallied, the researcher calculated the mean and standard deviation for each group per task. The difference between the means was calculated through non-parametric tests (i.e., 95% Confidence Interval). Comparisons between the control and the experimental group, as well as a comparison between the types of subject included in the experimental group materials were made to assess whether there was an effect and, if there was, whether it suggested significance. This type of analysis has been supported in the literature as a tool for preliminary indications of significance, to be followed and validated by a parametric analysis.

4. RESULTS

In this section I present the results obtained from the quantitative analysis. The results are presented as follows: in section 4.1, I present the percentage of correct answers achieved by each participant along with the average their assigned group obtained in each task. In section 4.2, I discuss the results of the non-parametric test and clustered column chart representations to compare the performance of the groups in each task according to the input condition. Finally, in section 4.3, a second comparison will be made considering only the performance of the groups in the tasks that included a specific type of overt subject; namely, a personal pronoun, a common noun, or a proper noun. The purpose of this comparison is to determine if there is variation among them and, if so, to which extent.

4.1. Participants individuals scores

Table 4.1. details the percentage of correct answers (scores of 1) achieved by every participant in each group by experimental task. The first four columns correspond to the control group; the last four columns correspond to the experimental group. The average scores of the control group (N = 31) were 10.87 in the perception task, 4.19 in the comprehension task, and 19.97 in the input processing task. The average score of the experimental group (N = 32) were 8.16 in the perception task, 5.34 in the comprehension task, and 24.56 in the input processing task.

Control	PT	CT	IPT	Experimental	PT	CT	IPT
3	64.28	50	78.57	**1**	3.57	7.14	75
4	28.57	0	89.28	**2**	35.71	39.28	100
5	28.57	0	67.85	**6**	85.71	53.57	100
11	82.14	0	85.71	**7**	60.71	21.42	89.28
17	14.28	0	64.28	**8**	0	7.14	53.57
18	32.14	32.14	67.85	**9**	3.57	7.14	67.85
23	7.14	3.57	25	**10**	25	0	89.28
24	21.42	7.14	71.42	**12**	7.14	0	78.57
25	25	0	67.85	**13**	7.14	0	85.71
26	67.85	75	89.28	**14**	32.14	0	96.42
27	17.85	7.14	75	**15**	21.42	28.57	92.85
28	10.71	0	67.85	**16**	3.57	0	78.57
30	85.71	57.14	89.28	**19**	64.28	25	96.42
35	17.85	0	71.42	**29**	25	10.71	82.14
36	71.42	0	100	**21**	14.28	3.57	85.71
38	10.71	7.14	53.57	**22**	64.28	32.14	100
39	53.57	0	82.14	**29**	50	25	92.85
40	32.14	0	78.57	**31**	71.42	67.85	100
42	25	3.57	28.57	**32**	39.28	53.57	92.85
45	17.85	0	71.42	**33**	17.85	17.85	89.28
46	67.85	50	85.71	**37**	17.85	21.42	92.85
47	64.28	32.14	82.14	**41**	0	0	64.28
48	57.14	14.28	78.57	**43**	21.42	0	92.85
49	64.28	0	89.28	**44**	10.71	21.42	89.28
54	14.28	0	60.71	**34**	28.57	17.85	92.85
55	10.71	0	39.28	**50**	28.57	0	89.28
57	46.42	21.42	57.14	**51**	3.57	3.57	78.57
59	71.42	78.57	100	**52**	7.14	3.57	89.28
60	17.85	7.14	57.14	**53**	17.85	21.42	96.42
62	14.28	7.14	53.57	**56**	53.57	46.42	92.85
63	60.71	10.71	82.14	**58**	78.57	67.85	96.42
				61	32.14	7.14	85.71

Table 4.1. Percentage of correct answers by every participant in each group for the perception task (PT), comprehension task (CT) and input processing task (IPT).

4.2. Comparison of performance in the tasks according to input condition

4.2.1. Perception task

Figure 4.1. summarizes the average of correct responses obtained from the participants' responses to the 28 questions of the perception task in each of the input conditions. The error bars in this and the following figures report the 95% confidence intervals (CI). The figure shows that the average for the control group (*M* = 10.87, *SD* = 7.02, CI 95% [8.4, 13.34]) is higher than that of the experimental group (*M* = 8.16, *SD* = 6.92, CI 95% [5.76, 10.56]). As there is an overlap in the CI reported, the result does not suggest significance.

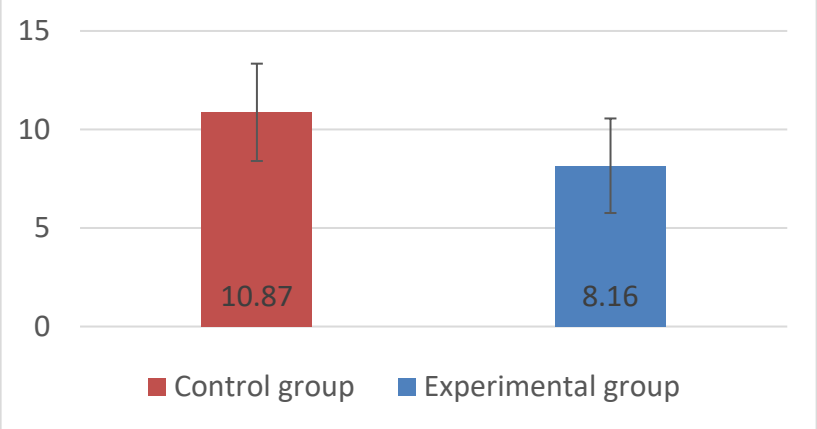

Figure 4.1. Average scores for the perception task by input condition.

4.2.2. Comprehension task

Figure 4.2. shows the average of correct responses obtained from the participants' responses to the 28 questions of the comprehension task in each of the input conditions. The average for the control group (*M* = 4.19, *SD* = 6.51, CI 95% [1.9, 6.49]) is lower than that of the experimental group (*M* = 5.34, *SD* = 5.72, CI 95% [3.36, 7.32]). As the averages for the variables fall within each other's CI, the effect does not suggest significance.

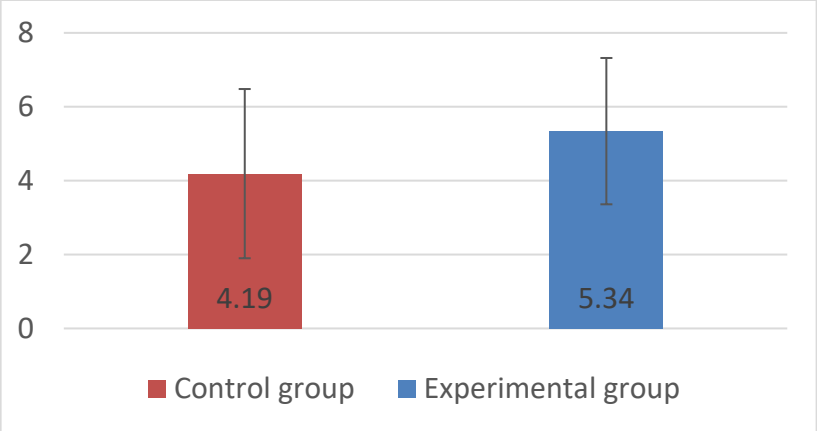

Figure 4.2. Average scores for the comprehension task by input condition.

4.2.3. Input processing task

Figure 4.3. displays the average of correct responses obtained from the participants' responses to the 28 questions of the input processing task in each of the input conditions. The average for the control group (*M* = 19.97, *SD* = 5.14, CI 95% [18.75, 21.78]) is lower than that of the experimental group (*M* = 24.56, *SD* = 3.05, CI 95% [23.51, 25.62]). This suggests that the inclusion of subject-verb agreement redundancy in the experimental sentences might have a significant effect on the participant's performance in this task.

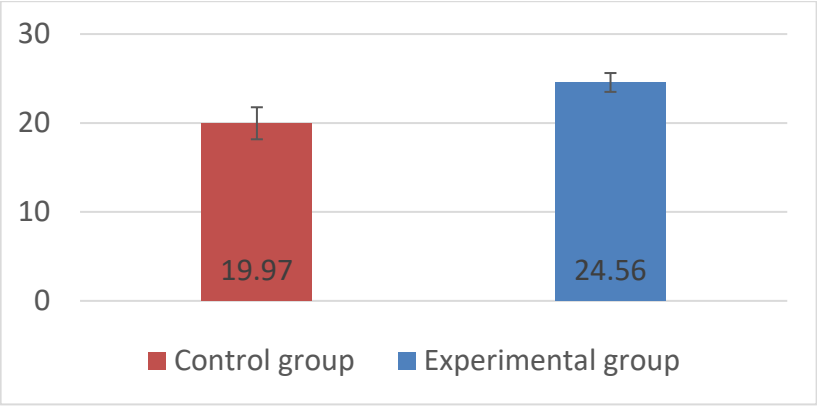

Figure 4.3. Average scores for the input processing task by input condition.

4.3. Types of subject

4.3.1. Perception and personal pronouns

Figure 4.4. represents the average of correct responses obtained from the participants' responses to the corresponding 13 questions of the perception task in each of the input conditions. The average for the control group (*M* = 5.58, *SD* = 3.64, CI 95% [4.3, 6.86]) is higher than that of the experimental group (*M* = 4.34, *SD* = 3.71, CI 95% [3.06, 5.63]). This suggests a lack of significance between both groups in the perception of personal pronouns.

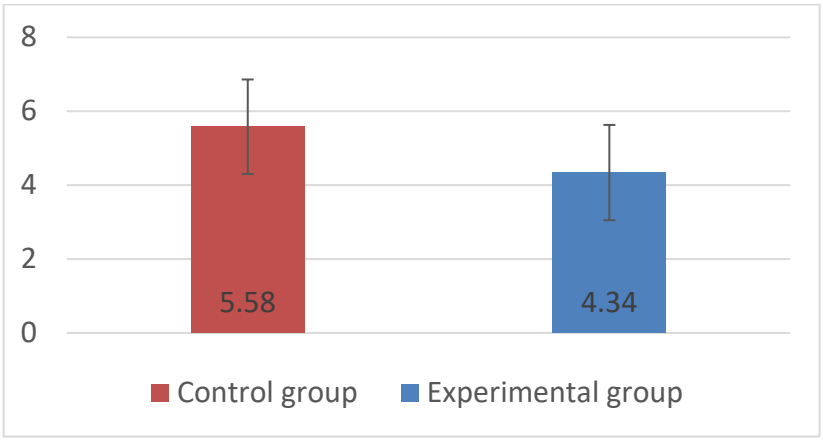

Figure 4.4. Average scores for the perception task by input condition: personal pronoun.

4.3.2. Comprehension and personal pronouns

Figure 4.5. illustrates the average of correct responses obtained from the participants' responses to the corresponding 13 questions of the comprehension task in each of the input conditions. The average for the control group (*M* = 2.13, *SD* = 3.21, CI 95% [1, 3.26]) is lower than that of the experimental group (*M* = 2.31, *SD* = 2.57, CI 95% [1.42, 3.2]). This difference does not suggest significance either.

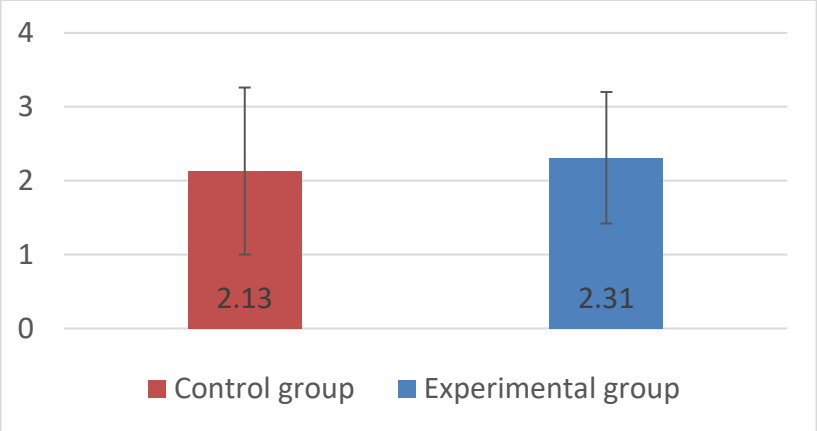

Figure 4.5. Average scores for the comprehension task by input condition: personal pronoun.

4.3.3. Input processing and personal pronouns

Figure 4.6. depicts the average of correct responses obtained from the participants' responses to the corresponding 13 questions of the input processing task in each of the input conditions. The average for the control group (M = 9.48, SD = 2.58, CI 95% [8.56, 10.39]) is lower than that of the experimental group (M = 12.63, SD = 0.91, CI 95% [12.31, 12.94]). This suggests that the inclusion of a personal pronoun as an overt subject in the experimental sentences might have a significant effect on the participant's performance in this set of questions.

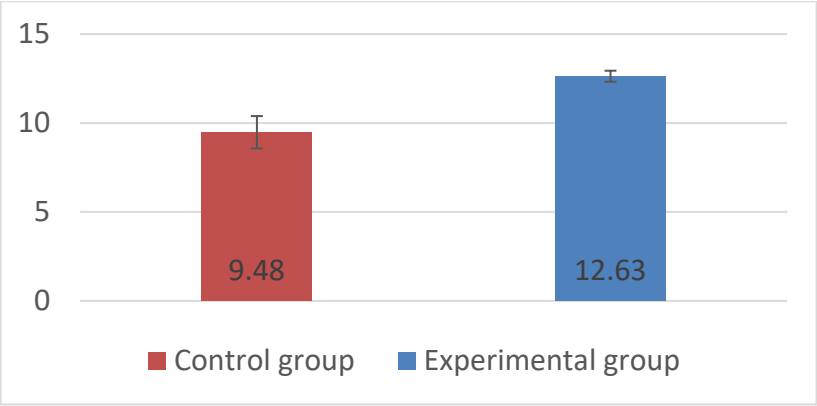

Figure 4.6. Average scores for the input processing task by input condition: personal pronoun.

4.3.4. Perception and common nouns

Figure 4.7. portrays of the average of correct responses obtained from the participants' responses to the corresponding 8 questions of the perception task in each of the input conditions. The average for the control group (*M* = 3.26, *SD* = 1.86, CI 95% [2.6, 3.91]) is higher than that of the experimental group (*M* = 2.66, *SD* = 2.21, CI 95% [1.89, 3.42]). The difference does not suggest significance.

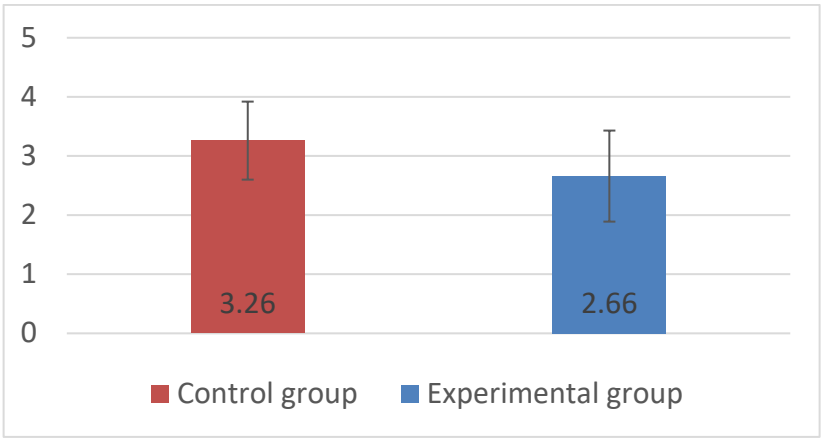

Figure 4.7. Average scores for the perception task by input condition: common noun.

4.3.5. Comprehension and common nouns

Figure 4.8. exhibits the average of correct responses obtained from the participants' responses to the corresponding 8 questions of the comprehension task in each of the input conditions. The average for the control group (*M* = 1.42, *SD* = 2.06, CI 95% [0.69, 2.15]) is lower than that of the experimental group (*M* = 2.31, *SD* = 2.22, CI 95% [1.54, 3.08]). There is a trend to be found, but the non-parametric test does not suggest significance.

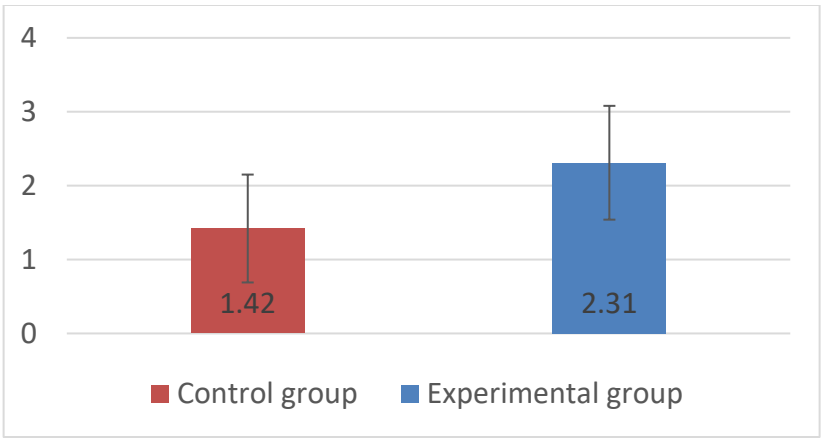

Figure 4.8. Average scores for the comprehension task by input condition: common noun.

4.3.6. Input processing and common nouns

Figure 4.9. below summarizes the average of correct responses obtained from the participants' responses to the corresponding 8 questions of input processing task in each of the input conditions. The average for the control group (*M* = 6.35, *SD* = 1.78, CI 95% [5.73, 6.98]) is lower than that of the experimental group (*M* = 7.09, *SD* = 1.38, CI 95% [6.62, 7.57]). The figure suggests that there is a trend, but the CI are too close to suggest significance.

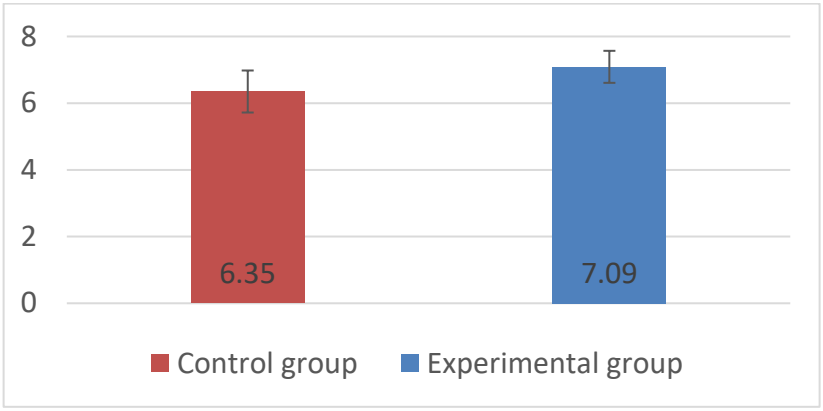

Figure 4.9. Average scores for the input processing task by input condition: common noun.

4.3.7. Perception and proper nouns

Figure 4.10. below shows the average of correct responses obtained from the participants' responses to the corresponding 7 questions of the perception task in each of the input conditions. The average for the control group (*M* = 2.03, *SD* = 2.17, CI 95% [1.27, 2.8]) is higher than that of the experimental group (*M* = 1.16, *SD* = 1.51, CI 95% [0.63, 1.68]). Although there is a trend, the effect does not appear to be significant.

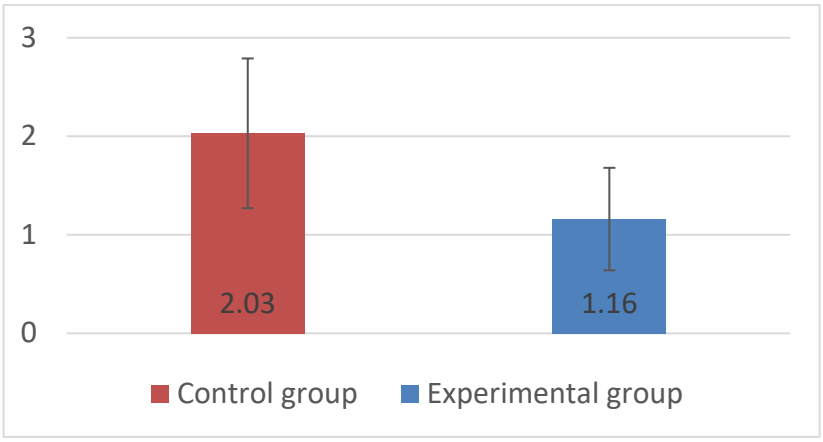

Figure 4.10. Average scores for the perception task by input condition: proper noun.

4.3.8. Comprehension and proper nouns

Figure 4.11. below represents the average of correct responses obtained from the participants' responses to the corresponding 7 questions of the comprehension task in each of the input conditions. The average for the control group (*M* = 0.65, *SD* = 1.38, CI 95% [0.16, 1.13]) is lower than that of the experimental group (*M* = 0.72, *SD* = 1.33, CI 95% [0.26, 1.18]). This difference does not suggest significance.

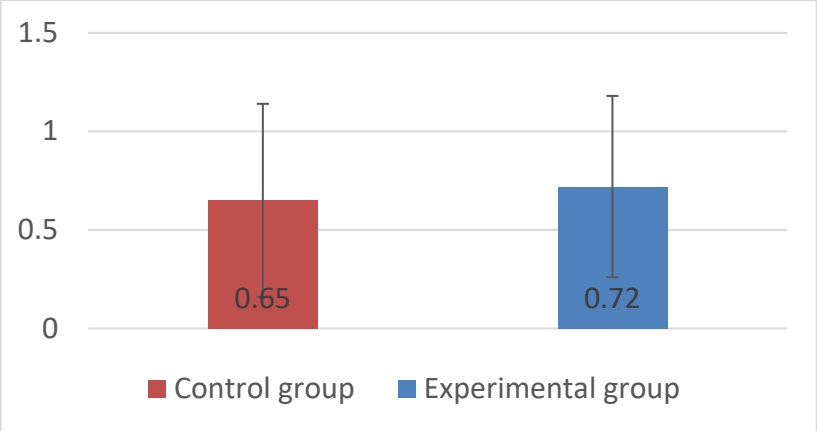

Figure 4.11. Average scores for the comprehension task by input condition: proper noun.

4.3.9. Input processing and proper nouns

Figure 4.12. displays the average of correct responses obtained from the participants' responses to the corresponding 7 questions of the input processing task in each of the input conditions. The average for the control group (M = 4.13, SD = 1.61, CI 95% [3.56, 4.69]) is lower than that of the experimental group (M = 4.84, SD = 1.37, CI 95% [4.37, 5.32]). There is a trend, but it does not suggest significance as there is overlapping between the CI.

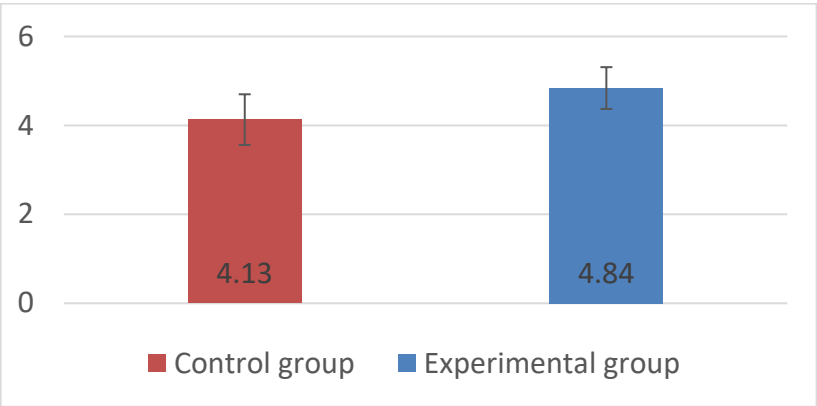

Figure 4.12. Average scores for the input processing task by input condition: proper noun.

5. DISCUSSION

The purpose of this study is to assess the effect of subject-verb agreement redundancy on Spanish L2 sentence-level listening perception and comprehension, on one side, and the processing of morphological grammatical markers, on the other side. It is a comprehension-oriented study given the relationship between comprehension and acquisition. It is also centered around the body of research on IP, particularly the *Lexical Preference* and the *Preference for Nonredundancy Principle* VanPatten (1996, 2002, 2004, 2007), for which this study seeks to provide empirical evidence.

This section presents a discussion of the findings presented in the section 4 considering the theoretical framework and background presented in section 1. A discussion of the results and the corresponding statistical analysis of the perception task, the comprehension task and the input processing task will be presented first, followed by a discussion of the findings based on the type of subject included in the experimental sentences. A general conclusion to the thesis, the factors that limited this study, and a discussion of avenues for future research will be presented in the following section.

5.1. Discussions of findings of the perception task

The first research question of the study sought to explore whether subject-verb agreement redundancy has an effect on L2 learners' sentence-level acoustic perception, as measured by a written recall task. The hypothesis was that it would positively affect the performance of the participants in this perception task. As presented in section 4, the results show that the average of correct responses of the control group (null subject) was higher than the experimental group's

(overt subject) average. This shows a trend that the experimental treatment hindered the perception of the sentences, but the non-parametric test does not suggest significance as there is an overlap between the CI. The hypothesis of the study was hence not upheld, as the experimental condition did not have any impact on the participants' performance.

The result of the perception task was the most unexpected given that this was the only task in which the control group outperformed the experimental one. A review of previous empirical research (Chaudron, 1983; Cervantes & Gainer, 1992) examining perception through similar means found that redundancy had a facilitative effect, but only significantly salient forms of redundancy such as paraphrasing and repetition. This factor might account for the performance of the participants in this task, as the form of redundancy is not as salient. This means that the participants had to recognize the subject being effectively redundant to be able to draw any benefits from its presence in the perception task. Similarly, another common thread through the studies is that only higher proficiency learners were able to benefit significantly from the experimental conditions. This might also account for their performance as 43 of the participants ($N = 63$) were enrolled in an elementary Spanish class.

The result can also be related to the complexity of the listening comprehension process (Anderson & Lynch, 1988; Vandergrift & Goh, 2012), as perception is a phase of the process with difficulties of its own. In this case, the results might suggest that a lack in linguistic knowledge resulted in learners of both groups having difficulty in bottom-up processing, as the sounds were not accurately accreted or perceived as sounds of the Spanish language under the influence of the participants' L1. It should also be noted that, for the sake of consistency, the scoring procedure used for the quantitative analysis was strict. A more lenient scoring

procedure—where participants would be awarded a score for partially correct answers as well—would result in higher average scores for both groups. The same statistical analysis would have to be run to confirm if the trend and its significance remain the same.

5.2. Discussion of findings of the comprehension task

The second research question of this study sought to examine whether subject-verb agreement redundancy has an effect on L2 learners' sentence-level listening comprehension, as measured by a written translation task. The hypothesis was that it would affect the performance of the participants in this comprehension task positively. It is specified in the results that the average of correct responses of the control group was lower than the experimental group's average. This shows a trend that the experimental conditions affected the performance of the participants positively; however, the results of the non-parametric test do not suggest significance either. This means that the hypothesis of the study was not upheld.

The first takeaway from these results is that the average score of the participants was low in both groups. Similarly, both averages are also lower than the averages obtained in the perception task. As discussed in section 1, perception and comprehension are interlinked, perception leads to parsing and then to utilization (Vandergrift & Goh, 2012), so if perception is not successful, there is likely to be a disruption in the comprehension process. It follows that, if the participants' perception scores were low, their comprehension scores might be just as low or lower.

The same factors that limited the perception task can also be applied to the comprehension task. A limited Spanish-language knowledge could have prevented participants from effectively understanding the propositional content of the sentences and then translating it to their L1. In the

same manner, low proficiency could also prevent the learners from effectively identifying the subjects as redundant and hence benefit from their redundancy for comprehension purposes, as was the case in Chaudron (1983) and Chiang and Dunkel (1992). Lee, Cadierno, Glass and VanPatten's (1999) study featured a similar research design and it was found that the experimental treatment did not have a significant effect in the performance of first-semester Spanish learners. Moreover, only the comprehension of the targeted items was assessed in Lee et al. (1999), whereas this study assessed global sentence-level comprehension. Theoretically, the first two principles of the IP model—*Primacy of Content Words* and *Lexical Preference*—might also explain the low scores for the tasks, since a qualitative overview of the responses shows that some learners were able to translate certain content words accurately but failed to translate aspects such as the time tense correctly. A detailed analysis of lexical versus grammatical words would have to be made to see if the principle fully upholds. This goes in line with the quantitative analysis that was applied to score the responses as well. As was the case with the perception task, only responses that fully translated the propositional content of the sentence were awarded a score of 1. A more flexible scoring system could raise the averages scores of both groups, but the statistics would have to be run again to confirm the significance of the trends.

5.3. Discussion of findings of the input processing task

The third research question of this study sought to examine whether subject-verb agreement redundancy has an effect on L2 learners' processing of grammatical markers, as measured by a sentence interpretation task. The hypothesis was that it would have a positive effect on the performance of the participants in this input processing task, i.e., identification of

the subject. As can be seen from the results, the average of correct responses of the control group was lower than that of the experimental group. This suggests that the experimental conditions did have a positive effect on the performance of the participants. The non-parametric test suggests the significance of this effect. This means that the hypothesis of the study was upheld and the inclusion of an overt subject in the experimental sentence had a positive effect on this task. In the case of personal pronouns, the subject might have been easier to identify since the correct answer was already incorporated into the sentence. However, the meaning of common nouns and proper nouns had to be decoded to be appropriately linked to the morphological marker and hence processed.

As compared to the other two tasks included in the study, the score achieved by participants in this task was higher across both groups. This is in line with previous empirical research conducted by Van Patten and Houston (1998) and particularly that of Lee et al. (1999) in that the participant's performance in the sentence subject identification task was higher than that of the comprehension task.

From a theoretical standpoint, the higher performance of the experimental group might be linked to the *Lexical Preference Principle*, given that, in the case a meaning is encoded by two forms, one grammatical and one lexical, the learner is likely to process the latter over the former as a more salient cue for meaning. While significantly lower, the performance of the control group is still high overall in accordance with the *Preference for Nonredundancy Principle*; as the learners had no redundant overt subject to help them process for meaning, they had to process the morphological marker. However, the meaning of that marker is not encoded in any other form and is not as salient as an overt subject placed at the beginning of a sentence. This resulted in a lower task performance.

5.4. Discussion of the findings based on the type of subject included

The first type of overt subject analyzed is the personal pronoun. There was a total of thirteen questions that included a personal pronoun (both singular and plural) as an overt subject in the experimental materials. In this case, the results of the comprehension and input processing tasks remained constant. This means that no significant effect was found in the comprehension task. In contrast, the inclusion of a personal pronoun did have a facilitative effect in the third task, the subject sentence identification task. Lastly, the difference in the perception task was not statistically significant. Personal pronouns were expected to yield higher averages considering their frequency of usage in the learner's L2, since they are among the first words learned in a language-learning setting.

Common nouns are the second type of subject analyzed. There was a total of eight questions that included a common noun (singular or plural, masculine or feminine) as an overt subject in the experimental materials. The findings remain the same in the case of the input processing task, as the results under this condition remained in line with the overall results. The implication is that the inclusion of a common noun as an overt subject in the experimental treatment affected the performance of the participants in the third task positively. There was not a significant effect for this condition in the perception task. However, there was a difference in the comprehension task, as compared to the overall results. The average of correct responses of the control group was lower than that of the experimental group. This might indicate that the performance of the participants was affected positively. The non-parametric confirms that there is a trend, but it is not statistically significant. This means that inclusion of the common noun might have had a facilitative effect on the comprehension of the experimental sentences. A

possible explanation to this might be the additional content provided by a common noun. For instance, in the sentence "*el cartero trae un paquete*" ("the mailman brings a package"), it is possible to relate the subject to the object more easily as they belong to the same semantic field. Another important consideration is that the common nouns had a determiner, which in turn added more redundant information (gender and number) to the sentence.

Proper nouns are the third type of subject included in the analysis. There was a total of seven questions that included a proper noun (singular or plural in number; male, female, or neutral in gender) as an overt subject in the experimental materials. In this case, the results of the perception, comprehension, and input processing tasks remained constant. In other words, the inclusion of a proper noun as an overt subject in the experimental treatment did not have a significant effect on the comprehension task, but it did have an effect on the sentence interpretation task. In contrast, in the perception task, the average of correct responses of the control group was higher than that of the experimental group. This suggests a trend that the inclusion of a proper noun hindered the performance of the participants, although the non-parametric test does not suggest significance. The possible implication is that the inclusion of the proper noun increased the difficulty of the perception of the experimental sentences. This might be partially explained by the participants'—particularly those with a lower proficiency level—unfamiliarity with some of the proper nouns included, such as "Paz" or "Fe". This also brings forth how the role of redundancy in the IP model might be conditioned as pointed by Harrington (2002), who suggests that redundancy, while a useful feature of language, must be recognized as such in order to aid comprehension (and perception as a key step for this).

6. CONCLUSION AND FUTURE RESEARCH

The present study focused on the effects of subject-verb agreement redundancy on Spanish L2 listening perception and comprehension and the processing of morphological grammatical markers. After a review of the relevant theoretical framework and background in section 1, the research questions and hypotheses were introduced in section 2. The methodology of the study is explained in section 3, while the results are presented in section 4 and discussed in section 5. The purpose of this final section is to draw the general conclusions of the study, discuss its limitations, and propose avenues for future research.

The main conclusion to be drawn from the discussion of the results is that the presence of an overt subject—personal pronouns, common nouns, and proper nouns alike—had a facilitative effect on the processing of the meaning of morphological grammatical markers, which is in line with the IP principles previously discussed. After a separate analysis focused on one type of subject at a time, trends also suggested that common nouns might have had a facilitative effect on global comprehension in sentences, whereas proper nouns might have had the opposite effect on global perception in sentences, operationalized as an orthographic transcription.

The present study was limited by several factors. Firstly, the population ($N = 63$) was mostly enrolled in elementary Spanish courses, this suggests that the prominent proficiency level was low, and this might have affected the results. The participants took a standardized proficiency test as one of the steps of the experimental sessions; however, all the results were not available to the researcher at the time of processing the data and were hence not included in the analysis for comparison. The course level was not used as an indicator of proficiency either given that it does not necessarily indicate the learner's level at the time of enrollment. Finally, the results are also limited by the scoring procedure used. The binary scoring was chosen because of its time efficiency and its consistency.

However, it does not account for the variations found in partially correct responses. There is a possibility that a future analysis of the data could include a more detailed qualitative analysis. Once all the results are available, a new analysis of the data would also include the results of the Spanish proficiency test.

This study contributes to body of research centered around input processing on IP by providing empirical evidence for its principles, while also incorporating listening perception and comprehension in the design. In this sense, future studies could use a similar design to analyze target structures other than subject-verb agreement or the structures analyzed in previous empirical research. This study focuses mainly on the first three principles of the IP model, but avenues for future research are also available for studies centered around the least researched principles. On a bigger scale, this study focused solely on one of the passage-related factors that affects listening comprehension, there are multiple possibilities to conduct research that improves our understanding of other factors that might affect this elemental language skill.

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Appendix A: Participants

No.	Native language	Group	Age	Gender	Course level
1	English	Experimental	20	F	Elementary
2	English	Experimental	21	F	Elementary
3	English	Control	20	F	Advanced
4	English	Control	19	F	Elementary
5	English	Control	19	F	Elementary
6	English	Experimental	21	F	Advanced
7	English	Experimental	19	F	Advanced
8	English	Experimental	20	F	Elementary
9	English	Experimental	19	M	Elementary
10	English	Experimental	19	F	Intermediate
11	English	Control	19	M	Advanced
12	English	Experimental	19	M	Elementary
13	English	Experimental	19	F	Elementary
14	English	Experimental	19	F	Elementary
15	English	Experimental	19	F	Elementary
16	English	Experimental	20	M	Elementary
17	English	Control	19	F	Elementary
18	English	Control	21	F	Intermediate
19	English	Experimental	19	F	Advanced
20	English	Experimental	21	M	Elementary
21	English	Experimental	20	M	Elementary
22	English	Experimental	19	M	Intermediate
23	English	Control	20	F	Elementary
24	English	Control	22	M	Elementary
25	English	Control	20	F	Elementary
26	English	Control	19	F	Advanced
27	English	Control	19	F	Elementary
28	English	Control	20	F	Elementary
29	English	Experimental	19	M	Elementary
30	English	Control	21	F	Advanced
31	English	Experimental	19	F	Advanced
32	English	Experimental	19	F	Elementary
33	English	Experimental	20	F	Elementary
34	English	Experimental	19	M	Elementary
35	English	Control	19	M	Elementary
36	English	Control	19	M	Advanced

37	English	Experimental	19	F	Elementary
38	English	Control	19	M	Elementary
39	English	Control	21	F	Elementary
40	English	Control	21	F	Elementary
41	English	Experimental	21	F	Elementary
42	English	Control	20	F	Elementary
43	English	Experimental	19	F	Elementary
44	English	Experimental	21	F	Elementary
45	English	Control	20	F	Elementary
46	English	Control	19	M	Intermediate
47	English	Control	19	M	Advanced
48	English	Control	20	M	Advanced
49	English	Control	20	M	Advanced
50	English	Experimental	21	F	Elementary
51	English	Experimental	21	F	Elementary
52	English	Experimental	21	F	Elementary
53	English	Experimental	20	F	Elementary
54	English	Control	19	M	Elementary
55	English	Control	25	M	Elementary
56	English	Experimental	21	F	Advanced
57	English	Control	19	F	Advanced
58	English	Experimental	20	F	Advanced
59	English	Control	27	F	Advanced
60	English	Control	21	F	Elementary
61	English	Experimental	19	F	Advanced
62	English	Control	21	M	Elementary
63	English	Control	20	F	Intermediate

Appendix B: Task samples

Press play and listen to the sentence. Then type the sentence you heard.

1. Perception task: written recall

Press play and listen to the sentence. Then translate the sentence you heard.

2. Comprehension task: written translation

Press play and listen to the sentence. Then choose who the sentence is talking about.

- Yo
- Tú
- Nosotros
- Ella

3. Input processing task: sentence interpretation

Appendix C: Sentences

No.	Control	Experimental
1	Canta una canción de amor	José canta una canción
2	Compra pantalones baratos	El niño compra pantalones
3	Escriben cartas muy largas	Los hombres escriben cartas
4	Hablamos español rápido	Nosotros hablamos español
5	Cocinan arroz con pollo	Cesar y Fe cocinan arroz
6	Visitan Madrid a menudo	Paz y Ana visitan Madrid
7	Desayuna café con leche	Él desayuna café con leche
8	Reservo una habitación	Yo reservo una habitación
9	Estudian alemán los martes	Ellos estudian alemán
10	Construyen una casa grande	Ellas construyen una casa
11	Almuerza una ensalada ligera	Carmen almuerza una ensalada
12	Toman un poco de vino tinto	Rita y Eva toman vino tinto
13	Pagan la cuenta completa	Juan y Luis pagan la cuenta
14	Nunca gasta mucho dinero	Víctor gasta mucho dinero
15	Practica tenis los lunes	El doctor practica tenis
16	Aprenden inglés y francés	Las mujeres aprenden inglés
17	Trae un paquete pesado	El cartero trae un paquete
18	Tocan la guitarra muy bien	Esos chicos tocan la guitarra
19	Tiene un vestido amarillo	Esa actriz tiene un vestido
20	Escuchan música clásica	Las chicas escuchan música
21	Veo la televisión	Yo veo la televisión
22	Buscas un muy buen trabajo	Tú buscas un buen trabajo
23	Siempre olvida la tarea	Él olvida la tarea
24	Envía una tarjeta postal	Ella envía una postal
25	Cenamos pescado asado	Nosotros cenamos pescado
26	Empiezan el examen tarde	Ellos empiezan el examen
27	Mira las noticias locales	Usted mira las noticias
28	Conocen París muy bien	Ustedes conocen París

Appendix D: Categorization of the sentences

Experimental

No.	Type of subject	Gender	Number	Syllables
1	Proper noun	Masculine	Singular	8
2	Common noun	Masculine	Singular	9
3	Common noun	Masculine	Plural	8
4	Personal pronoun	Masculine	Plural	10
5	Proper noun	Neutral	Plural	10
6	Proper noun	Feminine	Plural	9
7	Personal pronoun	Masculine	Singular	10
8	Personal pronoun	Neutral	Singular	9
9	Personal pronoun	Masculine	Plural	9
10	Personal pronoun	Feminine	Plural	9
11	Proper noun	Feminine	Plural	9
12	Proper noun	Feminine	Plural	9
13	Proper noun	Masculine	Plural	8
14	Proper noun	Masculine	Singular	9
15	Common noun	Masculine	Singular	8
16	Common noun	Feminine	Plural	10
17	Common noun	Masculine	Singular	9
18	Common noun	Masculine	Singular	10
19	Common noun	Feminine	Singular	8
20	Common noun	Feminine	Plural	8
21	Personal pronoun	Neutral	Singular	9
22	Personal pronoun	Neutral	Singular	8
23	Personal pronoun	Masculine	Singular	8
24	Personal pronoun	Feminine	Singular	8
25	Personal pronoun	Masculine	Plural	9
26	Personal pronoun	Masculine	Plural	9
27	Personal pronoun	Neutral	Singular	8
28	Personal pronoun	Neutral	Plural	10

Control

No.	Number	Syllables
1	Singular	8
2	Singular	9
3	Plural	8
4	Plural	8
5	Plural	8
6	Plural	9
7	Singular	9
8	Singular	8
9	Plural	9
10	Plural	9
11	Plural	10
12	Plural	10
13	Plural	8
14	Singular	9
15	Singular	8
16	Plural	9
17	Singular	8
18	Plural	9
19	Singular	8
20	Plural	8
21	Singular	8
22	Singular	8
23	Singular	8
24	Singular	10
25	Plural	8
26	Plural	9
27	Singular	9
28	Plural	8

Appendix E: Distracter samples

Choose the image that corresponds to the following word:

Falda




Choose the image that corresponds to the following word:

El reloj azul




Choose the word that corresponds to the following image:

- La casa
- El apartamento
- El coche
- El jardín