L2 Sentence Processing of Spanish OVS Word Order and Direct Object Pronouns: An Analysis of Contextual Constraints

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Native speakers of English acquiring Spanish as a second language (L2) rely on word order to assign the grammatical roles of subject and object to words in a sentence (Houston, 1997; Lee, 1987; 2000; LoCoco, 1987; VanPatten, 1984; VanPatten and Houston, 1998). The psycholinguistic strategy causes L2 learners to assign the roles of subject or agent to the first noun encountered in a target sentence. Doing so yields non-nativelike interpretations of object-verb-subject (OVS) sentences, on the one hand, and delays the acquisition of object pronouns, on the other, because of the variable word order characteristic of Spanish. For example, both of the following Spanish sentences are grammatical:

(1) Juan la vio.
    Juan-SUBJ her-OBJ saw
    'Juan saw her'

(2) La vio Juan.
    Her-OBJ saw Juan-SUBJ
    'Juan saw her'

The aforementioned research found that L2 learners whose native language is English overwhelmingly misinterpret (2) as 'She saw Juan' by assigning the grammatical role of subject to the direct object pronoun *la* 'her'. Lee (2003) reviewed the research on the acquisition of Spanish object pronouns and asserted that the default processing strategy based on word order is pervasive into intermediate levels of learning and is detrimental to the acquisition of that feature of the language.

Factors that help the L2 learner move away from a word order processing strategy include the L2 learners' familiarity with content (Houston, 1997), the absence of the plural *-s* morphology (i.e. singular versus plural object pronouns) (Lee, 1987), and the presence of pre-target sentence-level context (VanPatten and Houston, 1998). Previous research, however, has not tested the effect of post-target sentence-level context on the L2 learner's comprehension of word order (VanPatten, 2004, p. 18). Furthermore, we have yet to incorporate the previously identified attenuating factors into one counterbalanced experimental design to examine how they work together to move learners away from a word-order strategy (Lee, 2003). Consequently, the purpose of the present study is to determine how specific factors work together as the L2 learner processes sentences and assigns case to object pronouns. Also, it examines the effect of post-target contextual cues on the L2 learner's comprehension of OVS word order. The overall aim is to better understand the psycholinguistic strategies that account for the L2 learner's inability to process direct object pronouns with nativelike competence.

1. Background

Input processing (IP) theory, proposed by VanPatten (1996) and refined in VanPatten (2004), is the point of departure for the present study. IP is not a complete model of L2 acquisition. Rather, it seeks to explain under what conditions the L2 learner attaches meaning to linguistic form in a nativelike manner when attending to input (VanPatten, 2004, pg. 6). Furthermore, it identifies specific processing strategies utilized by L2 learners as they convert input to intake, i.e., as they assign

meaning to form, when exposed to the target language. The processing strategies are explained in terms of 'principles' that account for the inability of L2 learners to process all of the linguistic forms in the input (Mitchell and Myles, 2004, pp. 187-188). The present study focuses on the second principle of IP theory, the First Noun Principle (FNP).

1.1 Input Processing Theory

IP theory places the connection between form and meaning at the foundation of L2 acquisition (VanPatten, 1996). According to the model, the L2 input is coded by the L2 learner first and foremost for meaning. The input that the learner notices and to which meaning is assigned is referred to as *intake*. The intake is sent to the learner's L2 developing system where the relationship between linguistic form and its meaning is stored. The FNP asserts that the L2 learner makes initial form-meaning connections based on a default SVO word order strategy and provides sub-principles representing conditions that override its use. It is as follows (taken from VanPatten, 2004, p. 18):

P2. The First Noun Principle. Learners tend to process the first noun or pronoun they encounter in a sentence as the subject/agent.
   P2a. The Lexical Semantics Principle. Learners may rely on lexical semantics, where possible, instead of word order to interpret sentences.
   P2b. The Event Probabilities Principle. Learners may rely on event probabilities, where possible, instead of word order to interpret sentences.
   P2c. The Contextual Constraint Principle. Learners may rely less on the First Noun Principle if preceding context constrains the possible interpretation of a clause or sentence.

The word-order strategy represented by the FNP was first documented in L1 acquisition research by Bever (1970) as Strategy D, which stated that native-English speaking children acquiring their L1 tend to interpret noun-verb-noun utterances as SVO, even when they are passive constructions. Its existence as a psycholinguistic strategy among L2 learners of Spanish is not surprising; it often leads them to nativelike interpretations, since the canonical word order of Spanish is SVO (Silva-Corvalán, 2001). The acquisitional challenge to which Lee (2003) referred is that the L2 learner of Spanish has the burden of knowing when not to employ the strategy, since the word order is variable. According to the sub-principles, L2 learners may move away from the default strategy when certain conditions apply, such as lexical semantic constraints (i.e. a boy can throw a rock, but a rock can't throw a boy), event probabilities (i.e. a dog would more likely bite a mail carrier rather than a mail carrier biting a dog) and contextual constraints (i.e. the presence of contextual cues preceding the target OVS word order in a sentence versus the absence of contextual cues). An assumption made in IP theory is that the principles and sub-principles can override each other, work together and interact when input is being processed (VanPatten, 2004, p. 19).

1.2 Sentence-level L2 Processing of Spanish Word Order and 3rd Person Object Pronouns

Previous research taking a production-oriented approach to the L2 acquisition of Spanish has convincingly documented the non-nativelike use of object pronouns (Andersen, 1983; Liceras, 1985; Liceras et al., 1997; Sanchez and Al-Kasey, 1999; VanPatten, 1990; VanPatten and Sanz, 1995). Processing-oriented[1] approaches, however, have identified specific factors that influence the L2 learner's assignment of meaning to linguistic forms at the very initial stages of acquisition, before linguistic forms are produced. The present study is motivated by the processing-oriented research.

VanPatten (1984) presented fifty-nine participants who were either first- or second-semester university students with sentences that represented OVS word order and that contained either direct or indirect object pronouns. Each participant was given four pictures, then heard a target sentence, and then had to match the appropriate picture to the sentence they heard. His results revealed that participants interpreted OVS sentences as SVO sentences between thirty-five and seventy percent of the time. In addition, he found that accusative pronominal constructions were misinterpreted significantly more often than dative pronominal constructions. His findings indicated a strong propensity among L2 learners to default to the FNP when assigning meaning to object pronouns in OVS input.

Lee (1987) examined the influence of number- and gender- morphological markings of direct object pronouns on the processing of L2 sentences. He provided twenty-two first-year university learners of Spanish with sentences that were systematically coded for eight different varieties of *gender* and *number*. *Gender* referred to the genders of the subject and object as being the same or different and *number* referred to the object pronoun as being singular or plural. His manipulations of the input yielded four different experimental conditions: (1) the subject and the object were both singular; (2) the subject and object were both plural; (3) the subject and object were the same gender; and (4) the subject and object were different genders. Learners were presented with the sentences in writing one at a time. In each sentence the direct object pronoun was underlined. After reading each sentence, they had to respond to the question, "What does *lo/la/los/las* refer to?" (The form of the pronoun in the prompt matched the underlined form in the input sentence.) Results revealed that the participants interpreted plural object pronouns ('*los/las*' 'them') as the subject significantly more often than they did singular pronouns '*lo/la*' 'him/her/it'. No statistically significant difference was found between sentences that contained objects and subjects with contrasting genders and those with similar genders. Lee (1987) referred to Slobin's (1973) Operating Principle A, which states that L1 learners 'pay attention to the end of words' (p. 108), but applied the principle to an L2 context. He attributed his findings to the possibility that the additional morphological marking of plurality (the plural -*s*) depleted the L2 learners' attentional resources, and thus prevented them from assigning the appropriate meaning to the appropriate form.

Houston (1997) went beyond sentence structure and examined the influence that the L2 learner's previous knowledge of a specific topic has on the employment of the FNP. Using the framework of the Competition Model (Bates and MacWhinney, 1989), he examined the relative cost of pragmatic cues on attentional resources. He provided twenty-eight participants, all of whom were in their fourth semester of university-level Spanish, with two sets of sentences. One set consisted of sentences containing names of characters from the textbook/video series *Destinos* (VanPatten et al., 1992), with which all of the participants were familiar. The other set of sentences consisted of fictitious characters with whom nobody was familiar. Participants were given ten seconds to read a sentence and then had to interpret it. They were given the English translation of the verb, which had a blank on each side of it, and the participants were instructed to write in the appropriate name of the character on each side of the verb, thus providing the correct or incorrect interpretation of the input item. The justification for the method was that, since English only allows SVO word order in active declarative sentences, there could only be one correct interpretation of the input by placing the subject before the verb and the object after it. Results revealed that learners misinterpreted twenty-eight percent of the sentences when they were familiar with the content, whereas they misinterpreted forty-eight percent of the sentences when they were unfamiliar with it. Houston's results provide another dimension to previous literature regarding a word-order strategy; possessing extra-sentential topic familiarity weakens the default word-order strategy of form-meaning assignment. The findings of Houston (1997) can be accounted for by sub-principle *P2b* of the FNP, the *Event Probabilities Principle*, in that L2 learners' expectations regarding specific events, which are based on their familiarity with the participants involved, influence their employment of a default word-order processing strategy.

VanPatten and Houston (1998) examined the effect of pre-target OVS context on the L2 learner's comprehension of word order. They provided forty-six fourth-semester L2 learners of Spanish with ten target sentences containing OVS word order in which contextual information preceded the OVS phrase. The ten target sentences were paired with ten sentences containing no relevant contextual information, both of which are exemplified in (3) and (4), respectively (taken from VanPatten and Houston, 1998, example numbers not original):

(3) Roberto está en el hospital porque lo atacó María con un cuchillo.
    "Roberto is in the hospital because María attacked him with a knife."

(4) Gloria contó a sus amigas que la atacó Ramón en su casa.
    "Gloria told her friends that Ramon attacked her in her house."

They found that fifty-nine percent of the sentences were misinterpreted when the OVS phrase was preceded by a contextual cue, as demonstrated in (3), while eighty-four percent were misinterpreted when no cue was present, such as (4). Their finding led to the formation of sub-principle *P2c*, the

Contextual Constraint Principle, claiming that the FNP is weakened when context precedes the OVS phrase. However, they did not examine the effect of a contextual cue following the OVS phrase. Therefore, we cannot be certain that the location of contextual cues influences the employment of the FNP.

To summarize, Lee (1987), Houston (1997) and VanPatten and Houston (1998) revealed that both structural linguistic features as well as extra-sentential pragmatic knowledge attenuate the default strategy when processing word order and third-person direct object pronouns. However, the constraints imposed on the processing of word order remain unclear. Further investigation is needed to determine if the *location* of contextual cues within the sentence influences the L2 learner's comprehension of word order, and how, if at all, the specific attenuating factors work together to predict nativelike interpretations of input.

2. The Current Study

The present study is motivated by the findings found in the investigations reviewed in the previous section. Specifically, it extends the research of Lee (1987), Houston (1997) and VanPatten and Houston (1998) by combining the linguistic and pragmatic variables that affected sentence processing in their studies into one counterbalanced research design, with the aim of determining how specific factors work together to influence the L2 learner's processing strategies. The present study also directly responds to the assertion made by VanPatten (2004), in which he stated, 'We have yet to research any effects that a post target context may have on sentence interpretation' (p. 18). The assertion made here is that further investigation is needed to better understand the conditions supporting the *Contextual Constraint Principle* (P2c); it may be that not merely *preceding* context overrides the FNP, but rather, the mere presence of contextual cues overrides it.

The current study differs from previous research in several ways. Lee (1987) examined the influence that specific morphological features of the object pronoun have on the nativelike assignment of case by L2 learners to that feature of the language. However, all of the items used in Lee's study placed the OVS construction at the sentence-final position, yet the effect of sentence location of contextual cues was not examined. Houston (1997) investigated the effect of content familiarity, but did not look at other influential variables with regard to the comprehension of sentences. VanPatten and Houston (1998) placed a contextual cue *before* an OVS word order phrase and found that it promoted nativelike interpretations. While they showed that the presence of context in the sentence fosters more nativelike interpretations, they did not investigate if L2 learners demonstrated the ability to interpret in a nativelike manner an OVS phrase in sentence initial position when it is *followed* by a contextual cue. The present study combines the aforementioned variables in one counterbalanced design, and, it examines the additional variable of post target-phrase context. It is guided by the following research questions:

1. Do morphology, topic familiarity, and sentence location of contextual cues work together to predict the L2 learner's assignment of case to Spanish direct object pronouns?

2. Do contextual cues preceding the target phrase versus those that follow the target phrase affect the L2 learner's assignment of case to Spanish direct object pronouns?

3. Method
3.1 Participants

Learners from four different beginning-Spanish classes participated in the current study as part of their regular class period. All participants (N=58) were native speakers of English. There were no heritage speakers of Spanish who participated. All were enrolled in an intensive beginning-level Spanish course at the university level intended for individuals who had two years or less of high school Spanish. At the time of data collection, there had been no previous instruction regarding object pronouns in their university course work.[2]

3.2 Data Collection

Participation in the present study was voluntary and only those who completed the human-subjects consent form were included in the analysis. The four different classes were divided into two main groups. The two groups will be referred to as Group A and Group B. Each group consisted of an equal number of participants (N=29). All participants, regardless of which group they were in, received the same data-elicitation packet. The only difference between the two groups was that Group A received input consisting of Spanish sentences with contextual cues preceding the target OVS phrase, whereas Group B received input consisting of Spanish sentences containing contextual cues following the target OVS phrase (the difference in input between the two groups will be further explained below). All participants completed three tasks: (1) an impromptu discussion, in English, regarding the characters from the popular cartoon The Simpsons; (2) a data-elicitation task; and (3) a background questionnaire. All three tasks were completed in 25 minutes.

3.2.1 Impromptu Discussion

The impromptu discussion regarding The Simpsons was intended to activate the schemata, i.e. topic familiarity, of the participants regarding the different personalities in the cartoon. The present study chose to use The Simpsons due to its popularity and longevity within American culture, and assumed that everyone would be familiar with it. Of all fifty-eight participants, only three admitted that they never watched the show. However, even those three were able to describe characters from the cartoon, in terms of personality and appearance. The discussion was conducted in English in order to ensure its comprehensibility. During the discussion in each of the groups, participants had to name as many characters as possible from the cartoon, in addition to as many adjectives as possible describing each personality. The investigator wrote the names of the characters, accompanied by their respective adjectives, on the board. When the discussion ended, the investigator erased the information before going on to the following task. The ultimate objective of the impromptu discussion was to ensure that target sentences in the data-elicitation task that were coded for + *topic familiarity* would be reliable.

3.2.2 Data-elicitation task

Data elicitation began after all participants had completed the impromptu discussion. First, each of the verbs to be used in the task was presented to the learners on the overhead, along with its English translation, in order to ensure there would be no unfamiliar vocabulary in the task. Second, an overhead projector was used to provide each group with two sets of input sentences, one sentence at a time. Participants were instructed to read the sentence and then respond to the corresponding prompt on the answer sheet, which was included in their packet. Each sentence was projected on the overhead for six seconds before moving on to the next sentence.[3] The investigator kept time using a watch.

The target sentences for each group were divided into two sets. The first set consisted of twelve sentences, each of which consisted of scenarios regarding characters from The Simpsons. Eight of the sentences were target items and consisted of OVS word order, while the other four sentences were used as distracters and consisted of SVO word order. The first item in the input for each set of sentences in each group was a distracter, which was intended to give the participants a trial run before encountering a target item. After reading each sentence on the overhead, the participants where given a moment to indicate their interpretation of the sentence on their answer sheet. Utilizing the methods of Houston (1997) and VanPatten and Houston (1998), a fill-in-the-blank procedure was adapted. For the first set of sentences, the participants were instructed to translate the sentence they read by writing the names of the characters on the appropriate side of the English translation. An example of a target input sentence from the first set of input for each group is shown in (5a), and the corresponding prompt on the participant's answer sheet in (5b):

(5a)   Bart no saca buenas notas, pero Lisa sí, y a veces lo critica Lisa.
          "Bart doesn't get good grades, but Lisa does, and at times she criticizes him."

(5b)   _____ criticizes _____.

The second set of sentences (in each group) differed from the first set in three ways. First, the content did not involve characters from <u>The Simpsons,</u> but rather, depicted scenarios involving names of people invented by the investigator. That is, the first set consisted of characters with whom the participants were already familiar, whereas the second set did not. Second, there were sixteen sentences in the second set of input items, eight of which were target items, and eight of which were distracters. Finally, the prompts on the participants' answer sheet for the second set of sentences were not in the form of fill-in-the-blank translations. Rather, following the data-elicitation methods of LoCoco (1987) and VanPatten (1984), they consisted of a picture-matching activity. The present study chose to utilize two different task types to help ensure that the participants would not become bored with the activities and consequently tune out. The participants received the input on the overhead the same way they did on the first set of questions, but they merely had to put an X underneath the picture that corresponded to the sentence they had just previously read. Examples (6a) and (6b) provide a target item and the corresponding prompt for the participant's interpretation, respectively:

(6a)   Susan se siente como una víctima cuando la insulta Richard.
        "Susan feels like a victim when Richard insults her."

(6b)
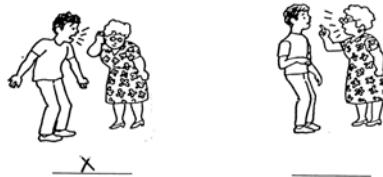
Thus, Group A and Group B both completed the fill-in-the-blank task regarding <u>The Simpsons</u> first, and they both completed the picture-matching task regarding novel characters second. Malovrh (2005) investigated task effect on the comprehension of Spanish sentences by L2 learners and found no significant main effect for task type when data elicitation involved picture-matching tasks as well as fill-in-the-blank tasks. Therefore, the present study assumes that task type did not influence the results.

VanPatten and Houston (1998) found a main effect for the type of verbs used in their investigation. Therefore, each of the input sentences in the present study consisted of transitive verbs, i.e. every verb required a subject and an object. Furthermore, there were no semantic constraints in any of the items. That is, each sentence depicted an event in which both the subject and the object could be capable of carrying out the action. As a result, sub-principle *P2a*, the *Lexical Semantics Principle*, is excluded from having a potential effect on the results.

3.2.3 Background Questionnaire

The background questionnaire was the final task completed by the participants and was used to ensure that only L1 speakers of English studying Spanish as an L2 were included in the study. Participants indicated whether or not they spoke different languages, if they were bilingual, if they spoke a different language before learning English, and they reported any previous foreign travel experience. Participants with previous experience of traveling or living in a Spanish-speaking country outside of the United States were excluded from the study.

3.3 Data Collection

All participants received the same answer sheet. The only difference between Group A and Group B is that the former was provided with sentences containing a pre-target OVS contextual cue, whereas the latter received input with sentences containing a post-target OVS contextual cue. Therefore, Group B's item corresponding to (5a) above contained a nominal phrase at the beginning of the sentence, as exemplified in (7) below:

(7)   A Bart lo critica Lisa a veces porque Bart no saca buenas notas.
      "Lisa criticizes Bart sometimes because Bart doesn't get good grades."

LoCoco (1987) examined the processing strategies of L2 learners of Spanish who were presented with full noun phrases in OVS word order (i.e. including the Spanish object marker 'a') aurally and visually. Her results indicated that the FNP applied to full noun phrases as well as pronominal phrases; her participants still interpreted the OVS constructions as SVO at a statistically significant rate, despite the presence of the full nominal phrase and object marker. Thus, the present study does not expect the difference between nominal phrases and pronominal phrases to affect the sentence-processing strategies of the L2 learners. The difference established between the two groups was necessary in order to compare the effect of sentence-initial versus sentence-final context.

3.4 Data Coding

All items were coded for four independent variables: +/-*topic familiarity* (i.e. tasks that depicted scenarios between characters from <u>The Simpsons</u> versus those that did not); *context location preceding the target phrase versus context location following it* (i.e. Group A versus Group B); *gender* (the gender of the subject and object were the same or were different); and *number* (the object in the sentence was singular or plural). Each of the eight target sentences in each set of input was systematically coded for the morphological variables of *number* and *gender* following the coding scheme of Lee (1987). That is, each of the four experimental conditions used in Lee (1987) was incorporated in the present study. Those conditions are repeated here: (1) the subject and object are both singular, (2) the subject and object are both plural, (3) the subject and object are the same gender, and (4) the subject and object are different genders. The combination of the four conditions yielded eight different target sentences. Table 1 provides the target sentences used in the first set of input for Group A, as an example.

Table 1: Target sentences from the first set of input for Group A

Target item	Sub	Obj
1. Marge es la madre y es muy autoritariana pero a veces la desobedece Bart.	ms	fs
2. Ralphie es un chico extraño, y lo rechaza Bart.	ms	ms
3. Homer y Bart son mal educados y los critican las hermanas de Marge.	fp	mp
4. Maggie es solamente una bebé, y por eso a veces la cuida Lisa.	fs	fs
5. Bart no saca buenas notas, pero Lisa sí, y a veces lo critica Lisa.	fs	ms
6. Patti y Selma fuman mucho y por eso las critican Marge y Lisa.	fp	fp
7. Itchy y Scratchy son malos ejemplos para los niños, pero los admiran Bart y Milton.	mp	mp
8. Las hermanas de Marge no son simpáticas y por eso no las adoran los hombres.	mp	fp

f = feminine, m= masculine, s=singular, p=plural

Thus, item #1 was coded as + *topic familiarity*, *pre-target context* (Group A), *gender = different* and *number = singular*. There were also eight target sentences that corresponded to the – *topic familiarity* set. Furthermore, all target sentences for Group B depicted the same scenarios as their corresponding input in Group A, except they contained an OVS construction preceded by a nominal phrase.

The dependent variable was the accurate interpretation of OVS word order. If the learners interpreted the target sentences as SVO, the FNP was promoted and the interpretation was not nativelike; if they interpreted them as OVS, the FNP was not favored and their interpretation was accurate. Items that were not responded to by the participant, or, that had ambiguous responses, were excluded from data analysis. For the fill-in-the-blank task, if the learner responded with English pronouns, such as *She* criticizes *him*, instead of full noun phrases, their response was not included in the analysis, because other similar responses, such as *He* criticizes *him*, would yield an ambiguous interpretation of the data.

3.5 Data Analysis

The experimental design of the present study isolated the four different variables so that each target item in the input represented a different combination of linguistic and pragmatic factors. The data were first analyzed for the frequency of OVS interpretations (i.e. not using the FNP) in each of the specific research conditions, and Chi square correlations were calculated. The Chi square analysis was

used to isolate independent variables and determine if they had a statistical main effect on the selection of the dependent variable. In addition, all data were entered into VARBRUL in order to perform a stepwise binary logistic regression analysis.[4] The stepwise regression analysis determines how the independent variables work together to create a model predicting the dependent variable. Furthermore, VARBRUL provides individual weights indicating the predictive value of each independent variable. The weight of a particular factor indicates the relative predictive strength of that factor over the dependent variable compared to other factors in the model. Variables that do not predict the dependent variable are not included in the model.

4. Results
4.1 Frequency of OVS interpretation

A total of 909 responses were coded and analyzed. The overall frequency of the dependent variable within each specific research condition is indicated in Table 2, as well as the frequency of OVS interpretation within Group A and Group B (percentages and raw scores are given).

Table 2. Overall and Group-Specific Frequency of OVS Interpretation within Research Conditions

Variable	Condition	% OVS interpretation		
		Overall	Group A	Group B
Number	When singular…	68% (317/462)	70% (160/227)	67% (156/232)
	When plural…	47% (211/447)	44% (100/225)	49% (110/221)
Gender	When same…	58% (238/406)	55% (112/201)	61% (125/203)
	When different…	57% (290/503)	58% (148//251)	56% (141/250)
Topic familiarity	When familiar…	65% (294/446)	65% (146/224)	66% (147/221)
	When not familiar…	50% (234/463)	50% (114/228)	51% (119/232)
Context Location	When pre-target…	57% (262/456)	N/A	N/A
	When post-target…	58% (266/453)	N/A	N/A

The frequencies between each group were not significantly different. As can be seen in Table 2, each group performed relatively the same under each research condition. The Chi square analysis, indicated in Table 3, revealed that, of the four variables, only two had a significant main effect on the dependent variable ($p<.001$). They were *number* and *topic familiarity*. Consistent with Lee (1987), the learners in the present study interpreted OVS constructions accurately significantly more often when the object pronoun was singular. Furthermore, neither a difference nor a similarity between the gender of the object and the subject had a significant main effect on the dependent variable.

The presence of topic familiarity also had a significant main effect. When the input entailed scenarios from <u>The Simpsons</u>, the learners interpreted OVS constructions accurately significantly more often than when the input entailed novel characters, thus supporting the results of Houston (1997).

Finally, contextual cues that preceded the OVS construction yielded results that were not significantly different than when the contextual cue followed it. Thus, Group A (pre-target context) performed the same as Group B (post-target context) under each of the other experimental conditions, indicating that the location of contextual cue in the sentence had no effect on how the two groups behaved under equal conditions.

Table 3: Chi Square Tests for each Independent Variable across both Groups of Participants

Variable	Sig.	*df*	Small Cells?	Cramer's *V*
*Number	.000	1	No	.000
Gender	.411	1	No	.769
*Topic Familiarity	.000	1	No	.000
Context Location	.737	1	No	.699

* Achieved level of significance ($p<.001$)

4.2 Predictors of OVS Interpretation

The results of the stepwise logistic regression analysis for the variables in this study are indicated in Table 4. The variables of *gender* and *context location* were excluded from the model. In other words, they do not predict the selection of OVS interpretations with statistical significance. The variables *number* and *topic familiarity*, however, were included in the model, and do predict the dependent variable. Table 5 provides the results of the statistical tests for the logistic regression model, and provides the percentage with which the model will predict the dependent variable.

Table 4: Logistic Regression Model – Predictors of OVS Interpretation

Factor Group	Factor	N	%	Weight
Number	Singular	317/462	68%	.609
	Plural	211/447	47%	.387
Topic Familiarity	Familiar	294/446	65%	.582
	Not familiar	234/463	40%	.420

Table 5: Details of the Statistical Tests for the Logistic Regression Analysis

Statistical Test	
Sig.	.000
- 2 Log likelihood	-585.396
Percent Predicted	60%

The logistic regression model indicates that the factors *number* and *topic familiarity* work together to predict the dependent variable at a statistically significant rate. Table 4 indicates that the weight of predictive power of the *number* of the object pronoun (.609) is slightly higher than that of *topic familiarity* (.582). While both factors are significant in the model ($p<.000$), it is interesting to note that surface structure has more influence on the selection of the dependent variable than pragmatic, extra-sentential features. The results of the statistical tests for the logistic regression analysis indicate that the model will statistically predict the selection of OVS interpretation of OVS sentences 60% of the time.

5. Discussion

In response to the first research question, the results of the present study indicate that the morphological marking of plurality on third-person object pronouns work together with the absence of topic familiarity to predict the default processing strategy based on word order. In other words, L2 learners are more accurate in interpreting Spanish OVS sentences when the object pronoun is singular and they are familiar with the content. Likewise, the combination of a plural object pronoun and a lack of topic familiarity do not predict nativelike interpretations. Both factors have previously been identified in Lee (1987) and Houston (1997), respectively, but neither study analyzed both factors together under controlled research conditions. Of particular interest to the present finding is that the logistic regression analysis weighted the variable *number* higher than *topic familiarity*. We can interpret the weights such that morphological structure has a slightly greater influence than extra-sentential pragmatic knowledge on the interpretation of Spanish OVS word order. The finding is significant from a cognitive perspective to SLA; researchers do not just want to know what factors promote a specific strategy, but they also want to know how different factors work together to promote a specific strategy. The present study confirms that structural features as well as extra-sentential knowledge both function as cues, and together attenuate the default psycholinguistic processing strategy based on word order.

In response to the second research question, the results of the current study indicate that the location of contextual cues in an OVS Spanish sentence has no effect on the L2 learner's assignment of meaning to the direct object pronoun. Therefore, the *Contextual Constraint Principle*, the sub-principle to the FNP in IP theory, could be refined to state that the *presence* of contextual cues in the

sentence weakens the FNP, not merely the *preceding* contextual cues. The finding explains why VanPatten and Houston (1998) found that preceding context attenuated the FNP. That is, the presence of context itself attenuated the principle, not its location in the sentence.

When considering the answers to both research questions together, it is of interest to note that the influence of the morphological plural marker of the direct object pronoun was consistent, regardless of where the contextual cue was located. This further supports the high influence morphological structure has on the L2 learner's attentional resources. As a factor predicting the FNP, it seems to dominate over the influence of context.

6. Conclusion

Houston (1997) concluded with the assertion that if the cognitive burden of comprehending form is reduced by the presence of topic familiarity, then bringing such topic familiarity to a task should enhance the L2 learner's attention to input and thus expedite acquisition (p. 132). He noted that future research should investigate if such an assertion holds. The present study confirms that topic familiarity and structural features (i.e. morphological plural markers) influence the nativelike assignment of case to OVS word order. Furthermore, it suggests that such factors are not necessarily competing with each other to gain the attentional resources of the L2 learner, but rather, may be working together to promote specific processing strategies. This conforms to VanPatten's (2004, p. 19) assertion that the principles and sub-principles of IP theory may work together, by either interacting or overriding each other.

The present study also investigated additional factors attenuating the second principle of IP theory, the *First Noun Principle*, and found that the location of contextual cues in the target L2 sentence had no effect on the L2 learner's ability to process OVS word order in a nativelike manner. Therefore, a refined definition of the *Contextual Constraint Principle*, a sub-principle of the FNP, may indicate that the mere presence of context overrides the FNP, as VanPatten and Houston (1998) found, and not just the preceding context, as the present study suggests.

Thus, the present study confirms findings from previous research and demonstrates how specific factors conspire to predict the interpretation of OVS sentences among L2 learners. Also, the validity of the FNP as a psycholinguistic processing strategy is supported, with additional evidence offered to refine its sub-principles. Future studies could control for the effect of pronominal phrases versus nominal phrases by comparing learners' performances to themselves, which would further support the findings of the present study.

Notes

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1. Here, 'processing-oriented' refers to previous studies that have focused on comprehension of input and form meaning connections. Production of the target language is not under analysis.

2. While it is not known whether or not the participants had received formal instruction regarding direct object pronouns in their previous instruction (if any), a pretest / proficiency test was not administered. The justification for this decision is that learner development is not under investigation here. Rather, the effect of specific experimental conditions on form-meaning connections is being analyzed, which is why a binary logistic regression analysis was conducted rather than an analysis of variance. Since the present study aims to determine the conditions that favor the use of the FNP, previous knowledge of the target structure does not bias the results, which is further supported by the data in Table 2.

3. The choice to allow six seconds for participants to respond to each target item was based on a previous pilot study in which participants' response time was observed. The approximate time required was six seconds.

4. All variables in this study are categorical and binary, which is why a stepwise binary logistic regression was selected as the most appropriate analysis to determine the conditions predicting the dependent variable.

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