RESETTING PARAMETERS IN THE ACQUISITION OF A SECOND LANGUAGE

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1. Introduction*

L2 Acquisition researchers are currently debating whether UG is accessible to the learner when acquiring his second language. There are mainly three scenarios to consider in this debate. First, the L2 learner has full access to UG, including L1 parameter settings and those settings not chosen by the L1. According to White (1985, 1986, 1989a), L2 learners initially take the L1 value of a parameter. However, when they realize that the L1 grammar is not able to accommodate the L2 input, they access all options provided by UG (i.e. new parameter settings, functional categories etc) and they modify their grammars accordingly. In a more recent version of this theory, Schwartz and Sprouse (1996) propose the 'full transfer/full access' model. Under this model, the whole L1 grammar, not just L1 parameter settings, is transferred into the L2. Based on the L2 input, the L2 learner restructures his grammar drawing on all the options made available by UG. In this respect, the L2 learner has full access to UG. According to a second model, the L2 learner has partial access to UG, including principles and L1 parameter settings, but not parameter settings not chosen by the L1 (cf. Tsimpli and Roussou 1991). Finally,

according to another claim, the L2 learner transfers the L1 grammar but fails to access UG for learning or for non-target parameter setting. Under this model the L2 learner must learn language by means of a problem-solving strategy (cf. Bley-Vroman 1990; Clahsen and Muysken 1989 and Schachter 1989). There is a fourth model which will not be entertained in this paper since its status is not crystal clear. Under this fourth model, the L1 is not part of the L2 learner at any point (i.e. no transfer of L1 grammar is assumed); rather, the L2 is acquired via UG alone. This idea is argued for in Epstein, Flynn and Martohardjono (1996/1997, 1998) and Flynn and Martohardjono (1994). According to White (1996), researchers arguing for this model also assume a role for the L1 although its status is rather unclear. As White (1996) points out, "Flynn (1987) argues that L2 acquisition involves the assignment of an 'additional' parametric value where L1 and L2 do not match in terms of parameter settings. This suggests that the L1 is after all a starting point, since it is only if the learner starts from the possibilities exemplified in the L1 that the issues of match and mismatch arise" (p. 5). In this paper, I will consider only the first three scenarios presented above. To put it clearer, all the models that will be entertained will take the L1 as a starting point in L2 acquisition. In other words, transfer of L1 grammar will count as the starting point for the L2 learner. The main question will be to find out whether L2 learners can access UG only through the L1 or whether UG is more generally available (i.e. for parameter resetting etc…).

Subjacency,[1, 2] the mechanism ensuring the locality of each instance of movement, is one of the areas that has served to test the scenarios presented above. More precisely, languages that differ with respect to this principle (e.g. Chinese and English) have been used to test whether Subjacency is obeyed by the L2 learner even though that principle is not operative in the overt syntax of his L1 (e.g. Chinese). If the L2 learner obeys the principle under investigation, then there is evidence for the presence of UG in the process of L2 Acquisition. If, on the other hand, the L2 learner does not obey the principle, we have an argument against UG being operative in the acquisition of a second language. So far, there is not a consensus as to whether UG is accessible to the L2 learner, at least, with respect to Subjacency. On the one hand, Martohardjono (1993), Uziel (1993) and White (1985, 1989b) claim that UG is fully accessible. In these studies, it has been found that L2 learners can identify ungrammatical sentences that violate abstract universal principles without being explicitly taught. Therefore, the relevant knowledge that a sentence is ungrammatical must come from UG. However, there are some areas in which the L2 learners do not perform as well as the native speakers. In order to explain this behavior, it has been argued that the L2 learner may exhibit a non-native behavior in some areas because he is still in the process of resetting the parameters corresponding to the L2. Finally, Bley-Vroman *et al.* (1988), Johnson (1988), Johnson and Newport

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[1] The Subjacency Condition was originally proposed by Chomsky (1973).
[2] There have been some non-grammatical approaches to Subjacency. For example, Berwick and Weinberg (1984) derive the effects of Subjacency from properties of parsing. In my paper, I will assume that Subjacency is part of the core grammar and subject to parametric variation (Rizzi 1982).

(1991) and Shachter (1989) argue against the availability of UG in the L2 learner. According to their findings, L2 learners exhibit a clearly non-native behavior when it comes to Subjacency.[3]

In this paper I present a new study which will shed new light on the issue of UG in L2 acquisition.[4] More specifically, I address the following question: Can parameters be reset in L2 Acquisition? As will be shown in section 3, those studies arguing for the availability of UG in L2 Acquisition have failed to show that the L2 learner is capable of resetting parameters from the value of their L1 to the value of the L2. Until this is shown, the availability of UG is not so strongly proven since the L2 learner could be rejecting certain violations because they are also ungrammatical in his own language. If one can show that the L2 learner rejects exactly those sentences that are ungrammatical in his L2, despite the fact that they are grammatical in their L1 (and vice-versa), then we will have clear evidence that UG is indeed available to the L2 learner. If that evidence is not found, there are reasons to doubt that the L2 learner is accessing UG when acquiring a second language.

Another theoretical point I address in my paper is the issue of markedness in L2 acquisition. Johnson (1988) points out that bounding nodes differ from language to language when it comes to Subjacency.[5] More precisely, there are mainly three parameter settings, depending on which nodes are considered bounding nodes. The available choices are: CP &IP, IP & NP, CP & NP.[6] According to Johnson (1988), the parameter values just mentioned form subsets of each other, that is, they vary in markedness. As she puts it, the least marked, (or the most restrictive) parameter setting contains the bounding nodes CP and IP. This setting prohibits extraction from embedded clauses. Russian is such a language. The next least marked option is IP and NP, which permits extraction from some embedded clauses, but not from embedded wh-questions, for example. English and German belong to this category. Finally, languages such as Spanish and Italian have CP and NP as bounding nodes. This option allows for extraction from wh-questions, unlike any of the others. These languages belong to the least restrictive option. Given this background, there are some questions arising at this point: Can subjects beginning with a less marked parameter value adopt a more marked parameter value? Can subjects beginning with a more marked parameter value adopt a less marked parameter value? In other words, do L2 learners obey the Subset Principle when acquiring a second language? I postpone the discussion of this topic until section 6.2.

In the following sections I first review two representative works arguing for and against the availability of UG in the process of L2 Acquisition. Second, I raise problems for those works. Third, I propose a new study and I explain in detail the

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[3] These researchers acknowledge that although L2 learners do not perform like native speakers, they perform above chance in most cases. In order to explain this behavior, they claim that UG could be accessible to the L2 learner in some attenuated form (see Bley-Vroman *et al.* 1988).

[4] I focus on Subjacency and another phenomenon that may or may be not related, so-called 'that-trace' effects.

[5] See Grimshaw (1986) for an account of the differences between English and Italian when it comes to the S/S' parameter.

[6] Johnson (1988) uses C´and S intead of CP and IP. I have updated her labels for ease of exposition.

question this study addresses and the research hypotheses that will be entertained. Fourth, I present the results of two experimental studies and I discuss those results in light of the research hypotheses proposed in this paper.

2. Johnson (1988)

Johnson (1988) raises the following question: are there critical period effects in L2 Acquisition? In other words, does access to UG decay after a certain age? In order to offer an answer to this question, she tested different age groups using a Grammaticality Judgment Task consisting of 180 sentences (including Complex NP Constraints, extraction out of Relative Clauses and Wh-islands) presented in an aural form. The sentences under analysis were presented in groups of four, as shown in (1):

(1)   a. Sally watched how Mrs. Gomez makes her cookies.   [Declarative]
      b. *What did Sally watch how Mrs. Gomez makes?   [Wh-island]
      c. Who did Sally show how Mrs. Gomez makes her cookies?   [Control][7]
      d. *Who Sally did show how Mrs. Gomez makes her cookies?   [S-V
                                                                      inversion]

21 Chinese speakers and 11 native speakers of Spanish were asked to judge the sentences.[8] Chinese was chosen because there is no overt wh-movement in this language and constraints on movement do not apply in the overt syntax (cf. Huang 1982 and Lasnik and Saito 1984). Spanish-speaking subjects were included in the study because, as Torrego (1984) suggests, there is parametric variation with respect to wh-islands.[9] To be more precise, extraction out of wh-islands in Spanish, in contrast to extraction out of wh-islands in English, is grammatical, as shown in (2) and (3). This difference in extraction between English and Spanish is traditionally attributed to the parametric variation in the choice of bounding nodes for Subjacency, as discussed above. In English IP is a bounding node. In contrast, CP, not IP, is a bounding node in Spanish. Since IP does not count as a bounding node in Spanish, extraction out of wh-islands is allowed in this language.

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[7] An experimental control is, in this case, a sentence which serves to control for the possibility that subjects might reject (1b) above not because they obey Subjacency but for an independent reason. For example, subjects might reject (1b) because it involves a complex structure. If one finds that a subject rejects both (1b) and (1c), one cannot conclude that that subject obeys Subjacency. Maybe that subject has problems with complex structures and that is why he rejects both sentences. If, on the other hand, a subject rejects (1b) but accepts (1c), one can fairly conclude that the relevant subject obeys Subjacency since he knows the difference in grammaticality between the two sentences.

[8] The Chinese speakers were divided into different groups depending on the age of arrival to the US (i.e. from 4 to 16 years of age). At the time of the test, all subjects were adults. The Spanish subjects constituted a single group of people who had arrived in the US as adults.

[9] Parametric variation in the choice for bounding nodes for Subjacency was first proposed by Rizzi (1982) to account for the differences between English and Italian in extraction from indirect questions. Torrego (1984) observes that Spanish behaves similarly to Italian in that Spanish also allows extraction out of indirect questions.

(2)   *Who don't you know how much weighs?

(3)   *Quién no sabes cuánto   pesa?*
        who   no know how-much weighs
        'Who don't you know how much weighs?'

The results of this study as are follows. The Chinese subjects exhibited a decay after age 7.[10] In order words, those subjects who had arrived in the US after age 7 did not perform as well as native speakers. The performance of the Spanish subjects was also below that of native speakers ($p < .01$). Based on these results, Johnson (1988) concluded that the Subjacency Principle is affected by maturation. As she puts it, "the outcome of late second language learning, then, is an acquired language which, though still probabilistically similar to the target language, is imperfectly mastered and sometimes even violates constraints on human languages in general" (p. 134). In essence, Johnson argues that UG does not work at full capacity in the adult learner.

3. Martohardjono (1993)

In her study, Martohardjono (1993) investigates whether the L2 learner has access to UG in the process of acquiring a second language. In order to evaluate this possibility, she compared the rates of rejection of strong islands (extraction out of Relative Clauses and Adjunct Clauses) versus weak islands (Wh-islands and That-trace effects).[11] She hypothesized that if L2 learners had access to UG, they should reject strong islands at a higher rate than weak islands since strong island violations result from crossing more barriers than in the case of weak island violations.[12]

The main task of this study was a Grammaticality Judgment Task consisting of 144 sentences presented in an aural form. Similarly to Johnson (1988), sentences were presented in groups of 4. The subjects of the study were 24 Indonesian, 19 Chinese and 11 native speakers of Italian. The results of the study are presented in Table 1.

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[10] Whether there are differences between L1 and L2 Acquisition in this respect is an unclear issue. According to Lenneberg (1967), for example, language ability decays at a later age (i.e. puberty) in L1 Acquisition. In contrast, Mayberry and Eichen (1991) and Morford & Mayberry (2000) claim that the language ability decays much earlier, even at 4 years old in some cases.

[11] Wh-islands and that-trace effects are both considered weak islands by Martohardjono (1993). The reason why she treats these two constructions in a similar way is because they involve fewer violations than extraction out of relative clauses, just to give an example. According to Martohardjono (1993), extraction out of wh-islands involves only one barrier. In contrast, extraction out of relative clauses involves two invariant barriers. Therefore, extraction out of relative clauses involves a stronger violation than extraction out of wh-islands. The situation with respect to that-traces is a bit more complicated. That-trace effects involve a government violation. At first sight, these types of sentences should be rejected at higher rates than those involving movement violations. However, there is another factor one needs to take into account when it comes to that-trace effects. As Martohardjono (1993) puts it, there is considerable variability among native speakers for these sentences. She hypothesizes that this variability makes the task of the L2 learner quite difficult. Since the input is ambiguous, L2 learners could take some time to figure out the grammaticality status of these constructions. In summary, Martohardjono (1993) considers that some constructions are weak islands if they involve only one invariant barrier, and/or require additional steps in the acquisition process.

[12] See footnote 15 for a more detailed discussion about that-trace effects.

Table 1

Results of the Grammaticality Judgment Task[13]

	Strong	Weak
Indonesian	87%	42%
Chinese	76%	38%
Italian	89%	61%
English	94%	79%

As the table makes clear, all groups rejected strong islands at a higher rate than weak islands ($p < .0001$ for all language groups).[14] Given the similarities among the groups, and more importantly, given the similar pattern of rejection exhibited between the native group and the non-native groups, Martoharjono (1993) concluded that UG is available to the L2 learner. The lower rate of rejection of weak islands is attributed to a difficulty in parameter resetting. According to Martohardjono (1993), the subjects of her study were still acquiring their second language and, consequently, they were still in the process of resetting parameters from the value of their L1 to the value of the L2.[15, 16]

Let us examine in more detail the results of the Italian group with respect to weak islands. As Table 2 shows, there is a clear difference between the native group and the Italian group. It is likely that the Italian L2 learners were relying on their native language when acquiring the strong constructions but not the weak ones. As I mentioned above, the poor performance of the L2 learners in judging the weak

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[13] The percentages indicate the rate at which the different language groups rejected the constructions under analysis.

[14] Martohardjono (1993) does not run a statistical analysis comparing the performance of the L2 groups and the English group.

[15] To be more precise, Martohardjono (1993) explains that wh-islands could represent a difficulty for the L2 learner due to parametric variation among languages. The difficulty with that-trace effects is attributed to dialectal-variation among native speakers. Since some English speakers find that-trace violations acceptable (i.e. the L2 input data is ambiguous), it could take some extra time to the L2 learner to figure out the grammatical status of this sentence. Uziel (1993), in her replication of Martohardjono's (1993) study, attributed the difficulty both with wh-islands and with that-trace effects to a difficulty with resetting parameters. I will follow Uziel (1993) in this respect although both possible approaches need to be more carefully examined. It is worth mentioning at this point that both Martohardjono (1993) and Uziel (1993) assume that UG is available to the L2 learner even though the L2 learner has not reset the value of the parameter from the L1 to the L2. Based on the similar results across groups shown in Table 1, they claim that these parallel results are due to the L2 learner being able to access UG. Still, it is possible that there are some constructions that require additional steps in the acquisition process. The fact that L2 learners do not reject weak islands at a much higher frequency is due to the fact that they have not reset the correct parameter(s). If L2 acquisition is guided by UG, the prediction is that these L2 learners will eventually reset the parameter(s) and will reject weak islands at a native rate.

[16] Martohardjono (1993) does not give an explanation for the fact that even native speakers did not reject weak violations 100% of the time. As she puts it "the fact that performance on the weak violations remained relatively low for the control group, in spite of the fact that acquisition for this group is complete, is in itself an interesting fact" (p. 131). So far, I do not have an explanation for this fact either. Probably satiation (see footnote 17) played a role in the results of the native group.

violations could be attributed to the necessity for a process of parameter-value reassignment, which caused a delay in the acquisition of the relevant parameter-setting(s) in the L2.[17]

Table 2

Weak islands: Italian vs. English

	Wh-islands-S	Wh-islands-O	That-trace
Italian	61%	57%	55%
English	95%	57%	85%

Based on the similarity in patterns across the language groups (see table 1), Martohardjono (1993) concludes that UG is fully accessible to the L2 learner.[18]

4. Problems with some previous studies

In this section I introduce some of the methodological and theoretical problems found in the studies described in sections 2 and 3.

Let me start with the main theoretical problem I found in Martohardjono (1993). The Italian subjects in Martohardjono's (1993) study could be rejecting strong islands because they are also ungrammatical in their own language. They could accept wh-islands and that-trace effects to a greater extent because those constructions are grammatical in Italian. In order to make the hypothesis that UG is accessible to the L2 learner stronger, it would be necessary to show that weak islands are rejected more often by L2 learners.

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[17] Note that the rates of rejection of object extractions out of wh-islands were equal among the two groups. Martohardjono (1993) interprets this result as evidence for the existence of UG in L2 Acquisition. However, it is well-known that English-speaking people satiate in certain islands (cf. Hiramatsu 1998, 1999 and Snyder 1994, 2000). Probably the native group satiated in these islands and that is why they rejected these violations less often than expected. Of course, it is also possible that the Italian group also satiated in these islands. However, this possibility seems less likely to me given that this group, in contrast to the English group, also had low rates of rejection for extraction of subjects out of wh-islands.

[18] Just by looking at Table 2, this conclusion does not seem to hold. However, what is important for Martohardjono (1993) is that there is a similar pattern of rejection across the groups. Given that that pattern exists (i.e. all language groups reject strong islands more often than weak islands), Martohardjono (1993) concludes that the pattern observed in Table 1 is not accidental. L2 learners were guided by UG, otherwise there would be no reason why L2 learners rejected strong islands to a greater extent than weak islands. Martohardjono (1993) explains the results in Table 2 by hypothesizing that the L2 learners were still in the process of learning their second language and therefore had not reset the relevant parameters to their correct value. Martohardjono (1993) implies that access to UG, but failure to reset the parameter, will lead subjects to make more mistakes and therefore to show lower rates of rejection that those of native speakers. It is possible that the some of the L2 learners in Martohardjono´s (1993) study have already set the correct value of the parameter but maybe others haven´t. The crucial point is that, generally speaking, the subjects in Martohardjono´s (1993) study are still unsure of the value of the L2 parameter and, consequently, they are less sure about their judgments.

With respect to methodological problems, I first mention one problem already noted by Murphy (1997). The problem is that in both studies the task was auditorily presented. According to Murphy (1997), subjects perform better in written activities than in aural activities. In her study, Murphy (1997) compared the performance of subjects in both written and aural activities. The results showed that subjects did much better in the written activity than in the aural one.[19] This methodological problem is especially relevant in Johnson's (1988) study, where non-UG effects could be attributed to the way the task was presented to the subjects.

Another problem, also pointed out by Murphy (1997), is that subjects had to judge too many sentences. A Grammaticality Judgment Task is a task that requires a lot of attention. If too many sentences are presented, subjects are likely to get tired and they can start judging sentences randomly.

A related problem surfaces with respect to the way the sentences were presented. In both studies, sentences were invariably presented in groups of four consisting of two grammatical and two ungrammatical sentences. The problem with this presentation method is that subjects could guess the pattern and start judging sentences according to that pattern.

Other aspects of the studies that need further improvement are the following. The number of subjects in some cases was very low. In both studies there were only 11 Italian and 11 native speakers of Spanish. If possible, more subjects should be included in the study. The second point to mention is that Johnson's (1988) subjects did not take an English proficiency test and their background was far from being homogeneous. Again, those factors need to be controlled for so that they do not interfere with the results.

Another problem with Johnson's (1988) and Martohardjono's (1993) studies is that they did not include sentences in the native language of the subjects. It could be the case that the subjects rejected some of the sentences because they also found them ungrammatical in their own language, even though those sentences had been described as grammatical by the linguists working on that particular language. It is important to check whether naïve informants' judgments coincide with linguists' judgments. In this way, we can rule out (or not) the possibility that subjects are rejecting some of the sentences due to this interfering factor.

5. Research hypotheses

Once the necessary background has been introduced, we are now ready to consider the research hypotheses I would like to evaluate in this paper. Recall that the research question I am interested in is the following: Can parameters be reset in L2 Acquisition? There are two competing research hypotheses I would like to

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[19] As Danks (1980) and Anderson (1980), among others, have suggested, a listener has little control over the auditory signal which fades rapidly while the reader has reasonably complete control over the amount and rate of visual input. It seems that verbal material presented aurally is processed in a different way from verbal material in visual form. Probably this difference between the two modalities under investigation is what made it easier for the subjects in Murphy's (1997) study to perform better in the written activity than in the aural one.

evaluate. Before introducing these research hypotheses, let me mention that I use wh-islands and that-trace effects as the linguistic structures which will serve to evaluate the validity of each hypothesis. The two research hypotheses under investigation are the following.

First, subjects will be able to reset parameters in L2 acquisition, in particular with respect to Subjacency. This hypothesis leads to the prediction that advanced L2 learners will reject weak islands at a high rate (i.e. the pattern will bear closer resemblance to the pattern of native speakers in this respect). This prediction follows from Martohardjono (1993), who suggests that L2 learners reject weak islands less often because they have not yet reset the parameter of the L2. If the prediction is borne out, this would provide evidence for the possibility of resetting parameters in L2 Acquisition and, more generally, it will provide evidence for the availability of UG in learning a second language.

The second competing hypothesis is that subjects will not be able to reset parameters when it comes to Subjacency. Under this hypothesis, we predict that L2 learners will keep on rejecting weak islands less often than expected. If this hypothesis is correct, we would not have strong evidence to support the idea that UG is available to the L2 learner, as I mentioned in the introduction. In other words, UG could be available in some attenuated form but not in the same form as in L1 Acquisition. This conclusion may also shed some light on a theory of Critical Period effects.

6. New study

In order to evaluate my research hypotheses I propose a new study which offers methodological innovations and which overcomes the problems mentioned in section 4.

6.1. L1 English/L2 Spanish

In this experimental study, I look at native speakers of English acquiring Spanish as a second language.[20] As I mentioned above, I use wh-islands and that-trace effects as the test sentences for my study. Recall that, as I explained in section 2, there is parametric variation between English and Spanish when it comes to wh-islands (cf. (2) and (3)). Similarly, that-trace effects are absent in Spanish. (4) below is ungrammatical in English. However, the Spanish counterpart is grammatical, as in (5).

(4)   *Who did Pat think that arrested her brother?

(5)   *Quién cree   Pat que arrestó   a su   hermano?*
       who   thought Pat that arrested to her brother
       'Who did Pat think that arrested her brother?'

Wh-islands and that-trace effects are ideal constructions to use in this study since there are clear differences in grammaticality between English and Spanish.[21]

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[20] As far as I know, this type of study has never been done before.

[21] I do not include strong islands in my study since they are also ungrammatical in Spanish and subjects could transfer the knowledge of their own language when judging these sentences. My study

In my study, there are three comparison groups, a beginner group, an intermediate group and an advanced group.[22] All subjects are adult L2 learners of Spanish.

The experiment proceeds as follows. First, subjects take a Spanish Placement test, which serves to assess the Spanish proficiency level of the subjects. Second, a paper and pencil task (i.e. a Grammaticality Judgment task) is administered to the subjects of the study. After filling out some background questions, they are asked to read an instruction sheet (written in Spanish) explaining the nature of the task. Once the subjects make sure they understand the instructions, they can start with the task. As I have already mentioned, I use a Grammaticality Judgment Task, similarly to Johnson (1988) and Martohardjono (1993). The main differences between their tasks and mine is that the task is in written form, as opposed to aural form, the number of sentences is considerably reduced and the presentation of the sentences is different. Importantly, instead of a lead-up sentence for a total of four sentences, subjects have to judge just one sentence based on a preceding lead-up sentence. When judging sentences, subjects have three options to choose from: 'possible', 'impossible' and 'not sure'.

Sentences are divided into two groups. In the first group of sentences, subjects are asked to judge sentences in English, their native language. Sentences are presented in a fixed randomized order. This part of the task consists of 4 wh-islands (ungrammatical subject extractions),[23] 4 that-trace effects (ungrammatical), 4 controls for wh-islands (grammatical), 4 controls for "that-trace effects" (grammatical) and 8 fillers (4 ungrammatical and 4 grammatical).[24, 25] Some sample stimuli are provided below:

►   Pat knew where Mary had hidden the candy.
(6)   Who did Pat know where had hidden the candy?   [wh-island]
      Possible   Impossible   Not Sure

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only focuses on those constructions where there is parametric variation. In this way, we can evaluate whether L2 learners can reset parameters or not.

[22] As it will become clear below, I divided the L1 Spanish subjects into two groups (i.e. intermediate and advanced). Since the number of subjects was smaller, a division into two groups seemed more appropriate. Whether the two language groups (i.e. L1 English and L1 Spanish) can be equated based on the tests used in this study is not crystal clear. The placement tests were not designed to test the same structures. Therefore, it is difficult to know whether the advanced L2 Spanish learners, for example, were as advanced as the advanced L2 English learners. See also sections 7.1.1. and 7.2.1. for some discussion on this issue. The crucial point here is that there were subjects with different proficiency levels. Even though the proficiency levels were not comparable across the L1 English and the L1 Spanish groups, there was still enough variability to test our hypotheses.

[23] I use subject extractions only since Hiramatsu (1998, 1999) and Snyder (1994, 2000) found some possible satiation effects with extraction of an object out of wh-islands.

[24] The controls for wh-islands consisted of short-distance movement of the subject, as in (7). The controls for that-trace effects were sentences with a null Complementizer, as shown in (9). The fillers were sentences which had the same grammaticality in English and in Spanish. As for the grammatical fillers, sentences were short-distance questions. The ungrammatical fillers consisted of extractions out of an adjunct, a Relative Clause, an NP (i.e. CNPC) and one question with no 'do'-support.

[25] The length of the sentences was controlled for. Sentences contained approximately the same number of syllables to make sure that subjects did not reject some of the sentences because they were longer than others.

► Pat knew where Mary had hidden the candy.
(7) Who knew where Mary had hidden the candy?   [wh-island—control]

► Max said that his neighbor saw the burglar.
(8) Who did Max say that saw the burglar?   [that-trace]

► Max said his neighbor saw the burglar.
(9) Who did Max say saw the burglar?   [That-trace—grammatical]

In the second group of stimuli, subjects are asked to judge sentences in Spanish,[26] the second language they are acquiring. Subjects are asked to judge 4 wh-island comparison sentences (grammatical-subject extraction), 4 that-trace effect comparison sentences (grammatical), 4 controls for wh-island comparison sentences (ungrammatical), 4 that-trace effect comparison sentences (ungrammatical) and 8 fillers (4 ungrammatical and 4 grammatical).[27] Some examples are given below:

► *No sé   dónde había escondido María los juguetes.*
no know where had   hidden   Mary the toys
'I don't know where Mary had hidden the toys'

(10) *¿Quién no sabes dónde había escondido los juguetes?* [wh-island-grammatical]
who no know where had hidden the toys
'Who don't you know where had hidden the toys?'
Bien   Mal   No sé
Good   Bad   I don't know

► *No sé dónde había escondido María los juguetes.*
(11) *¿Dónde no sabes quién había escondido los juguetes?* [wh-island-ungrammatical]
'Where don't you know who had hidden the toys?'

► *María creía   que un policía   había arrestado a su hermano.*
Mary thought that a policeman had arrested   to her brother

(12) *¿Quién creía María que había arrestado a su hermano?* [that-trace—grammatical]
'Who did Mary think that had arrested her brother?'

► *María creía que un policía había arrestado a su hermano.*
(13) *¿Quién creía María había arrestado a su hermano?* [that-trace—ungrammatical]
'Who did Mary think had arrested her brother?'

Half of the subjects are asked to do the Spanish part first (version A) and the other half the English part first (version B). Furthermore, subjects are provided with a vocabulary list with the words used in the experiment to make sure that they understand all the words in the task.

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[26] See the Appendix for a complete list of the test sentences used in the experiments reported in this paper.

[27] In the Spanish part, controls for wh-island comparison sentences were ungrammatical sentences where the adjunct had been extracted over the argument. The controls for "that-trace" effect comparison sentences were sentences without the Complementizer *que* (that). Similarly to the English part, grammatical fillers consisted of short distance questions. Ungrammatical fillers violated the same constraints mentioned in footnote 24.

My predictions for this part of the study are as follows. If subjects have access to UG and have reset parameters, then they will accept the grammatical sentences (or at least the advanced speakers will accept the grammatical sentences). In contrast, if subjects do not have access to UG when learning a second language, then they will not accept the grammatical sentences at a native rate and there will be no difference in acceptance between the low, the intermediate and the advanced group.

6.2. L1 Spanish /L2 English

In this experiment I look at native speakers of Spanish acquiring English as their second language. The question that arises in this part of the study is the following: Will L2 English learners reject the English sentences even though they are grammatical in Spanish?

A hypothesis I would like to evaluate in this study is the following proposal put forward by Johnson (1988). As I mentioned in the introduction, languages vary in markedness when it comes to bounding nodes. Johnson (1988) predicts that subjects beginning with a less marked parameter value (i.e. English) will be able to adopt a more marked parameter value (i.e. Spanish). In contrast, subjects with a more marked parameter value will not be able to adopt a parameter value that is less marked at least not only on the basis of positive evidence. If L2 Acquisition follows the Subset Principle, one would expect L2 learners of Spanish to reset the relevant parameter. In contrast, L2 English learners will fail to do so. This hypothesis only applies to wh-islands, not to that-trace effects, since only in this case are English and Spanish in a subset relation.

For this second part of the study I use the same methodology and the same criterion for the selection of the subjects I spelled out in section 6.1. More precisely, there are two comparison groups, an intermediate group and an advanced group. Again, all subjects are adult L2 learners. The materials are identical to those in the previous study,[28] the only difference being the placement test. In this case, subjects take the *Michigan Test of English Language Proficiency* (1977) (grammar part), which serves to divide them into groups according to their proficiency in English. Once again, subjects are asked to judge sentences in English and Spanish. The latter part of the experiment serves to see whether subjects accept those sentences that have been described as grammatical by linguists (Torrego 1984). In this way, we confirm the judgments from the native speakers and we rule out (or not) the possibility that subjects are rejecting the English sentences because they think they are also ungrammatical in Spanish.

7. The experiments

In this section I present the results from the experiments proposed in section 6. For each experiment, I start by giving all the background information and then I report the results.

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[28] There were a couple of minor differences between the two studies. First, the background questions and the instruction sheet were written in Spanish. Second, the vocabulary list was different: a number of English words were translated into Spanish.

7.1. L1 English/L2 Spanish

7.1.1. Background

This experiment took place in the Department of Spanish at the University of Connecticut. I went to 8 different classes ranging from beginner to advanced students. First of all, I explained to the students the nature of the task. I also gave them some examples so that they knew what they had to do in the actual experiment. After my explanation, students were allowed to ask questions in case there were some unclear points in my explanation. Once everyone knew what to do, I administered a Spanish placement test which was later on used to classify subjects by Spanish proficiency level.[29] Once the students finished the Spanish placement test, they took the experiment itself. As proposed in my experimental design, half of the subjects took version A (Spanish-English) and the other half version B (English-Spanish). There were no time constraints. Most people finished in 35 minutes although some people took more time than others (ranging from 15 to 50 minutes).

Originally I tested 85 subjects. After checking their background information, 17 subjects had to be eliminated from the analysis. 8 of those students were native or near-native speakers of Spanish, 4 were bilingual speakers (English/Spanish) and 3 were non-native speakers of English. Finally, two subjects were eliminated because they skipped one page of the test. In the end, I ended up with 68 subjects, 42 females and 26 males. 35 of the subjects took version A and the remaining 33 version B.

Before reporting the results from the experiment, I provide some background information about the subjects. As can be seen in Table 3, the information refers to the grade obtained by the subjects in the Spanish Placement test, the age of the subjects, the age at which they started learning Spanish, the number of years they have been studying Spanish and finally, the number of months spent in a Spanish-speaking country.[30]

Table 3

L1 English: Background information

	Average	Maximum	Minimum	St. Deviation
PL. Test	16.57	25	5	4.50
Age	20.03	41	18	3.09
Start	13.38	40	7	4.56
Years	5.94	13	2	2.32
Months	0.49	6	0	1.45

N = 68

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[29] The Spanish placement test used in this experiment is the same test used to classify American students at the University of Deusto (Bilbao, Spain). The test originally had 85 questions. Due to time constraints, I reduced the test to 30 questions. I made sure the questions did not contain any phrase which would only be used in Spain but not in the rest of the Spanish-speaking countries around the world.

[30] I also collected the following information: place of birth (country and state) and knowledge of other languages. At this point I don't think this information is going to be relevant so I ignore it for the time being.

As shown in the table, the average of correct answers in the Spanish Placement test was 16.57 out of 30 test items. For some reason, the placement test was somewhat difficult for the subjects since the highest grade was 25 out of 30. Still, there is variability in the grades. While some subjects only got 5 correct answers, some others got a total of 25 correct. This variability allows me to classify subjects into different groups according to their proficiency level in Spanish. As the table also shows, the age average was 20.03, ranging from 18 to 41 years of age. Subjects had started learning Spanish at an average of 13.38 years and they had been learning the language for 5.94 years on average. In general, people had spent less than a month in a Spanish-speaking country.

In the following tables I provide the same information for the three groups (i.e. beginners, intermediate and advanced) in this study.

Table 4

L1 English-Low: Background information

	Average	Maximum	Minimum	St. Deviation
PL. Test	11.58	14	5	2.43
Age	20.20	25	18	1.86
Start	13.66	23	7	4.05
Years	5.58	13	2	2.85
Months	0.12	1	0	0.33

N = 24

Table 5

L1 English-Intermediate: Background information

	Average	Maximum	Minimum	St. Deviation
PL. Test	17.40	19	15	1.19
Age	19.60	25	18	1.77
Start	12.44	24	7	3.08
Years	6.04	10	2	2.05
Months	0.40	6	0	1.41

N = 25

Table 6

L1 English-Advanced: Background information

	Average	Maximum	Minimum	St. Deviation
PL. Test	21.78	25	20	1.78
Age	20.36	41	18	5.14
Start	14.26	40	10	6.45
Years	6.26	9	2	1.91
Months	1.05	6	0	2.12

N = 19

7.1.2. The results

The results of the experiment are presented in Table 7.[31] As shown in the table, I provide the results from both parts (i.e. the Spanish part and the English part). Under the heading 'type' I list all the test items including the controls for the test items. In the third column of the table, I provide the percentage-acceptance of all subjects as a group. In the next column, subjects are divided into levels. More precisely, there are 24 subjects who got less than 15 answers correct in the Spanish Placement test. In the next column I provide the results from the 25 subjects who got 15-19 answers correct. Finally, the last group, consisting of 19 subjects, obtained 20-25 answers correct.

Table 7
L1 English: Percent acceptance[32, 33]

Language	Type	ALL	<15	15-19	20-25
Spanish	*WHI-G*	45.59	45.65	41.35	51.32
	WHI-U	20.96	27.17	21.15	13.16
	that-t-G	73.53	70.65	71.15	80.26
	that-t-U	70.59	61.96	76.92	72.37
English	*WHI-G*	95.22	92.71	97.32	94.74
	WHI-U	3.68	3.12	5.36	1.32
	that-t-G	98.53	98.96	98.21	98.68
	that-t-U	30.15	30.21	24.11	38.16

N = 68 (< 15: 24, 15-19: 25, 20-25: 19)

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[31] Following a conservative approach, 'not sure' and 'no sé' ('I don't know') answers were counted as incorrect answers.

[32] I have used the following abbreviations: WHI = wh-island, G = grammatical and U = ungrammatical.

[33] Fillers have not been included in the statistical analysis since their only purpose was to make sure that subjects were really paying attention to the task. Let me briefly report subjects' responses with respect to the filler items. As expected, subjects accepted grammatical items at a high rate in their native language. To be more precise, subjects accepted grammatical fillers in English 92.61% of the time. Again, as expected, ungrammatical fillers were accepted only 6.34% of the time. When it came to the grammatical fillers in Spanish (i.e. their L2), subjects accepted grammatical fillers at a high rate; namely 78.87% of the time. There seems to be an improvement across levels. While the low group accepted these items 77.08% of the time, the intermediate learners accepted those very same items 83.04% of the time. Finally, the most advanced learners accepted the grammatical fillers at a rate of 89.47%. Ungrammatical fillers were slightly problematic. Subjects accepted these items at a higher rate than one would expect. More precisely, subjects accepted these items 47.54% of the time. A significant result is that subjects exhibited lower acceptance rates as they had a better command of Spanish. While the low group accepted the ungrammatical fillers 58.33% of the time, the intermediate group accepted these items at a lower rate; namely, 47.32% of the time. Finally, the advanced group showed the lowest acceptance rate: 34.21%. It is quite surprising that the L2 learners of Spanish accepted the ungrammatical fillers at such high rates given that these very same items are also ungrammatical in English. Admittedly, the ungrammatical fillers were quite complex in structure. Probably, most subjects in this study did not even recognize the linguistic structure they were supposed to judge. This might be one reason why the subjects performed quite poorly on these items.

Let me start with the English part. The subjects, being native speakers of English, performed as expected in this part. In general, they gave the expected judgment from 95.22% to 98.53% of the time. The only exception to this generalization was the 'that-t-U'. Although approximately 70% of the subjects rejected the sentences, 30.15% of the subjects accepted it. It is well known that there is dialectal variation when it comes to that-trace effects. For example, Sobin (1987) found that students from the Midwest tended to accept these types of sentences. In my study, 44.11% rejected all four sentences containing that-trace effects. 22.05% of the subjects rejected 3 out of the 4 test items. Other subjects (i.e. 13.23%) consistently accepted all of the sentences. Only 4.41% of the subjects accepted 3 out of the four that-trace effects. Finally, some subjects (i.e. 16.17%) rejected 2 sentences and accepted the other 2.

With respect to the Spanish sentences there is some variability in the results. In order to analyze these results, an ANOVA was performed on these data looking at main factors "level" (i.e. low/medium/high), "construction-type" (i.e. wh-island and that-trace effect comparison sentences) and "grammaticality" (i.e. grammatical vs. ungrammatical). See Table 8 for a summary of the statistical analysis.

Table 8

Summary of statistical analysis

Effect	F ratio	P
Construction-type (W/T)	$F(1, 65) = 147.479$	< .001
Grammaticality (G/U)	$F(1, 65) = 25.764$	< .001
Construction-type × Grammaticality	$F(1, 65) = 9.410$	.003

The general picture obtained from the statistical analysis is the following. To begin with, "construction-type" was significant ($F(1, 65) = 147.479$, $p < .001$). This means that the subjects in this study treated wh-island and that-trace effect comparison sentences in a different way. More precisely, they accepted that-trace effects at a higher rate than wh-islands (72.06% and 33.27%, respectively). "Grammaticality" was also significant ($F(1, 65) = 25.764$, $p < .001$). This is a welcome result indicating that subjects distinguish grammatical from ungrammatical sentences. Finally, there was an interaction effect between "construction-type" and "grammaticality" ($F(1, 65) = 9.410$, $p = .003$). This interaction effect indicates that the grammatical/ungrammatical contrast was different depending on whether the L2 learners were judging wh-island or that-trace effect comparison sentences. To be more precise, subjects accepted wh-island comparison sentences 45.59% of the time. As expected, the controls for these items (i.e. wh-I-U) received a much lower acceptance rate, namely 20.96%. This last result is not extremely surprising given that these sentences are also ungrammatical in English. Still, it is important to point out that these L2 learners can distinguish between grammatical and ungrammatical sentences when it comes to wh-islands even though this contrast is not present in their L1. In contrast, that-trace-G and that-trace-U were accepted at approximately the same rate: 73.53% and 70.59%, respectively. From these results one can conclude

that the subjects in this study did not know that sentences of the type that-t-U are ungrammatical in Spanish. In summary, the interaction effect "construction-type" and "grammaticality" indicates that the grammatical/ ungrammatical contrast is present in wh-island comparison sentences but not when it comes to that-trace effect comparison sentences. In this case, there is no grammatical/ungrammatical contrast in L2 Spanish.

To examine the role of level, that is, to see whether the effect of grammaticality of the Spanish wh-islands was significant for each level, a post-hoc analysis was performed (i.e. Tukey's test).[34, 35] All groups differentiated between grammatical and ungrammatical items (p = .014 for the low group, p = .005 for the medium group and p < .001 for the high group). This result is expected given the discussion in the previous paragraph. When it came to the interaction between "level" and "grammaticality", no significant differences were found across levels. The differences in percentages between the three groups turned out to be non-significant (see Figure 1 for a graph of the results).
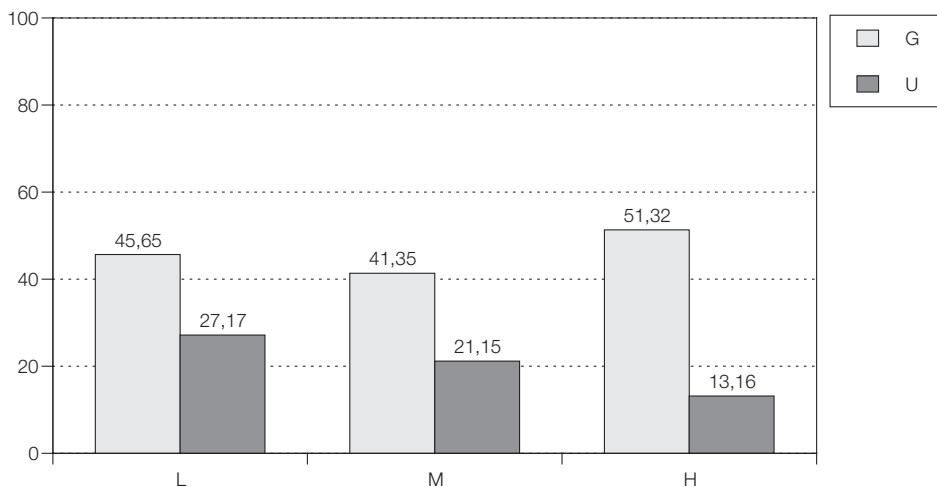
Graph 1
L2 Spanish: Wh-islands in Spanish

Tukey´s test revealed that the High group behaved like the Medium group with respect to the grammatical items (no significant contrast between High group and Medium group, p = .578). Similar results were obtained when the High and the Low group were compared (p = .897). The difference between the Low and the

[34] Since there was no grammatical/ungrammatical contrast with respect to that-trace effect comparison sentences, I decided to focus only on wh-island comparison sentences to investigate the role of level.

[35] Native speakers were also included in the post-hoc analysis. For ease of exposition, I will only talk about the results of the L2 learners in this part of the discussion. I will discuss the results of the native speakers in the post-hoc analysis in section 7.3.

Medium group was also non-significant (p = .938). With respect to the ungrammatical items, a similar pattern is observed: Low and High (p = .299), Low and Medium (p = .848) and Medium and High (p = .735).

To evaluate whether the score on the Spanish proficiency test was directly predictive of performance on wh-islands, a Pearson correlation analysis was performed on both the grammatical and the ungrammatical items. When it came to the test items, no significant correlation was found between score and performance on these items (r = .06, t(66) = .55, p = .580). A similar result was obtained with respect to the ungrammatical controls (r = −.15, t(66) = −1.2, p = .211). The results from the Pearson correlation analysis give further support to the results obtained in the post-hoc analysis reported above.[36]

In summary, subjects accepted wh-island comparison sentences even though they are ungrammatical in their L1. Even though the rate of acceptance of these items is not very high, subjects know that there is a grammaticality contrast between these items and the ungrammatical controls (F(1, 65) = 25.764, p < .001).[37] This contrast in grammaticality is not present in their L1, where both sentence types are ungrammatical. Therefore, the knowledge that wh-I-G is grammatical in Spanish does not come from their L1. With respect to that-trace effects, a different situation is observed. As explained above, there is no contrast between the grammatical and the ungrammatical items, both items are accepted at similar rates. What is crucial for this study is that they accept the grammatical sentences. According to the results obtained, it seems that most subjects know that that-t-G is indeed grammatical in Spanish. What they do not seem to know is that the presence of an overt Complementizer is always obligatory in Spanish. That is why they accepted most of the that-t-U items. Finally, differences across levels were not significant.

7.2. L1 Spanish/L2 English

7.2.1. Background

This experiment was conducted in the Department of English at the University of Deusto (Bilbao, Spain). In this case, there were only two classes, one corresponding to the low/intermediate level and a second group of advanced learners. As in the first experiment, subjects received some explanation about the task before they started judging sentences. Then, they took the Michigan test (grammar part) and

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[36] In addition, to evaluate the data in terms of "rank", a Spearman Rank correlation analysis was performed. The results are the following. When it comes to the grammatical items, no significant correlation was found (r= .06, t(66), p = .604). Similarly, no significant correlation was obtained with respect to the ungrammatical items (r = -.19, t(66) = -1.6, p = .103).

[37] One could argue that the subjects in this study do not know that wh-island comparison sentences are indeed grammatical in Spanish. This is because the pattern of acceptance is only around 50%. However, the crucial point for my argumentation is that subjects know the difference between the grammatical and the ungrammatical sentences. The low acceptance of the grammatical items may be related to extragrammatical factors such us the oddity of the construction itself. Note that if subjects were not accessing UG when making their judgements, they should have rejected both the grammatical and ungrammatical at similar rates. See Grimshaw and Rosen (1990) for a similar pattern of results with respect to Condition B.

finally, they took the experiment. As in the previous experiment, subjects took approximately 35 minutes to complete the task.

38 subjects participated in the experiment, 35 females and 3 males. 18 subjects took version A and 20 version B. The relevant background information is provided in Table 9.

Table 9
L1 Spanish: Background information[38, 39]

	Average	Maximum	Minimum	St. Deviation
PL. Test	25.74	30	14	3.55
Age	19.71	23	18	1.35
Start	8.68	13	3	2.27
Years	10.92	16	5	2.45
Months	1.74	8	0	2.23

N = 38

As the table shows, L2 English learners performed better than the L2 Spanish learners on the placement test. The L2 English learners got an average of 25.74 questions correct out of 30 items. The lowest score was 14, compared to a 5 for the L2 Spanish learners. Note that some people got a perfect score. We have two possibilities to consider. Either the Spanish placement test was more difficult than the Michigan test or the L2 English learners were in general more advanced than the L2 Spanish learners. With respect to the age of the students, the average was 19.71, ranging from 18 to 23. In general, the L2 English learners started learning their second language at a younger age than the L2 Spanish learners. As an average, these subjects started learning English at 8.68 years of age, ranging from 3 to 13. They had been learning English for 10.92 years and they had been in an English-speaking country for 1.74 months.

Once again, I provide the results from the two groups of L2 learners separately.

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[38] In this study, there was a subject who had started learning English when s/he was only 3 years of age. His/her score in the English Placement test (i.e. 23) reveals that s/he did not perform as well as one might have expected just by looking at the age at which she started learning English for the first time. His/her results on the English part were above chance (i.e. 66%) but not native-like. Furthermore, the relevant statistical analyses were run without him/her to see if his/her removal made any difference in the results. Once the new statistical analyses were run, it was shown that the removal of this subject did not make a difference in the results. Given all these reasons, I decided to include this subject in my study.

[39] Contrary to my initial expectations, most of the subjects had started learning English earlier than 12/13 years of age. I suspect that the initial exposure these subjects got at these early ages was restricted to a maximum of 2 to 3 hours a week. Probably these subjects initially played some games or learned some basics of English such as naming colors or counting numbers. It is not likely that the early exposure of most of the subjects made them behave exactly like native speakers. The case discussed in footnote 38 gives further support to this idea. Given the amount and quality of input in English these subjects presumably received, I believe that we can classify them as adult L2 learners of English. Any English-like behavior they exhibit will be attributed to the access of UG in acquiring a second language.

Table 10

L1 Spanish-Intermediate: Background information

	Average	Maximum	Minimum	St. Deviation
PL. Test	22.88	26	14	3.06
Age	18.88	21	18	1.07
Start	8.11	13	3	2.58
Years	10.61	16	5	2.91
Months	1.44	6	0	2.14

N = 18

Table 11

L1 Spanish-Advanced: Background information

	Average	Maximum	Minimum	St. Deviation
PL. Test	28.3	30	27	1.26
Age	20.45	23	18	1.14
Start	9.2	13	6	1.85
Years	11.2	14	7	1.98
Months	2	8	0	2.31

N = 20

7.2.2. The results

The results from the experiment are shown in Table 12. In this case, I only have two groups. According to the results from the Michigan test, there were no beginners

Table 12

L1 Spanish: Percent acceptance[40]

Language	Type	ALL	14-26	27-30
Spanish	WHI-G	68.42	68.06	68.75
	WHI-U	15.79	23.61	8.75
	that-t-G	96.05	97.22	95.00
	that-t-U	14.47	16.67	12.50
English	WHI-G	87.50	80.56	93.75
	WHI-U	21.71	29.17	15.00
	that-t-G	29.61	26.39	32.50
	that-t-U	84.21	77.78	90.00

N = 38 (14-26: 18, 27-30: 20)

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[40] Again, fillers were not included in the statistical analysis. As a brief overview, subjects performed as expected in their native language. They accepted grammatical fillers 97.37% of the

in the sample so I decided to divide them into intermediate and advanced. 14-26 answers correct means intermediate and 27-30 answers correct corresponds to the advanced group. There were 18 and 20 subjects in each group, respectively.

As the table shows, subjects performed as expected on their native language. WHI-U and that-t-U were accepted to a very limited extent. The acceptance rate for these items was approximately 15%.[41] The only slightly problematic case was wh-islands. Although these sentences are grammatical, some people thought they weren't.[42] There was a lot of variability in the judgments. While some subjects accepted the four items (i.e. 28.94 %), as expected, some other subjects only accepted three (i.e. 31.57%). In some cases, subjects accepted two items and then they rejected the other two (i.e 26.31%). In some instances, subjects rejected 3 out of the 4 test items (i.e. 10.52%). Only 2.63% of the subjects rejected all 4 items, which makes the possibility about dialectal variation less likely.

Let me turn now to the responses on the English items. Again an ANOVA was performed looking at "level", "construction-type" and "grammaticality". The only significant result was an interaction effect between "construction-type" and "grammaticality" ($F(1, 36) = 205.047$, $p < .001$). This interaction effect indicates once again that that the grammatical/ungrammatical contrast was different depending on whether the L2 learners were judging wh-islands or that-trace effects. However, the interaction effect was different from the one found for the L2 learners of Spanish. To begin with, the subjects in this second experiment showed an expected grammaticality contrast between Wh-I-G and Wh-I-U. They accepted Wh-I-G 87.50% of the time. As expected, the acceptance rate for Wh-I-U was much lower; namely, 21.71%. The relevant difference with respect to the L2 learners of Spanish comes at this point. As we observed in the previous experiment, subjects accepted that-t-G and that-t-U at similar rates. In the current experiment, subjects showed a grammaticality contrast but the contrast went in the wrong direction. While the grammatical items were accepted only 29.60% of the time, the

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time. Ungrammatical fillers received a very low rate of acceptance: 8.55%. Subjects performed as expected in the L2 they were acquiring (i.e. English). The grammatical fillers were accepted most of the time: 94.74%. Subjects exhibited a slight improvement across levels. The intermediate learners accepted the items 91.67% of the time whereas the advanced learners accepted the same items 97.50% of the time. When it came to the ungrammatical fillers, subjects accepted those items at a low rate; namely, 17.76% of the time. Again, one can observe an improvement across levels. The intermediate learners accepted the ungrammatical items 26.39% of the time whereas the advanced learners accepted the same items only 10% of the time.

[41] Maybe one reason why some subjects accepted WHI-U is because they associated the adjunct with the matrix clause. This idea deserves further examination. Why some subjects accepted that-t-U is a bit more mysterious since the Complementizer is always obligatory in Spanish. Once possibility is the following: maybe some subjects read the relevant sentences quickly and they didn´t pay close attention to the fact that there was not a Complementizer in the sentence. Although it was emphasized that they should not imagine or add words that were not written in the text, some subjects might have ignored this fact.

[42] These sentences, even though they were supposed to be grammatical, were quite complex in structure. Furthermore, these sentences may have be considered weird by some subjects since they are never used in everyday life. Maybe some subjects found these sentences ungrammatical because they were uncommon.

ungrammatical items were accepted 84.21% of the time. These judgments in the wrong direction were probably the reason why a significant effect for "grammaticality" was not obtained in this experiment.

A post-hoc analysis (by Fisher LSD Method)[43] looking at "level" and "grammaticality" revealed that "grammaticality" was significant ($p < .001$) for both the High and the Medium group.[44, 45] There was a significant difference ($p < .015$) between the High and the Medium group in acceptance rate for the grammatical items (i.e. Wh-I-G). Furthermore, the two groups were also significantly different ($p = .007$) with respect to the acceptance of the test items (i.e. Wh-I-U). It seems that there is an improvement in performance as subjects have a better command of their L2. See Graph 2 for a summary of these results.

Again, to evaluate whether the score on the Michigan test was directly predictive of performance on wh-islands, a Pearson correlation analysis was performed. The test revealed that the correlation between score and the grammatical controls was marginally significant ($r = .29$, $t(36) = 1.8$, $p = .076$).[46] The correlation between score and the test items was significant ($r = −.51$, $t(36) = −3.5$, $p = .001$). Again these results confirm the results of the post-hoc analysis above.

In summary, there is an asymmetry in the results.[47] Subjects performed very well on wh-islands but very poorly on that-trace effects. Crucially, subjects also performed poorly on the control items (i.e. that-t-G). This fact suggests that knowing that you can drop a Complementizer in English is crucial for knowing that sentences containing that-trace effects are ungrammatical in English.[48] Finally,

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[43] Originally, Tukey's test was used to run the post-hoc analysis. The problem with this test was the following. The ANOVA revealed that there was a weak effect of level ($p = .035$). When Tukey's test was run to find out where the difference was, the test did not reveal any differences. To be more precise, there were no significant differences between the 3 language groups (Medium vs. Native: $p = .083$; Medium vs. High: $p = .987$ and High vs. Native: $p = .104$). Since Tukey's test did not reveal where the weak effect of level was, an alternative test was chosen. As mentioned in the text, I used Fisher LSD Method in my post-hoc analysis. This test showed us where the differences were. To be more precise, the Medium group was significantly different from the Native group ($p = .033$). The High group was not significantly different from the natives ($p = .052$) (but note that the p-value is clearly approaching significance). Finally, the Medium and the High group were behaving alike ($p = .813$).

[44] Since the grammatical/ungrammatical contrast with respect to that-trace effects went in the wrong direction, I decided to focus only on wh-islands to investigate the role of level.

[45] Native speakers were also included in this analysis.

[46] Probably the results on the grammatical controls turned out to be only marginally significant because there was some noise in the data. Spearman correlation analysis revealed that this correlation was fully significant in terms of "rank" ($r = .33$, $t(36) = 2.1$, $p = .040$). When it came to the ungrammatical items, a marginally significant correlation was obtained in this test ($r = −.28$, $t(36) = −1.7$, $p = .085$).

[47] Martohardjono (1993) did not find this asymmetry in her results. In both wh-islands and that-trace effects she found a similar rate of rejection (ranging from 55% to 61%). As Diane Lillo-Martin (p.c.) points out to me, my results are probably a better representation of what is going on with the performance of L2 learners in these constructions. Given the large amount of sentences the Italian subjects had to judge in Martohardjono's (1993) study, some of the people might have started guessing. Therefore, Martohardjono's (1993) results might not be the best representation of the status of wh-islands and that-trace effects in L2 Acquisition.

[48] See section 8.2. for related discussion.
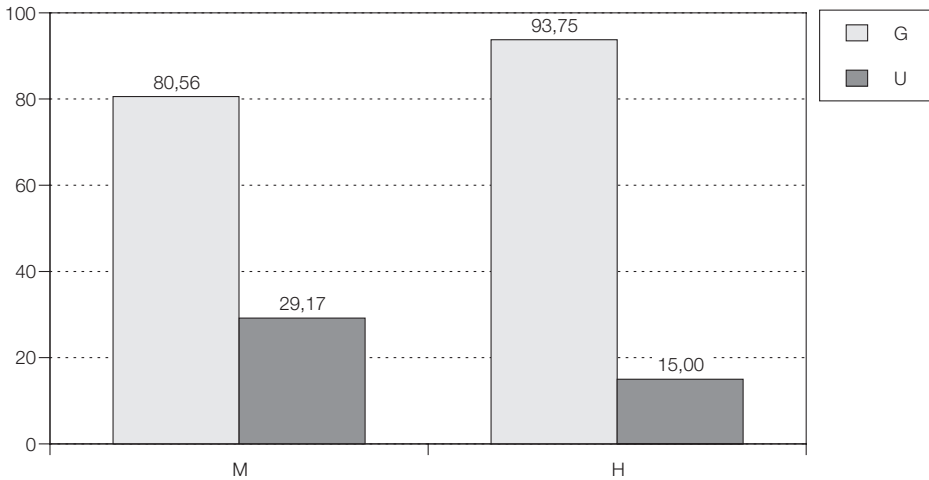
Graph 2
L2 English: Wh-islands in English

let me mention that the subjects in this study showed a statistically significant improvement when they were more advanced.

7.3. A comparison across groups

In this section I will offer two tables comparing the results from both experiments. In this way, we can directly compare the results of the natives with the results of the L2 learners. Let me start by comparing the results of the L2 learners of Spanish with the results of the native speakers of this language. The relevant figures are provided in Table 13:

Table 13
L1 Spanish/L2 Spanish compared

Language	Type	ALL-L1S	ALL-L2S	L2S <15	L2S 15-19	L2S 20-25
Spanish	*WHI-G*	68.42	45.59	45.65	41.35	51.32
	WHI-U	15.79	20.96	27.17	21.15	13.16
	that-t-G	96.05	73.53	70.65	71.15	80.26
	that-t-U	14.47	**70.59**	**61.96**	**76.92**	**72.37**

The ANOVA performed on the data revealed the following significant effects (see Table 14 for a summary of the statistical analysis).

To begin with, the ANOVA revealed that "construction-type" was significant (F (1, 102) = 133.988, p < .001). Subjects treated wh-island and that-trace effect comparison sentences in a different way. That-trace effect comparison sentences were accepted 66.04% of the time whereas Wh-island comparison sentences received an

Table 14

L1 Spanish/L2 Spanish: Summary of statistical analysis

| Effect	F ratio	p
Construction-type (W/T)	$F(1, 102) = 133.988$	< .001
Grammaticality (G/U)	$F(1, 102) = 228.685$	< .001
Level (L/M/H/N) × Construction-type (W/T)	$F(3, 102) = \quad 9.032$	< .001
Level (L/M/H/N) × Grammaticality (G/U)	$F(3, 102) = \quad 47.865$	< .001
Level × Construction-type × Grammaticality	$F(3, 102) = \quad 8.505$	< .001

acceptance rate of 36.44%. "Grammaticality" was also significant ($F(1, 102) = 228.685$, $p < .001$) indicating that subjects could differentiate between grammatical and ungrammatical items. The ANOVA revealed that there was a significant interaction effect between "level" and "construction-type" ($F(3, 102) = 9.032$, $p < .001$). As Figure 3 shows, there was a difference across levels in how the different groups treated wh-island and that-trace effect comparison sentences. As the graph below makes clear, the Native and the Low group made less of a difference between the two constructions. In contrast, the difference was much bigger for the High and the Medium group.
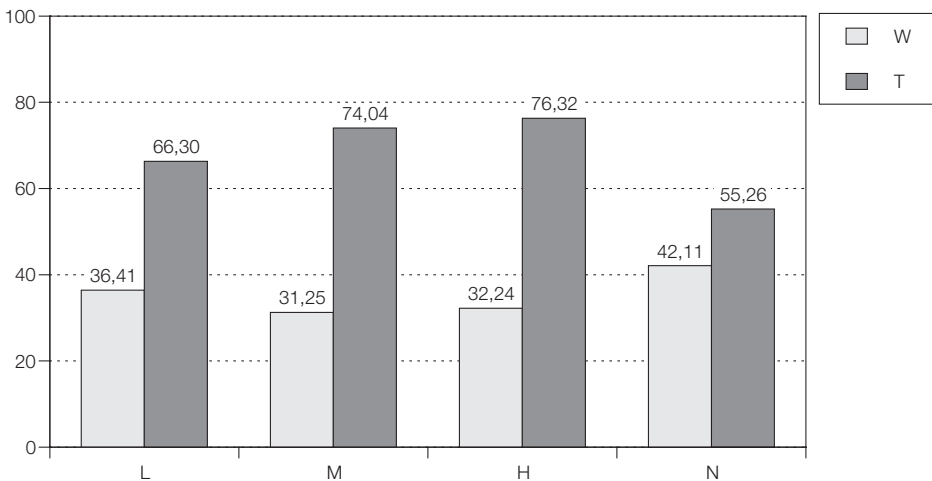
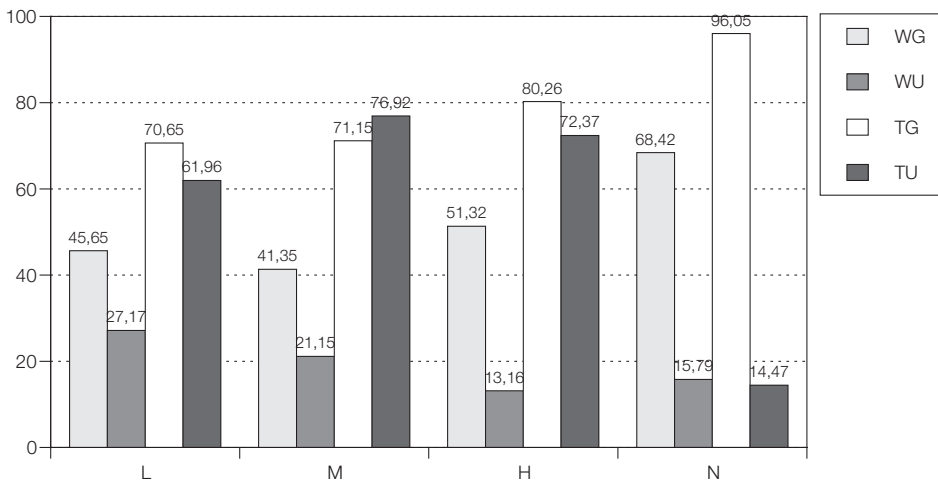Graph 3

L1 Spanish/L2 Spanish: Level × Construction-type

"Level" and "grammaticality" was also significant ($F(3, 102) = 47.865$, $p < .001$). As shown in Figure 4, the grammatical/ungrammatical distinction was different across levels. While the Native group showed a clear contrast between grammatical and ungrammatical, the contrast was less obvious for the L2 learners. This fact was probably due to the overacceptance of that-t-U by the non-native groups.
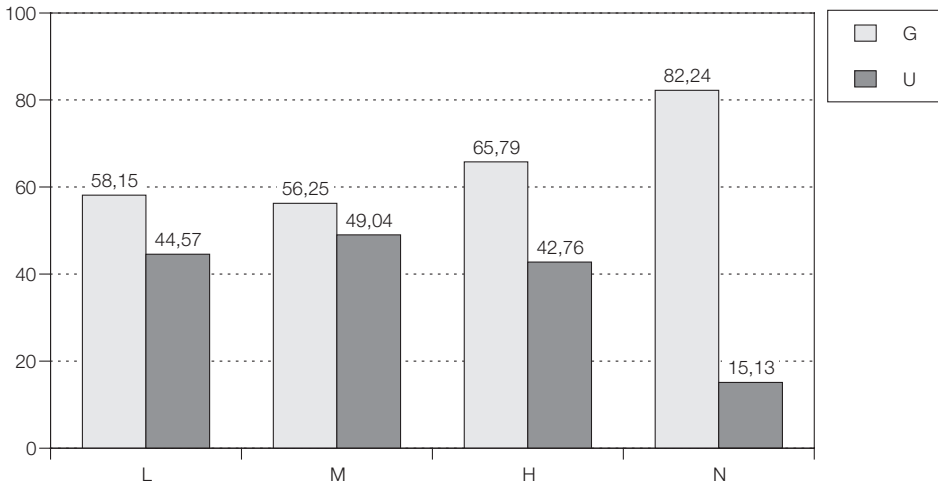
Graph 4
L1 Spanish/L2 Spanish: Level × Grammaticality

Finally, there was a significant 3-way interaction between "level", "construction-type" and "grammaticality" ($F (3, 102) = 8.505$, $p < .001$). This interaction effect was probably due to the big difference native speakers (see Figure 5) found between the grammatical vs. ungrammatical items with respect to that-trace effects. As Figure 5 shows, the difference was much smaller for the Low and the High group. For the Medium group there was also a small difference between the two items but the contrast went in the wrong direction.

Graph 5
**L1 Spanish/L2 Spanish: Level × Construction-type × Grammaticality**

In a post-hoc analysis by Tukey´s test, "grammaticality" proved to be significant for all language groups (p = .014 for the Low group, p = .005 for the Medium group and p < .001 for the High and Native groups). There was also a significant interaction effect between "level" and "grammaticality". With respect to the grammatical items (i.e. Wh-I-G), there was a significant difference between the Native and the Medium Group (p < .001) and the Native and the Low Group (p = .002). There was also a significant difference between the natives and the advanced learners (p = .046).

The remaining comparisons across groups turned out to be non-significant, as indicated in section 7.1.2. With respect to the ungrammatical items, all groups behaved in the same way. Just to give an example, the apparent difference in performance between the Native and the Low group turned out to be non-significant (p = .381). The graph in Figure 6 shows the difference across levels with respect to Wh-I-G and Wh-I-U. As the statistical analysis has revealed, the effect of level (Low/Medium/High/Native) is to raise the acceptance rate on the grammatical items. In contrast, the effect of level is absent (non-significant) for the ungrammatical items. Figure 7 shows schematically the effect of level we have just discussed.
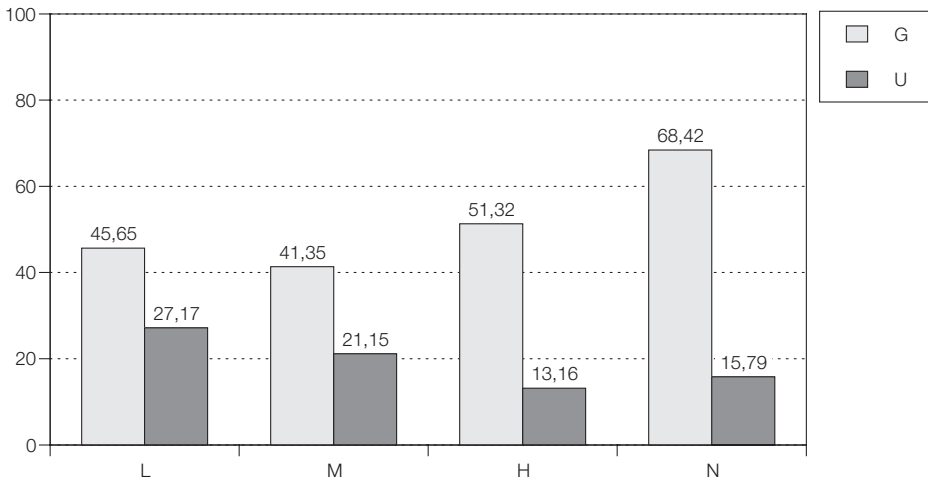
Graph 6
L1 Spanish/L2 Spanish: Wh-islands in Spanish
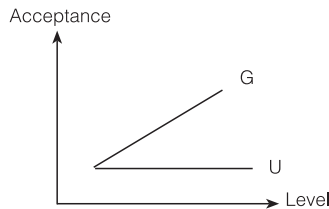
Graph 7
L1 Spanish/L2 Spanish: Effect of level

Let us turn now to the native speakers of English and the L2 learners of this language (cf. Table 15).

Table 15
L1 English/L2 English compared

Language	Type	ALL-L1E	ALL-L2E	L2E 14-26	L2E 27-30
English	*WHI-G*	95.22	87.50	80.56	93.75
	WHI-U	3.68	21.71	29.17	15.00
	that-t-G	**98.53**	**29.61**	**26.39**	**32.50**
	that-t-U	**30.15**	**84.21**	77.78	**90.00**

The results of the statistical analysis are presented in Table 16 below.

Table 16
L1 English/L2 English: Summary of statistical analysis

Effect	*F* ratio	*p*
Construction-type (W/T)	$F(1, 103) = 25.896$	< .001
Grammaticality (G/U)	$F(1, 103) = 603.723$	< .001
Level (L/M/H/N) × Construction-type (W/T)	$F(2, 103) = 5.382$	.006
Level (L/M/H/N) × Grammaticality (G/U)	$F(2, 103) = 136.221$	< .001
Construction-type (W/T) × Grammaticality (G/U)	$F(1, 103) = 197.751$	< .001
Level × Construction-type × Grammaticality	$F(2, 103) = 66.806$	< .001
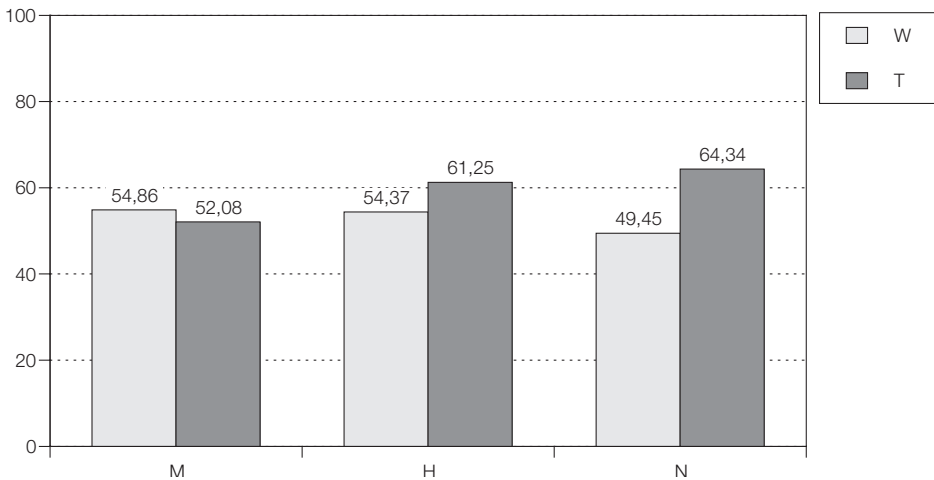
Graph 8
L1 English/L2 English: Level × Construction-type

The ANOVA revealed that "construction-type" was significant ($F(1, 103) = 25.896$, $p < .001$). Subjects accepted that-t 61.67% of the time whereas wh-islands were accepted at a lower rate (i.e. 51.30%). "Grammaticality" was also significant ($F(1, 103) = 603.723$, $p < .001$). As the statistics show, the contrast grammatical vs. ungrammatical was clear for the subjects. There was an interaction effect between "level" and "construction-type" ($F(2, 103) = 5.382$, $p = .006$). As the graph below indicates, the native speakers showed a bigger difference between the two constructions, showing a higher rate of acceptance for that-t.

The interaction between "level" and "grammaticality" was also significant ($F(2, 103) = 136.221$, $p < .001$). In other words, the grammatical/ungrammatical distinction varied across groups. As Figure 9 shows, the Native group showed a clear contrast between the grammatical and the ungrammatical items. In contrast, the L2 learners either showed no contrast, as the intermediate group, or a very slight contrast, as the High group. The lack of contrast among the L2 learners was most likely due to the opposite pattern on judgments they exhibited with respect to that-t (i.e. they rejected the grammatical items and accepted the ungrammatical ones).
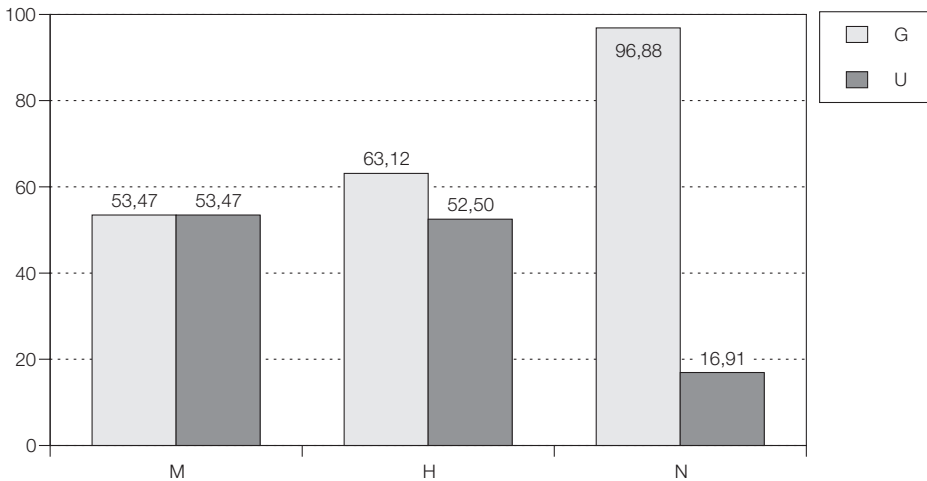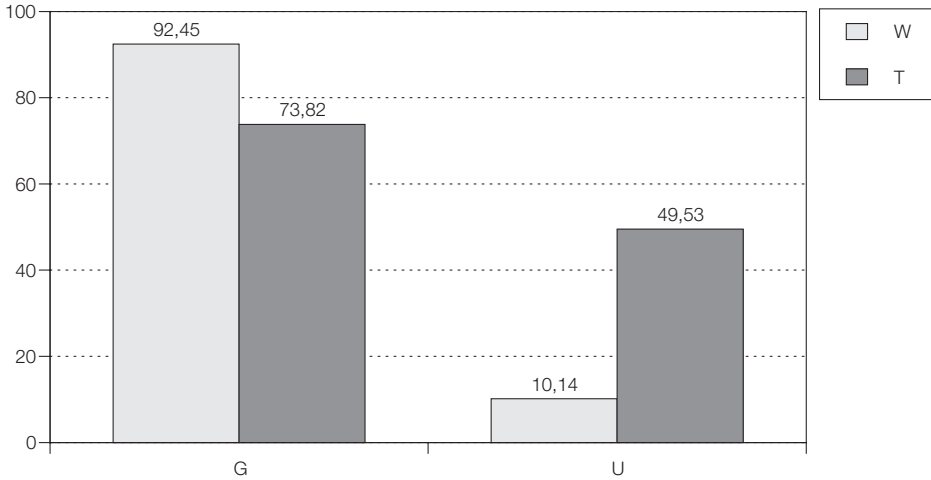

Graph 9
L1 English/L2 English: Level × Grammaticality

"Construction-type" and "grammaticality" constituted another significant interaction ($F(1, 103) = 197.751$, $p < .001$). As shown below, the grammatical/ungrammatical distinction was more obvious in the wh-island case. Although there was also a contrast in the that-trace cases, the contrast was smaller. This difference between the two constructions with respect to the grammaticality contrast gave us the interaction effect we have just discussed.

Finally, there was a 3-way interaction effect between "level", "construction-type" and "grammaticality" ($F(2, 103) = 66.806$, $p < .001$). This interaction effect was

Graph 10

**L1 English/L2 English: Construction-type × Grammaticality**

probably due to the opposite patterns displayed by the native speakers and the L2 learners with respect to that-trace effects. While the Native group accepted the grammatical that-trace effect comparison sentences at a much higher rate than the ungrammatical ones, the L2 learners had the opposite pattern: they accepted the ungrammatical items at a much higher rate than the grammatical ones. The difference was slightly bigger for the High group, as shown below:
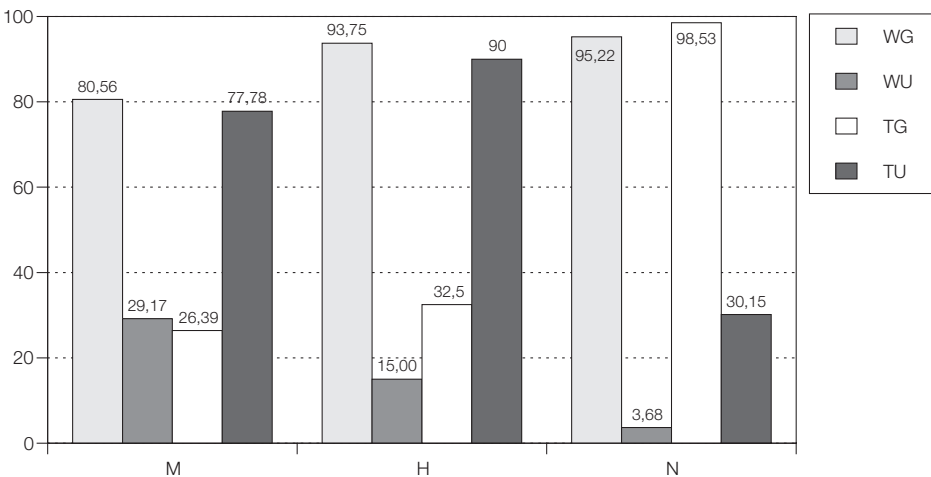
Graph 11

**L1 English/L2 English: Level × Construction-type × Grammaticality**

   To see which differences across levels were significant, a Fisher LSD Method was conducted. The first result the post-hoc analysis revealed was a weak effect of level (p = .035) indicating that one (or two) of the groups accepted sentences at a higher rate than the other group(s). While the native speakers accepted the sentences 49.40% of the time, the L2 learners showed a tendency to accept some of the ungrammatical items. More precisely, the Medium group showed an acceptance rate of 55.10% and the High group 54.37%. The Fisher LSD Method showed an expected significant effect for "grammaticality". All language groups treated the grammatical and ungrammatical items in a different way (p < .001 for the three language groups). Finally there was an interaction effect between "level" and "grammaticality". With respect to the grammatical controls (i.e. Wh-I-G), the Native group was significantly different from the Medium group (p = .001). The High group was also significantly different from the Medium group (p = .015). Finally, the Native and the High group were not significantly different from each other (p = .718). As for the ungrammatical items, all groups were different from each other. The natives performed better than the High group (p = .006) and the Medium group (p < .001). As mentioned in section 7.2.2., the High and the Medium group were also different from each other (p = .007). In conclusion, the effect of level (M/H/N) is to raise acceptance with respect to the grammatical items. For the ungrammatical items, the effect of level is to lower acceptance. The figures below show graphically the effect of level.
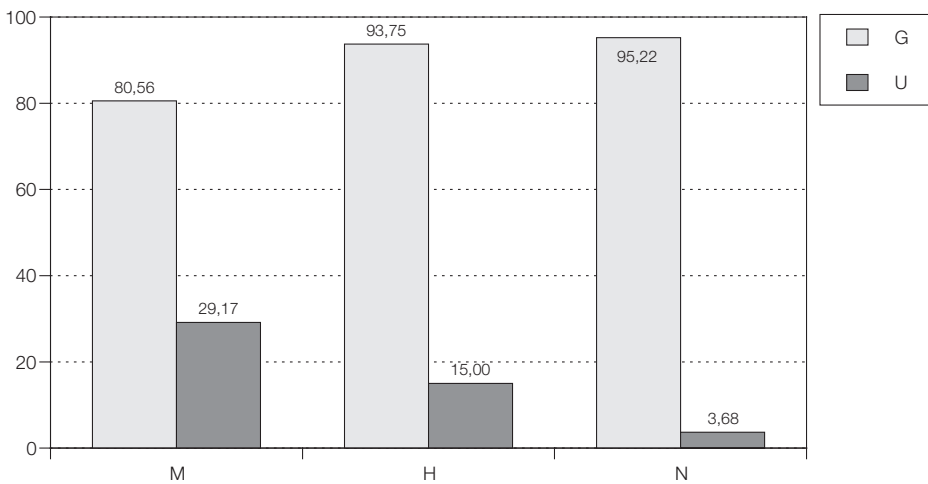
Graph 12

L1 English/L2 English: wh-islands in English

   In summary, L2 learners of Spanish behaved like native speakers with respect to wh-I-U. The grammatical sentences, which constituted the test items, were accepted by the L2 learners on equal grounds. The native speakers performed significantly better than the L2 groups. With respect to that-trace effects, L2 learners accepted

Acceptance

G

U
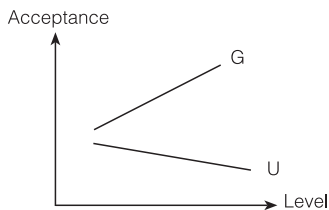
Level

Graph 13
L1 English/L2 English: Effect of level

that-t-effects but they also accepted the ungrammatical controls. The huge difference between the natives and the L2 learners indicates that the subjects do not know that the Complementizer is obligatory in Spanish.

When it comes to the L2 learners of English, we observe that the High group behave like the Native group with respect to the grammatical items. The Medium group was significantly different indicating that there was an improvement in performance across levels. The ungrammatical items were treated differently by all language groups. The difference in percentages in Table 15 indicates that the natives perform better than the advanced learners. Furthermore, the advanced learners perform better than the intermediate group. This difference again suggests that there is an improvement across levels. Subjects perform better as they are more advanced. If this line of reasoning is correct, we should expect more advanced learners to perform better. Some of the subjects in this study were very advanced but still they were learning their second language. It is predicted that these subjects will improve their results as they become more advanced. The situation with that-t is different. Clearly, L2 learners have opposite judgments from those of the L2 learners.

8. Discussion

Given all the data discussed above, we are now ready to go back to the research question proposed in this study: Can parameters be reset in L2 Acquisition? In order to answer this question, let's explore what we conclude from each of the construction types (i.e. wh-islands and that-trace effects) examined in this paper. I will first discuss wh-islands and then that-trace effects. An overall conclusion will be provided after the discussion of each of the structures.

8.1. Wh-islands

When it comes to wh-islands, the ANOVA revealed that both L2 groups showed a clear contrast between grammatical and ungrammatical items. This is an important result given that this contrast was not present in the L1 of the subjects. More precisely, L2 learners of Spanish accepted wh-island comparison sentences even though they are ungrammatical in their L1 (i.e. English). As expected, they showed lower rates of rejection for the control items. This result is not surprising since extraction of an adjunct over an argument is also ungrammatical in English. The

important point is that they showed a contrast in grammaticality which was not present in their L1. The only way these subjects could have gained this knowledge is from UG. Similarly, L2 learners of English showed very low acceptance rates for wh-islands. If subjects were merely transferring the knowledge of their L1, they should have just accepted these sentences. Since they didn't, the only explanation left is that these subjects were accessing UG when making their judgements.[49] The grammatical controls for wh-islands were also grammatical in Spanish. As one would expect, subjects accepted these items as well. Again, the crucial point in this discussion is that the subjects exhibited a grammaticality contrast which was not present in the L1 of the subjects in this study.

The answer to the question "can parameters be reset in L2 Acquisition?" seems to be a positive one. The subjects in this study have shown that they were not transferring the value of the parameter of their respective L1s. If this had been the case, we should not have expected any grammaticality contrasts among test and control items. More precisely, L2 learners of Spanish should have rejected both items and L2 learners of English should have accepted all the relevant English sentences. Since both L2 groups showed a grammaticality contrast, we can conclude that they were able to reset the value of the parameter of their L1 to the value of the parameter of the L2 they were learning. The results from the statistical analysis support the idea that parameter resetting is indeed possible in L2 Acquisition. A question arises at this point, which is the best hypothesis to account for the data we have discussed so far? Recall that under Research Hypothesis 1, we predicted subjects to be able to reset parameters in L2 Acquisition. Under an alternative competing hypothesis, it was predicted that subjects will not be able to reset parameters when it comes to Subjacency. Given all the previous discussion, it seems that Hypothesis 1 is the best way to account for the data.

Now, let me explore the results of the L2 learners in more detail. More precisely, I will compare the performance of the L2 learners to the performance exhibited by the native speakers. Let us start with the L2 learners of Spanish and the native

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[49] Let me mention a couple of factors that need to be controlled for. In the case of the native speakers of Spanish, it could be argued that they do not accept WHI-U in English because they do not accept to a certain extent the same type of islands in their native language. In order to check whether there was some truth in the previous statement, I ran an ANOVA looking at L1Spanish/L2 English. The ANOVA revealed that grammaticality was significant ($F(1, 36) = 79.367$, $p < .001$). To be more precise, the subjects accepted wh-island comparison sentences approximately 68% of the time. In contrast, they accepted wh-islands in English approximately 22% of the time. The difference between the two acceptance rates was statistically significant. This indicates that the native speakers of Spanish were not transferring their L1 when judging wh-islands in English. A similar problem arises with respect to the rate of acceptance of the L2 Spanish learners on that-t-G in Spanish (see section 8.2. for relevant discussion). As I have mentioned above, there was some dialectal variation among speakers. While some subjects considered sentences containing that-trace effects ungrammatical in English, other subjects found them grammatical. Again, I ran an ANOVA to check whether there could be some transfer effects with respect to that-trace effects. The ANOVA revealed that grammaticality was significant ($F(1, 65) = 182.113$, $p < .001$). Subjects accepted sentences containing that-trace effects 30.15% of the time. In contrast they accepted that-trace comparison sentences 73.53% of the time. The difference was statistically significant, which indicates that L2 learners of Spanish were not transferring the knowledge of their L1 when judging that-trace comparison sentences.

speakers of this language. When it comes to the test items, that is, the wh-island comparison items, the post-hoc analysis by Tukey's test revealed that L2 learners behaved alike, that is, there were no significant differences among the L2 groups (i.e. Low/Medium/High). Native speakers behaved significantly different from the L2 learners. With respect to the control items, all groups behaved in the same way. In summary, the effect of level is to raise acceptance for the grammatical items. In contrast, the effect of level is absent for the ungrammatical items. It seems that L2 learners of Spanish exhibit a native-like behavior when it comes to the control items. As for the test items, native speakers perform significantly better than the L2 groups.

If we now focus on the L2 learners of English, we have the following results. With respect to the test items, all language groups behaved differently. The High group performed better than the Medium group and the Native group performed better than the High group. As for the control items, the High group was not significantly better than the Native group. The High group performed significantly better than the Medium group. The effect of level is to raise acceptance for the grammatical items and to lower acceptance for the ungrammatical ones. In the case of the L2 learners of English we see a clear improvement in performance as subjects have a better command of their L2. What does this mean? It has been suggested by Li (1998) that language proficiency makes a difference when it comes to the performance of L2 learners on the language they are acquiring.[50] In other words, a better command of the L2 allows the L2 learner to make fewer speech errors when judging sentences in his second language. The assumption here is that a learner with a poor command of his L2 will make more speech errors than an L2 learner with a good command of his L2. This does not mean that the grammar of these two hypothetical L2 learners is different. It only means that the learner with a poorer command of his L2 will make more performance errors than the one with a good command of his L2.

According to Li (1998), it is unwise to conclude that differences between native speakers and L2 learners serve as an indication for the non-availability of UG to the L2 learner. What he suggests is that subjects perform better the more proficient they are in their L2. If this is the case, we can explain our results. It seems that differences across levels are just an indication of L2 proficiency. It is expected that less advanced learners will perform worse since they have less experience with their L2. This doesn't mean that UG is not available, it probably means that these subjects are likely to make more performance errors than the advanced learners.

In the case of the L2 learners of English, differences across levels were found. The fact that native speakers perform better than the advanced learners does not imply that the advanced learners have not reset the relevant parameter. It only implies that the advanced learners need more exposure to their L2 in order to get native-like proficiency. The prediction here is that the better the proficiency in the L2, the better the performance will be. The High group has had quite a lot of exposure to English but still they don't perform like the native speakers. The Medium group has had some exposure to English but not as much exposure as the

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[50] White and Juffs (1998) suggest that parsing, not proficiency, is the relevant interfering factor that distinguishes native speakers from L2 learners. For the purposes of my paper, I will refer to proficiency in my discussion but bearing in mind that parsing could be the relevant factor here.

advanced learners. Therefore, this group performs worse than the advanced group. As for the grammatical controls, the advanced group has attained native-like proficiency. No significant difference was found among the two groups. The Medium group performs significantly different from the two previous groups probably due to the less exposure with English. It is predicted that this group will behave more like the Native group the more exposure these L2 learners receive.

One piece of evidence supporting the idea that proficiency plays an important role in L2 Acquisition comes from the fillers. As reported in footnote 40, L2 learners of English accepted grammatical fillers 94.74% of the time. Crucially there is a difference across levels. While the intermediate learners accepted the fillers 91.67% of the time, the advanced learners accepted them 97.50% of the time. Similarly, there was an improvement across levels with respect to the ungrammatical fillers. The intermediate group accepted these fillers 26.39% of the time whereas the advanced group accepted them only 10% of the time. What these results show us is that we are really dealing with a performance problem. It is not the case that the grammar is different but that language proficiency plays a role. The better your command on your L2, the fewer performance errors you will make.

What can we say about the L2 learners of Spanish? It seems that all L2 groups have attained native-like proficiency with respect to the ungrammatical controls. The situation with respect to the test items is less clear. The three L2 groups behaved equally. Native speakers performed significantly better than the three L2 groups. At first sight one could argue that the three L2 groups behaved more like a homogeneous group and that is why we don't see any significant differences across levels. However, recall that the spread across levels was much more obvious in the case of the L2 learners of Spanish than in the case of the L2 learners of English. Therefore, one would expect to see less of a difference across levels in the L2 learners of English. Clearly this is not the case. Therefore, the homogeneity idea does not seem to give us a good way to account for the facts.

Let us explore a different line of reasoning which is going to rely on Johnson's (1988) markedness hierarchy. According to Johnson (1988) subjects beginning with a less marked parameter (i.e. English) will be able to adopt a more marked parameter value (i.e. Spanish). In contrast, subjects with a more marked parameter value will not be able to adopt a parameter value that is less marked at least not only on the basis of positive evidence. Clearly, the strong form of this hypothesis does not seem to hold. Both L2 groups have been able to reset the parameter of their respective L2s. However, there can still be some truth in Johnson's (1988) prediction. If it is indeed the case that it should be easier for the L2 learners of Spanish to reset their parameter, then we can see why the behavior of the L2 learners of Spanish was more homogeneous than the behavior of the L2 learners of English. If L2 learners of Spanish have some advantage over the L2 learners of English, one can hypothesize that performance limitations will not play such an important role.[51] If the Spanish L2 groups have some advantage to start with, then

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[51] Johnson (1988) does not discuss this possibility. I am just taking her initial hypothesis in order to show that performance limitations should not affect L2 learners of Spanish in the same way as L2 learners of English.

it can be the case that even the Low group should not be affected that much by performance limitations. If this line of reasoning is correct, then we have an explanation for the facts we started this discussion with. Differences across levels are not found in the L2 Spanish case since the L2 learners have some advantage over the L2 English learners. Even the beginners seem to behave like the advanced learners indicating that the low levels do not have any difficulties to start with. Differences across levels are more obvious for the L2 learners of English since these L2 learners are hypothesized to have more difficulty resetting the relevant parameter. Consequently, we expect the resetting process to be more gradual. Differences in performance across levels are expected. Intermediate learners should exhibit more performance limitations than the advanced learners, for example.

In summary, we can claim that parameters can be reset when it comes to wh-islands. This claim gives support to Research Hypothesis 1. We have seen that L2 learners exhibited knowledge of their L2 that they could not have transferred from their respective L1s. The only source of knowledge for these facts had to come from UG. It has also been shown that in some cases there was an improvement across levels in terms of native-like behavior, that is, the performance of the L2 learners improved with a better command of the L2. The differences that were found among native speakers and L2 learners was not attributed to the fact that the L2 learners were not accessing UG when making their judgments. We have already seen that they showed grammaticality contrasts that were not present in their L1s. What these differences suggest is that UG is indeed available but that exposure to the L2 plays an important role. The better your command of the L2 is, the fewer errors you will make. It is predicted that a bigger amount of exposure to the L2 will make the performance of the L2 learners bear closer resemblance to that of the native speakers.

8.2. That-trace effects

The situation with that-trace effects is more problematic. We have seen that L2 learners of English show opposite judgments when it comes to that-trace effects. More precisely, they accept 'that-trace' effects but they reject the grammatical controls (i.e. same sentence without 'that'). In this case it seems that L2 learners are simply transferring the knowledge of their L1. In the case of L2 learners of Spanish, we can observe that they accept the that-trace comparison sentences even though they are ungrammatical in their L1. This is a welcome result. However, the problem arises when it comes to the ungrammatical controls (i.e. same sentences without the complementizer). L2 learners of Spanish accept these sentences as well. Can we now argue for the idea that parameters can be reset in L2 Acquisition? Let us explore each case in detail before trying to offer an answer to this question.

As discussed above, L2 learners of English show opposite judgments to the target. It seems that the subjects in this study know that the Spanish Complementizer 'que' can be translated in English as 'that'. From that point on, they transfer their knowledge of their L1. In other words, they transfer the knowledge that in Spanish, extraction across a Complementizer is allowed. Furthermore, they transfer the knowledge that in Spanish, the presence of a Complementizer is always obligatory. Even though most of the subjects in this study think that the presence of a

Complementizer is always obligatory in English, there are a few individual subjects who already know that the Complementizer is optional. Could it be the case that knowing that you can drop a Complementizer in English is crucial to know that sentences containing that-trace violations are ungrammatical in English?

In order to test this hypothesis, a Pearson correlation analysis was performed. What the correlation analysis was testing was whether the subjects who were more accepting of sentences without a Complementizer were less accepting of that-trace violations. The statistical analysis revealed that this was not the case ($r = .19$, $t(36) =$ $= 1.2$, $p = .234$). Even though some subjects knew that the presence of a Complementizer is optional in English, they did not know that sentences containing that-trace violations are ungrammatical in this language.

In summary, we have evidence for transfer when it comes to the acquisition of that-trace effects by L2 learners of English. However, some of the subjects in this study have already begun to learn that in English you can leave out a Complementizer. Even though this knowledge could trigger the knowledge that that-trace effects are ungrammatical in English, this cannot be the whole story. Otherwise, we should have obtained a statistically significant result in the Pearson correlation analysis. Presumably, lexical learning could play a role but there must be something else involved. What this "something else" is is an open issue I won't be able to shed light on in this paper.[52] Whatever it is, it must involve something beyond lexical learning which makes the task of the L2 learner pretty difficult. The assumption here is that once this "something else" is acquired, the L2 learner would be able to know that that-trace violations are ungrammatical in English.

L2 learners of Spanish seem to know that the English Complementizer 'that' is translated in Spanish as 'que'. What they don't seem to know is that 'que' is always obligatory in Spanish. According to the results of this group, it seems that they know that 'that-trace' comparison sentences are grammatical in Spanish even though they are ungrammatical in their L1. The explanation I will pursue in this paper is the following. Subjects start with a default option, which in this case seems to be that extraction across a Complementizer is not allowed. Based on positive evidence, the subjects realize that extraction out of a Complementizer is indeed allowed in Spanish. As a consequence, they are able to accept that-trace comparison sentences at a high rate. The problem now is that there is no positive evidence which is going to tell them that 'que' is always obligatory in Spanish. At this point, subjects have the Spanish grammar plus the English grammar. I hypothesize that these subjects will be able to abandon the English grammar completely once they learn that the presence of a Complementizer is always obligatory in Spanish. How are they going to learn that? It seems to me that negative evidence is the only option. Someone will have to tell the L2 learner that they need to realize the complementizer overtly if they want to produce a grammatical sentence in Spanish. Whether negative evidence is available or not to the L2 learner is an open issue I will not explore in this paper. On an intuitive basis, it seems that negative evidence is more likely to be available to the L2 learner than to the L1 learner. For one thing, the L2 learners in

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[52] Presumably, this "something else" would be negative evidence.

this study had learned their second language in a class setting environment where negative evidence is readily available. Whether L2 learners made use of negative evidence is an open issue. If my line of research is correct, negative evidence should be available in some form to the L2 learner. Otherwise, there would be no way for the L2 learner to learn that the presence of 'que' is obligatory in Spanish.

After this discussion, let me go back to my research question: Can parameters be reset in L2 Acquisition? What the discussion above seems to be telling us is that we are not dealing with parameter resetting in the case of that-trace effects. Given all the evidence presented in section 8.1., it does not seem likely that we are dealing with the same process in this case. What the data seem to be telling us is that we are dealing with a process which could require lexical learning of some sort plus "something else" in the case of the L2 learners of English. For some reason, that-trace effects seem to take much time to learn than wh-islands, for example. If the problem with that-trace effects is that we are dealing with a phenomenon which requires a lot of exposure to the language, then we have an explanation for these facts. For example, in the case of L2 learners of Spanish, it seems that these subjects need to be told that that 'que' is obligatory in Spanish. This process could take a long time. Subjects can know that extraction across a Complementizer is allowed in Spanish but at they same time they can be ignorant about the fact that you cannot leave out a Complementizer in Spanish. This process is hypothesized to take plenty of time, since it will involve language-specific learning rather than parameter resetting. If this line of reasoning is correct, then we can explain the delay in acquisition with that-trace effects. The subjects in this study need more exposure to the language to learn the language-specific things about their L2. Until they get the required amount of exposure, they will fail to give a correct judgement.

8.3. A comparison with L1 Acquisition

In this section I will show that English-speaking children have no trouble dealing with Subjacency violations but they have some difficulty with sentences containing that-trace effects. I will not attempt to equate L1 Acquisition with L2 Acquisition since the starting point in each case is not necessarily the same. What I will try to do in this section is to show that that-trace effects are problematic even for children acquiring their native language. If this is so, maybe we can find an explanation for the difficulty exhibited by the L2 learners of English. Maybe there is something very specific about that-trace effects that takes time to be fully learned.

It has been observed that English-speaking children accept sentences containing that-trace violations even though they are ungrammatical for adults.[53] For example, Thornton (1990) found that several children consistently produced ungrammatical questions such as (14):

(14) *Who do you think that's in the box?
       (Cf. Who do you think is in the box?)

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[53] Thanks to Inkie Chung for suggesting looking at first language acquisition when trying to determine the behavior exhibited by L2 learners.

Assuming Rizzi's (1990) version of the ECP, Thornton (1990) argues that "children's questions conform to the structural requirements of the ECP – but have incorrectly concluded that the overt complementizer is the appropriate head governor for the subject trace. Although this conclusion is mistaken, this means that children's questions reflect an endeavor to 'preserve' the ECP, not violate it" (p. 209). Based on positive data, children should be able to converge on the adult grammar.

Could it be the case that L2 learners of English also take some time to figure out that sentences containing that-trace effects are ungrammatical in English? Maybe these learners are exhibiting some difficulties with that-trace effects for the same reason that English-speaking children exhibit difficulties with this construction. If this is the case, we cannot simply say that L2 learners of English don't have access to UG when it comes to that-trace effects. The problem is that that-trace violations take time to be recognized. Since English children exhibit the same type of difficulty, this possibility seems quite likely.

A question arises at this point. Do English-speaking children observe Subjacency from the very beginning? If L2 learners of English are acquiring these constructions with the same ease as English children, we should expect that-trace effects to take more time than Subjacency. This is so because L2 learners of English have trouble with that-trace effects but not with wh-islands. The answer to this question seems to be a positive one. The relevant evidence comes from Otsu (1981).[54] Otsu (1981) ran some experimental studies with young English-speaking children and he found that those children observed Subjacency as soon as they acquire the relevant structures to which it applies. Presumably the structures Otsu (1981) is referring to are long-distance questions. We can assume that L2 learners of English have already acquired those structures. Therefore, it follows that they should perform well on wh-islands.

From the evidence given so far it seems that there are some similarities between L2 and L1 Acquisition. L2 learners of English do well on Subjacency but perform poorly on that-trace effects. Similarly, English-speaking children have no trouble with Subjacency but show some difficulties with that-trace effects. These similarities are suggestive of what could be going on in L2 Acquisition. There is something intrinsic about that-trace effects that makes them somewhat difficult to be learned. There seems to be something language-specific about that-trace effects that requires enough exposure to the language in order to be fully acquired.

To conclude section 8, let me go back once again to my research hypothesis in section 5. According to the first hypothesis, the L2 learner can reset parameters when acquiring his second language. Under the second hypothesis, parameters cannot be reset. According to my results and my previous discussion, it seems that Hypothesis 1 is the best way to account for the data. We have seen evidence that L2 learners accept or reject sentences at a very high rate even though those sentences have a different grammaticality status in their L1. We can then conclude that the L2 learner has access to UG. Furthermore, parameters can be reset. That-trace effects are problematic at first sight. Based on this, one could argue against the idea that UG

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[54] See de Villiers *et al* (1990) for a similar conclusion.

is available to the L2 learner. However, what the data seem to be telling us is that parameter resetting is not even an issue here.[55] What seems to be relevant is something language-specific (the facts from L1 Acquisition give further support to this idea). In other words, L2 learners of Spanish need to be told that in Spanish you cannot leave out a Complementizer and L2 learners of English need to learn that the Complementizer 'that' is optional in English.

9. Conclusions

In this paper I have proposed a new experimental study to address the following question: Can parameters be reset in L2 Acquisition? Previous studies (i.e. Martohardjono 1993) have failed to show that parameters can be reset. Until this is shown, evidence for UG is weaker since subjects could be rejecting/accepting some sentences because they are also ungrammatical/grammatical in their own language.

My experimental studies have shown that there is good evidence to think that parameters can be reset in L2 Acquisition. More precisely, subjects exhibit a clear grammaticality contrast when it comes to wh-islands. As I have argued extensively, this knowledge cannot come from the L1. Therefore, the source of this knowledge can only come from UG. That-trace effects were problematic at first sight. After a careful examination of the results, we concluded that we are not really dealing with parameter resetting when it comes to that-trace effects. It seems that some sort of lexical learning (and/or "something else") is required in these cases. Only after subjects learn the language specific details of the language they are acquiring, will they be able to judge that-trace effects in an accurate way.

In conclusion, I have shown, along the lines of Martohardjono (1993), that L2 learners have access to UG when learning a second language. Furthermore, I have also shown that parameter resetting is indeed possible in L2 Acquisition.

Appendix

English sentences

► Pat didn't know where her sister had hidden the toys.
(1) Who didn't Pat know where had hidden the toys?

► Ray wondered when Mary would come to the party.
(2) Who wondered when Mary would come to the party?

► John thought that some medicine cured his illness.
(3) What did John think that cured his illness?

► I met the woman with the red hat in the British Museum.
(4) Where did you meet the woman with the red hat?

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[55] As Elaine Grolla (p.c.) points out to me, it could be the case that 'that-trace' effects do not involve parameter resetting at all. If this is the case, L2 learners of English would be able to reset parameters since they reject wh-islands in English. The fact that they accept sentences containing that-trace effects could require some independent lexical learning, but crucially not the resetting of a parameter.

► Amy wondered why John had brought the parcel.
(5) Who wondered why John had brought the parcel?

► Pam said Mary spoiled the dinner.
(6) Who did Pam say spoiled the dinner?

► Mary thinks that John has a new car.
(7) What Mary thinks that John has?

► Max explained how the poison killed the patient.
(8) What did Max explain how killed the patient?

► Max said that his neighbour saw the burglar.
(9) Who did Max say that saw the burglar?

► Mary found a very expensive ring as she was walking down the street.
(10) What did Mary find as she was walking down the street?

► Pat thought that a policeman arrested her brother.
(11) Who did Pat think that arrested her brother?

► The music which the woman played filled the room.
(12) Who did the music which played filled the room?

► Pat didn't know where her sister had hidden the toys.
(13) Who didn't know where her sister had hidden the toys?

► Max said his neighbour saw the burglar.
(14) Who did Max say saw the burglar?

► Ray wondered when Mary would come to the party.
(15) Who did Ray wonder when would come to the party?

► Paul noticed the fact that a glass had cut the girl.
(16) What did Paul notice the fact that had cut the girl?

► Mary said that she would travel to Europe next month.
(17) Where did Mary say that she would travel next month?

► Pat thought a policeman arrested her brother.
(18) Who did Pat think arrested her brother?

► The man left the table after the waiter spilled the soup.
(19) Who did the man leave the table after spilled the soup?

► Pam said that John spoiled the dinner.
(20) Who did Pam say that spoiled the dinner?

► Daniel said that he couldn't speak Italian.
(21) What did Daniel say that he couldn't speak?

► Max explained how the poison killed the patient.
(22) Who explained how the poison killed the patient?

► John thought some medicine cured his illness.
(23) What did John think cured his illness?

► Amy wondered why John had brought the parcel.
(24) Who did Amy wonder why had brought the parcel?

Spanish sentences[56]

► *No sé   cuánto   pesa   María con los zapatos puestos.*
No know how-much weighs Mary with the shoes   on
'I don't know how much Mary weighs with her shoes on'

(1) *¿Quién no sabes cuánto   pesa   con los zapatos puestos?*
Who   no know how-much weighs with the shoes   on
'Who don't you know how much weighs with her shoes on?'

► *Creo   el rumor de que a Juan le   gusta el   chocolate.*
Believe the rumor of that to Juan CL likes the chocolate
'I believe the rumor that Juan likes chocolate.'

(2) *¿Quién crees   el rumor de que le   gusta el   chocolate?*
Who   believe the rumor of that CL likes the chocolate
'Who do you believe the rumor that likes chocolate?'

► *Juan creía   que un medicamento contra el cáncer podría curar su enfermedad.*
Juan believed that a medicine   against the cancer could- cure his illness
'Juan believed that a medicine against cancer could cure his illness.'

(3) *¿Qué creía   Juan que podría curar su enfermedad?*
What believed Juan that could-cure   his illness
'What did Juan believe that could cure his illness?'

► *Creo que iré   al   cine   mañana por la tarde   a ver*
Belive that will-go to-the movie-theater tomorrow in   the evening to watch
El   señor de los anillos.
The lord of the rings
'I think I will go to the movie theater tomorrow evening to watch *Lord of the Rings*'

(4) *¿Cuándo crees que irás   al   cine   a ver   El señor de los anillos?*
When think that will-go to-the movie-theater to watch The lord of the rings
'When do you think you will go to the movie theater to watch *Lord of the Rings*?'

► *Te encontraste a Daniel después de que María fuera al   mercado.*
CL met   to Daniel after   of that María went to-the market
'You met Daniel after Mary went to the market.'

(5) *¿A quién te encontraste a Daniel después de que fuera al   mercado?*
To who   CL met   to Daniel after   of that went to-the market
'Who did you meet Daniel after went to the market?'

► *María creía   que un chico alto había pegado a su hermano.*
María believed that a   guy tall had   hit   to her brother
'Mary believed that a tall guy had hit her brother.'

(6) *¿Quién creía   María que había pegado a su hermano?*
Who   thought Mary that had   hit   to her brother
'Who did Mary think that had hit her brother?'

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[56] Glosses are provided for convenience. The subjects in the study only saw the Spanish sentences.

► *Juan dijo que el vecino   del   tercero había arreglado el techo.*
Juan said that the neighbour of-the third   had   fixed   the ceiling
'Juan said that the neighbour of the third floor had fixed the ceiling.'

(7) *¿Quién dijo Juan había arreglado el techo?*
Who   said Juan had   fixed   the ceiling
'Who did John say had fixed the ceiling?'

► *No sé   dónde había escondido María los juguetes.*
No know where had   hidden   Mary the toys
'I don't know where Mary had hidden the toys.'

(8) *¿Dónde no sabes quién había escondido los juguetes?*
Where no know who   had   hidden   the toys
'Where don't you know who had hidden the toys?'

► *Pedro cree   que aprobará el examen de química sin   dificultad.*
Pedro thinks that will-pass the exam   of chemistry without difficulty
'Pedro thinks that he will pass the chemistry exam without difficulty.'

(9) *¿Qué cree   Pedro que aprobará sin   dificultad?*
What thinks Pedro that will-pass without difficulty
'What does Pedro think that he will pass without difficulty?'

► *Juan cree   que las bebidas   frías hacen mal al   estómago.*
Juan thinks that the beverages cold make bad to-the stomach
'Juan thinks that cold beverages harm the stomach.'

(10) *¿Qué cree   Juan hace   mal al   estómago?*
What thinks Juan makes bad to-the stomach
'What does Juan think harms the stomach?'

► *No sé   cómo   irá   vestida María a la fiesta.*
No know how   will-go dressed Mary to the party
'I don't know how Mary will go dressed to the party.'

(11) *¿Quién no sabes cómo irá   vestida a la fiesta?*
Who   no know how will-go dressed to the party
'Who don't you know how will go dressed to the party?'

► *María cree   que Juan se va a ir a casa   dentro de un rato.*
Mary thinks that Juan CL go to go to home in   of a   while
'Mary thinks that Juan is going to go home in a while.'

(12) *¿Cuándo María cree   que Juan se va a ir a casa?*
When   Mary thinks that Juan CL go to go to home
'When does Mary think that Juan is going to go home?'

► *Juan dijo que el vecino   del   tercero había arreglado el techo.*
Juan said that the neighbour of-the third   had   fixed   the ceiling

(13) *¿Quién dijo Juan que había arreglado el techo?*
Who   said Juan that had   fixed   the ceiling
'Who did Juan say that had fixed the ceiling?'

► *Juan no fue   a la   fiesta de cumpleaños de Luis porque estaba cansado.*
Juan no went to the party of birthday   of Luis because was   tired
'Juan didn't go to Luis' birthady party because he was tired.'

(14) *¿Por qué no fue   Juan a la   fiesta de cumpleaños de Luis?*
Why   no went Juan to the party of birthday   of Luis
'Why didn't Juan go to Luis' birthday party?'

► *No sabía cuándo me había visto María por la   calle.*
No knew when   CL had   seen Mary in   the street
'I didn't know when Mary had seen me in the street.'

(15) *¿Cuándo no sabías quién te   había visto por la   calle?*
When   no knew who CL had   seen in   the street
'When didn't you know who had seen you in the street?'

► *No sé   dónde había escondido María los   juguetes.*
No know where had   hidden   Mary   the toys

(16) *¿Quién no sabes dónde había escondido los   juguetes?*
Who   no knew where had   hidden   the toys
'Who didn't you know where had hidden the toys?'

► *Pedro arregló la   puerta que había roto   Juan.*
Pedro fixed   the door   that had   broken Juan

(17) *¿Quién arregló Pedro la   puerta que había roto?*
Who   fixed   Pedro the door   that had   broken

► *Juan creía   que un medicamento contra el cáncer podría curar su enfermedad.*
Juan believed that a medicine   against the cancer could- cure his illness

(18) *¿Qué creía   Juan podría curar su enfermedad?*
What thought Juan could cure his illness
'What did Juan think could cure his illness?'

► *No sé   cuánto   pesa   María con los zapatos puestos.*
No know how-much weighs Mary with the shoes on

(19) *¿Cuánto   no sabes quién pesa   con los zapatos puestos?*
How-much no know who weighs with the shoes   on
'How much don't you know who weighs with the shoes on?'

► *Juan cree   que las bebidas   frías hacen mal al   estómago.*
Juan thinks that the beverages cold make bad to-the stomach

(20) *¿Qué cree   Juan que hace mal al   estómago?*
What thinks Juan that makes bad to-the stomach
'What does Juan think that harms the stomach?'

► *No sabía cuándo me había visto María en la   calle.*
No knew when   CL had   seen Mary in the street

(21) *¿Quién no sabías cuándo te   había visto en la   calle?*
Who   no knew when   CL had   seen in the street
'Who didn't you know who had seen you in the street?'

► *María creía   que un chico alto había pegado a su hermano.*
   María believed that a   guy tall had   hit   to her brother

(22) *¿Quién creía   María había pegado a su hermano?*
   Who   thought María had   hit   to her brother
   'Who did Mary think had hit her brother?'

► *Carmen dijo que le iba   a comprar un diccionario a su hermano pequeño.*
   Carmen said that CL went to buy   a dictionary to her brother younger
   'Carmen said that she was going to purchase a dictionary to her younger brother.'

(23) *¿Qué dijo Carmen que le iba   a comprar a su hermano pequeño?*
   What said Carmen that CL went to buy   to her brother younger
   'What did Carmen say that she was going to purchase to her younger brother?'

► *No sé   cómo irá   vestida María a la   fiesta.*
   No know how will-go dressed Mary to the party

(24) *¿Cómo no sabes quién irá   vestida a la   fiesta?*
   How   no know who   will-go dressed to the party
   'How don't you know who will go dressed to the party?'

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