

# Effect of Relativizer Type in the Processing of Non-restrictive Relative Clauses in L2 French

Amandine Lorente Lapole  
Université Paris Diderot-Paris 7

## 1. Introduction

A body of research argues for evidence of native-like syntactic reflexes when parsing sentences in a second language (L2), although some processing strategies may differ (e.g., Dussias, 2003; Dussias & Sagarra, 2007; Fernández, 2003; Frenck-Mestre, 2002; Frenck-Mestre and Pynte, 1997; Juffs, 1998; Witzel, Witzel & Nicol, 2012). However, another body of research (e.g., Clahsen and Felser, 2006a, 2006b; Felser, Roberts, Marinis, & Gross, 2003; Papadopoulou & Clahsen, 2003) argues that non-native speakers rely on lexical-thematic and contextual information when native speakers rely on syntactic structure. By testing processing of two different types of non-restrictive relative clauses (RCs) in French and their respective interpretation preferences when preceded by a complex determiner phrase (DP): “DP1 of DP2”, this study highlights the manner in which the poverty-of-the-stimulus problem in L2 acquisition is overcome by the computational system and seeks to determine the degree to which UG constrains the L2.

I consider the structure of the relativizers *qui* versus *lequel*, which both translate to “who” with animates. Following Cinque (2008), I will assume that two types of non-restrictive RCs in L1 French result from the division of labor between syntax and discourse. Specifically, the morphosyntactic properties of the relativizing head *qui*, as a reflex of a (predicative) complementizer associated with the licensing of a null expression (an operator or a trace), involve syntactic identification by an antecedent and are reminiscent of locality conditions on anaphors. In RCs specifically, the null *wh*-operator licensed by *qui* in the C-head participates in a chain relation in syntax under identity. The constraints on locality and reference derive from requirements on null elements. *Lequel*, on the other hand, as a definite pronoun (an E-type pronoun), contributes a discourse referent that must be identified with a previously introduced referent matching in number and gender features. Identification in discourse results in greater freedom in permissible construal.

As Reuland (2001) points out, aspects of the distribution of referentially dependent expressions can be seen as a reflex of a trade-off between cost of computations and anaphoric freedom in language design. According to Reuland (2001), processes within  $C_{HL}$  [the computational system of human language] are less costly than processes involving the discourse storage. The computational difference between syntactically induced binding (*qui* non-restrictive RCs) and co-reference (*lequel* non-restrictive RCs) is therefore expected to be quite general. The less costly computations of *qui* non-restrictive RCs—involving a  $C_{HL}$ -mediated syntactic chain with the antecedent—should allow DP1 construal in ambiguous DP1 *de* DP2 sequences (e.g. *le père du maçon*, “the father of the mason”) because revision is facile. The more costly identification of *lequel* non-restrictive RCs with the most recent discourse referent—as a reflex of cost avoidance in the memory storage—should hinder identification of DP1. The establishment of anaphoric relations in discourse-semantics is costlier because a greater choice of anaphoric relations is possible. This trade off seems to reflect a major computational divide.

On this view, the morphosyntax of the relativizer is the trigger: Different lexical items induce different processing behaviors. The degree to which L2 learners can detect the abstract grammatical properties of the relativizing head *qui* versus the DP relative pronoun *lequel* with gender and number specifications would provide an unparalleled test of the epistemology of L2 systems. Indeed, the view

---

\*I would like to thank my audience at SLRF 2012 and two anonymous reviewers for their helpful feedback.

that CHL-mediated feature-based grammatical computations relieve computational burden in L2 acquisition is at odds with the claim that L2 learners generally do not compute as detailed representations as native speakers, relying instead on a shallow representation that uses strictly meaning-based lexical and contextual information (Clahsen and Felser, 2006). In contrast to the unstable phenomena investigated in many experiments on RC ambiguity resolution, knowledge of *qui* versus *lequel* non-restrictive RCs (and their hypothesized cluster of properties), offers a rare window onto the mental architecture channeling the acquisition of a second language.

## 2. Interpretation Properties of Non-restrictive Relative Clauses in L1 French

Focusing on non-restrictive RCs, Delle Luche (2008) conducted two questionnaire experiments in which she investigated whether attachment preferences for ambiguous non-restrictive RCs in L1 French are affected by the form of relativizer that is used. The type of sentences Delle Luche (2008) used are exemplified in (1a, b).

- (1) a. *Je connais le père du maçon, qui est amusant.*  
 b. *Je connais le père du maçon, lequel est amusant.*  
 “I know the father<sub>DP1</sub> of the mason<sub>DP2</sub>, who is funny.”

Using independent questionnaires to test the two structures separately, Delle Luche (2008) observed that *qui* non-restrictive RCs are preferentially construed with DP1 and *lequel* non-restrictive RCs with DP2. Delle Luche argues that the asymmetry in the ambiguity resolution for sentences of the type “DP1 of DP2” in (1a, b) relies on the accessibility of the referent when processing the relativizer (Hemforth, Konieczny, and Scheepers, 2000). She proposes that relativizers function as anaphoric expressions ranked on an accessibility hierarchy according to their form: *Lequel* is more informative (marked for gender and number) and less attenuated than *qui* (two vs. one syllable) and should therefore signal a less accessible antecedent. This, however, does not happen with the dative *à qui* versus *auquel/à laquelle* etc, (which both translate as “to whom” with animates). This can however be explained if the differences follow from the X Phrase (XP) status: Both *à qui* and *auquel/à laquelle* involve prepositional phrases (PPs).

In the current study, I examine how the processing of non-restrictive RCs seems to result from a specific division of labor between computations in syntax and discourse as a direct reflex of their morphosyntactic properties. Thus the featurally dependent head relativizer *qui* induces syntactic computations subject to locality while the featurally specified XP relativizer *lequel* induces discourse computations. If discourse computations allow for the greater grammatical autonomy of *lequel* non-restrictive RCs, this autonomy comes at a price in terms of storage of discourse referents. This cost, mitigated by the number of marked features to process, should be visible in processing with different interpretation preferences in “DP1 of DP2” sequences.

On this morphosyntactic hypothesis, asymmetries reflecting the cost of feature specification in *lequel* are likely to arise in L1 processing (Harley & Ritter, 2002). Thus, the feminine and plural values of gender and number features in *lequel* non-restrictive RCs (see table 1) are likely to induce more attachment to DP2, as function of the cost of revision. This is because the cost of computations of non-default values is greater than for default values, resulting in an asymmetry in the ability to revise the initial phrase-structure attachment of the non-restrictive RC dictated by structure minimization (Fodor, 1998). Thus, these intralinguistic differences offer a test of the degree to which L2 learners compute the details of feature structure encoded in these relativizer forms.

Table 1: *Distribution of  $\phi$ -features in DP Relativizers*

Lequel:	XP, [ Pred], Gender: $\emptyset$ , Number: $\emptyset$
Laquelle:	XP, [ Pred], Gender: F, Number: $\emptyset$
Lesquels:	XP, [ Pred], Gender: $\emptyset$ , Number: P
Lesquelles:	XP, [ Pred], Gender: F, Number: P

### 3. Learnability of the distinction

Schwartz and Sprouse (2000) as well as Dekydtspotter et al. (1997) argue that the Poverty of the Stimulus approach is the only indisputable way to prove that UG is actively engaged in L2 acquisition and that L2 acquisition is not fundamentally different from L1 acquisition. When adult learners are able to master aspects of the L2 which are not instantiated in the L1, not obvious from the input, and not explicitly taught in the classroom, this provides evidence that innate linguistic knowledge is at work (Dekydtspotter, Sprouse and Anderson 1997, Dekydtspotter, Sprouse and Swanson 2001, Montrul and Slabakova 2003, Kanno 1998, etc). Crucially, there appears to be a particularly severe poverty of the stimulus associated with the interpretation of *qui* versus *lequel* relativizers for English learners of French. *Qui* and *lequel* might be present in authentic texts brought into the classroom, in textbooks or uttered by the instructor. However, the interpretive possibilities of *qui* and *lequel* relativizers in ambiguous contexts are discussed neither in pedagogical grammars of French nor in classroom presentations. Students are taught that *lequel* has the same meaning than *qui* but is used in more formal and literary contexts. The structures under investigation in this study are therefore not discussed in any relevant way.

Thus, morphosyntactic knowledge of *qui/lequel* in L2 should offer a clear robust trigger. Predictions for the current study are as follows: Sensitivity to morphological details should be accompanied by distinct interpretation preferences for L2 learners. Indeed, the cost of feature computations should affect the ability to revise the initial parse dictated by cost avoidance and consequently result in more interpretation preferences to DP2 for the relativizer *lequel*. On the other hand, if L2 learners do not have the same degree of morphosyntactic sensitivity as native speakers, they should use whatever lexical-thematic or contextual information is available to interpret the input (Clahsen and Felser, 2006). In that case, a lack of preference among L2 learners or an overreliance of real-world knowledge when asked to assign an interpretation to a particular L2 sentence would reflect evidence of shallow processing.

### 4. The Study

The central empirical question to be tested in this study is the degree to which the various relativizers as well as their feature content affect the interpretation of non-restrictive RCs for L1-English L2-French learners. Experiment 1 captured final preferences of two types of non-restrictive relatives in French in written and oral stimuli. The term “final preference” refers to final interpretation of participants on a given sentence. Indeed, in this offline task, when it is time to answer, the participants have finished treating the sentence and it is their final interpretation that is recorded. This experiment replicated aspects of Delle Luche (2008), but also allowed for an analysis based on the feature contents of the relativizer. Experiment 2 focused on the computations involved in terms of the  $\phi$ -feature composition of the relativizer, versus interpretation driven by knowledge of pragmatics.

#### 4.1. Experiment 1

Experiment 1 consisted of two questionnaires comparing *qui* and *lequel* in non-restrictive RCs following a ‘DP1 of the DP2’ structure. These questionnaires specifically examined biases in terms of  $\phi$ -features (gender and number) encoded in *qui* versus *lequel* in silent reading and in listening comprehension. It is expected that *qui* non-restrictive RCs will allow more DP1 interpretations than *lequel* non-restrictive RCs as a function of computational costs in discourse dependencies. Forty sets of experimental sentences were constructed in four versions, one with *qui* RCs in the singular (2a), one with the relativizer *lequel* or *laquelle* in the singular (2b), one with *qui* RCs in the plural (2c), and one with the relativizer *lequel* or *laquelle* in the plural (2d). Any given participant saw only one of these four possible versions.

For questionnaire A, a 160-item list was created, containing 80 experimental items and 80 distracters randomized into 4 different versions. The 80 distracters quadruples were complex sentences containing the dative relative pronouns *à qui/auquel* (“to whom”). Each experimental trial consisted of a written sentence followed by two statements, one consistent with the DP1 attachment interpretation (*The doctor loves his job*) and one consistent with DP2 attachment interpretation (*The accountant loves*

*his job*). The order of statements was counterbalanced across trials. Participants were instructed to tick the option that was ‘most correct’. DP1 and DP2 were matched for gender, number, length and number of syllables.

For questionnaire B, participants were instructed to listen to a new list of 160 items (a different version to avoid the repetition of items across questionnaires) two weeks later and again to tick the statement that was ‘most correct’ on a separate sheet of paper. All items were recorded in Praat (Boersma & Weenink, 2009) by a native French speaker. Prosodic contours were controlled. Each task did not exceed 20 minutes.

Prior to the experiment, a pretest was conducted to ensure that experimental items were not biased towards DP1 or DP2. Fifteen participants, none of whom took part in Experiment 1, were asked to rate on a seven-point scale the plausibility of statements consistent with DP1 interpretation and DP2 interpretation. For the 80 sentences selected, no overall preference for either DP1 (5.90) or DP2 (5.94) interpretation was detected.

- (2) a. *J'affectionne le docteur du comptable, **qui** aime son travail.*  
 b. *J'affectionne le docteur du comptable, **lequel** aime son travail.*  
 c. *J'affectionne les docteurs des comptables, **qui** aiment leur travail.*  
 d. *J'affectionne les docteurs des comptables, **lesquels** aiment leur travail.*  
 “I love the doctor(s) of the accountant(s), who love(s) their job”

This task was completed by 15 high-intermediate learners in their fifth semester of French, 15 advanced learners of French (with 1 year of residence in France), and a control group of 15 native speakers currently residing in the US. In view of previous research (e.g., Frenck-Mestre, 2002), the amount of language exposure and years of study in the two groups of learners was considered to be a reliable linguistic indicator for proficiency. The high-intermediate learners (undergraduate students) participating in this study were compensated by receiving 10 homework points in their respective French classes. The advanced learners and native speakers of French (graduate students) did not receive any payment for this study.

The mean acceptance rates for DP1 construal in these two types of non-restrictive RCs in silent reading are presented in Table 2. These results were coded with SPSS and a mixed design repeated measures ANOVA was run on DP1 interpretation preferences, with Level as in between-subjects factor and the Relativizer Type (*qui* or *lequel*), Gender (feminine or masculine) and Number (singular or plural) as within-subjects factors. An ANOVA yielded three significant interactions: Relativizer x Level,  $F(1, 42) = 6.809$ ,  $p < .05$ , Gender x Level,  $F(1, 42) = 6.213$ ,  $p < .05$  as well as Relativizer x Number,  $F(1, 42) = 5.776$ ,  $p < .05$ . Individual ANOVAs were then conducted. In native-speakers, an ANOVA yielded a main effect of relativizer,  $F(1, 14) = 8.839$ ,  $p \leq .01$ , as well as a marginal effect of number,  $F(1, 14) = 4.514$ ,  $p = .052$ . In the group of advanced learners, an ANOVA revealed a main effect of relativizer,  $F(1, 14) = 202.618$ ,  $p \leq .01$ , as well as a main effect of gender,  $F(1, 14) = 15.333$ ,  $p = .05$ . For high-intermediate learners, a marginal effect of relativizer was found,  $F(1, 14) = 4.487$ ,  $p = .053$ , as well as a marginal effect of number,  $F(1, 14) = 4.375$ ,  $p = .055$ . Results for filler items proved to be flat and statistically non-significant across the groups. In sum, the acceptance rates data in silent reading revealed two profiles for L2 learners: On the one hand, lower-proficiency learners tended to have DP1 preferences regardless of the relativizer used, even though a marginal effect of relativizer was noted. Advanced learners, like native speakers, exhibited a clear effect of relativizer but also an effect of gender, accepting more feminine than masculine complex relativizer interpretations with DP1, in the singular,  $t(14) = 2.828$ ,  $p < .05$ , and in the plural,  $t(14) = 5.906$ ,  $p < .001$ , a morphological distinction that was not clearly noted in the two other groups.

Table 2. Mean construal with DP1 (in %) in silent reading.

Group	Qui				Lequel			
	Singular		Plural		Singular		Plural	
	Masc.	Fem.	Masc.	Fem.	Masc.	Fem.	Masc.	Fem.
Intermediate	70.66 (26.04)	78.66 (15.97)	69.33 (14.86)	74.00 (18.82)	60.00 (15.11)	64.00 (15.49)	69.33 (21.20)	70.66 (23.74)
Advanced	69.33 (18.30)	80.00 (18.51)	62.66 (19.80)	77.33 (18.30)	30.66 (22.50)	53.33 (16.30)	36.00 (13.52)	58.66 (11.87)
Natives	85.33 (23.25)	84.00 (22.92)	82.66 (27.11)	74.66 (21.99)	47.33 (22.18)	50.00 (33.59)	50.66 (24.91)	56.00 (24.14)

Note: standard deviations are provided in parentheses.

The mean acceptance rates for DP1 preferences in listening comprehension are presented in Table 3. Again, results were coded with SPSS and a mixed design repeated measures ANOVA was run on DP1 interpretation preferences, with Level as in between-subjects factor and the Relativizer type (*qui* or *lequel*), Gender (feminine or masculine) and Number (singular or plural) as within-subjects factors. An ANOVA yielded two significant interactions: Relativizer x Level,  $F(1, 42) = 19.226, p < .001$  and Relativizer x Gender,  $F(1, 42) = 13.588, p \leq .001$ . Individual ANOVAs were then conducted. In native speakers, an ANOVA yielded a main effect of Relativizer,  $F(1, 14) = 87.203, p \leq .0001$  and a main effect of Gender,  $F(1, 14) = 6.089, p \leq .05$ . Paired-samples *t*-tests revealed that native speakers accepted the singular masculine complex relativizer *lequel* construed with the DP1 referent significantly more than its feminine counterpart,  $t(14) = 2.870, p < .05$ . In advanced learners, an ANOVA revealed a main effect of relativizer,  $F(1, 14) = 284.846, p < .0001$ , as well as a main effect of gender,  $F(1, 14) = 9.032, p \leq .05$ ; as for native-speakers, paired-samples *t*-tests revealed that advanced learners accepted non-restrictive RCs introduced by the singular masculine complex relativizer *lequel* construed with DP1 significantly more than its feminine counterpart *laquelle*,  $t(14) = 2.358, p < .05$ . Finally, in high-intermediate learners, a main effect of relativizer was found,  $F(1, 14) = 26.925, p \leq .0001$ , as well as a marginal effect of gender,  $F(1, 14) = 3.921, p = .068$ . In comparison, for non-restrictive RCs introduced by the relativizer *qui*, the gender and number of the referent did not result in any significant effect in any of the groups. Finally, in the plural context, all groups accepted both masculine and feminine forms of the complex relativizer equally.

Table 3. Mean construal with DP1 (in %) in listening comprehension.

Group	Qui				Lequel			
	Singular		Plural		Singular		Plural	
	Masc.	Fem.	Masc.	Fem.	Masc.	Fem.	Masc.	Fem.
Intermediate	81.33 (14.07)	77.33 (18.30)	78.66 (15.97)	80.00 (10.69)	72.00 (10.14)	61.33 (15.97)	61.33 (14.07)	53.33 (16.32)
Advanced	74.66 (11.87)	81.33 (15.97)	72.00 (12.64)	76.00 (13.52)	36.00 (17.23)	24.00 (18.82)	32.00 (12.64)	28.00 (12.64)
Natives	73.33 (17.99)	68.00 (23.66)	66.66 (17.99)	68.00 (24.84)	42.66 (19.80)	29.33 (16.67)	37.33 (22.50)	26.66 (19.51)

Note: standard deviations are provided in parentheses.

The fact that both groups of learners, especially advanced learners, exhibited a Gender effect in the singular complex relativizers, along with the native speakers, suggests that L1-English L2-French learners have acquired relevant aspects of the morphosyntactic representations of the two types of relativizers. Results for filler items in this task were statistically flat, reflecting morphosyntactic expectations.

## 4.2. Experiment 2

In this experiment, subjects were engaged in an online plausibility judgment task adapted from the “stop making sense” task used by Boland and colleagues (Boland and al., 1995). This experiment tested whether L2 learners demonstrate immediate commitment to syntactic details in the disambiguating region or whether interpretation is directly driven by knowledge of pragmatics via sentential information. The experimental material was partially borrowed from Delle Luche (2008). 40 items in four versions were used, handling three variables, the type of relativizer (*qui* or *lequel*), sentential disambiguation of the RC either towards DP1 or towards DP2, and the effect of features (masculine or feminine) contained in the complex relativizers. A sample quadruple is given in (3).

- (3)
- a. *qui* – disambiguation towards DP1  
*L'écolière de la maîtresse, **qui** recommence sa punition jusqu'à la grande récréation, préfère le bleu au rouge.*
  - b. *laquelle* – disambiguation towards DP1  
*L'écolière de la maîtresse, **laquelle** recommence sa punition jusqu'à la grande récréation, préfère le bleu au rouge.*
  - c. *qui* – disambiguation towards DP2  
*La maîtresse de l'écolière, **qui** recommence sa punition jusqu'à la grande récréation, préfère le bleu au rouge.*
  - d. *laquelle* – disambiguation towards DP2  
*La maîtresse de l'écolière, **laquelle** recommence sa punition jusqu'à la grande récréation, préfère le bleu au rouge.*  
“The schoolgirl of the schoolmistress / The schoolmistress of the schoolgirl, who is again being punished until recess, prefers blue to red”

As many distracters as experimental items were created. Distracters did not contain relative clauses. They consisted of a subject, a verb and a direct object and were either followed by a present participle or by (*tout*) *en* + present participle (“while”), and ended with a DP. Thus, subjects read 80 sentences (40 experimental items and 40 distracters) one word at a time and were asked to press the “End” key as soon as they thought that the sentence had become implausible. Some examples preceded the actual task, familiarizing the participants with the material. Subjects controlled the presentation rate of each word in the sentence by pressing the space bar. Each press of “space” displayed the next word in a sentence in a cumulative fashion. Pressing the key labeled “End” concluded a sentence and began the next trial. All participants completed a practice session to ensure that they fully understood how to do the task. The experiment took about 20 minutes. For this task, all participants also participated in a pretest a week before the experiment took place to ensure that in each sentence, the pragmatic dimension of the two terms used (in DP1 or DP2 position) could/could not possibly cue the information found in the main clause. Two lists of 40 short situations were created involving the terms used in the experiments. Participants were asked to rank these 40 short situations on a 6-point scale reflecting the plausibility of these situations in the real world (-3: highly implausible; -2: implausible; -1: rather implausible; +1: rather plausible; +2: plausible; +3: highly plausible). Two examples are reported in (4). The pretest did not exceed 10 minutes. The results of the pretest followed the initial expectations: Items created to describe a “plausible” situation exhibited positive results while items created to describe an “implausible” situation exhibited negative results across the groups. The pretest raised any potential pragmatics ambiguity effect and made sure that plausibility judgment and interpretation preferences would be clearly directed either by the type of relativizer or by knowledge of pragmatics.

- (4)
- a. *L'écolière recommence sa punition jusqu'à la grande récréation.*  
“The schoolgirl is again being punished until recess”
  - b. *La maîtresse recommence sa punition jusqu'à la grande récréation.*  
“The schoolmistress is again being punished until recess”

The actual task was completed by a new set of participants: 12 high-intermediate learners in their fifth semester of French, 12 advanced learners of French (with 1 year of residence in France), and a

control group of 12 native speakers currently residing in the US. The high-intermediate learners (undergraduate students) participating in this study were compensated by receiving 10 homework points in their respective French classes. The advanced learners and native speakers of French (graduate students) did not receive any payment for this study.

Learners were expected to show evidence of computation reflexes versus direct influence of knowledge of pragmatics. Evidence of computational reflexes would involve the indexing of the null operator *qui*, linked by a local antecedent, versus the discourse-level construal of the pronoun *lequel*, presumed to involve the matching of features. Due to the difference in feature computations, the cost differences between binding and co-reference should be accompanied with distinct final interpretation preferences, resulting in more stops when *lequel* non-restrictive RCs are disambiguated towards a DP1 interpretation. On the other hand, if learners do not have the same degree of morphosyntactic sensitivity, they should use whatever pragmatic knowledge they have to interpret the input, reflecting shallow processing.

The primary data in this paradigm is the rate of “stop making-sense” decisions collected beginning with the object of the RC (disambiguating region) and on. Table 4 provides the results for the “stop making-sense” decisions (in percentages), according to the type of relativizer, interpretation, and group. An ANOVA was run on these results, with Level as in between-subjects factor and the Relativizer Type (*qui* or *lequel*), Interpretation Preference (DP1 or DP2) and Gender (feminine or masculine) as within-subjects factors. An ANOVA did not reveal any level effect ( $p > .05$ ) but revealed a solid Relativizer x Interpretation interaction for all three groups,  $F(1, 33) = 155.698, p < .001$ . Thus, although knowledge of the world would provide information for final assignments, L2 learners exhibited the same morphologically driven interaction found in native speakers: A tendency to stop sentences disambiguated towards DP1 with the pronoun *lequel* but to accept items disambiguated towards DP2; and an opposite tendency for the relativizer *qui*.

Table 4. “Stop making-sense” decisions (in percentages), according to the type of pronoun, interpretation, and group.

Group	Qui				Lequel			
	DP1		DP2		DP1		DP2	
	Masc.	Fem.	Masc.	Fem.	Masc.	Fem.	Masc.	Fem.
Intermediate	14.16 (18.31)	11.66 (20.37)	70.00 (23.35)	71.66 (21.67)	74.58 (20.95)	63.50 (30.04)	19.25 (26.16)	22.08 (32.71)
Advanced	15.00 (12.43)	18.33 (15.85)	78.33 (21.67)	71.66 (36.63)	66.50 (37.71)	69.41 (31.71)	20.00 (38.13)	16.50 (17.23)
Natives	11.66 (10.29)	13.33 (15.56)	60.00 (41.77)	50.83 (38.48)	66.50 (37.71)	77.75 (35.09)	33.33 (49.23)	23.41 (17.94)

Note: standard deviations are provided in parentheses.

Table 5 indicates that most “stop making-sense” decisions were found when disambiguation occurred, at the level of the RC, for all groups, and immediately following, on the prepositional phrase, especially for the intermediate learners. Only a few stops were observed on the last segment for all groups.

Table 5. Number of “stop making-sense” decisions according to the position in the sentence at which they were made.

Group	Relative Clause	Prepositional Phrase	Final Segment	Total number of stops
Intermediate	123	77	31	231
Advanced	160	35	6	201
Natives	136	32	29	197

In this experiment, the rate of “stop-making sense” decisions confirmed the interaction between the relativizer and interpretation preferences for all groups (i.e. more ‘stops’ when *qui* non-restrictive RCs were disambiguated towards DP2 and more stops when *lequel* non-restrictive RCs were disambiguated towards DP1). Most “stops” were found as soon as disambiguation occurs, at the level of the RC, which demonstrates immediate commitment induced by syntactic details.

## 5. Discussion

Results showed that learners recovered from structural recency effects (due to structure minimization) with *qui* non-restrictive RCs to a much greater extent than from referent recency effects (due to cost avoidance in discourse storage) with *lequel* non-restrictive RCs, when prosody was left constant and when context was left constant. This suggests that learners are sensitive to morphosyntactic information rather than solely focused on meaning based information. From the point of view of shallow structure processing in a second language, the results obtained are problematic.

The findings in this study are consistent with the idea that language acquisition is mediated by a parser that acts on the target language input to create structural representations: Even lower-level learners computed two types of non-restrictive RCs, even if the anaphoric properties revealed a lack of stability relative to advanced learners and native speakers in the first experiment (questionnaire A). The learners’ processing contours nevertheless followed the robustness of the native speaker processing in experiment 2. It should be noted, of course, that such subtle differences between the two types of RCs are not the subject of classroom instruction. Thus, it seems that the ability to process certain structures in the L2 is not dependent on mastery of these structures. Hawkins (1989) stated that configuration and processing complexity were key factors affecting the acquisition of restrictive RCs in L2 French—rather than a hierarchical ordering of grammatical role. Although configuration in the sense of Hawkins (1989) was kept constant because all relativization involved the subject position of the RC, processing complexity seems to be a central ingredient of the behavior of non-restrictive RCs in interlanguage. The developmental dimension of the results suggests that interlanguage grammar develops as a result of the need to fully structure the input with greater efficiency.

Although the present study provides the beginning of an answer to the mechanisms that constrain the acquisition and interpretation of such structures, some limitations must be noted. First, this research was conducted only on a small size of population. Therefore, to generalize the results for larger groups, further studies should involve more participants for the three different levels tested. Second, the binary nature of these tasks (although results in the current study mirror Delle Luche (2008)’s independent results for native speakers) could be controlled by testing the two types of non-restrictive RCs independently. Finally, the claim that processing constraints on *qui* versus *lequel* non-restrictive RCs follow from the identification of the morphosyntax and feature contents of *qui* versus *lequel* only found full support in questionnaire B. Current methodology may not be sensitive enough. More sensitive measures of online sentence processing (e.g. moving window and eye-tracking experiments) should provide additional information in support of these conclusions.

## References

- Boland, Julie, Tanenhaus, Michael, Garnsey, Susan and Carlson, Gregory. (1995). Verb argument structure in parsing and interpretation: evidence from wh-questions. *Journal of Memory and Language* 34.
- Cinque, Guglielmo. (2008). Two Types of Non-restrictive Relatives, in Olivier Bonami and Patricia Cabredo Hofherr (eds.) *Empirical Issues in Syntax and Semantics* 7. Paris (2008), pp. 99–137.
- Clahsen, Harold, & Felser, Claudia. (2006a). Continuity and shallow structures in language processing. *Applied Psycholinguistics*, 27, 107-126.
- Clahsen, Harold, & Felser, Claudia. (2006b). Grammatical processing in language learning. *Applied Psycholinguistics*, 27, 3-42.
- Crocker, Matthew. (1996). *Computational psycholinguistics: An interdisciplinary approach to the study of language*. Dordrecht: Kluwer.
- Dekydtspotter, Laurent, Sprouse, Rex, & Anderson, Bruce. (1997). The interpretive interface in L2 acquisition: the Process-Result distinction in English-French interlanguage grammars. *Language Acquisition* 6, 297-332.



- Dekydtspotter, Laurent, Sprouse Rex A. & Kimberly Swanson. (2001) Reflexes of the mental architecture in second language acquisition: The interpretation of discontinuous *combien* extractions in English-French interlanguage. *Language Acquisition* 9: 175-227.
- Delle Luche, Claire. (2008). *Rôle du relativiseur dans l'attachement des propositions relatives ambiguës en français*. Thèse de 3e cycle, Institut de Psychologie, Université Lumière Lyon 2, LYON.
- Dussias, Paola. (2003). Syntactic ambiguity resolution in L2 learners: Some effects of bilinguality on L1 and L2 processing strategies. *Studies in Second Language Acquisition*, 25, 529–557.
- Dussias, Paola, & Sagarra, Nuria. (2007). The effect of exposure on syntactic parsing in Spanish-English bilinguals. *Bilingualism: Language and Cognition*, 10, 101-116.
- Felser, Claudia, Roberts, Leah, Marinis, Theodore & Gross, Rebecca. (2003). The processing of ambiguous sentences by first and second language learners of English. *Applied Psycholinguistics*, 24, 453–489.
- Fernández, Eva. (2003). *Bilingual sentence processing: Relative clause attachment in English and Spanish*. Amsterdam: John Benjamins Publishers.
- Fodor, Janet. (1998). Parsing to learn. *Journal of Psycholinguistic Research*, 27, 339-374.
- Franceschina, Florencia. (2003). The Nature of Grammatical Representations in Mature L2 Grammars: The Case of Spanish Grammatical Gender. Dissertation Abstracts International, C: Worldwide, 64, 3, 526-C.
- Frenc-Mestre, Cheryl. (2002). An on-line look at sentence processing in the second language. In R. R. Heredia & J. Altarriba (eds.), *Bilingual sentence processing*, pp. 218– 236. Amsterdam: Elsevier.
- Frenc-Mestre, Cheryl, & Pynte, Joël. (1997). Syntactic ambiguity resolution while reading in second and native languages. *Quarterly J. of Experimental Psychology*, 50A, 119-148.
- Gregg, Kevin. (2003). The state of emergentism in second language acquisition. *Second Language Research*, 19, 95-128.
- Hawkins, Roger. (1989). Do second language learners acquire restrictive relative clauses on the basis of relational or configurational information?: The acquisition of French subject, direct object and genitive restrictive relative clauses by second language learners. *Second Language Research*, 5, 156–188.
- Harley, Heidi & Ritter, Elizabeth. (2002). Person and number in pronouns: A feature-geometric analysis. *Language*, 78, 482-526.
- Hawkins, Roger, & Casillas, Gabriela. (2008). Explaining frequency of verb morphology in early L2 speech. *Lingua*, 118, 595-612.
- Hawkins, Roger, & Chan, Cecilia Yuet-hung. (1997). The partial availability of Universal Grammar in second language acquisition: The Failed Feature Hypothesis. *Second Language Research*, 13, 187-226.
- Hazdenar, Belma, & Schwartz, Bonnie. (1997). Are there optional infinitives in child L2 acquisition? In Elizabeth Hughes, Mary Hughes, & Annabel Greenhill (Eds.), *Proceedings of the 21st Annual Boston University Conference on Language Development* (pp. 257-268). Somerville, MA: Cascadilla Press.
- Hemforth, Barbara, Konieczny, Lars, & Scheepers, Christoph. (2000). Syntactic attachment and anaphor resolution: The two sides of relative clause attachment. In M. W. Crocker, M. J. Pickering & C. Clifton, Jr. (Eds.), *Architectures and mechanisms for language processing* (pp. 259-282). Cambridge, UK: Cambridge University Press.
- Juffs, Alan. (1998). Main Verb Versus Reduced Relative Clause Ambiguity Resolution in L2 Sentence Processing. *Language Learning* 48 (1).
- Kanno, Kazue. (1998) The stability of UG principles in second-language acquisition: Evidence from Japanese. *Linguistics* 36: 1125-1146. .
- Klein, Elaine, & Martohardjono, Gita. (1999): Investigating second language grammars: some conceptual and methodological issues in generative SLA research. In Elaine Klein and Gita Martohardjono (eds.), *The development of second language grammars: a generative perspective*, 3-34. Amsterdam: John Benjamins.
- Lardiere, Donna. (2009). Some thoughts on the contrastive analysis of features in second language acquisition. *Second Language Research*, 25, 173-227.
- McCarthy, Corinne. (2007). Morphological variability in second language Spanish. Unpublished doctoral dissertation, McGill University, Montréal.
- McCarthy, Corinne. (2008). Morphological variability in the comprehension of agreement: An argument for representation over computation. *Second Language Research*, 24, 459-486.
- Montrul, Silvina and Slabakova, Roumyana. (2003). Competence similarities between natives and near-native speakers: An investigation of the Preterit/Imperfect contrast in Spanish. *Studies in Second Language Acquisition* 25, 351-398.
- Papadopoulou, Despina & Clahsen, Harold. (2003). Parsing strategies in L1 and L2 sentence processing: A study of relative clause attachment in Greek. *Studies in Second Language Acquisition*, 25, 501-528.
- Reinhart, Tanya. & Reuland, Eric. (1993). Reflexivity, *Linguistic Inquiry* 24:657-720.
- Reuland, Eric. (2001). Primitives of Binding. *Linguistic Inquiry* 32.2, 439-492.
- Reuland, Eric. (2006). Binding Theory: Terms and Concepts. Chapter 9 in *The Blackwell Companion to Syntax*. Malden, MA: Blackwell.
- Schwartz, Bonnie D. (1999). Let's make up your mind: 'Special nativist' perspectives on language, modularity of mind, and nonnative language acquisition. *Studies in Second Language Acquisition*, 21, 635-655.

- Schwartz, Bonnie D. & Sprouse Rex A. (2000) When syntactic theories evolve: Consequences for L2 acquisition research. In John Archibald (ed.), *Second Language Acquisition and Linguistic Theory*, Malden, MA: Blackwell, pp. 156-186.
- Valdman, Albert, Pons, Cathy, Scullen, Mary Ellen, & Jourdain, Sarah. (2009). *Chez nous: Branché sur le monde francophone* (4th ed.). Upper Saddle River, NJ: Pearsons Education.
- Witzel, Jeffrey, Witzel, Naoko, & Nicol, Janet. (2012). Deeper than shallow: Evidence for structure-based parsing biases in L2 sentence processing. *Applied Psycholinguistics*, 33, 419-456.

# Selected Proceedings of the 2012 Second Language Research Forum: Building Bridges between Disciplines

edited by

Ryan T. Miller, Katherine I. Martin,  
Chelsea M. Eddington, Ashlie Henery,  
Nausica Marcos Miguel, Alison M. Tseng,  
Alba Tuninetti, and Daniel Walter

Cascadilla Proceedings Project    Somerville, MA    2014

## Copyright information

Selected Proceedings of the 2012 Second Language Research Forum:  
Building Bridges between Disciplines  
© 2014 Cascadilla Proceedings Project, Somerville, MA. All rights reserved

ISBN 978-1-57473-464-5 library binding

A copyright notice for each paper is located at the bottom of the first page of the paper.  
Reprints for course packs can be authorized by Cascadilla Proceedings Project.

## Ordering information

Orders for the library binding edition are handled by Cascadilla Press.  
To place an order, go to [www.lingref.com](http://www.lingref.com) or contact:

Cascadilla Press, P.O. Box 440355, Somerville, MA 02144, USA  
phone: 1-617-776-2370, fax: 1-617-776-2271, [sales@cascadilla.com](mailto:sales@cascadilla.com)

## Web access and citation information

This entire proceedings can also be viewed on the web at [www.lingref.com](http://www.lingref.com). Each paper has a unique document # which can be added to citations to facilitate access. The document # should not replace the full citation.

This paper can be cited as:

Lorente Lapole, Amandine. 2014. Effect of Relativizer Type in the Processing of Non-restrictive Relative Clauses in L2 French. In *Selected Proceedings of the 2012 Second Language Research Forum*, ed. Ryan T. Miller et al., 110-119. Somerville, MA: Cascadilla Proceedings Project. [www.lingref.com](http://www.lingref.com), document #3090.