

The Roles of L1 Transfer and Processing Limitations in the L2 Acquisition of French Object Clitic Constructions: Evidence from Chinese- and Spanish-speaking Learners

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1. Introduction

Object clitic constructions (1a) are notoriously difficult to master for learners of French, especially second language (L2) learners (e.g., Adiv 1984, Herschensohn 2004). This raises the question of what type of forms learners use in contexts typically requiring object clitics. Such contexts are ones in which the referent of the object is salient in the discourse and thus is felicitously encoded as a pronoun. In French this is realized as a preverbal clitic (1a). Previous work suggests that learners typically resort to one of two options: they either use a postverbal lexical DP, as in (1b), or they omit the object altogether (1c). (1b), while grammatically correct, is infelicitous in a context where the object represents given information, as in (1). (1c), by contrast, is considered ungrammatical in standard French.

- (1) Que fait Sophie avec le chien? a. Elle le brosse.
what do-3sg Sophie with the dog she cl-3sg-masc brush-3sg
'What is Sophie doing with the dog?' 'She is brushing him.'
b. #Elle brosse le chien.
c. *Elle brosse.

Despite its ungrammaticality, object omission appears to be a frequent choice in L2 learners' spoken French, as shown in Table 1, which presents a summary of previous studies reporting frequency of clitic-drop in object pronominalization contexts in the speech of English-speaking learners of French.

What is the source of this error? One option is L1 transfer, or more precisely, the *absence* of positive transfer in cases where the L1 does not have preverbal object clitics, a possibility raised by White (1996). Assuming full transfer of the L1 grammar at the L2 initial state, an English-speaking learner's

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initial French interlanguage lacks an accusative clitic projection, due to the absence of such a projection in the L1. In consequence, preverbal object clitics simply cannot be realized, and may thus be prone to omission. Such a transfer-based account makes a clear prediction, which, somewhat surprisingly, appears not to have been tested empirically so far. The prediction is that L2 learners of French whose L1 contains a similar clitic construction (e.g., Spanish) should encounter significantly less difficulty with this property than those whose L1 does not. Moreover, a transfer-based account also predicts that object (clitic) omission will be more frequent in learners whose L1 allows referential null objects (e.g., Chinese), due to the (negative) transfer of null objects into these learners' initial French interlanguage. Furthermore, if null objects are indeed transferred, these learners are also predicted to accept null objects in a receptive task. The present study was designed to test precisely these predictions.

Table 1. Frequency of object omission in previous L2 studies.

<i>study</i>	<i>data</i>	<i>n</i>	<i>age</i>	<i>mean omission rate</i>
Herschensohn (2004)	spontaneous production	2	16-17	35% (9/26 relevant contexts)
Paradis (2004)	spontaneous production	10	ø 6;8	~40% of pronominalization contexts
Grüter (2005)	elicited production	7	ø 6;8	54%
Grüter (2006b)	elicited production	9	ø 7;7	31%

However, as Prévost (2006) pointed out, a transfer-based account cannot fully explain why learners whose L1 does not sanction null objects (e.g., English) omit objects in French, rather than consistently choosing a construction with a postverbal lexical object, as in their L1. For this reason, Prévost observed that “[o]bject-drop in child L2 French does not seem to be affected by L1 transfer” (263). Instead, Prévost appeals to the computational complexity of object clitic constructions (Jakubowicz et al. 1998). He argues that “[a]ssuming that (preverbal) object clitics require computational operations that go beyond the simple projection of the canonical object position, the heavy processing load required by the presence of these semantically deficient elements would result in almost systematic omission initially” (Prévost 2006: 276). Such a processing-based account of object clitic omission in L2 French also makes a clear, and to the best of our knowledge yet untested prediction, namely that frequency of object clitic omission should be inversely related to an independent measure of processing capacity. This constitutes the third prediction to be tested in the present study. Our three predictions are summarized in (2).

- (2) (i) Spanish-speaking learners will perform better than Chinese-speaking learners on clitic-related tasks in French.

- (ii) Chinese-speaking learners will not only omit objects more frequently in production, but they will also accept more null objects than Spanish-speaking learners in a receptive task in French.
- (iii) Frequency of object omission will be inversely related to independent measures of processing capacity.

2. The study

2.1. Participants

Participants were 26 school-aged children from immigrant families in Montreal, 15 from China, 11 from Spanish-speaking countries in Central and South America. All were attending school within the French school system in Montreal at the time of testing. None were exposed to French before the age of 2;10 years, and none were fluent in a language other than French and their L1 (Chinese/Spanish), with the exception of one child in the Chinese group, who was fluent in both English and French. All except two mothers indicated having a college degree. There are no statistically significant differences between the Chinese and the Spanish groups in terms of mean age, length of exposure to French, and age on arrival in Quebec, as shown in Table 2.

Table 2. Participant information (means and ranges, in years).

	Chinese group (n=15)	Spanish group (n=11)	t(24)	p
Age	8;0 (5;10-9;8)	8;5 (6;9-10;0)	-.83	.42
Length of exposure to French	2;11 (1;2-5;3)	3;1 (0;10-5;1)	-.37	.71
Age on arrival in Quebec	5;1 (3;3-7;3)	5;3 (2;10-8;11)	-.29	.78

2.2. Method

All participants completed four tasks: an elicited production and a truth-value judgment (TVJ) task targeting object clitics and null objects, as well as two measures of working memory, a non-word repetition and a backward digit recall task, both administered in French. The elicited production task consisted of a picture story interspersed with questions such as that illustrated in (1) above. A total of 16 questions were constructed to elicit accusative object clitics.

The TVJ task was designed to investigate whether learners use referential null objects in their interpretation of French sentences (see Grüter 2006a for a detailed description of this task). The task relies on the potential ambiguity of verbs that enter a causative/inchoative alternation, such as *monter*, shown in (3).

- (3) a. Dora monte sur le rocher.
 ‘Dora is climbing up onto the rock.’
 b. Dora monte le sac sur le rocher.’
 ‘Dora is pulling the bag up onto the rock.’

In a grammar that allows null objects, (3a) becomes ambiguous: in addition to the intransitive interpretation, it should also be able to mean ‘Dora is pulling *it* (=a previously mentioned object) onto the rock’, given a context where a referent for a potential null object is prominent in the discourse.

Thus, the crucial experimental condition (NULL OBJECT CONDITION) consists of an utterance without an (overt) object (3a) coupled with a picture illustrating the transitive use of the verb with a discourse-prominent object. In a grammar that disallows null objects, this utterance is false. However, if the learner’s grammar sanctions null objects, the utterance is expected to be judged true. Sentences were presented by a puppet, and the child’s task was to indicate whether what the puppet said was true or not. In addition to the NULL OBJECT condition, the experiment contained five additional conditions, a summary of which is provided in Table 3 (for further detail, see Grüter 2006a). There were four items in each condition, for a total of 24 items overall.

Table 3. Summary of experimental conditions in the TVJ task.

condition	picture sentence	target truth value
NULL OBJECT	<i>Dora pulling bag up with a rope.</i> Dora monte sur le rocher. (=3a)	false
INTRANSITIVE	<i>Dora climbing up. (bag remains on ground)</i> Dora monte sur le rocher. (=3a)	true
TRANSITIVE (LEXICAL)	<i>Dora pulling bag up with a rope.</i> Dora monte le sac sur le rocher. (=3b)	true
TRANSITIVE (CLITIC)	<i>Dora pulling bag up with a rope.</i> Dora le monte sur le rocher. (= ‘Dora is pulling it up onto the rock.’)	true
SUPERFLUOUS LEXICAL OBJECT	<i>Dora climbing up. (bag remains on ground)</i> Dora monte le sac sur le rocher. (=3b)	false
SUPERFLUOUS CLITIC	<i>Dora climbing up. (bag remains on ground)</i> Dora le monte sur le rocher. (= ‘Dora is pulling it up onto the rock.’)	false

As a measure of phonological working memory, the French non-word repetition task of Poncelet and Van der Linden (2003) was administered and scored according to the authors’ guidelines for total number of correct items. As a more complex memory measure associated with both the central executive and phonological loop components of working memory (Gathercole et al. 2004), the backward digit recall task from the Working Memory Test Battery for Children (WMTB-C, Pickering & Gathercole 2001) was administered in a direct translation of the English original, and scored for total trials correct.

2.3. Results

The results from elicited production are presented in Figure 1. Children in the Spanish group produced more clitics than those in the Chinese group (68.6% vs. 42.3%, $t(24) = -1.97, p = .06$), and omitted clitics significantly less often than their Chinese peers (6.2% vs. 43.7%; $t(24) = 3.53, p = .002$). Overall, only 2 out of 11 children in the Spanish group omitted any clitics, while 13 out of 15 children in the Chinese group omitted at least one. There is no significant group difference in the proportion of post-verbal lexical objects.

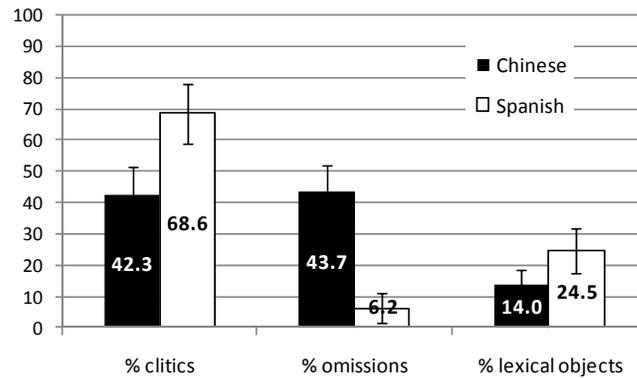


Figure 1. Results from elicited production in percentage of response type per group. Percentages are calculated out of all responses with a verb requiring a direct object (88% of responses overall). Included in *clitics* are forms marked incorrectly for gender and/or number (e.g., *le* for *la*).

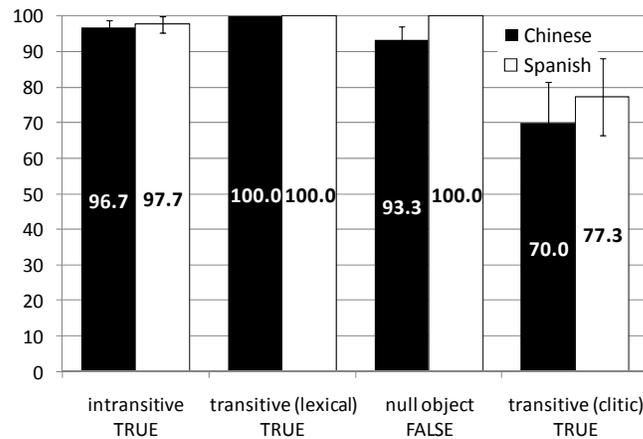


Figure 2. Results from the TVJ task in percent correct per condition and group. (For reasons of space, results from the SUPERFLUOUS LEXICAL OBJECT and the SUPERFLUOUS CLITIC conditions are not reported here.)

Results from the TVJ task are presented in Figure 2. In both groups, performance was at ceiling (>96%) in the INTRANSITIVE and the TRANSITIVE (LEXICAL) conditions, indicating that all participants correctly accepted both the intransitive and the transitive usage of the alternating verbs used in the experiment. Crucially, both the Chinese and the Spanish group were also at ceiling (93.3% and 100%, respectively) in rejecting items in the NULL OBJECT condition, indicating that interpretations requiring a referential null object were not available to learners in either group. Finally, neither group was at ceiling in accepting utterances with a clitic in an appropriate context (TRANSITIVE (CLITIC) condition). The slight advantage for the Spanish group (77.3%) compared to the Chinese group (70.0%) is not statistically significant ($t(24) = -.44, p > .05$).

Table 4 shows the performance of both groups on the two measures of working memory. While the two groups performed equally on the backward digit recall task ($t(24) = .76, p > .05$), the Chinese group performed better than the Spanish group on the non-word repetition task ($t(24) = 3.12, p = .005$), an unexpected finding for which, at present, we have no explanation.

Table 4. Results from working memory tasks (in total trials correct, standard deviations in parentheses).

	Chinese (n=15)	Spanish (n=11)
Backward digit recall	15.60 (7.80)	13.55 (4.99)
Non-word repetition	19.53 (3.80)	14.00 (5.27)

What is of particular interest with regard to our predictions is whether performance on these memory tasks relates to the frequency of object (clitic) omission in production. For this purpose, correlational analyses between these measures were conducted. However, given that in the Spanish group, object omission was very infrequent (6.2%, see Fig. 1), these analyses are restricted to the Chinese group. In this group, no significant correlation existed between non-word repetition span and frequency of object omission ($r = -.094, p > .05$). However, a significant negative correlation was found between backward digit recall span and frequency of object omission ($r = -.703, p = .003$). Moreover, controlling for participants' age and length of exposure in a regression model, performance on backward digit recall continued to predict frequency of object omission ($\beta = -2.947, t(11) = -2.948, p = .013$), explaining 34% of the variance.

2.4. Discussion

Returning to the three predictions outlined in (2), let us consider each in turn. First, the transfer-based prediction that Spanish-speaking learners would perform better than Chinese-speaking learners on clitic-related tasks in French is clearly supported by the evidence from elicited production. Results showed that Spanish-speaking learners produced clitics more often, and only rarely (6.2%) omitted them. In the Chinese group, by contrast, a mean omission rate of 44% was found. Given that the two learner groups did not differ significantly for

length of exposure to French, this asymmetry suggests a clear role for positive transfer of the clitic construction from the L1. The TVJ task, however, did not show this asymmetry. In particular, the two groups performed equally in the TRANSITIVE (CLITIC) condition, where a transfer-based account would predict an advantage for the Spanish group. While the difference between the groups is in the right direction, it is not significant. Whether this is due merely to lack of statistical power in the TVJ task, or whether it reflects a differential impact of positive transfer on production versus comprehension, we are unable to decide within the scope of the present study.

Our second prediction arose from the possibility of negative transfer of null objects from Chinese to French. If Chinese-speaking learners fully transfer their L1 grammar, as expected under a full transfer account of the L2 initial state (e.g., Schwartz & Sprouse 1996), their French interlanguage grammar will, at least initially, allow them to posit referential null objects in the same contexts as in Chinese. Such contexts were provided in the NULL OBJECT condition of the TVJ task. Findings showed that the Chinese-speaking learners consistently (93.3%) rejected items in this condition, indicating that they did not use referential null objects in their interpretation of French, contrary to our second prediction. One might argue that the learners in this group were no longer at the initial state and had already successfully restructured their interlanguage to exclude null objects. Note, however, that Chinese has both null and overt pronouns, whereas French allows only the latter, thus giving rise to a potential superset-subset relation between the L1 and the L2. Such scenarios pose a logical learnability problem, and have been shown to lead to protracted development and often non-convergence on the L2 target (e.g., Inagaki 2001). Given these circumstances, it would be rather surprising if virtually all learners in the Chinese group, some with only 14 or 15 months of exposure to French, had fully restructured their interlanguage in this manner. Instead, we take these findings as evidence against transfer of null objects at the level of grammatical representations. This is unexpected under a full transfer account of the L2 initial state. We thus tentatively propose the hypothesis stated in (4).

- (4) L1 transfer is limited to overt material, and does not extend to empty categories.

This hypothesis raises immediate questions with regard to the status of null subjects in L2. While previous evidence from production and grammaticality judgments have been taken as evidence for transfer of null subjects (e.g., White 1985) we do not know of any evidence from interpretive tasks comparable to the TVJ task in the present study.¹ Future work is required to further investigate this potential limitation of L1 transfer in L2 acquisition.

¹ See Orfitelli and Hyams (2008) for a relevant task and evidence from the L1 acquisition of English.

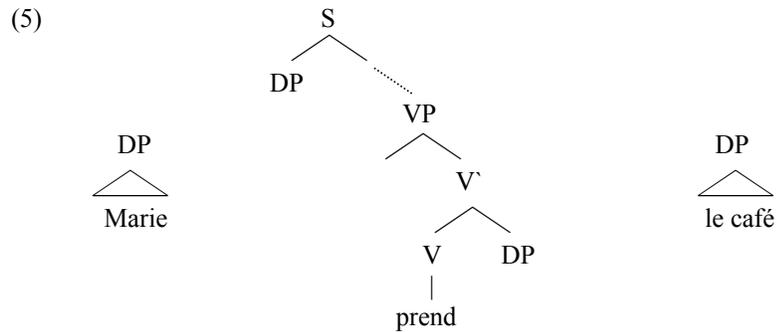
Finally, our third prediction arose from Prévost's (2006) proposal, which attributes object clitic omission to processing limitations. Under this assumption, we expect frequency of object clitic omission to be inversely related to independent measures of processing capacity. Two such measures were included in our test battery, non-word repetition and backward digit recall span. Results from the non-word repetition task showed an unexpected difference between the two learner groups, and no relation to frequency of object omission. Yet given that the psychometric properties of this particular task are known only for broad age classes (ages 3-5, 5-7, 7-9, 9-12 years; Poncelet & Van der Linden 2003), we are uncertain to what extent it provides a reliable estimate of phonological working memory in our learners.² Thus we hesitate to draw strong conclusions from this particular finding. By contrast, the backward digit recall task showed no differences between the two learner groups. Moreover, performance on this task predicted as much as 34% of the variance in Chinese learners' frequency of object clitic omission, controlling for both age and length of exposure to French. This finding provides new support for Prévost's (2006) proposal linking object omission in production to processing limitations.

3. Object clitic drop due to processing limitations during syntactic encoding

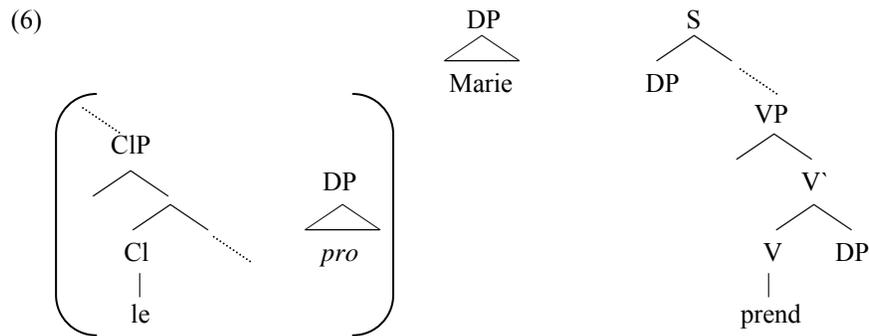
Our study has shown evidence of a relation between frequency of object (clitic) omission in production and working memory span, a finding that supports the hypothesis that object (clitic) omission is due to processing capacity limitations. However, it remains unclear how exactly the presumed computational complexity of object clitic constructions interacts with processing limitations in the process of language production, and specifically, how this leads to omission of the clitic. In the remainder of this paper, we outline a proposal of how object clitic omission may arise as a result of limited processing capacity in the course of incremental grammatical encoding. To this end, we employ a psycholinguistic model of syntax in language production using tree-adjoining grammars (TAGs), as presented in Ferreira (2000). As Ferreira illustrates, TAGs are directly compatible with the incremental, left-to-right construction of syntactic representations in real-time production (in contrast to recent instantiations of minimalist theories, as pointed out by O'Grady 2008 and Labelle 2007).

Within a TAG approach, clausal representations are built through the rule-governed combination of elementary trees retrieved from the lexicon (Joshi & Schabes 1997). For example, the simple transitive clause *Marie prend le café* ('Mary takes the coffee') is composed of the three separate elementary trees shown in (5).

² Please note that to the best of our knowledge, no published, standardized non-word repetition task was available in French at the time of testing.



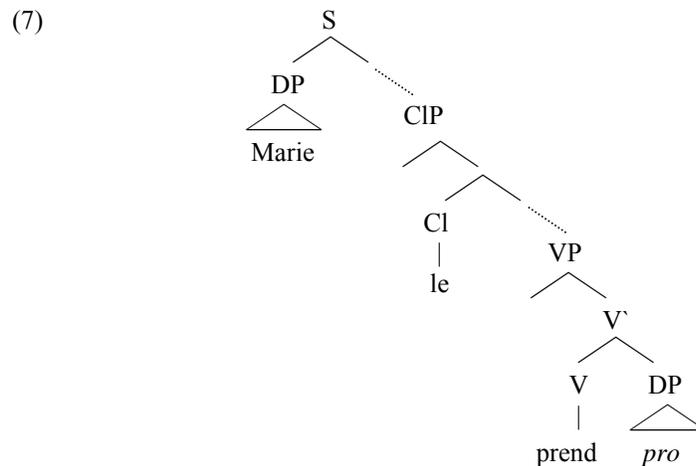
Following Ferreira's (2000) approach to incremental syntactic encoding, the three elementary trees combine with each other in the following steps: first, the elementary tree for the subject is retrieved, projecting up to DP. Second, the elementary tree for the verb is retrieved, projecting up to an extended verbal projection (labeled *S* for the purpose of illustration). Third, the two elementary trees combine through the *substitution* operation, whereby one elementary tree is attached to a terminal node in another. In this case, the elementary tree for the subject is substituted into the relevant specifier position in the verbal projection. The next step, following Ferreira's model, is that the contiguous string consisting of the subject and the verb is passed on to the next component in the production system (phonological encoding), and can thus no longer be modified by syntactic encoding. Finally, the elementary tree for the object is retrieved, and substituted into the appropriate terminal node in the extended verbal projection, thus completing grammatical encoding of this clause.



Let us now consider this process in the case of a clause with an object clitic construction, such as *Marie le prend* ('Mary is taking it'). While the elementary trees for the subject and the verb are the same as above, the elementary tree required for the clitic construction is somewhat more complex. The solution adopted here is that of a multi-component tree set (see Joshi & Schabes 1997), whereby the elementary item retrieved from the lexicon consists of a set containing two or more trees, in this case, one projected by the preverbal clitic,

the other by the empty nominal (*pro*) to be substituted into the postverbal argument position (6).³

Let us now consider the incremental construction of this clause. First, the subject DP is retrieved. Second, the tree set for the clitic construction is retrieved. Note that at this point, no combinatorial operations can occur, as neither elementary tree offers a substitution (or adjoining) site for the other. Thus all elements must be kept active in working memory, while the final elementary tree, the verb and its extended projection, is retrieved. Only now can elements be combined, starting with the substitution of the subject into the appropriate terminal node of the verbal projection. At this point, only the left-most part of this projection, consisting of the subject alone, can be passed on to phonological encoding. Next, the first element of the clitic set is *adjoined* to the verbal projection, i.e., inserted at an appropriate node within the verbal projection (leaving aside, for present purposes, details of the adjoining site and operation). At this point, the contiguous string consisting of the clitic and the verb can be passed on to phonological encoding, while syntactic encoding is completed by the substitution of the second element of the clitic set into the complement of V, yielding the final representation in (7).

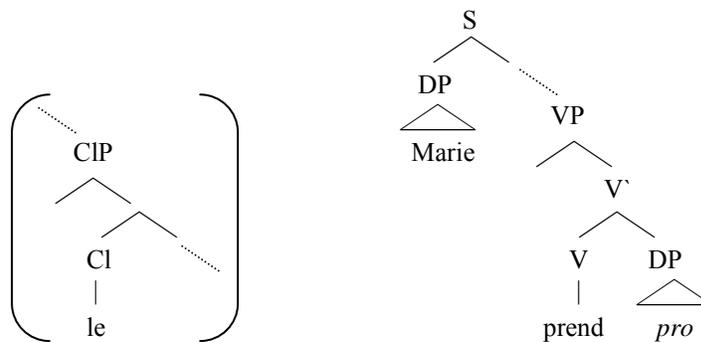


From these illustrations, it appears clear that the clause with the clitic construction involves considerably more processes and requires keeping more elements concurrently active in (syntactic) working memory than the construction with a lexical object. Let us consider what may occur in a system with limited processing resources while attempting to incrementally construct this clause. Recall that once the subject is substituted into its argument position,

³ As shown by Abeillé (1992) and Bleam (2000), among others, the formalisms required for clitic constructions within TAGs are considerably more complex. The representations in (6) are simplified, but should suffice for our current purpose.

only the subject alone – without the verb, unlike in clauses with a postverbal object – can be passed on to phonological encoding, as the clitic still needs to be adjoined at a site to the left of the verb. Suppose, however, that due to limited memory and/or processing capacity, the system is under pressure to pass material on to the next component. Thus, rather than passing on only the subject, it may instead pass on the string consisting at this point of subject *and* verb. Consequently, the first tree in the clitic set can no longer be adjoined into the verbal projection, since its adjoining site is no longer available. The second part of the set, however, can be properly substituted, thus fulfilling the argument requirements of the verbal projection. This will result in the representation illustrated in (8), a clause with a null postverbal object and no clitic, in other words, an instance of object omission as observed in learners' speech.

(8)



4. Conclusion

In this paper, we investigated the influence of both L1 transfer and processing limitations on object clitic constructions in L2 French. We found clear evidence of positive transfer for learners whose L1 contains a similar clitic construction, yet no evidence of negative transfer of referential null objects for learners whose L1 sanctions object drop. Based on this latter finding, we hypothesized that L1 transfer may be limited to overt material, and does not extend to empty categories, a hypothesis that needs to be further investigated in future research. Finally, we found a significant inverse relation between working memory, as measured by backward digit recall span, and frequency of object omission in production, supporting Prévost's (2006) hypothesis that clitic omission is conditioned by processing limitations. In consequence, we presented an outline of *how* clitic omission may result from processing limitations in the course of syntactic encoding, adopting Ferreira's (2000) model of syntax in language production using tree-adjoining grammars.

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