SYNTACTIC AMBIGUITY RESOLUTION IN ADULT EFL LEARNERS IN TAIWAN

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Abstract

The purpose of the study is to investigate Taiwanese EFL learners' parsing strategies while they process English (L2) sentences. The syntactic structure under investigation is relative clause attachment ambiguities in "two-site contexts", namely, a complex NP (NP1-of-NP2 and NP1-with-NP2) followed by a relative clause. A total of sixty freshmen at an Institute of Technology in northern Taiwan participated in the experiment. Data collected by means of a carefully designed questionnaire were analyzed by a t-test and a one-way ANOVA. Results showed that a) the EFL learners preferred to attach the relative clause high to the first NP, and b) they were not sensitive to the lexical semantic information carried by *with*. The findings suggested that the principle of late closure might not be universal, and during sentence comprehension learners might have drawn on other parsing principles and were under the influence of properties of L1.

Key Word: parsing strategy, syntactic ambiguity resolution

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英文形容詞子句的語法分析技巧調查:

以台灣技職院校生為例

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摘要

本研究旨在調查台灣大專生的英文語法分析技巧，尤其是當遭遇因語法導致兩種語意解讀的形容詞子句時，學生在語意解讀上是否有其偏好，而該偏好是否可歸因於相關文獻中所提及之語法分析技巧。本計畫共有六十位北部某技術學院大一新生參與。透過問卷收集及統計分析，結果顯示學生在解讀語意不清的形容詞子句時，傾向將前位名詞片語當成所修飾之先行詞，同時學生似乎無法判讀先行詞裡的介系詞所隱含的字詞語意線索。因此本研究發現文獻中*晚期關閉*語法分析技巧應不是普遍存在於各個語言，另外學生在理解句子時可能利用其他語法分析技巧並且受到母語的影響。

關鍵字：語法分析技巧 形容詞子句

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1. Introduction

While investigating the mechanism of language acquisition, researchers have proposed different hypotheses. Some suggest that human acquires languages by means of general cognitive learning ability; others claim that an innate language learning device is responsible for language acquisition. In research on second language acquisition (SLA) whether there is an innate predetermined capacity for language learning has also been a topic of considerable debate. In particular, the views regarding the availability of Universal Grammar (UG) in post-childhood second language acquisition range from "full access", "partial access" to "no access".

Juffs (1998) claims that learners of a second language (i.e., L2) still have access to UG, and to some extent, the inconsistent language performance might be attributed to parsing problems. In other words, it is possible that the differences in the ways learners parse sentence structures could lead to variations in ultimate attainment. Moreover, since learners might differ greatly in syntactic parsing, it is also possible that learners of different language backgrounds could transfer non-target-like (L1) processing strategies to the L2, which could in part explain the differences in the development of L2 competence.

Although sentence processing research and language acquisition research each has distinct goals, they started to merge (Fodor, 1998) because the research problems addressed in each strand frequently collide with each other. Specifically, since the 1980s, syntactic parsing has been a frequent subject of inquiry in first language acquisition. However, it is a recent innovation in the field of second language acquisition and thus relatively little is known about the strategies L2 learners employ to process sentences. Without a doubt, a lot of research needs to be conducted and replicated to corroborate theoretical claims.

The aim of the study is to investigate Chinese-speaking EFL learners' parsing strategies while they process English (L2) sentences. The syntactic structure under investigation is relative clause attachment ambiguities in "two-site contexts" (Felser, Roberts, Marinis and Gross, 2003), namely, a complex NP (NP1-of-NP2) followed by a relative clause. In addition, whether there is cross-linguistic influence on the parsing of this syntactic structure will also be the focus of the investigation.

2. Review of the Literature

2.1 Attachment Preferences in First Language Acquisition

Research on attachment preferences in ambiguous sentences, as illustrated in sentence (1), reveals how human parsers behave in sentence processing. In sentence (1), the relative clause is ambiguous due to the fact that it can be attached to either the first noun (NP1) or to the second noun (NP2).

(1) *John was looking at the boy of the mother that was in the living room*.

The first noun attachment, also known as high attachment, would result in an interpretation that the boy was in the living room. On the contrary, attachment to the lower noun would mean that the mother was in the living room. Studies examining English (native) speakers' attachment preferences in these sentences showed a low attachment (NP2) preference (Carreiras & Clifton, 1999; Cuetos & Mitchell, 1988). According to Papadopoulou and Clahsen (2003), the same tendency appeared in Norwegian, Swedish, Romanian, Brazilian Portuguese and Arabic.

Contrary to English and the above mentioned languages in which adjuncts such as RCs in (1) tend to be attached low, RCs in Spanish (Carreiras & Clifton, 1999), Greek (Papadopoulou & Clahsen, 2002), German (Hemforth, Konieczny, Scheepers & Strube, 1998), and Dutch (Brysbaert & Mitchell, 1996) prefer an NP1 attachment. According to Gleason & Ratner (1998), the NP2 attachment preference is a result of a parsing strategy called late closure principle (Gleason & Ratner, 1998) or recency strategy (Gibson, Pearlmutter, Canseco-Gonzalez, & Hickock, 1996) as opposed to the NP1 attachment preference, the so-called early closure (De Vincenzi & Job, 1993).

Late closure or recency strategy is an effort saving mechanism in terms of computation. On the basis of late closure strategy, the parser will integrate new constituents immediately onto the clause or phrase currently being processed within the limits of short term memory. In other words, the principle encourages local attachment and hence leads to an NP2 preference. Moreover, since late closure strategy is driven by cognitive needs, it should be universal rather than language-specific. However, the view is challenged because of the aforementioned cross-linguistic variations.

To account for the variations in attachment preference, Gibson and Pearlmutter (1998) proposed a multiple-constraint model in which the relative strength of a number of interacting parsing principles is contributory to the attachment preferences. Predicate proximity is one of the competing principles and based on which the parser will attach the incoming constituents as structural close as possible to the head of a predicate phrase. In other words, predicate proximity favors (NP1) high attachment.

It is suggested that predicate proximity is somewhat parameterized and its relative strength is linked to the degree of configurationality of a language. Hence in Spanish, Greek or German where the verbs and the complements can be nonadjacent, predicate proximity is strong enough to outweigh the supposedly universal late closure principle because the verb may be more active to attract ambiguous modifiers. On the other hand, in highly configurational languages such as English the principle of predicate proximity is relatively weak and thus sentence parsing is guided by recency principle.

Frazier and Clifton's Construal Hypothesis (cited in Dussias, 2003) offers yet another explanation. The Construal Hypothesis suggests that late closure is limitedly applied to primary phrases such as subjects, predicates, complements and other obligatory elements. Non-primary phrases like adjuncts (e.g., RCs) or conjuncts, which are loosely associated with the thematic domain, are interpreted on the basis of structural, semantic or discourse information. Within this framework, principles like "Relativized Relevance" or "Referentiality" would favor an NP1 attachment since the head of the complex NP corresponds referentially to an already existing discourse entity and is more directly related to the main assertion of the sentence.

According to the Construal Hypothesis, the Referentiality Principle is universal, and thus English should display the same attachment preference as Spanish. The fact it did not reflects the operation of an intervening factor called Gricean maxims of manner, that is, to avoid obscurity and ambiguity (Dussias, 2003).

In English, there are Saxon genitive (i.e., the mother's boy) and Norman genitive (i.e., the boy of the mother). It is suggested that in *John was looking at the boy of the mother that was in the living room* if a speaker intends to associate the RC to *the boy*, the Gricean principle of ambiguity avoidance would guide the speaker to choose the Saxon genitive over the Norman genitive because it can best convey the intended meaning. By contrast, the use of Norman genitive would indicate that the RC is

intentionally employed to modify the second noun. In other words, in NP1 of NP2 followed by a relative clause, the Gricean effect would lead to low attachment preferences.

Apart from the aforementioned parsing principles, lexical-semantic information also has a great influence on the resolution of ambiguous sentences. Take sentence (2) for example. In sentence (2), the RC is found to be universally attached to the

(2) *John was looking at the boy with the mother that was in the living room*.

noun phrase (NP2) introduced by *with*, even in languages where NP1 attachment preference is robust (e.g., German and Greek). As researchers suggest, this is because *with* creates a local thematic domain of its own so the second noun becomes more attractive to relative clause attachment. On the contrary, in *the boy of the mother*, the current thematic domain is the overall subject NP. Therefore, either NP1 or NP2 can be the antecedent of the RC and the final attachment of RC will be decided by the relative strength of a number of interacting parsing principles. In sentence processing research, frequency distribution of the attached adjuncts (i.e., the frequency of past exposure to the attachment patterns) appears to have an impact on attachment preferences, too. (Mitchell, 1994, Mitchell, Cuetos, Corley & Brysbaert, 1995). Prosody, according to Fodor (1998), exerts a subtle influence on sentence comprehension as well.

By far, though a number of theories have been proposed to explain the cross-linguistic differences in the resolution of ambiguous sentences, two assumptions underlying these theories remain invariant: the use of phrase-structure based parsing principle and lexical-semantic information. Since languages could differ in the weights assigned to the phrase-structure based parsing principles (i.e., Late Closure, Predicate Proximity, Referentiality, or Gricean Principle), and the relative strengths of the interacting parsing principles could lead to different attachment preferences across languages, an investigation into the ambiguity resolution of these constructions (i.e., NP1-of-NP2-RC and NP1-with-NP2-RC) will better our understanding on sentence processing, second language acquisition and the influence of learners' first language as well.

2.2 Ambiguity Resolution in L2 Learners

Studies on L2 sentence processing is of great value in the field of second language acquisition. The question frequently asked is whether L2 learners have access to the same set of constraints, rules and principles that English speakers use in real-time sentence processing. If so, these processing constraints would be considered universal. If not, what are the language-specific principles? Can they be learned? So far, a firm conclusion is not yet available due to the reported mixed results.

Generally, research shows that L2 learners and native speakers alike have a tendency in using lexical information during sentence processing. By means of a word-by-word reading time technique, Juffs (1998a) found that similar to native speakers, L2 learners of English also relied on verb argument information while interpreting sentences like (3).

(3) *The bad boys criticized almost everyday were playing in the park.*

Moreover, Hoover and Dwivedi (1998) found that while processing syntactic structures not existing in subjects' L1 (e.g., English), the highly fluent L2 French speakers processed the target constructions within the constraints of the L2. Furthermore, Dussias (2001) reported that Spanish-speaking learners of English (e.g., late bilinguals) can acquire the typical NP2-attachment preference of English native speakers. The results of the above research imply that L2 learners might analyze ambiguous sentences in a manner similar to that of native speakers.

However, in addition to the effect of syntactic or non-syntactic cues (Harley, Howard & Hart, 1995; Ying, 1996) L2 sentence processing is also under the influence of properties of learners' L1 (Harrington, 1987; McDonald, 1987). Juffs (1998b) reported that the reading time differences among participants (i.e., Chinese, Korean, Japanese learners of English and native speakers of English) in sentences (4) ~ (7) are largely attributable to differences in the argument structure between the L1 and L2.

(4) *First of all / the cook melted / the chocolate on / the cake.*

(5) *First of all / the chocolate melted / slowly on the / cake.*

(6) *First of all / the cook made / the chocolate melt / on the cake.*

(7) **First of all / the chocolate melted / itself on the / cake.* (Juffs, 1998b, p. 417)

Fernandez's (1999) research on RC-attachment ambiguities in sentences such as

Roxanne read the review of the play that was written by Diane's friend provided additional evidence of L1 influence. In the study, the results of off-line questionnaire indicated that Spanish learners of English (the late learners) preferred NP1 attachment, contrary to the NP2 preference of native speakers of English. Fernandez further suggested that L2 learners might have transferred language-specific (L1) processing strategies to L2 sentence interpretation.

In a similar vein, Papadopoulou and Clahsen (2003) used a self-paced reading technique to investigate to what extent Spanish, German, and Russian L2 speakers of Greek differ from or similar to native speakers of Greek in the resolution of ambiguous sentences containing complex genitive antecedents. The results showed that though the Greek native speakers reported an NP1 attachment preference, surprisingly, a consistent preference for either NP1 or NP2 attachment was not found in L2 learners of Greek. This has further complicated the picture because even though learners' L1 (e.g., Spanish, German and Russian) and L2 (Greek) obviously favored NP1 attachment, none of the L2 learners seemed to transfer the NP1 preference to L2 processing. Moreover, in Dussias' study (2003), the fact that both groups of subjects (i.e., the L1 Spanish-L2 English and L1 English-L2 Spanish speakers) favored a local (NP2) attachment in reading ambiguous RC-constructions (as described above) could indicate the existence of a universal set of parsing strategies.

In summary, the review shows that whether language learners process an L2 similar to native speakers is not clear. Some studies reported similarities in the use of parsing strategies across languages while others identified significant differences. Moreover, it is also possible that the L2 learners' processing strategies is midway between L1 and L2, as MacWhinney (1987) suggested in her Competition Model. If this is the case, then L2 learners' poor performance might be attributed to inappropriate use of processing strategies, instead of lack of access to UG.

3. The Study

3.1 Research Questions

The study is a partial replication of Papadopoulou and Clahsen's study in 2003.

By comparing RC-attachment preferences of Chinese-speaking adult learners of English with those identified in the literature, implications about the universality of parsing strategies will be drawn. The questions addressed are:

1. Do Chinese-speaking adult learners of English process ambiguous sentences containing a complex NP (NP1-of-NP2 and NP1-with-NP2) followed by a relative clause similar to native speakers of English?
2. If the adult L2 learners show a difference in ambiguity resolution, can the difference be attributed to L1 influence?
3. Are the adult L2 learners sensitive to lexical-semantic information such as the theta role assignment carried by *with* and do they produce NP2 attachment preference attested in the literature?

3.2 Method

3.2.1 *Participants*

Sixty Chinese-speaking adult learners of English participated in the experiment. All of them were freshman students at an Institute of Technology in northern Taiwan. Thirty of them were of higher level of English proficiency and the rest lower. Their level of English proficiency was determined by a battery of tests including the grades of a united entrance examination, and grades of a private screening examination of entrance. The learners of higher proficiency level were English majors. All of the participants were randomly selected by means of a stratified sampling procedure. During the experiment, they were instructed to read ambiguous sentences on a questionnaire carefully and answer the questions. The time allotted for this experiment was thirty-five minutes.

3.2.2 *Materials*

The questionnaire contains a total of thirty-three questions. Eleven of them are fillers. There are twenty-two experimental sentences, seventeen of which containing the ambiguous constructions--the NP-V-[NP1-prep-NP2]-RC as illustrated in (8) and (9). Of the seventeen test items, eight of them are of NP1-with-NP2 type and nine are of

NP1-of-NP2 type. The rest of the sentences contain disambiguating cues (such as reflexive pronouns) that bias the attachment of either the first noun or the second noun. All of the experimental sentences are adopted from Felser, Roberts, Marinis and Gross (2003) and all of the sentences including the fillers are randomly distributed on the questionnaire.

(8) *The dean like the sectary of the professor who was reading a letter*.

(9) *The dean like the sectary with the professor who was reading a letter*.

3.2.3 *Procedure*

Participants were instructed to read each sentence carefully and to choose from two possible interpretations they considered the more appropriate. Take sentence (9) for example.

(9) *The dean like the sectary with the professor who was reading a letter*.

Who was reading a letter?

A. The sectary was reading a letter.

B. The professor was reading a letter.

In order to prevent the participants from developing a strategy for answering the question, the NP1 in experimental sentences sometimes appears first and sometimes appears second.

4. Results

On the basis of the results of a *t*-test, overall the participants produced more NP1 attachment than NP2 attachment, t_1 (59) =3.892, p <.001 (see Table 1). In addition, in Table 2, a one-way analysis of variance on the interaction between the percentages of NP1attachments and the types of NP (i.e., *of* vs. *with*) appeared to be non-significant (p = 0.074 > .001). In other words, different types of complex NP did not significantly bias certain attachment preference. Moreover, an analysis of variance (see Table 3) indicates that there is no interaction between learners' English proficiency level and different types of complex NP (*of* vs. *with*). That is, learners' proficiency level and the types of complex NP did not favor one attachment site over another. The percentages of correct responses of temporarily ambiguous construction (i.e., the ones with

disambiguating cues such as *himself*, *herself* and *her*) are listed in Table 4. The results will be discussed in next section.

Table 1. The preference for NP1 attachment

Assumption	t	df	* p< .001
Equal variances assumed	3.892	118	*0.000165

Table 2. The effect of different types of complex NP (*of* vs. *with*) on the attachment preference

Source	SS	df	MS	F	P
Between group	10.8	1	10.8	3.246	0.074
Within group	392.667	118	3.328		
Sum of square	403.467				

One-way ANOVA * *p*< .001

Table 3. The effect of learners' proficiency levels on attachment preference

Source	df	SS	MS	F ratio
Model	2	11.3333	5.666	1.717
Error	117	386.133	3.300	Prob> F
C. Total	119	397.466		0.1841

Analysis of variance

Table 4. The percentages of correct responses for each temporarily ambiguous construction

Type of sentences	Percentages of correct responses
Type I: NP1 of NP2 when the cue *herself* bias **NP2**	75%
Type II: NP1 with NP2 when the cue *herself* bias NP2	56%
Type III: NP1 of NP2 when the cue *himself* bias NP1	67%
Type IV: NP1 with NP2 when the cue *himself* bias NP1	58%
Type V: NP1 of NP2 when the cue *her* bias NP1	55%

5. Discussion

On the whole, Table 1 and 3 showed that learners regardless of their proficiency levels in English produced more NP1 attachments. In other words, similar to monolingual speakers of Spanish, German, Dutch or Greek, the Chinese-speaking EFL learners preferred to attach the relative clause high to the first NP. Hence, the answer to the first research question *do Chinese-speaking adult learners of English process ambiguous sentences containing a complex NP (NP1-of-NP2 and NP1-with-NP2) followed by a relative clause similar to native speakers of English* is negative. Since English speakers' attachment preference is guided by the late closure principle, the conflicting attachment preference of Chinese-speaking EFL learners could suggest that some parsing strategies like late closure principle may be language specific rather than universal.

It appears that the EFL learners in the study were guided by some other parsing strategies; specifically, their attachment preference could somehow be attributable to properties of their L1. As Hawkins and Chan (1997) suggested, L2 learners would sometimes create sentences with L2 lexical items while maintaining the syntax of their L1. In Chinese Mandarin, the Norman genitive (NP1 of NP2) does not exist and a construction similar to Saxon genitive (i.e., an NP plus a free standing morpheme *de*) is used to indicate possessiveness. Consider the following sentence.

(10) *The volume of the TV is too loud.*

The television	*'s*	*volume*	*(is)*	*too loud.*		
Dian shi	***de***	***sheng yin***	*tai*	*da*	*le*	
television	*[possessive]*	*volume*	*too loud*			

It is possible that in order to understand the meaning of the complex genitive NP (i.e., the possessive relationship between NP1 and NP2) learners in the study changed the Norman genitive into a Saxon genitive. Thus, the NP1 *volume* will be moved to NP2 position (i.e., television's volume) and become the antecedent of the relative clause resulting in first noun attachment.

In the study, because the learners produced more NP1 attachments not only in NP1-of-NP2 but also in NP1-with-NP2 constructions, the answer to the third research *are the adult L2 learners sensitive to lexical-semantic information such as the theta role*

assignment carried by with and do they produce NP2 attachment preference attested in the literature is negative. In other words, learners were not sensitive to the lexical semantic information carried by *with*, which acts as a theta role assigner during sentence processing. This is quite different from the well attested findings of NP2 preference in the NP1-with-NP2-RC construction. Conceivably, on the basis of semantic and discourse information, the EFL learners were more prone to attaching the following RCs to the head since the head of the complex NP bears a higher degree of referentiality. As most researchers suggest, a parser needs to draw on a variety of cues to comprehend sentences. In this study, whether one parsing strategy wins out another needs further investigation.

The results from test items containing disambiguating cues reveal interesting patterns. Note that (see Table 4) type I and III sentences elicited more accurate responses (75% and 67%) than those of type II and IV (56% and 58%), no matter the cues biased NP1 or NP2. In the study, sentences of type I and III were shorter than those of type II and IV. Therefore, it is possible that the computational load in reading type II and IV sentences excelled learners' working memory capacity and resulted in the relatively lower degree of accuracy.

6. Conclusions and Limitations

In the study, the EFL learners' preferences of NP1 attachment in ambiguity resolution imply that the principle of late closure might not be universal. In addition, during sentence comprehension learners might have drawn on other parsing principles (such as predicate proximity) and are under the influence of properties of L1. Besides, the fact that learners of higher level of proficiency did not process ambiguous sentences in a manner similar to English speakers indicates their parsing strategies are not midway between L1 and L2. They might not yet acquire the parsing strategy of the target language.

Overall, the study poses some interesting questions regarding L2 sentence processing. Particularly, why learners' attachment preferences were not affected by lexical semantic information will need further investigation. Variables such as

working-memory capacity, prosody, types of adjuncts being attached or language exposure (late vs. early) are interesting questions for future inquiry as well.

REFERENCES

Brysbaert, M., & Mitchell, D. (1996). Modifier attachment in sentence processing: Evidence from Dutch. *Quarterly Journal of Experimental Psychology, 49A*, 664-695.

Carreiras, M., & Clifton, C. (1999). Another word on parsing relative clauses: Eyetracking evidence from Spanish and English. *Memory and Cognition, 27*, 826-833.

Cuetos, F., & Mitchell, D. C. (1988). Cross-linguistic differences in parsing: Restrictions on the use of the Late Closure strategy in Spanish. *Cognition, 30*, 73-105.

De Vincenzi, M., & Job, R. (1993). Someobservations on the university of the Late Closure strategy. *Journal of Psycholinguistic Research, 22*, 189-206.

Dussias, P. (2001). Sentence parsing in fluent Spanish-English bilinguals. In J. Nicol (ed.), *One mind, two languages: Bilingual language processing* (pp. 159-176). Malden, MA: Blackwell.

Dussias, P. E. (2003). Syntactic ambiguity resolution in L2 learning: Some effects of bilinguality on L1 and L2 processing strategies. *Studies in Second Language Acquisition, 25*, 529-557.

Felser, C., Roberts, L., Marinis, T., & Gross, R. (2003). The processing of ambiguous sentence by first and second language learners of English. *Applied Psycholinguistics, 24*, 453-489.

Fernandez, E. M. (1999). Processing strategie sin second language acquisition: Some preliminary results. In E. C. Klein & G. Martohardjono, (Eds.), *The development of second language grammar: A generative grammar approach* (pp. 217-239). Amsterdam: Benjamins.

Fodor, J. D., (1998). Learning to parse? *Journal of Psycholinguistic Research, 27*, 285-319.

Gibson, E., Pearlmutter, N., Canseco-Gonzalez, E., & Hickock, G. (1996). Recency preferences in the human sentence processing mechanism. *Cognition, 59*, 23-59.

Gibson, E., & Pearlmutter, N. (1998). Constraints on sentence comprehension. *Trends in Cognitive Science, 2*, 262-268.

Gleason, J. B., & Ratner, N. B. (1998). *Phycholinguistics*. Harcourt Brace.

Harley, B., Howard, J., & Hart, G. (1995). Second language processing at different ages: Do younger learners pay more attention to prosodic cues to sentence structure? *Language Learning, 45*, 43-71.

Harrington, M. (1987). Processing transfer: Language-specific processing strategies as a source of interlanguage variation. *Applied Psycholinguistics, 8*, 351-378.

Hemforth, B., Konieczny, L., Scheepers, C., & Strube, G. (1998). Syntactic ambiguity resolution in German. *Syntax and Semantics, 31*, 293-309.

Hoover, M., & Dwivedi, V. (1998). Syntactic processing by skilled bilinguals. *Language Learning, 48*, 1-29.

Juffs, A. (1998a). Main verb versus reduced relative clause ambiguity resolution in L2 sentence processing. *Language Learning, 48*, 107-147.

Juffs, A. (1998b). Some effects of first language argument structure and morphosyntax on second language sentence processing. *Second Language Research, 14*, 406-424.

McDonald, J. (1987). Sentence interpretation in bilingual speakers of English and Ducth. *Applied Psycholinguistics, 8*, 379-413.

MacWhinney, B. (1987). Applying the Competition Model to bilingualism. *Applied Psycholinguistics, 8*, 315-327.

Mitchell, D. (1994). Sentence parsing. In M. A. Gernsbacher (Ed.), *Handbook of psycholinguistics*, pp. 375-409. San Diego, CA: Academic Press.

Mitchell, D., Cuetos, F., Corley, M. M. B., & Brysbaert, M. (1995). Exposure-based models of human parsing: Evidence for the use of coarse-grained (nonlexical) statistical records. *Journal of Psycholinguistic Research, 24*, 469-488.

Papadopoulou, D., & Clahsen, H. (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.

Hawkins, R., & Chen, C. Y. H. (1997). The partial availability of Universal Grammar

in second language acquisition: the 'fail functional features hypothesis'. *Second Language Research, 13*, 187-226.

Ying, H. (1996). Multiple constraints on processing ambiguous sentences: Evidence from adult L2 learners. *Language Learning, 46*, 681-711.