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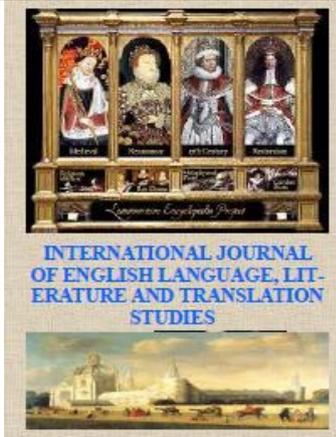
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COMPLEX SENTENCES WITH EMBEDDED RELATIVE CLAUSE: PROCESSING THE
SUBJECT AND OBJECT NPs BY ESL LEARNERS IN CAMEROON

NAPOLEON EPOGE

Higher Teacher Training College (ENS) Yaounde, University of Yaounde I
PO box 47, Yaounde, Cameroon



ABSTRACT

The study investigates L2 learners of English in Cameroon processing and processing strategies of both the subject and object noun phrases (NPs), in sentences with embedded relative clause, in order to assign the correct meaning to the sentence. Data was collected from university students who performed a sentence comprehension task consisting of the Subject-Subject, Subject-Object, Object-Subject, and Object-Object embedded relative clauses. Results show that respondents opt for a linear rather than syntactic parsing strategy in the processing of subject and object NPs. Findings also reveal that, in the processing of the subject and the object NPs in situations wherein the respondents are able to make a distinction between the embedded relative clause and the matrix clause, the co-referential NPs that have the same grammatical function in their respective clauses (SS, OO) are easier to process than co-referential NPs with different grammatical functions (SO, OS). Processing difficulties can be attributed to poor mastery of clausal elements, as well as to non-linguistic factors such as working memory limitations, and linguistic constraints such as syntactic and semantic properties.

Keywords: Sentence processing, relative clause, embedding, noun phrase, Cameroon English

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INTRODUCTION

Language learners must process language forms in order to comprehend and produce them (Izum 2003). One of these language forms is the sentence. Sentence processing focuses on how the learners or speakers of a language, when hearing or reading a string of words, assign structural relationships among them in order to assign the correct meaning to the sentence. This is the case of sentence processing involving English embedded relative clause. Because the internal structure is complicated, English sentences with embedded relative clause are difficult to produce and to comprehend by ESL learners. As a consequence of this, L2 learners face a lot of processing difficulties in identifying and comprehending the subject and object noun phrases in both the matrix and embedded relative clauses in these sentences. In this respect, studies have

been carried out to investigate L2 learners processing strategies in various constructions cross-linguistically (King and Just 1991, Traxler et al 2002, Izumi 2003, Felser et al 2003, Papadopoulou and Clahsen 2003, Omaki and Arijji 2004, Izumi and Izumi 2004), just to name a few. In the same light, the present study sets out to investigate ESL learners in Cameroon processing and processing strategies of both the subject and object noun phrases (NPs) in sentences with embedded relative clause in order to assign the correct meaning to the sentence.

A clause is a grammatical unit consisting of a subject and a predicate, and every sentence must consist of one or more clauses (Task and Stockwell, 2007). In the examples that follow, each clause is marked off by brackets. A simple sentence consists only of a single clause (e.g. Mabel has bought a portable radio). A compound sentence consists of two or more clauses of equal rank, usually joined by a coordinating conjunction such as *and*, *or* or *but* (e.g. [Deborah wants children], but [her career won't allow them]). A complex sentence consists of two or more clauses where one outranks the others, which are subordinated to it (e.g. [After Veronica got her promotion], [She bought a new car]). It is healthy to point out here that all sentences consist of an obligatory main clause and one or more optional subordinate clauses. A clause which is the highest-ranking clause, or only clause, in its sentence is a main clause; whereas, a clause which is subordinated to another is a subordinate clause. Though a single main clause can theoretically contain many different clause functions, the defining characteristic of all main clauses is that they must contain a predicator¹ consisting of a finite verb² as exemplified below.

- 1) Catherine walks away.
- 2) Jonathan and I talked about this yesterday.
- 3) Jonathan and I were talking about Cameroonian films.

Each of the predicators (*walks*, *talked*, and *were talking*), in turn, consists of either a lexical verb or auxiliary that is finite, some verbal element that is marked for tense - *walks* is marked for present tense, *talked* and *were* for past tense. Because each of the examples contains a finite verb and no markers of subordination, each of the examples qualifies as a main clause. With regard to the afore-mentioned, Meger (2009:132) states that a clause becomes subordinate if it lacks a finite verb and instead contains one or more non-finite verbs; or, is headed by a subordinating conjunction such as *that*, *when*, *if*, *because*, or *who*. Thus, there are several types of subordinate clause as the examples below illustrate. Each subordinate clause is marked off by square brackets.

- 4) a. That is the house [which I want].
b. The rumour [that Deborah is quitting] is not true.
- 5) a. The man said [that he was tired].
b. Catherine has decided [that she will look for a new job].
- 6) a. The thief ran away [when he saw the police].
b. Mabel develops a rash [whenever she eats bread and butter].

In sentence (4), the subordinate clause is a complement clause which is attached to the preceding noun. In (4a) [which I want] qualifies the NP *house* and in (4b) [that Deborah is quitting] qualifies the NP *rumour*. Since each of these relative clauses qualifies a noun, they are known in the literature as adjective clause. In sentence (5), the subordinate clause is a complement clause which is attached to the preceding verb. In (5a) [that he was tired] is a noun or nominal clause and the object of the verb *said* and in (5b) [that she will look for a new job] is a noun or nominal clause and the object of the VP *has decided*. In sentence (6), the subordinate clause is an adverbial clause since each of them is related to its higher or main clause like an adverb. In (6a) [when he saw

¹ The predicator is a clause function that includes all of the elements making up Quirk et al.'s (1985) definition of a verb phrase: an obligatory lexical verb and one or more optional auxiliary verbs (Meger 2009:132).

² A finite verb is a verb form in the present and past tense. For instance, the finite form of the verb 'to eat' include: *eat*, *eats*, and *ate*. The other forms of this verb such as the infinitive form (to eat), the present participle form (eating), and the past participle form (eaten), are the non-finite form of the verb.

the police] qualifies or modifies the verb *ran* and in (6b) [whenever she eats bread and butter] qualifies the verb *develops*. As seen above, a relative clause, the focus of this study, modifies a noun: [The skirt [that Susie bought] is too short].

2. Relative Clause

A relative clause is a clause which modifies the head noun within a noun phrase as illustrated in the example below.

7) [The man [whom we admire] S] NP lives in Yaounde.

This example illustrates the three basic parts of a relative clause construction: the head noun *man*, the modifying clause *we admire*, and the relativizer *whom* which links the modifying clause to the head. It would be noticed here that the modifying clause is incomplete; it lacks a direct object, even though its verb *admire* requires one. Though the modifying clause lacks a direct object, the sentence is acceptable because the head noun is understood to be the object of the verb *admire*. In this regard, the head noun actually has two different roles in this example - it functions as the subject of the main clause and at the same time interpreted as the object of the modifying clause. Furthermore, the head of the relative clause *man* is a common noun which could refer to any man. The function of the modifying clause is to identify, uniquely, which particular man the speaker is referring to.

The relative pronoun, which introduces the relative clause, agrees with the head noun for gender and number; while, its case marking indicates the grammatical relation which the head noun is understood to bear within the modifying clause. This is clearly a very important function, since we cannot interpret the meaning of the NP correctly without understanding the semantic relationship between the head noun and the modifying clause. The NP which contains the relative clause functions as the subject of the main clause. This can be referred to as the 'external' Grammatical Relation of the NP. At the same time, the head noun is interpreted as the object of the modifying or relativized clause. This 'internal' Grammatical Relation is referred to as the relativized function - the Grammatical Relation that is assigned to the head noun within the modifying clause (Kroeger 2005:236).

In this respect, a relative clause is a clause which modifies a noun or noun phrase. The noun qualified is called the antecedent and the relative clause normally follows the antecedent as exemplified below.

8) People_i [who smoke]_i annoy me.

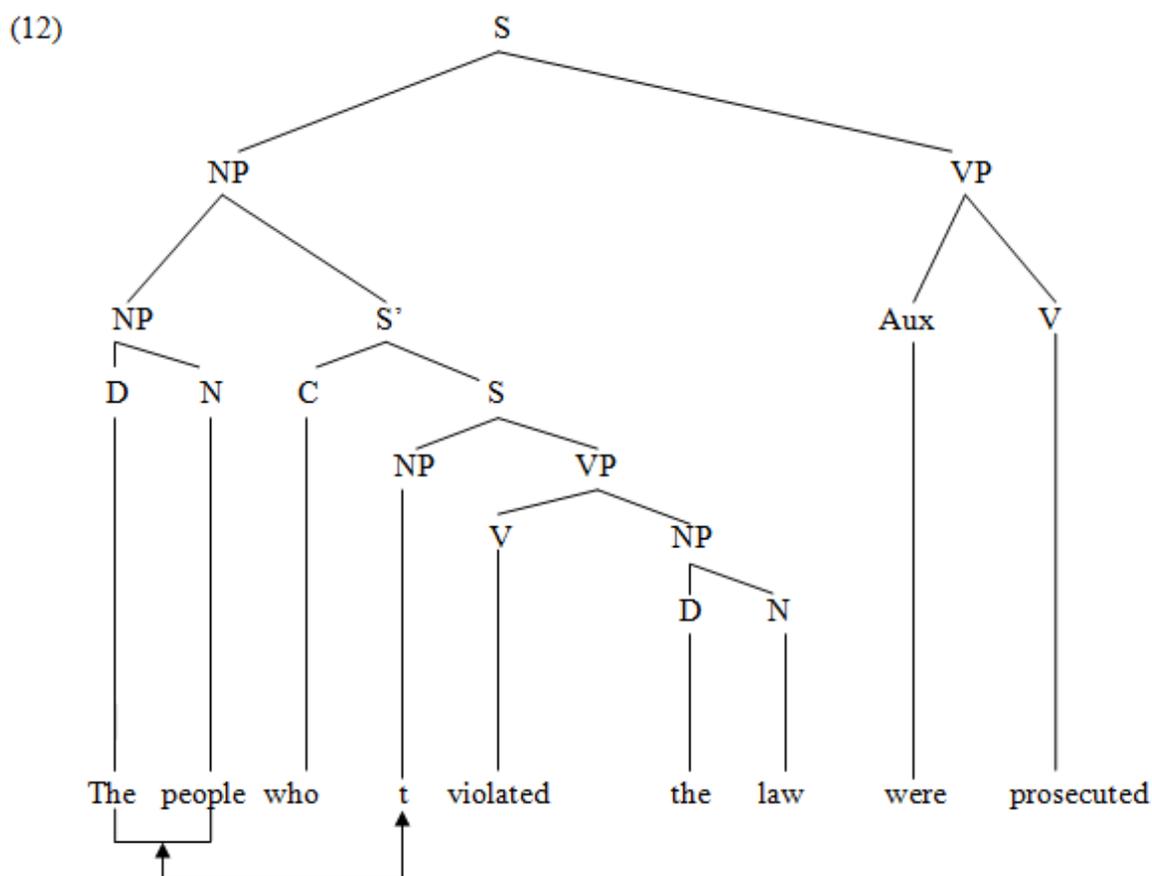
9) The visitor_i [whom David was expecting]_i has arrived

10) Hypocrisy is the tribute_i [that vice pays to virtue]_i.

11) The mangoes_i [which Mirabel gave Pauline]_i provoked diarrhea.

In (8), the relative clause *who smoke* modifies the NP *people* and this NP is the antecedent of the relativized clause. In (9), the relative pronoun *whom* introduces the relative clause *whom David was expecting* and this relativized clause modifies the NP *the visitor*. The antecedent of the relativized clause is the NP *the visitor*. Moreover, the subject of the VP *was expecting* is the NP *David* and the object is the NP *visitor*. In (10), the antecedent of the relative clause *that vice pays to virtue* is the NP *the tribute*. In this relative clause, the object of the verb *pays* is the NP *tribute* and the subject is the NP *vice*. In (11) the antecedent of the relativized clause *which Mabel gave Paulin* is the NP *mangoes*. The subject of the verb *gave* is the NP *Mirabel* and the object is the NP *Paulin*. Furthermore, the subject of the verb *provoke* is the NP *mangoes* and the object is the NP *diarrhea*. Thus, the antecedent plays a vital role of determining which relative to use. In this sense, the relative pronoun, which introduces a relative clause, and the antecedent denote the same entity. This process, whereby the referent expression and the referent point to the same entity, is known as coreference.

As can be inferred above, relative clauses are introduced by a relative pronoun and the said clauses modify their NP antecedents or head noun. These clauses always contain a gap *t*, which is indicated by the trace of the relative pronoun as shown in (12)



As seen above, the basic structural relationship in relative clause is formed by a process called embedding³ as the example below illustrates.

(13) The people [who violated the law] were prosecuted.

a) The people were prosecuted.

b) The people violated the law.

Sentence (13) is derived from (13a) [the main clause] and (13b) [the embedded clause in (13a)]. As a result of this, there is an NP which incidentally occurs in both clauses as shown in example (13a) and (13b) above. When one of the clauses is embedded as in original sentence (13), the NP of this embedded clause is substituted by a relative pronoun. In this process, the relative pronoun takes the same case as the original embedded sentence. For instance, the NP *the people* in the second clause, (13b), is the nominative case; therefore, it is replaced by the nominative relative pronoun *who* in the main sentence as a result of embedding.

It is healthy to point out here that there are four processes involved in producing relative clauses. Firstly, the identical NP or the antecedent that is qualified should be identified. Secondly, an appropriate relative pronoun should be chosen to substitute the identical NP in the relative or relativized clause. Thirdly,

³ Embedding is the generation of one clause within another higher-order or superordinate clause such that the embedded clause becomes a part of the superordinate main clause. For example, the sentence *The house that I would like to buy is not for sale* is formed through embedding *The house I would like to buy* into *The house is not for sale*. In the sentence, *that* replaces *the house*. *The house* in the embedded sentence functions as subject, and *the house* in the main clause also functions as subject. In order to function as a relative clause, the embedded clause must contain an NP that is identical in form and reference to the NP in the main clause. In the above example, NP is *the house* which refers to the same thing in both sentences and it is in identical form. The relative clause is functioning as an adjective, modifying the noun preceding it.

In this sentence, there are two sentences [The people have expressed their gratitude to the Head of State] and [We visited the people yesterday]. The latter sentence is embedded into the former sentence. The NP *the people* is an object in the embedded sentence and the subject in the main sentence. Because the object NP in the embedded sentence is relativized, it takes the relative pronoun with the accusative case *whom* as seen in the sentence above. The objective relative pronouns in situations like this are *who*, *whom*, *which*, and *that*. The relative pronoun *who* is used for both nominative and accusative cases, and *whom* is used for formal accusative cases and after prepositions.

19) We know the lady_i [who speaks English and French fluently]_i.

a. We know the lady. b. The lady speaks English and French fluently.

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20) The lady_i [whom Nicholas gave the invitation]_i played the guitar.

21) The tennis_i [which I bought yesterday]_i costs 5000 CFAF.

22) The money_i [that was collected at the fund-raising on Sunday]_i was stolen.

In (19), the relative pronoun *who* is the subject of the verb *speaks* and its antecedent is the object NP *the lady* of the verb (know) in the sentence [We know the lady]. In this case, the relative pronoun which is replacing the subject of the embedded sentence adopts the nominative case. In (20), *whom* is the indirect object of the verb *gave* and its antecedent is the subject NP *the lady* of the verb *turned up* in the sentence [The lady turned up late]. In this sense, the subject of the verb *gave* is the NP *Nicholas*, the indirect object is the NP *doctor*, and the direct object is the NP *invitation*. In (21), the relative pronoun *which* is the direct object of the verb *bought* in the sentence [I bought the tennis yesterday] and its antecedent is the NP *tennis*. The NP *tennis* is the subject of the verb *costs* in the sentence [The tennis costs 5000 CFAF]. Since the relative pronoun *which* points back to the NP *shoes*, the two refer to the same entity. This type of coreference is what Chomsky (1981, 1993, 1995) refers to as binding. As a result of this syntactic maxim, the subject of the verb *bought* is the NP *I* and the object is the NP *tennis*. In (22), it is noticed that the relative pronoun *that* can also be used in a sentence to replace the relative pronoun (*who* or *which*) in defining relative clauses. As the above examples illustrate, after replacing the object with the relative pronoun, the relative pronoun has to move to the front of the relative clause to be adjacent to the noun qualified. This rule is referred to as “relative pronoun fronting” (Celce-Murcia and Larsen-Freeman, 1999:576). The processes involved in subject-object (SO) type of relative clauses are relative pronoun substitution and relative pronoun fronting.

Another type of relative clause is known as object-object (OO type) relative clauses. In this type of relative clauses, the object of the embedded sentence is relativized to qualify the object of the main sentence.

23) Leopold Senghor wrote the greatest poems [that we read].

a. Leopold Senghor wrote the greatest poems. b. We read the greatest poems.

S V O S V O

24) John threw away something [that provoked the people to anger].

In (23) the base sentences are: *Leopold Senghor wrote the greatest poems* and *we read the greatest poems*. The identical NP in both sentences is *the greatest poems*. In the embedded sentence, the NP *the greatest poems* is replaced by the relative pronoun *that*, which takes the object case of the original sentence.

Finally, another type of relative clause is one which begins with the genitive case relative pronoun, *whose*. This type of relative pronouns relates the person or thing possessed to the possessor.

24) Children [whose parents won the wrestling match] prepared rice and beans.

a. Children prepared rice and beans. b. Children’s parents won the wrestling match.

S V O S V O

Since the relative clause concerns the parents of the children, the relative *whose* is in the genitive case. The relative *whose* can also be used as the genitive of *which*, with reference to non-personal antecedent. In this case, *whose* can only be used as a non-personal possessive in relative clause.

25) John bought a television whose screen blew out.

Table 2: Frequency of the Respondents' Performance in the identification of Subject and Object NPs

Clause type	Subject NP		Object NP		Total
	Correct NP	Incorrect NP	Correct NP	Incorrect NP	
Matrix clause	728 (47.89%)	792 (52.11%)	1431(94.14%)	89 (05.86%)	3040
Relative clause	1235 (81.25%)	285 (18.75%)	847 (55.72%)	673 (44.28%)	3040
Total	1963 (64.57%)	1077 (35.43%)	2278 (74.93%)	762 (20.07%)	6080

Statistics in the table above show that, in the matrix clause, respondents produced 728 (47.89%) instances in which they could identify the subject noun phrase and 1431 (94.14%) instances in which they could identify the object NP of the verb. However, they also produced 792 (52.11%) instances wherein they could not identify the appropriate subject NP of the verb in the matrix clauses as well as 89 (05.86%) whereby the object NP provided for the verb in the matrix clauses was not appropriate. In the embedded relative clauses, respondents produced 1235 (81.25%) instances wherein they identified the appropriate subject NP of the verb and 847 (55.72%) instances wherein they appropriately identified the object NP of the verb. On the other side of the coin, they produced 285(18.75%) and 673(44.28%) instances, respectively, of inappropriate subject NP and object NP of the verb in the embedded relative clauses. These results show that respondents encounter problems of syntactic and semantic features in understanding and using sentences with embedded relative clause due to their grammatical peculiarities. The analysis of the respondents' performance in sentences with Subject-Subject (4.1), Subject-Object (4.2), Object-Object (4.3), and Object-Subject (4.4) embedded relative clauses is presented below.

4.1 Sentences with Subject-Subject type relative clause

When the NP in both the main and embedded clauses is nominative, the relative clause type in this case is known as subject-subject (SS) type relative clause. The processes involved in the producing of subject-subject (SS) type relative clauses are relative pronoun substitution and centre-embedding. Four tokens such as "The dog which chased the cat killed the mouse" were used in the elicitation of data. The results of the respondents' performance are presented in the table below.

Table 3: Results in the interpretation of the subject and object NPs in sentence with embedded S-S relative clauses

Clause type	Subject NP		Object NP		Total
	Correct NP	Incorrect NP	Correct NP	Incorrect NP	
Matrix clause	161(42.37%)	219 (57.63%)	360 (94.74%)	20 (05.26%)	760
Relative clause	265 (69.74%)	115 (30.26%)	366 (96.32%)	14 (03.68%)	760
Total	436 (57.37%)	334 (43.95%)	726 (95.53%)	34 (04.47%)	1520

The result shows that respondents scored 42.37% in the identification of the appropriate subject NP in the matrix clause as against 57.63% wherein they failed to identify the appropriate NP. In the embedded relative clause, they scored 69.74% in pointing out the appropriate subject NP as against 30.26% wherein they could not identify the appropriate subject NP. In the identification of the object NP in the matrix clause, respondents scored 94.74% in identifying the appropriate NP, and 05.26% in failing to identify the appropriate NP. The results in the embedded relative clauses portray that they scored 96.32% as against 04.47%. However, it is healthy to point out here that the respondents have a high performance in identifying object NPs in both the matrix clause and the embedded relative clause due to the proximity of the verb and the object NP. As a result of linearity they quickly identified the appropriate phrases.

4.2 Sentences with Subject-object type relative clause

In subject-object (SO) relative clause type, the object NP of the embedded sentence is relativized to qualify the subject of the main sentence. Because the object NP in the embedded sentence is relativized, it takes the relative pronoun with the accusative case. The processes involved in subject-object (SO) type of relative clauses are relative pronoun substitution and relative pronoun fronting. Four sentences such as “The woman whom Paul visited yesterday has bought a new car” were used in eliciting data. The table below records the performance of the respondents.

Table 4: Results in the interpretation of the subject and object NPs in sentence with embedded S-O relative clauses

Clause type	Subject NP		Object NP		Total
	Correct NP	Incorrect NP	Correct NP	Incorrect NP	
Matrix clause	133 (35%)	247 (75%)	344 (90.53%)	36 (09.47%)	760
Relative clause	356 (93.68%)	24 (06.32%)	157 (41.32%)	223 (58.68%)	760
Total	489 (76.49%)	271(35.66%)	501(65.92%)	259 (34.08%)	1520

As can be inferred in the table above, respondents performed poorly (35%) in the identification of the subject NP in the matrix clause and highly in embedded relative clause (93.68%) of sentences with embedded subject-object relative clause. This performance is in sharp contrast to the results scored in the identification of object NP. Here they scored 90.53% in the matrix clause as against 41.32% in the embedded subject-object relative clause. It is noticed here that the feature of linearity enabled the respondents to easily identify the subject NP in the relative clause and object NP in the matrix clause.

4.3 Sentences with Object-Object type relative clause

In the object-object (OO type) relative clause, the object of the embedded sentence is relativized to qualify the object of the main sentence. In the embedded sentence, the NP is replaced by the relative pronoun which takes the object case of the original sentence. Four tokens such as “We read the book which John recommended” were used in the elicitation of data.

Table 5: Results in the interpretation of the subject and object NPs in sentence with embedded O-O relative clauses

Clause type	Subject NP		Object NP		Total
	Correct NP	Incorrect NP	Correct NP	Incorrect NP	
Matrix clause	259 (68.16%)	121 (31.84%)	368 (96.84%)	12 (03.16%)	760
Relative clause	377 (99.21%)	03 (0.79%)	162 (42.63%)	218 (57.37%)	760
Total	636 (83.68%)	124 (16.32%)	530 (69.71%)	230 (30.26%)	1520

Statistical results in the table above show that respondents scored 68.16% in the identification of the appropriate subject NP in the matrix clause of sentences with embedded object-object relative clause as against 57.63% wherein they failed to identify the appropriate NP. In the embedded object-object relative clause, they scored 99.21% in pointing out the appropriate subject NP as against 0.79% wherein they could not identify the appropriate subject NP. In the identification of the object NP, in the matrix clause of sentences with embedded object-object relative clause, respondents scored 96.84% in identifying the appropriate NP; and 03.16% in failing to identify the appropriate NP. The results in the embedded object-object relative clauses portray that they scored 42.63% as against 57.37%. Here too, the respondents have a high performance in identifying the subject NPs in object-object relative clauses and in the matrix clause because of the proximity of the verb and the NP. As a result of linearity they quickly identified the appropriate phrases.

4.4 Sentences with Object-Subject type relative clause

When the subject NP of the embedded sentence is relativized into the main clause to qualify the object of the main clause, subject of the embedded sentence and the object of the main sentence are needed. In this case, the relative pronoun which has replaced the subject of the embedded sentence, adopts the nominative case. Consequently, indirect object and the object of the main sentence can be qualified by the subject relative clauses as well. The relative clause type in this case is called object-subject (OS) relative clause. Four tokens such as “He brought the woman who runs a garage” were used in the collection of data.

Table 6: Results in the interpretation of the subject and object NPs in sentence with embedded O-S relative clauses

Clause type	Subject NP		Object NP		Total
	Correct NP	Incorrect NP	Correct NP	Incorrect NP	
Matrix clause	175 (46.05%)	205 (53.95%)	359 (94.47%)	21(05.53%)	760
Relative clause	237 (62.37%)	143 (37.63%)	162 (42.63%)	218(57.37%)	760
Total	412 (54.21%)	348 (45.79%)	521(68.55%)	239 (31.45%)	1520

The result in the table above portrays that respondents scored 46.05% in the identification of the appropriate subject NP in the matrix clause of sentences with embedded object-subject relative clause as against 53.95% wherein they did not succeed in identifying the appropriate NP. In the embedded object-subject relative clauses, they scored 62.37% in pointing out the appropriate subject NP as against 37.63% wherein they did not succeed in identifying the appropriate subject NP. In the identification of the object NP in the matrix clause with embedded object-subject relative clause, respondents scored 94.47% in identifying the appropriate NP; and 05.53% in failing to identify the appropriate NP. The results in the embedded object-subject relative clauses show that they scored 42.63% as against 57.37%.

In view of the foregoing discussion, the statistical information clearly show that ESL learners of English in Cameroon encounter problems of syntax, semantic and collocation features in understanding and spelling out the subject and object NPs of verbs in complex sentences that embody embedded relative clause. This comes about as a result of the grammatical peculiarities of such sentences. The matrix sentence is interrupted by the embedded relative clause when it modifies the subject, and comes directly after the subject of the main clause. Consequently, the identification of appropriate NPs becomes a daunting task to these ESL learners. With regard to this, they keep on identifying NPs of verbs, in this context, in a manner that distorts the syntactic and semantic features of the complex sentence. The distortion of these features is as a result of the fact that respondents opt for a linear rather than syntactic parsing strategy in the processing of the subject and object NPs. Though they opt for a linear rather than syntactic parsing strategy, findings reveal that, in the processing of the subject and the object NPs in situations wherein the respondents are able to make a distinction between the embedded relative clause and the matrix clause, the co-referential NPs that have the same grammatical function in their respective clauses (SS, OO) are easier to process than co-referential NPs with different grammatical functions (SO, OS). This is because the antecedent of the relative pronoun in sentences with embedded subject-subject and object-object relative clauses has the same grammatical function. This finding is in line with Hamilton (1994) SO Hierarchy Hypothesis (SOHH) which takes into account both the function of the head noun in the matrix clause and the function of the relative pronoun within the embedded relative clause to account for the order of difficulty on the notion of processing discontinuity which is created by the interruption of the main clause by the relative clause.

CONCLUSION

This study has investigated L2 learners of English in Cameroon processing and processing strategies of both the subject and object noun phrases (NPs), in sentences with embedded relative clause, in order to assign the correct meaning to the sentence. A sentence comprehension task, which consisted of the Subject-Subject, Subject-Object, Object-Subject, and Object-Object embedded relative clauses, was administered to 95 respondents. Findings show that they encounter difficulties in processing the subject and object NPS both in the matrix clause and in the embedded relative clause. Consequently, they opt for a linear rather than syntactic parsing strategy in the processing of these NPs. Processing difficulties can be attributed to poor

mastery of clausal elements, as well as to non-linguistic factors such as working memory limitations, and linguistic constraints such as syntactic and semantic properties.

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