

The Journal of Teaching Language Skills (JTLS)

35(1), Spring 2016, ISSN: 2008-8191

pp. 139-159

Do Heavy-NP Shift Phenomenon and Constituent
Ordering in English Cause Sentence Processing
Difficulty for EFL Learners?

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Abstract

Heavy-NP shift occurs when speakers prefer placing lengthy or “heavy” noun phrase direct objects in the clause-final position within a sentence rather than in the post-verbal position. Two experiments were conducted in this study, and their results suggested that having a long noun phrase affected the ordering of constituents (the noun phrase and prepositional phrase) by advanced Iranian EFL learners. In the first experiment, we found that when the direct object NP is lengthened by adding extra linguistic information, participants tended to form sentences with heavy-NP shift structures more often than the basic word order (subject + direct object + prepositional phrase). The results of the grammaticality judgment task used in the second experiment indicated that participants regarded sentences with the shifted word order as being grammatical more often than being awkward and ungrammatical. These findings support the idea that advanced EFL learners, quite like native speakers of English, show a strong tendency towards forming shifted structures when the length of the direct object NP increases. The results obtained from this study can be attended to in developing materials for learners in different levels of proficiency. Furthermore, teachers can use the results to

Received: 02/04/2016 Accepted: 23/05/2016

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adapt their teaching of the structure to learners' level of proficiency by considering the processing difficulty the structure might cause.

Keywords: constituent ordering, heavy-NP shift, length, sentence processing

Shifting occurs when there is a change in the ordering of constituents within a sentence. One widely acknowledged sort of shifting is what Kimball (1973) called *heavy-NP shift*. This phenomenon occurs when some intervening material separates a lengthy or heavy direct object noun phrase (NP) from the verb. Consider the sentences below:

Example 1. I gave to her the stamps which my father left to me as part of his inheritance.

In the case of the example given, the prepositional phrase (PP), *to her*, plays the role of the intervening material and causes a separation between the verb and the heavy direct object NP, *the stamps which my father left to me as part of his inheritance*. Shifted sentences like the one above are in contrast in terms of word order, with “basic order” sentences, where the verb and the heavy direct object NP are adjacent (*I gave the stamps which my father left to me as part of his inheritance to her*). Most native speakers of English agree on the accuracy of both the basic word order and the shifted structures when the direct object NP is lengthy. However, speakers have a strong tendency towards the basic word order when the direct object NP is short (e.g., *gave the stamps to her*). In such cases, shifted structures are typically considered either ungrammatical or very awkward (e.g., *gave to her the stamps*). Ross (1967) regarded NP complexity as playing a key role in speakers’ inclination to the alternative structures. Hawkins (1994) analyzed a text corpus, and offered that the length of the NP as well as the other material in the verb phrase (like a PP) could better predict choice of the structure than properties of the NP alone. He went further to suggest that irrespective of NP complexity and length, there was not much shift in NPs until they were lengthier than the other material by at least four words.

There are a number of hypotheses in the linguistic and psycholinguistic literature which have been suggested with regard to the reasons of occurrence of heavy-NP shift. As per a number of researchers, a syntactic property of the lengthy NP, such as the length or relative length in number of words (Hawkins, 1994; Kimball, 1973) is the reason for shifting to occur. Zec and

Inkelas (1990), among others, believed that syntactic-prosodic interactions rather than strictly syntactic processes may motivate shifting. They argued that heavy NP shift is an example of a class of phenomena in which change in the order of constituents results in better prosodic contours.

There is a controversy concerning whether movement operations such as heavy-NP shift are caused by consideration of the needs of the hearer/reader or by constraints on speaker performance (Wasow, 1997). Kimball (1973) argues that long and/or complex constituents cause processing problems for hearers/readers in the middle of a sentence. Accordingly, shifting is believed to occur to accommodate the needs of the hearer/reader. In other words, shifting causes the complex material to the clause-final position, where it is easier to process.

On the other hand, there is also evidence which supports the idea that shifting results from production constraints. Arnold, Wasow, Losongco, and Ginstrom (2000) suggested that ordering of constituents is affected by production difficulty. In other words, shifting is regarded as a strategy used when the production process is difficult. While it is possible to develop a hearer-centered interpretation for this phenomenon, there is another argument according to which speakers do not take the listener's needs into consideration when planning an utterance (Horton & Keysar, 1996). In so far as heavy-NP shift results from the concern for the hearer, it is not much revealing of underlying sentence production processes (Bock, 1990).

According to a number of models, there are three principal stages in sentence production, namely conception, formulation, and articulation. Furthermore, the formulation stage is divided into two distinct sub-stages (Bock & Levelt, 1994). The first sub-stage is characterized by *functional processes*, in which syntactic roles (such as subject, predicate, and object) are assigned to conceptual representations. It is in these processes that major content words such as nouns and verbs are retrieved (Bock, Loebell, & Morey, 1992). The second sub-stage consists of *positional processes* in which syntactic roles are associated with particular syntactic structures. This stage occurs right before phonological encoding and articulation. Heavy-NP shift can logically be regarded as a late functional or early positional process. In order to distinguish functional processes from positional ones, one needs to

analyze speech errors. Generally, errors which involve whole word and phrase exchanges are attributed to the functional sub-stage: They result from mis-assignment of entities such as nouns and noun phrases to equivalent syntactic roles. Garrett (1980) gives an example of this type of error, in which two nouns are exchanged in the sentence *I left the briefcase in my cigar*. He also gives an instance of two NPs being exchanged in the sentence *I got into this guy with a discussion* (Garrett, 1980).

In linguistics production models, the way major syntactic constituents are ordered might often be determined in the mapping of information from conceptual to functional representation in an incremental way (De Smedt, 1990). In other words, items which are more accessible during the mapping stage owing to their frequency, semantics, or some other factors, will be regarded primary in the speech plan, and will thus tend to take an earlier position in the sentence. Accordingly, De Smedt (1994) hypothesized that shorter phrases and more conceptually accessible items are available for sequencing prior to longer phrases during the utterance-production process. This hypothesis can be applied to the heavy-NP shift phenomenon, suggesting that heavy long NPs tend to appear after more accessible PPs. Furthermore, Stallings and MacDonald (2011) investigated the impact length might have on word order, and claimed that the change in the ordering of constituents might be due to accessibility. They concluded that shorter NPs tend to appear before longer ones in English because shorter NPs are more accessible.

Unlike those who believe that shorter NPs are more accessible than longer NPs (De Smedt, 1994; Stallings & MacDonald, 2011), there are others who believe otherwise. In his study, Hofmeister (2011) came to the conclusion that increasing the length has a considerable impact on increasing accessibility. In other words, adding extra elaborative information to an NP makes it semantically rich, and therefore increases its accessibility. Moreover, Yamashita and Chang (2001) claimed that longer linguistic units have higher accessibility compared to shorter ones. This is due to the idea that additional linguistic material provides more information about an item, and renders it semantically richer and more salient.

According to De Smedt's (1990) approach, accessibility is influenced by the number of words each phrase has; however, an account based on

incremental accessibility could also be developed. For instance, more complex syntactic or phonological structures might be less accessible compared to simpler structures. Furthermore, brand new information might be less accessible than old information. However, the corpus analyses Wasow (1997) conducted indicated a significant number of examples in which heavy-NP shift was not predicted by some or all of the above accounts. In his analyses, some of the shifted NPs were not lengthier than the PP, nor were they syntactically and phonologically complex. In addition, they did not appear to contain new information. Based on such observations, he concluded that shifting is not motivated by any single factor, suggesting that a multi-factor theory may need to be developed.

To the present researchers' knowledge, few studies, if any, have attempted to take into account processing of heavy-NP structure by Iranian adult advanced EFL learners. Furthermore, a gap in knowledge was felt with regard to how Iranian adult advanced EFL learners put in order constituents when direct object NPs are lengthened. Therefore, this study attempted to investigate the possible effect lengthening a direct object NP might have on how Iranian adult advanced EFL learners process sentences and put constituents in order.

The researchers hypothesized that when there is an increase in the length of direct object NPs, there might be an alteration in the way Iranian adult advanced EFL learners process sentences and put in order the constituents.

Method

Experiment 1

This experiment aimed at investigating whether increasing NP length has any effect on advanced EFL learners' tendency towards either basic [NP-PP] or shifted [PP-NP] order of these phrases. Participants put phrases in their preferred order to construct sentences, selecting either the basic word order where a verb and direct object NP were adjacent with a PP following the NP [S-V-NP-PP] or the shifted word order in which the PP intervened between the verb and the direct object NP [S-V-PP-NP]. Phrases appeared on a computer screen, using Microsoft Power Point. Our general expectation was

that participants would select the shifted structure more often than the basic word order.

Participants

A total of 30 male ($n = 17$) and female ($n = 13$) undergraduate students at the University of Tehran, Tehran, Iran participated in this experiment. They were chosen from students majoring in different disciplines of Humanities. They were all advanced learners of English. Furthermore, they had passed general English courses. They had been learning English for a minimum period of four and a maximum of seven years. In order to ensure their proficiency level, the present researchers used the Oxford Quick Placement Test. Primarily, 100 individuals participated in the placement test, and 52 of them were perceived to be at advanced level as determined by the test's specifications. Out of these 52 individuals, 30 were selected randomly to participate in the experiment. They were homogeneous with respect to English proficiency. All were native speakers of Persian, and their age ranged from 19 to 23. They all voluntarily participated in this study, and were kept unaware of the purpose of the study.

Materials

The researchers constructed 20 experimental items, each comprising three components: a subject, a verb, a noun phrase, and a prepositional phrase. Two examples are provided in Table 1, and all the experimental items are listed in the Appendix.

Table 1

Examples of Experimental Sentences

| Subject and Verb | Direct Object NP | PP |
|------------------|---|----------|
| John presented | a brand new speedy brown sports car with a spare tire | to Kate |
| Mary described | the best and the worst routes to the Liverpool beach and pier | to Alex. |

Each of the 20 subject–verb phrases was two words in length (e.g., Mark reported). The long direct object NPs contained 11-12 words, and they consisted of prenominal adjectives and prepositional phrases. In the prepositional phrases used, the preposition was either *to*, *with* or *at*, expressing a goal thematic role, as in *to Alex*, a manner role, as in *with unwillingness* and time, as in *at lunch time*.

The Oxford Quick Placement Test (version 2) was used as the criterion measure of participants' level of proficiency. The test is divided into two parts, and it consists of 60 items 35 of which are in the form of individual multiple choice items. The rest 25 items appear in five separate cloze tests, each comprising five items. Those who answered at least 48 items out 60 correctly or higher were deemed suitable participants for this study.

Design and Procedure

The task required the participants to put in order the phrases presented on a computer screen to form sensible sentences. Each sentence was divided into three justified phrases. On each trial, the phrases appeared at the top, center, and bottom of the screen locations, and the participants were required to make sentences either with the phrase order MIDDLE–TOP–BOTTOM or with the order MIDDLE–BOTTOM–TOP. No punctuation was used in the sentences, and the subject–verb phrase was always held in the center position. This phrase was highlighted yellow, indicating that it formed the beginning of the sentence. Prior to the start of the task, participants had been told to start the sentences with the phrase in the middle of the screen. The position of the other two phrases was counterbalanced across different items.

The researchers also developed five practice items to ensure that the participants were completely familiar with the task. Furthermore, 25 filler items were constructed to camouflage the purpose of the study. What distinguished the experimental items with the filler ones was that only one ordering of the top and bottom phrases resulted in a grammatical sentence in the filler items. In order to run the task, Microsoft Power Point Presentation was used. On each trial, the three phrases appeared on the screen. The time allocated for each trial was 25 seconds after which time the subsequent item would appear on the screen automatically. This means that if the participant

could not decide on the ordering of the sentence in the allocated time, they would lose that item. The participants were not allowed to go to the next or previous items, and had to allow the computer to do this for them. The center-position phrase was always labeled 1, and the top phrase and the bottom phrase were labeled 2 and 3, respectively. The participants were required to read the phrases and write the correct number, either 123 or 132, on their answer sheets. The following is an example of how an item appeared on the screen.

2. to Carol

1. Jennifer explained

1 --- ---

**3. all of the important facts for the import and
export taxes.**

The number they wrote for each item indicated which phrase order they chose to construct the sentence. In this way, the participants were obliged to be explicit in their choice between the alternative orders. For the example given above, if a participant wrote 132, it indicated that he or she constructed the sentence in the basic order (S-V- direct object NP-PP). On the other hand, the number 123 would represent that the shifted order was selected (S-V-PP- direct object NP). The participants completed this task without a break in about a 21-minute session. For each participant, a separate session was held.

Experiment 2

For the second experiment in this study, a grammaticality judgment task was used. The aim of this task was to investigate the participants' grammatical

knowledge of shifted structures with long NPs as direct object. The participants were supposed to decide upon the grammaticality of the sentences.

Participants

A total of thirty male ($n = 14$) and female ($n = 16$) undergraduate students at Ferdowsi University of Mashhad, Mashhad, Iran participated in this experiment. They were selected from among students majoring in different fields of Humanities and Sciences. They were all advanced learners of English. Moreover, they had taken general English courses. They had been learning English for a minimum period of three and a maximum of six years. The Oxford Quick Placement Test was administered to make sure of their proficiency level. Like Experiment 1, 100 individuals participated in the placement test, and 46 of them were regarded as being at advanced level as determined by the test's specifications. Out of these 46 individuals, 30 were selected randomly to participate in the experiment. Therefore, they were homogeneous with regard to proficiency level. All were native speakers of Persian, and their age range was between 18 and 24. They all voluntarily took part in the experiment, and were kept naïve to the purpose of the study. The researchers decided that a second group of participants be selected for this experiment. One reason was that if participants took part in both experiments, repetition of the heavy-NP shift structure might have led them to discern a pattern in the materials, and figure out the purpose of the study. To prevent such factors from affecting participants' natural processing of the materials, a second group of participants was selected.

Materials

All the 20 experimental items and 25 filler items which were used in the experiment 1 were also utilized in this experiment.

Design and Procedure

In order to do this task, participants were required to decide on the grammaticality or ungrammaticality of the sentences. In so doing, they were expected to decide whether each sentence was grammatical, awkward or

ungrammatical. Before starting to do the task, they were told that awkward in this sense meant that the structure is used in conversational English, but is against the standard grammar rules of the language. This task was run like a paper-and-pencil test. Participants were expected to read each sentence, and check grammatical, awkward or ungrammatical in their answer sheets. The time allocated for this task was 20 minutes. The following is an example of an experimental item:

Example 2. *Alex described each of the key points of the Parliament conflict in an interview to Curtis.*

Grammatical *Awkward* *Ungrammatical*

Based on the answers participants provided, we were able to investigate what they thought of the shifted structure.

Results

Table 2 shows the frequency of the shifted structure and the basic word order formed by five of the participants in the first experiment.

Table 2

The Frequency of the Shifted Structure and Basic Word Order As Formed By Five of the Participants in the First Experiment

| | Shifted Word Order | Basic Word Order | Not Attempted |
|---------------|--------------------|------------------|---------------|
| Participant 1 | 12 | 6 | 2 |
| Participant 2 | 11 | 8 | 1 |
| Participant 3 | 9 | 10 | 1 |
| Participant 4 | 14 | 3 | 3 |
| Participant 5 | 13 | 5 | 2 |

Considering the information presented in the table above, it is clear that the participants quite often formed the sentences with the shifted order. The five participants mentioned above chose the shifted word order and the basic word order 59 and 32 times respectively. In other words, the participants favored the shifted structure over the basic word order. Moreover, the

participants did not attempt some items in some cases. According to table 2, five of the participants did not attempt the items 9 times in total, and each varied in the number of items they missed. In other words, they could not provide an order for a number of items, and so missed them.

Figure 1 indicates the frequency of the shifted word order and the basic word order as formed by all of the participants in experiment 1. There were 30 participants and 20 experimental items. Therefore, there were 600 answers ($30 \times 20 = 600$).

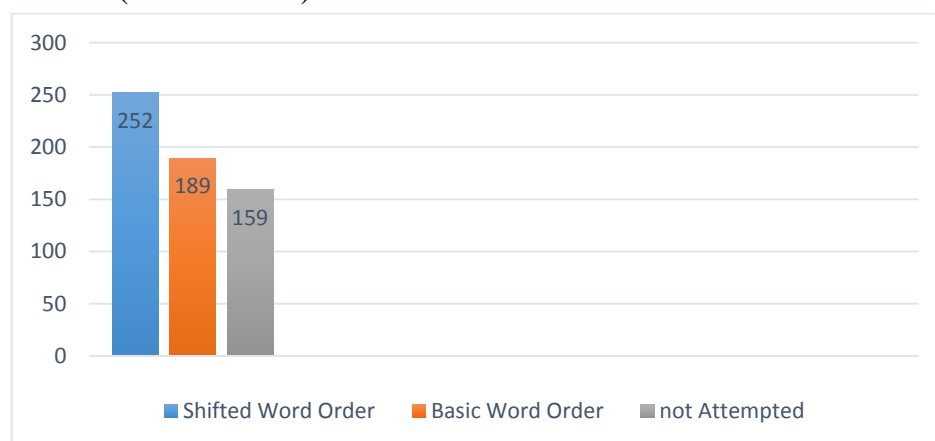


Figure 1. The Frequency of the shifted word order and the basic word order as formed by all of the participants in the first experiment

The figure shows the differences in the number of times each word order was used to construct the sentences. The information in figure 1 indicates that the participants formed 252 sentences with the shifted structure. Furthermore, 189 sentences were constructed using the basic word order, and the participants missed the chance to form 159 of the sentences in general.

In order to find out whether there was a significant difference between the frequency of formation of the shifted word order and that of basic word order, a one-way Chi-square test was run. Table 3 indicates the results of the chi-square analysis in experiment 1.

Table 3
The Results of the Chi-square Analysis in Experiment 1

| | Observed N | Expected N | df | Residua l | χ^2 | sig |
|--------------------------|---------------|---------------|----|--------------|----------|-------|
| Shifted Word Order | 252 | 200 | 2 | 52 | 21.942 | 0.000 |
| Basic Word Order | 189 | 200 | 2 | - 11 | | |
| not Attempted | 159 | 200 | 2 | - 41 | | |
| Total | 600 | | | | | |

Given the results of the analysis, there is a significant difference in the frequency of shifted word order and that of basic word order as formed by the participants ($\chi^2 = 21.942$, $p < 0.05$). As the results suggest, the shifted word order was formed more often by the participants as the desired structure (observed $N = 252$) than expected ($N = 200$). Accordingly, it may be inferred that when the direct object NP is lengthened, and thus 'heavy', shifted word order is more likely to be formed. On the other hand, the number of the basic word structure (observed $N = 189$) formed is significantly less than the shifted structure.

Table 4 indicates the number of times the shifted structure was regarded as being grammatical, awkward or ungrammatical by five of the participants.

Table 4.
*The Number of Times the Shifted Word Order Was Considered
 Grammatical, Awkward or Ungrammatical by Five of the Participants*

| | Grammatical | Awkward | Ungrammatical |
|---------------|-------------|---------|---------------|
| Participant 1 | 9 | 6 | 3 |
| Participant 2 | 8 | 5 | 7 |
| Participant 3 | 12 | 4 | 3 |
| Participant 4 | 6 | 8 | 5 |
| Participant 5 | 15 | 2 | 3 |

As can be seen in table 4, all the five participants reported regarded sentences with the shifted structure as grammatical more often compared to basic word order (50 times vs. 21 times). The participants also considered the sentences to be grammatically awkward in a number of cases (25 times). Participant 4, for instance, considered the sentences to be awkward more often than he/she considered them to be either grammatical or ungrammatical.

Figure 2 shows the number of times the shifted word order was perceived as grammatical, awkward or ungrammatical by all of the participants in experiment 2. There were 30 participants and 20 experimental items. Therefore, there were 600 answers ($30 \times 20 = 600$).



Figure 2. The number of times the shifted word order was considered grammatical, awkward or ungrammatical by all of the participants

Figure 2 provides information with regard to the number of times the participants perceived the sentences as being grammatical, awkward or ungrammatical. As can be seen in the figure, the participants regarded the sentences as grammatical 246 times. Furthermore, they considered the sentences to be awkward and ungrammatical 173 and 181 times, respectively.

To find out whether there existed a significant difference in the number of times participants considered the shifted word order to be grammatical, awkward or ungrammatical, a one-way chi-square test was run. Table 5 shows the results of chi-square analysis in experiment 2.

Table 5

The Results of the Chi-square Analysis in Experiment 2

| | Observed N | Expected N | df | Residual | χ^2 | sig |
|---------------|---------------|---------------|----|----------|----------|------|
| Grammatical | 246 | 200 | 2 | 46 | 14.808 | .000 |
| Awkward | 173 | 200 | 2 | - 27 | | |
| Ungrammatical | 181 | 200 | 2 | - 19 | | |
| Total | 600 | | | | | |

Considering the results of the analysis, there is a significant difference in the number of times participants regarded the shifted structure as grammatical, awkward or ungrammatical ($\chi^2 = 14.808$, $p < 0.05$). As the results propose, the participants viewed the shifted word order as being grammatical (observed $N = 246$) more often than expected ($N = 200$). Therefore, it may be inferred that even when the PP intervenes between the subject and the long, heavy direct object NP, which results in a structure sharply in contrast with the basic word order, the participants considered the structure to be grammatical. On the other hand, the number of times the participants regarded the shifted structure as being awkward (observed $N = 173$) or ungrammatical (observed $N = 181$) is significantly less than the number of times they viewed it as being grammatical.

Discussion

In quest of investigating the phrasal ordering of sentences by Iranian advanced EFL learners, the heavy NP shift phenomenon was taken into account to see whether it had a significant influence on learners' tendency towards shifted word order when the direct object NP is lengthened and heavy. According to a number of studies, it is a syntactic property of the long, heavy NP, such as the length (e.g., Hawkins, 1994; Kimball, 1973), which motivates shifting to occur. The results of this study demonstrated that when the direct object NP was lengthened through attaching additional information, participants quite often formed shifted word order with the PP intervening between the subject and the object NP. One explanation for this might lie in the idea that when an NP is lengthened, and extra linguistic information is added to it, it becomes semantically rich, and hence takes a salient position in

mind. This is in line with the findings of a number of researchers (e.g., Hofmeister, 2011; Yamashita & Chang, 2001) who have argued that longer NPs are more accessible compared to shorter NPs. Another possible explanation might be the idea that longer NPs are highly accessible as extra elaborative information tends to result in richer memory representations (e.g., Marks, 1987).

With respect to the results of the experiment 1, we found that advanced EFL learners formed sentences with the shifted structure significantly more than the basic word order. This finding not only confirms the results of the studies which consider NP complexity as an important factor in a speaker's preference for the shifted structure (e.g., Ross, 1967), but it also underscores the essential role the NP's length plays in tendency towards the shifted structure (Hawkins, 1994). Another explanation for why advanced EFL learners showed greater tendency towards the shifted structure is that long, heavy direct object NPs are placed in the clause final position where it is easier to process. In other words, if a heavy NP occurs in a clause-middle position, it makes the processing more difficult (e.g., Kimball, 1973).

To endorse the obtained results, the tendency to the shifted word order can be associated with theories which propose the production constraints as the principal reason for the shifted structure to happen. As per this view, the ordering of constituents within a sentence is heavily influenced by difficulty in production (Arnold et al., 2000). In other words, participants used shifting as a strategy to overcome the difficulty in the production process. Considering all these, it can be argued that advanced EFL learners' tendency towards the shifted structure was not motivated by any single factor, but by multiple factors. This espouses the idea put forward by Wasow (1997), according to which, a multi-factor theory might be needed to explain the heavy NP shift phenomenon.

As for the findings of the grammaticality judgment task, we found that advanced EFL learners consider the shifted structure to be grammatical. This supports the findings of the first experiment, and suggests that advanced EFL learners process constituents of a sentence more or less similar to the way that native speakers of English do when attempting to make grammatical sentences in terms of phrasal ordering.

In conclusion, both experiments indicated a clear impact of NP length on advanced EFL learners' tendency towards shifting. Participants formed shifted structures more, and also considered shifted structures to be more grammatical, when the sentence contained a long, heavy direct object NP. Therefore, our study endorses sensitivity to the heavy-NP shift phenomenon by advanced EFL learners.

Implications

This study attempted to investigate the processing of sentences with heavy-NP shift structure by Iranian adult advanced EFL learners. Although most studies dealing with sentence processing have suggested implications which are linguistically oriented, they might sometimes be of use in language teaching and related areas. Considering the results of this study, two important implications can be suggested with regard to English language teaching. These include the processability and teachability of this structure and considerations with regard to materials development for different levels of proficiency. Furthermore, teaching the structure as a grammatical point to advanced EFL learners can also be taken into account.

One important point to consider is that teachability and learnability are affected by psychological constraints (Pienemann, 1984) and by processability (Pienemann, 1998) as well. In other words, materials that are processable are more likely to be learned compared to materials which cause processing difficulty for individuals. This idea was put forward by Pienemann (1998) in his Processibility Theory. As the sentences comprising the heavy-NP shift structure do not follow the basic word order of English which is the common structure in most sentences of the language, they might be more difficult in terms of processing. Therefore, it might be the case that advanced learners of English have less difficulty in processing sentences with the heavy-NP structure in comparison with learners at elementary and intermediate levels of proficiency. One possible explanation for this might be that elementary and intermediate EFL learners are only familiar with the basic word order, and only in advanced levels do learners become familiar with structures comprising changes in constituent-ordering.

Given all these, material developers should take into consideration the processing difficulty the heavy-NP shift structure may cause; therefore, they are advised to refrain from including this structure in the input materials developed for elementary or intermediate learners. For instance, passages which are retrieved from authentic sources should be examined for this structure if they are to be used for learners at lower levels of proficiency. However, materials in which the heavy-NP shift structure is found might not be problematic for advanced learners of English as they might not have difficulty in processing as suggested by the results of this study.

A second implication can be that the heavy-NP shift structure can be brought to the attention of learners as a grammatical point when facing it in the input materials. Once again, it should be noted that advanced learners are more likely to benefit from this structure. Thus, if English teachers want their learners to consciously attend to this structure, they have to take into account their learners' level of proficiency. The idea of making elementary and intermediate conscious of this structure is not advised since they may still have difficulty with simpler word ordering of the language.

This study did not take into account advanced learners' ability to produce sentences consisting of the heavy-NP structure. The two experiments utilized in this study were both recognition tasks, and therefore were not concerned with learners' production of the structure. Thus, teachers can consider teaching this structure as a stylistic device to advanced EFL learners. Producing sentences with this structure when object NPs are long make their output look more native-like both in writing and speaking.

References

- Arnold, J., Wasow, T., Losongco, A., & Ginstrom, R. (2000). Heaviness vs. newness: The effects of complexity and information structure on constituent ordering. *Language*, 76, 28-55.
- Bock, J. K. (1990). Structure in language: Creating form in talk. *American Psychologist*, 45, 1221-1236.
- Bock, J. K., & Levelt, W. J. M. (1994). Language production: Grammatical encoding. In M.A. Gernsbacher (Ed.), *Handbook of psycholinguistics* (pp. 945-984). Hillsdale, NJ: Erlbaum.

- Bock, J. K., Loebell, H., & Morey, R. (1992). From conceptual roles to structural relations: Bridging the syntactic cleft. *Psychological Review*, 99, 150-171.
- De Smedt, K. J. M. J. (1990). IPF: An incremental parallel formulator. In R. Dale, C. Mellish, & M. Zock (Eds.), *Current research in natural language generation* (pp. 167-192). London, UK: Academic Press.
- De Smedt, K. J. M. J. (1994). Parallelism in incremental sentence generation. In G. Adriaens & U. Hahn (Eds.), *Parallel natural language processing* (pp.421-447). Norwood, NJ: Ablex.
- Garrett, M. F. (1980). Levels of processing in sentence production. In B. Butterworth (Ed.), *Language production* (pp.177-220). London, UK: Academic Press.
- Hawkins, J. A. (1994). *A performance theory of order and constituency*. Cambridge, UK: Cambridge University Press.
- Hofmeister, P. (2011). Representational complexity and memory retrieval in language comprehension. *Language and Cognitive Processes*, 26, 376-405.
- Horton, W. S., & Keysar, B. (1996). When do speakers take into account common ground? *Cognition*, 59, 91-117.
- Kimball, J. (1973). Seven principles of surface structure parsing in natural language. *Cognition*, 2, 15-47.
- Marks, W. (1987). Retrieval constraints on associative elaborations. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 13, 301-309.
- Pienemann, M. (1984). Psychological constraints on the teachability of languages. *Studies in Second Language Acquisition*, 6, 186-214.
- Pienemann, M. (1998). *Language processing and second language development: Processability theory*. Amsterdam: John Benjamins.
- Ross, J. R. (1967). *Constraints on variables in syntax*. Doctoral dissertation, Massachusetts Institute of Technology. Retrieved from <http://babel.ucsc.edu/~hank/ross67.pdf>
- Stallings, L. M., & MacDonald, M. C. (2011). It's not just the "Heavy NP": Relative phrase length modulates the production of heavy-NP shift. *Journal of Psycholinguistic Research*, 40, 177-187.

- Wasow, T. (1997). Remarks on grammatical weight. *Language Variation and Change*, 9, 81-105.
- Yamashita, H., & Chang, F. (2001). “Long before short” preference in the production of a head-final language. *Cognition*, 81, 45–55.
- Zec, D., & Inkelas, S. (1990). Prosodically constrained syntax. In S. Inkelas & D. Zec (Eds.), *The Phonology-Syntax Connection* (pp. 365-378). Chicago: University of Chicago Press.

Appendix

1. Mary returned the used car ad for a Chevrolet and Cadillac with low mileage to Frank.
2. John presented a brand new speedy brown sports car with a spare tire to Kate.
3. Robert gave one round trip plane ticket from New York to Washington to Lizzy.
4. Jennifer explained all of the important facts for the import and export taxes to Carol.
5. Brian released all of the answers on the twenty point English language quiz at lunch time.
6. Alex described each of the key points of the Parliament conflict in an interview to Curtis.
7. Jack acknowledged all of the pieces of the evidence in the tax fraud case with unwillingness.
8. Rachel explained some difficult math concepts for the one hundred point final test with care.
9. Tom sent a large package with a lot of presents for small children to the orphanage.
10. Shelly revealed top secret plans for a large fleet of Russian defense missiles to David.
11. Wayne reported all the information on the armed bank robbery crimes in Utah with care.
12. Chris wrote a nine-page letter with many details of his business trip to England to the company.
13. Joseph donated some second-hand toys, a box of candy, clean blankets, and snow boots to charity.
14. Tim explained the small reward for helpful clues on a recently occurred murder with hesitation.
15. Bob dispatched a short warning message on the dangers of the terrorist attacks to Michael.
16. Kathy recited all ten verses from an old, famous and beautiful Spanish poem to Peter.
17. Henry sent some of the documents of the selling of the old house to Jacob.

18. Mary described the best and worst routes to the Liverpool beach and pier to Alex.
19. Mark reported the shocking news of the living conditions of the prisoners in Europe to John.
20. Howard disclosed the confidential information of the criminal records of the three prisoners to Nina.