YOUR GENDER MAY LEAD YOU DOWN THE GARDEN PATH

Parvaneh Khosravizadeh1, Ashkan Latifi2, Ghazal Ghaziani3

1,2Languages and Linguistics Center, Sharif University of Technology, Tehran, 3Faculty of Fine Arts, University of Tehran, Tehran (IRAN)

*Corresponding author: khosravizadeh@sharif.edu

DOI: 10.7813/jll.2015/6-1/36

ABSTRACT

The paper investigates the possible effects of gender on the detection of garden path sentences from ungrammatical ones. Participants of the mentioned study were 47 girls and 47 boys who were students of General English Course at Sharif University of Technology. They were required to sit for a grammaticality judgment test given to them as a questionnaire to specify whether the sentences were grammatical or not. The paper indicates that gender has a significant effect on an individual’s recognition of garden path sentences from ungrammatical ones.

Keywords: Garden path sentence, gender, mind

1. INTRODUCTION

When someone thinks of garden path sentences, several questions immediately come up to the surface which seem promising for some future possibilities to quench one’s thirst for more knowledge about the mind and its very structure. Questions such as the following: “How does the mind function? Can garden path sentences help us find out more about the mind? How can such information help us learn more about the mind and its very functional processes and procedures? How can we utilize such sentences experimentally? What uses can we rationally make of the finds of the experiments on such sentences?” and so forth.

This article tries to provide some answers to the questions aforementioned and throws light on more research lines for further probe into the mind and its functional procedures via the information obtained through these, if we may call them so, marvelous sentences. It is foremost to give a concrete account of what garden-path-sentence means. It is a sentence which leads a human being or a machine parser down a “garden path”. It may lead you astray, and consequently, results in a momentarily incorrect analysis of a grammatical sentence as ungrammatical. This sentence results in instant ambiguity which can be overcome as a result of reparsing the sentence with resort to its context (Akmajian, Demers, Farmer, and Harnish 2001).

To be blessed with a language which is to a large extent prone to such sentences is an opportunity for a researcher who is into the mind of humans and language. But an excruciating curse upon L2 learners of that language who are messed up with a whole number of hurdles to overcome being crowned by such sentences; this is what our personal experience bears witness to. In a study carried out by Khosravizadeh and Pushmfroosh (2012), it was shown that being led down the garden path can be the result of lack of lexical and grammatical knowledge of the learner and not solely the very nature of the language itself. They indicate that “words with primarily grammatical functions sometimes have different functions and appear as other classes of word in a given context” (2012: 276). What is important in the current research is the participants are not native speakers of the English language but language learners in an EFL context who suffer from lack of the mentioned knowledge.

Jovanović (2013) maintain that the effect of the garden path sentences most commonly abounds in written language than in spoken one. Due to the small pauses drawn upon in spoken language in places in which commas are utilized in written language and the appropriate intonation provided by the speaker, we are more likely to be trapped in garden path sentences which are written than spoken to us.

As reading is more common than listening in the EFL context of Iran among university students; according to personal interviews with some of them from several cities such as Tehran, Hamedan, Shiraz and Broujen, they are more likely encountered such sentences and suffering from as well as taking advantage of such sentences in learning English.

According to Khosravizadeh and Pashmfroosh (2012), familiarizing learners with garden path sentences can enable them to gain control and awareness over a wide range of lexical categories. The implementation of this technique is based upon inductive learning and reasoning to help learners avoid such drawbacks, such as mistaking a lexical item for another part of speech due to its shape, which are very common and mostly related to cross association.

Carroll (2008) succinctly proposes that two processing models can be drawn upon to shed light on what takes place while getting trapped in a garden path sentence. One is the model which tends that we make decisions in processing a sentence with resort to its immediate context and do not defer it until the whole sentence is processed to make a decision as to what a word means. This is a controlled form of processing rather than an autonomous one. The second model that he proposes advocates that language processing is modular in nature. He mentions that, according to this model, we retrieve the whole number of meanings of a word from our lexicon, which is devoted to the aggregation of lexical items and their components, where, of which, only one accommodates the intended contextual meaning depending on the context of the sentence.

In another classification, Harley (2008) argues that there are two models with regard to parsing, one called the garden path model and the other ‘constrained-based model of parsing’. The former holds that parsing starts with drawing upon only syntactic information and if the solely syntactic-produced information is not compatible with further syntactic, semantic, pragmatic and thematic information generated by an independent thematic processor, the whole processing
restarts from the very beginning. The latter, on the other hand, holds that processing draws upon a multitude of constraints or, in another term, syntactic, discourse, semantic and frequency-based sources.

As Malaa, Wilbur, and Weber-Fox (2009) state, the difficulty level of reanalysis increases as a result of different manipulations and administrations of the ambiguous zone. They declare that if a relative clause takes place after a temporarily ambiguous noun within a garden path structure, the garden path sentence becomes more burdensome to comprehend. On the contrary, modifiers such as adjectives before the noun which is ambiguous do not affect the difficulty of comprehension to a great extent.

In another finding, Ferreira and Henderson (1991) state that modifiers which pursue the head noun of an ambiguous phrase within a garden path sentence escalate the probability that the sentence will be wrongly judged ungrammatical. Studies carried out related to garden-path effects suggest that vulnerability to falling victim to garden path sentences can be probably a result of the reader’s working-memory capacity as well as the causes aforementioned such as the ambiguity zone, the level of proficiency, the frequency of grammatical categories of the lexical items, etc. (Just and Carpenter 1992). They argue that this lets the readers who possess larger and more efficient working memory capacities retain more than one parsing possibility active and, as a result, designate the proper and accurate interpretation as later information of the sentence becomes evident and available.

As it was mentioned, there are a number of factors which may have influence on the probability by which an individual may go down the garden path in his confrontation with garden path sentences. Another factors proposed by Traxler and Tooley (2007) could be the size of an individual’s vocabulary knowledge. They suggest the possibility that individuals with larger vocabulary knowledge could possess more powerful connections between particular lexical items and structures which lead to garden path sentences due to the issue that such learners totally have access to a larger number of different structures. As a result may happen to be more likely to point out scarce structures, their greater vocabulary knowledge may result that such individuals are more skilled at selecting, extracting and making up novel argument structures at times which they confront rare structures.

They further maintain that the individuals who possess a great knowledge of vocabulary may be able to do more subtle discriminations between words which are similar at the syntactic, argument structure and semantic levels. As a result, they state that this can facilitate the recovering process for an individual with a greater knowledge.

Along the same lines, to show whether or not the effect of a first wrong parsing of a sentence remains active during the following parsing of the same sentence, some other studies are carried out and briefly discussed as the following.

In the mentioned study, Kaschak and Glenberg (2004) claim that the establishment of the improper syntactic analysis in constructions which are novel promotes, speeds up the processes which determine the successive processing of structures that are identical or similar to the first inappropriate analysis. Such findings back up the standpoint that inaccurate analysis is not completely deactivated during the analysis of constructions similar to the first ambiguous construction or word. It means there is a carry-over effect from the former situation to the latter on parsing two sentences with the same constructions or words. It could be the result of the neural associations and connections made in the brain which is, of course, in need of more research in linguistics, neuro-linguistics, psycholinguistics, bio-linguistics, cognitive psychology, learning psychology, cognitive sciences, etc.

As suggested by Choi and Trueswell (2010), cognitive maturation can be a decisive factor in recovering of misanalysis of garden path sentences. They argue that the limited cognitive abilities of children would not let them cope with such parsing conditions as involved in recovering of a garden path trap. Such parsing conditions hinder children’s ability to launch an initial interpretation. They further maintain that comprehension studies, as a matter of fact, prove that five or four-year-old children experience much difficulty when it comes to revising their first parsing choice than adults or older children. This results in their usual failure to ever recover from a garden path.

As they further discuss, children (Korean children in their study) usually perform non-adult actions when intending to recover from a garden path. Most of psycholinguistic theories contend the standpoint in which difficulties involved in processing occur when parsing made in garden-path occurs (Hopf, Bader, Meng, and Bayer 2003). As it is mentioned above, recovery from such instances are much more difficult for children than adults.

To draw any conclusion from the study of garden path sentences about the mind and its functional processes and procedures and to account for different variables which may have influence on parsing of such sentences, it is compulsory to adopt a sound experimental approach in such studies.

To see into parsing difficulties and the coping with difficulties in such sentences, different approaches have been exercised which will be noted. One of these approaches is concerned with the amount of time taken by the participant in reading such sentences. According to Wilson and Garnsey (2009), garden-path sentences, by and large, take much time to be processed than other sentences due to their requirement for reanalysis.

They maintain that one of the goals of research in language comprehension is to issue explanations for the whys and reasons which demonstrate the ways that certain kinds of sentences end up in garden-pathing. This can provide a more comprehensive account of the capacity of human being for language.

The other approach could be that of eye movement to be observed and recorded (Akmajian et al. 2001). As they argue, eye-tracking can also be a notion of reparsing in the reader as a result of instant ambiguity caused by such sentences.

“Eye-tracking” is concerned with the position of an individual’s eyes and eye movement. It attempts to capture an individual’s eye movement in temporary consideration and then in the revision of this sort of sentences (Choi and Trueswell 2010).

The last approach which is taken in this research is using a questionnaire. This approach helps us to penetrate into the participants’ minds with regard to their gender difference in order to process naughty sentences and the possible influences of this variable on such a process.

Consequently, according to the mentioned studies regarding garden path sentences, there are a number of factors which affect an individual’s ability to distinguish a garden path sentence form an ungrammatical one. This study is carried out to see into the possible differences between the two genders, namely male and female, in detecting and recognizing garden path sentences among Iranian learners of English language at Sharif University of Technology which is an example of the EFL context.

The authors believe that there have been very few studies taking into notice gender differences and its effect upon garden-path-sentence detection in general, and among Iranian learners of English in an EFL context in particular.
The purpose of the study is twofold. First, its implications for pedagogical issues are of utmost importance. If the results of the study show any differences; consequently, different strategies are necessary to be coined and adopted on part of teachers for the issue of instructing their students of different genders about garden path sentences. This will undoubtedly call for more research into such strategies. Second, the results of this study may play an exploratory role in providing more gainful insights into the issues of gender and probably different structures of the mind, specifically in the comprehension of garden path sentences and the possible effects of it upon other cognitive processes such as instantly ambiguous mathematical formulae, numbers, etc. to be further explored and delved into.

The questions which are posed and attempted to be answered by this study are as the following:
1. Does the learner’s gender have any effect on their recognition of garden path sentences from ungrammatical sentences?
2. If we consider there is an effect imposed by gender upon the learner’s recognition of garden path sentences from ungrammatical sentences, which gender is more vulnerable to such sentences and more likely to be led down the garden path?

Hypothesis
H0: Gender of a language learner has no effect on his/her ability to recognize garden path sentences from ungrammatical ones.

2. MATERIALS AND METHODS

Participants
Participants in the study were 94 Iranian students, 47 boys and 47 girls, of General English Course at Sharif University of Technology in Iran. They were at upper-intermediate level of proficiency with an average age of 20. In addition, they were students of different fields of study who were majoring in engineering and science and not in English. They were not instructed anything about garden-path sentences as it was intended to test their efficiency in determining garden-path sentences from ungrammatical ones solely based upon their intuition and the possible effect of gender upon it.

They took the test as a test of grammaticality judgment in which they had to utterly rely upon their interlanguage competence and not any knowledge of garden-path sentences accumulated in the past. The participants were chosen through non-random convenience sampling, that is, the participants in the study have been those of language learners who were at researchers’ disposal.

Instrument
The only instrument utilized in this study was a questionnaire developed by the researchers (available in the appendix). The questionnaire comprised 25 sentences of which 10 were ungrammatical and 15 grammatical. 5 of the 15 grammatical sentences were garden path sentences.

The respondents were required to choose from one of two possible choices (grammatical or ungrammatical) with regard to the sentences provided in the questionnaire. 20 of the sentences were applied as distracters and only five garden-path sentences were of interest to the researchers, namely sentences 7, 10, 15, 21 and 25. The sentences were ordered randomly in the questionnaire to guard against any possibility which might give away the true answers through any possible patterns. This could, as well, cancel any possibilities of providing any patterns of difficulty in the sentences. The wording of the sentences was tried to mirror the language proficiency of the participants so as to prevent any unnecessary difficulty imposed upon them which could be attributed to unfamiliar words.

In order to estimate the reliability index of the questionnaire, the questionnaire was piloted with 40 participants at approximately the same level of proficiency as the target participants. As table 1 shows, the Cronbach’s alpha held 0.71 which is an acceptable level of reliability regarding what Larson-Hall (2010) suggests.

As sentences were decontextualized, the only factor of interest to the researchers that could account for the results obtained from the two groups could be attributed to their gender. Its relevance to sentence parsing as any possibility of major differences in the knowledge of syntax and parts of speech of the lexical items within the sentences on part of the participants could be dismissed due to the fact that the participants were all at the same level of proficiency.

The researchers try that the participants take the test under the same testing conditions although they cannot guarantee that the students were all at the same level of motivation, relaxedness, health, satisfaction, seriousness, anxiety and the like issues.

The garden path sentences were retrieved from Maxfield, Lyon, and Silliman (2009: 97-99). The participants were required to specify grammatical and ungrammatical sentences by choosing one of the possible answers, i.e., grammatical or ungrammatical, within a time limit of 8 minutes which was set relatively short in order to tap into their competence and not their conscious knowledge of grammatical rules of the English Language.

Table 1. Reliability Statistics

<table>
<thead>
<tr>
<th>Cronbach’s Alpha</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.71</td>
<td>25</td>
</tr>
</tbody>
</table>

Design
The design of the study is quantitative in nature which draws upon the frequency of the number of the correct and wrong answers chosen by the participants in the study. The study was carried out with two main groups of participants with regard to their gender differences whether as male or female. The two groups were chosen of an equal number of male and female participants to probe into any possible causes of gender differences in any difference in recognizing grammatical garden path sentences from ungrammatical sentences.

All measures were taken to make sure that the two groups are not significantly different from one another as a result of different language proficiencies by choosing them from students at the same level of proficiency and those who had undergone no instructions on garden path sentences.

As the design of the study was a comparative one, it was believed that a control group who had been taught about garden path sentences might prove beneficial and shed more light on the possible outcomes of the study which was later
abandoned as it just turned out superfluous, viz., that was sound to make the comparison between the two experimental groups as they were equally unconscious of even the existence of such sentences and, consequently, naïve to the purpose of the study. Therefore, the study went on with the two groups.

**Data Collection**

The data were collected through four administrations of the questionnaire to the participants. They were fully instructed as to how to perform on the questionnaire and explicitly informed that they had to go through the whole items within the time limit which was set. They did exactly and precisely as just instructed and required to do. They were required to base their decisions regarding grammaticality or ungrammaticality of the items upon their intuitive knowledge of English and the plausibility of the sentences provided and not blind-guessing.

The study has fulfilled this requirement with resort to the following discussion. As it was completely optional and at their discretion for the participants to provide their names and, besides, they were informed that even if they provided their names, they would not be published under any conditions. Consequently, they were ascertained that their scores on the questionnaire would be kept confidential with no further harm to their face. The researchers assure the participants with a safe ground to perform on the questionnaire without any anxiety over their scores and further harm to their face as the result of the consequences of any possible low score and its publication. As a result, this hopefully resulted in dwindling the possibility of blind-guessing among the participants.

All participants performed on the questionnaire within the time limit specified. The questionnaire was administered at noon for the whole four times of its administration for the four groups of participants to guard against any possibilities of undecided discrepancies such as fatigue, temperature, noise and hunger to the extent possible for the four groups.

Nevertheless, individual temporal differences among participants could not have been assured not to be present within the administrations sessions.

The number of variables which may affect the results of a study is larger than anything that could be controlled and even planned for a priori.

**Data analysis**

In this study the Chi-Square test was used to specify whether the differences between the frequencies of right and wrong choices between the two genders were significant or not. As the scores obtained by the participants were on a nominal scale (count data) representing the frequencies of right and wrong answers, the researchers drew upon the Chi-Square test.

According to Field (2009), there are assumptions which should be met to allow for the utilization of the Chi-Square test. First, the data should be independent. It means that the Chi-Square test will be meaningful if each participant in the study provides only one answer that contributes to just one cell and such study did not violate this assumption. Hinton, Brownlow, McMurray, and Cozens (2004) propose this assumption as the key assumption of the Chi-square test. Second, the frequencies which are expected should be larger than 5, this was too addressed aptly in the study. As the following shows:

There is a second assumption that the calculated chi-square is ‘continuous’ as the chi-square distribution is continuous. In order to satisfy this assumption it is better to have large numbers in each cell rather than small numbers. When the ‘expected frequency’ of a cell is lower than five, we are concerned that this assumption is violated .... Usually, with tables larger than 2×2 and cell frequencies larger than five (and preferably over ten) we use the ‘standard’ chi-square value (Hinton et al. 2004, 275).

As the two aforementioned assumptions were met in the study, the ‘standard’ Chi-Square test was run to specify whether or not there was any significant difference between the results provided by the participants of the two genders.

**3. RESULTS AND DISCUSSION**

In this study, the Chi-Square test was used as the data collected were count data, independent and, in addition, the frequency of the data was greater than 5. The results of the Chi-Square test are illustrated below in table 2.

**Table 2. Case Processing Summary**

<table>
<thead>
<tr>
<th>Cases</th>
<th>Valid</th>
<th>Missing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Percent</td>
<td>N</td>
<td>Percent</td>
</tr>
<tr>
<td>Correct Wrong * Gender</td>
<td>470</td>
<td>100.0%</td>
<td>0</td>
</tr>
</tbody>
</table>

As table 2 shows, 100% of the answers provided by the participants are valid data (N= 470) and 0% of the answers provided by the participants are missing data (N=0), as a result of this, 100% of the total answers provided by the participants are valid data (N=470).

**Table 3. Correct/Wrong Cross tabulation**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
</tr>
<tr>
<td>Count</td>
<td>97</td>
</tr>
<tr>
<td>Expected Count</td>
<td>82.0</td>
</tr>
<tr>
<td>% within Gender</td>
<td>41.3%</td>
</tr>
<tr>
<td>Count</td>
<td>138</td>
</tr>
<tr>
<td>Expected Count</td>
<td>153.0</td>
</tr>
<tr>
<td>% within Gender</td>
<td>58.7%</td>
</tr>
<tr>
<td>Count</td>
<td>235</td>
</tr>
<tr>
<td>Expected Count</td>
<td>235.0</td>
</tr>
<tr>
<td>% within Gender</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
As table 3 shows, 34.9% of participants choose the right choices (N=164) because 65.1% of them choose the wrong choices (N=306). According to this table, 41.3% of female participants choose the right choices (N=97) because 58.7% of them choose the wrong choices (N=138). As table 3 shows, 28.5% of male participants choose the right choices (N=67) because 71.5% of them choose the wrong choices (N=168).

Table 4. Cross-Square Test

<table>
<thead>
<tr>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>8.429</td>
<td>1</td>
<td>.004</td>
<td></td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>7.876</td>
<td>1</td>
<td>.005</td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>8.465</td>
<td>1</td>
<td>.004</td>
<td>.005</td>
</tr>
<tr>
<td>Fisher’s Exact Test</td>
<td></td>
<td></td>
<td></td>
<td>.002</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>8.411</td>
<td>1</td>
<td>.004</td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>470</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As table 4 shows, females perform better on the questionnaire on average. But to specify whether this difference is significant or not, the researchers utilized the Chi-Square test. As the above table indicates, there is a significant difference between the performance of the female participants in comparison to that of the male participants in distinguishing garden-path sentences from ungrammatical ones, $\chi^2 = 8.429$, df=1, P<0.05.

The obtained result suggests that, based on the odds ratio, the odds of males choosing the right choices would amount to that of females’ if they had performed 1.76 times better than what they did on the questionnaire as what follows:

97/67 = 1.4477
138/168 = 0.8214
1.4477/0.8214 = 1.76

As the bar chart indicates too, the female participants in the study have outperformed the male participants. They have made fewer mistakes with regard to their better distinguishing of garden-path sentences from ungrammatical ones.

To provide an answer to the first question proposed, as the results indicate, we are able to reject the null hypothesis which stated that there is no significant difference between the two genders and its effect upon distinguishing garden-path sentences from ungrammatical ones, as the probability level (p value) is by far below the 0.05 level of significance (α level).

To answer the second question posed, the results show that the male participants in the study were more vulnerable to garden-path sentences traps. As the odds ratio indicates, the female participants were 1.76 times better than the male participants in the study in distinguishing garden-path sentences from ungrammatical ones. As the participants were at the same level of proficiency and unfamiliar with garden path sentences and the testing conditions were held constant during the study, the obtained results can be mainly attributed to the influences of gender differences in the participants upon their performance on the questionnaire.

4. CONCLUSION

The study aim at investigating the possible effects of gender upon distinguishing garden-path sentences from ungrammatical ones as a possible result of different parsing approaches in female and male language learners.
As the study shows, there is a significant difference between how female and male participants perform on the questionnaire which is intended to distinguish garden path sentences from ungrammatical ones. As the participants are at the same level of proficiency who are naïve to garden path sentences and the study is carried out under the same testing conditions, any possibility of systematic differences between the two groups can be dismissed and the significant difference between the two groups can be reduced to the gender differences.

As a result of the finding of the study, the related suggestion for the teachers could be that they should adopt different teaching strategies for instructing learners about garden-path sentences through familiarizing them with different parts of speech of certain English words. For example, “read” both as an intransitive and a transitive verb or “man” both as a verb and a noun and rare syntactic structures.

Consequently, as Khosravizadeh and Pashmforoosh (2012) suggest, introducing garden-path sentences to learners can help them gain control over handling a large number of different categories of lexical items. This can, in its own turn, help language learners reason inductively in order to avoid the hidden trap of cross association which may lead them down a garden path.

However, as the results of the study are based upon the performance of a limited number of subjects at only one university, it may be helpful to carry out this study in different learning contexts with a larger number of participants to provide more information on the effects of gender upon parsing a sentence.

Human beings’ language processing in particular and cognitive processing in general may be subject to gender differences between males and females. It can be suggested that females may have developed with more sophisticated capabilities in information processing than males which could be attributed to what natural selection has bestowed upon them in order to compensate for their lesser muscular mass and, consequently, less body strength in comparison with males for survival reasons to assure maintenance of a next generation in a forever-battle for survival.

The researchers would like to suggest that such a capability for a more sophisticated information processing may have resulted in different modes of cognitive processing in females which, of course, is in need of further research for confirmation or refutation. This is proposed with regard to the confirmed influence of working memory’s capacity upon parsing facility in children and the adult (Just and Carpenter 1992) and now as a possible analogy, this time, concerned with the two biological genders.

REFERENCES

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Journal of Language and Literature, ISSN: 2078-0303, Vol. 6. No. 1. 2015

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