

Proto-typicality in Phrase Production: Producing Word Pairs by Normal versus Intellectually Challenged Iranian Children

Parvaneh Khosravizadeh¹
Somaye Akbari², Seyed Mehdi Akbari Fakhrabadi³, Farid Akhlaghi⁴

¹Sharif University of Technology, Languages, and Linguistics Center
Assistant Professor, email: khosravizadeh@sharif.edu

^{2,3,4}Sharif University of Technology, Languages, and Linguistics Center
MA Student of TEFL program

Abstract

To date many researchers have examined the effect of category typicality on the ordering of words in the sentence production among normal people. They mostly have found out that typical items are more prior than atypical ones. They also unanimously confirmed that the results are affected by either word frequency or conceptual variable. In this study, it is decided to expand the experiment among intellectually challenged subjects to compare the results with the ones obtained from normal ones. Furthermore, the effect of typicality on word order in some Persian collocations has been tested. Experiment 1 is administered among normal students, while experiment 2 is administered among abnormal (mentally retarded) ones in order to investigate the effect of typicality on word order in both groups. Word pairs of both same and different categories have taken into considerations in this study.

Keywords: Typicality; Word pairs; Collocation; Word order; Retardation

1. Introduction

In some occasions, word order can alter the meaning of a sentence: *John fired Mary* means different from *Mary fired John*. In some other occasions, however, word order does not have any effect on meaning of sentences: *John and Mary got through to the final competition* has the same meaning as *Mary and John got through to the final competition*. In this article, we study the factors that can affect word order in the latter case in normal vs. abnormal

Iranian students. For this purpose, we have exploited some Persian collocations and word pairs, some of which of the same category and some others of different categories.

One principle determining word order is that things that are easier to say tend to be said earlier (Bock, 1982). It can be either easier to access the concept, which is called *conceptual accessibility*, or to access the word that refers to that concept, which is called *lexical accessibility*. Conceptual accessibility refers to the fact that certain kinds of concepts have prominence within the conceptual system. Properties that make a concept more prominent include concreteness, and animacy (Bock, Loebell, & More, 1992; Bock & Warren, 1985; Clark & Begun, 1971; McDonald et al., 1993). Lexical accessibility has to do with the ease of retrieving a word. All things being equal, words that are more accessible, that is more frequent or shorter, tend to be placed earlier within phrases (Bock, 1982; Kelly, 1986). Furthermore, lexical variables connected with accessibility tend to affect word order more within phrases rather than within major sentence constituents.

Another variable that may influence word order is category typicality. It is a measure of the goodness of category membership (Rosch, 1975). For instance, *rose* is judged to be a more typical flower than *daffodil*. Although typicality effects has to do more with concepts- mental representations about classes of entities in the world-, some evidence proves that it consists of a lexical component which can influence language production. Thus, two completely distinct hypotheses can explain how typicality affects word order: the *lexical account* says that words are differentially accessible due to their typicality, which has a direct effect on the linguistic representation of a word. On the other hand, the *conceptual account* argues that concepts underlying typical words are more similar to the concepts of their categories (e.g., rose-flower) than concepts of atypical words (e.g., daffodil-flower), and that this has an indirect effect on word order.

2. The present study

We conducted two surveys studying the nature of typicality effects on word order, trying to obtain evidence for their lexical or conceptual bases in the case of phrases. Moreover, we attempted to examine the effect of typicality on normal versus abnormal Iranian elementary students' phrase production. In both experiments, twice the researcher read a short text of ten sentences. In experiment 1 which was for normal students, the text was divided into three parts each of which followed by a group of questions. In experiment 2, which was performed for abnormal subjects, however, the same text was divided into different parts regarding the students' mental ability and their retardation range. The same set of questions elicited the target word pairs from the abnormal group as well; one question for each sentence, ten questions totally.

All of the word pairs were divided by [*o*], a Persian coordinating conjunction meaning 'and'. The text included three Persian collocations, /*dæst o suræf*/ meaning 'hand and face', /*nân o pænîr*/ meaning 'bread and cheese', and /*muš o gôrbæ*/ meaning 'mouse and cat'. The rest of the word pairs are not collocations in Persian language. In addition, half of the word pairs were of the same category: /*æll o îmân* / 'Ali and Iman' as names, /*dæst o suræf*/ 'hand and face' as body parts, /*nân o pænîr*/ 'bread and cheese' as breakfast, /*čIps o pofæk*/ 'chips and snack' as snacks, and /*muš o gôrbæ*/, 'mouse and cat' as animals. The other half of the word pairs were of different categories.

3. Experiment 1

The purpose is to examine the previous results among normal students and to reassure the existence of contrast between lexical and conceptual accounts of typicality effect on sentence and phrase production. We have provided the phrases (collocations) in the frame of sentences that composed of not only two category members but also non-category members to test the effect of typicality on the same category items.

Subjects heard sentences that encompassed two category members articulating collocations, one more typical or frequent and one less typical or frequent that the students are required to recall. In half of the collocations, two items

were members of same category, while in the other, they were from different categories; for instance *hand* and *face* are of the same category while *horse* and *bike* are not.

In the research on normal students, we found out that the highly typical, more frequent, more easily produced, and shorter items in the phrases manifested earlier; the fact that shows the influence of other factors besides the typicality. Sometimes, the priority of lexical approach over conceptual approach was observed, while some other times the reverse was the case.

3.1. Participants

One hundred and eight normal male students participated from a primary school in Tehran but only fifty of them were randomly selected in order to be considered for later research. All of these normal subjects were between 7 and 11 years old.

3.2. Materials

In order to prove the effect of typicality on the ordering of words in collocations in sentences and to emphasize its effect on relevant category items, we provided a short text, which included collocations. [o], as a coordinating conjunction in Persian means 'and', was used between each word pair. The text was followed by some questions eliciting word pairs from the students.

3.3. Procedure

Subjects were tested in groups of 15 and 20 in normal classroom condition. In experiment1 a text was divided into 3 parts and each part was read twice by inverting the order of collocations at the second time in order not to impose the ordering and to permit the subjects themselves to determine the sequence of the word pairs; (For instance: First time: Ali rides *bike and horse*. Second time: Ali rides *horse and bike*). Then the questions are putting forward serving as the cue to assist the subjects of the study to recall the target word pairs.

3.4. Results

Written responses were counted:

Table 1.

| Ali and Iman <i>/æI o īmân /</i> | Iman and Ali <i>/īmân o æI /</i> | Other names |
|-------------------------------------|-------------------------------------|-------------|
| 34 | 12 | 4 |

| Hands and face <i>/dæst o suræt /</i> | Face and hands <i>/suræt o dæst /</i> | Other parts/or one of the parts |
|--|--|---------------------------------|
| 34 | 8 | 8 |

| Bread and cheese <i>/nân o pænIr /</i> | Cheese and bread <i>/pænIr o nân /</i> | Other responses |
|---|---|-----------------|
| | | |

| | | |
|----|---|---|
| 46 | 1 | 3 |
|----|---|---|

| | | |
|--|---|-----------------|
| Chips and snack <i>/čİps o pofæk/</i> | Snack and chips <i>/pofæk o čİps /</i> | Other responses |
| 40 | 6 | 4 |

| | | | |
|---------------------------------------|---------------------------------------|--------------------------------------|-----------------|
| Mouse and cat <i>/muš o görbə/</i> | Cat and mouse <i>/görbə o muš/</i> | Tom and Jerry <i>/tom o jərI/</i> | Other responses |
| 37 | 1 | 6 | 6 |

| | | |
|--|--|-----------------|
| Bike and horse <i>/dočærxə o æsb/</i> | Horse and bike <i>/æsb o dočærxə/</i> | Other responses |
| 19 | 17 | 14 |

| | | |
|---|---|-----------------|
| Jelly beans and ball <i>/pâstİl o tup/</i> | Ball and jelly beans <i>/tup o pâstİl/</i> | Other responses |
| 26 | 12 | 12 |

| | | |
|---|--|-----------------|
| Glasses and sourdough <i>/əynæk o lævâšæk/</i> | Sourdough and glasses <i>/ lævâšæk o əynæk/</i> | Other responses |
| 23 | 20 | 7 |

| | | |
|--|--|-----------------|
| Car and book <i>/mâšIn o kətâb/</i> | Book and car <i>/kətâb o mâšIn/</i> | Other responses |
| 26 | 12 | 12 |

| | | |
|---|---|-----------------|
| Chair and eraser <i>/sændæll o pâkkon/</i> | Eraser and chair <i>/Pâkkon o sændæll/</i> | Other responses |
|---|---|-----------------|

| | | |
|----|----|----|
| 20 | 12 | 18 |
|----|----|----|

3.5. Discussion

The first experiment apparently mirrors the fact that normal students answered the same as we anticipated. In the question about the names, most of the students wrote *Ali* and *Iman*; it is meant to be they probably take several things to the consideration: from a lexical point of view, the name *Ali* has one syllable less than *Iman* so it is more easily pronounced. Moreover, *Ali* is a more frequent name in Iran and it has more typicality.

The second question is about hand (in Persian /dæst/) and face (in Persian /suræt/), most students prioritize to write hand first. Owing to the fact that it is a one-syllable word in Farsi, but in this language face/suræt/ has two. In addition, it is more frequent to say this way in Persian therefore hand is more typical among normal students.

In the instance of bread (in Persian /nun or nân/) and cheese /pænIr/ the majority of them wrote bread prior as we see in Persian it has one syllable as compared to cheese that has two, and it is utilized more often, so the matter of frequency is involved too.

For chips and snack, the word ‘chips’ is put in the beginning more; probably it is a consequence of conceptual approach as it is clear they have no remarkable lexical difference.

In the case of mouse (in Persian /muš/) and cat (in Persian /görbæ/), mouse is preferable to be put first as a result of having one less syllable than cat (in Persian) and more trouble-free pronunciation. The eye-opening part is that few students correlated it with their own inferences such as *Tom and Jerry*. Mouse and cat are both animal and it can be seen there is inordinate typicality for the cases with the same category. Consequently, there is predictably less typicality for the ones with different categories; that is why in the case of jelly bean /pâstIl/ and ball /tup/ with dissimilar categories, the difference is not as unanimous as “mouse and cat” with only one category. In addition, there is a repetitive procedure for “car / mâšIn / and book /kætâb/” that we find more students wrote car first but the number of them is not as decisive as the ones with same category.

4. Experiment2

Like the first one, the purpose of this experiment is also to observe the effect of prototypicality on ordering of words in a sentence. The only difference lies between the types of participants. This time, mentally retarded students are chosen (Retarded students are those who are different from normal ones because of their physical or mental problems and need specific kind of training and education). These participants suffer from different types of retardation. They are classified to: a) profound retardation, b) severe retardation, c) moderate retardation, d) mild retardation, and e) border retardation. There is no color of the effect of high or less typical entities on the ordering of words in the phrase among the a, b, and c students who are suffering from the severe mental deficiency. The effect of prototypicality can be observable to some extent among d group students, and its effect is evident on the last group (group e) who possess more IQ percentage in comparison with the other group members. The table below illustrates the mentioned groups along with their related IQ range.

Table 2.

| | |
|----------------------|------------------|
| profound retardation | IQ below 20 |
| severe retardation | IQ between 21-35 |

| | |
|----------------------|------------------|
| moderate retardation | IQ between 36-50 |
| mild retardation | IQ between 51-65 |
| border retardation | IQ between 66-80 |

4.1. Participants

Thirty students from two abnormal elementary schools of Tehran took part in this experiment. They are elementary school students but they are not of the same age of the normal ones. It should be mentioned that retarded students possess two kinds of age: intellectual age and birth age, the second of which they share with normal students. Retarded students are older than normal students are, but have lower IQ than that of normal ones.

4.2. Materials

Materials are as the same as the ones with normal students (the same text and the same questions).

4.3. Procedure

This time, the text was divided to different parts according to the students' ability and the category they belong to. The same procedure with normal students was repeated with abnormal ones. A text was read twice with an inversion in the order of the nouns in word pairs within the sentences, but the students were required to produce the answers **orally** and it was the researcher who wrote down their responses. The main difference between two procedures was that in the second experiment, the number of division of the text was mostly increased in order to help the students to recall the target phrases.

4.4. Results

Uttered responses were counted:

Table 3.

| Ali and Iman | Iman and Ali | Other names |
|----------------------------------|--------------|-------------|
| 9 <i>Ali is more typical.</i> | 4 | 17 |

| Hands and face | Face and hands | Other parts/or one of the parts |
|--------------------------------------|----------------|---------------------------------|
| 15 <i>Hands are more typical.</i> | 5 | 10 |

| Bread and cheese | Cheese and bread | Other responses |
|-------------------------------------|------------------|-----------------|
| 19 <i>Bread is more typical.</i> | 2 | 9 |

| Chips and snack | Snack and chips | Other responses |
|---|-----------------|-----------------|
| 14 <i>Shorter syllabus is easier to produce.</i> | 6 | 10 |

| Mouse and cat | Cat and mouse | Tom and Jerry | Other responses |
|---------------|---------------|---|-----------------|
| 14 | - | 4 <i>The influence of cognition.</i> | 12 |

| Bike and horse | Horse and bike | Other responses |
|----------------|----------------|-----------------|
| 7 | 5 | 18 |

| Jelly beans and ball | Ball and jelly beans | Other responses |
|----------------------|----------------------|-----------------|
| 2 | 8 | 20 |

| Glasses and sourdough | Sourdough and glasses | Other responses |
|-----------------------|-----------------------|-----------------|
| 8 | 3 | 19 |

| Car and book | Book and car | Other responses |
|--------------|--------------|----------------------------------|
| 4 | 5 | 21 <i>(book and notebook)</i> |

| Chair and eraser | Eraser and chair | Other responses |
|------------------|------------------|------------------------------------|
| 3 | 7 | 20 (<i>pencil and eraser</i>) |

4.5. Discussion

In experiment 2, while looking at the result charts, which refer to different category words, difference between majority and minority is less tangible. Moreover, most of them tend to make up other own new responses (for instance instead of chair and eraser they preferred to produce pencil and eraser). For ball/ tup / and jelly bean/pâstîl/, most students put ball first. In this case they answered lexically based on syllable. You are not capable of finding a regular pattern in their answers, however.

About the terms from the same category, the students with higher IQ percentage were able to utilize prototypicality more evidently when they were asked to recall the target noun phrases. There is an influence of frequency factor in example of bread and cheese that the majority of participants even those suffering from severe retardation were capable of supplying the target response.

6. Conclusion

Comparatively, among abnormal students, the ones who have more I.Q intuitively paid more attention to typicality. They made less unrelated responses and were more likely to answer in accordance with lexical and conceptual approaches. In contrast to them, the ones with profound and severe retardation answered totally on the contrary of normal students. To give an example for “chair /*sændæll* /and eraser /*pâkkon* /”, most normal ones preferred to initially place chair, but abnormal ones did vice versa.

Among abnormal ones it was frequent to produce easier words initially in different category phrases and occasionally they articulate simpler words instead of those lengthy words, they tend to change the words in different category phrases in order to provide the answer. These group had problems with the same category words either, but they were able to supply the correct collocation which were more typical either in lexical approach or conceptual approach (For instance bread and cheese, or cat and mouse). Their order is very frequent in Persian and the first words are produced earlier.

As it became obvious in previous studies, normal students pay attention to typicality in noun phrase construction, and somehow it is true about abnormal students who possess higher IQ named border retardation. The effect of typicality in different category words is fading among normal participants while the abnormal ones are ignoring the typicality issue, they are attempting to construct shorter, easier words instead of those lengthy words, which are difficult to pronounce. It should be mentioned that those students with higher mental deficiency produced the other responses in second experiment.

References:

- Afruz, G. (1834), *An introduction to psychology and schooling of retarded children*, Tehran university press.
- Ahadi, H and Bani jamali, Sh. (1369), *Mental health and retardation*, Nei publication.
- Bock, J.K. (1982), Toward a cognitive psychology of syntax: Information processing contributions to sentence formulation. *Psychological Review*, 89, 1-47.
- Bock, J.K., & Warren, R.K. (1985), Conceptual accessibility and syntactic structure in sentence formulation, *Cognition*, 21, 47-67.

Bock, K., Loebell, H., & Morey, R. (1992), From conceptual roles to structural relations: Bridging the syntactic cleft. *Psychological Review*, 99, 150-171.

Clark, H.H., & Begun, J.S. (1971), The semantics of sentence subjects. *Language and Speech*, 14, 34-46.

Hormozi, M. *My retarded child*, Gharn publication.

McDonald, J.L., Bock, K. & Kelly, M.H. (1993), Word and word order: Semantic, phonological, and metrical determinants of serial position. *Cognitive Psychology*, 25, 188-230.

Onishi, K.H., Murphy, G.L., & Bock, K. (2008), Prototypicality in sentence production. *Cognitive Psychology*, 56, 103-141.

Rosch, E. (1975). Cognitive representations of semantic categories. *Journal of Experimental Psychology: General*, 104, 192-233.

Seif Naraghi, M. and Naderi, E. (1379), *Psychology and education of retarded children*, Samt publication.

Seif Naraghi, M. and Naderi, E. (1361), *Retarded student*, Amir kabir publication.