IRANIAN EFL FEMALE STUDENTS' LEXICAL INFERENCING AND ITS RELATIONSHIP TO THEIR L2 PROFICIENCY AND READING SKILL

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Abstract

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This paper reports a study in which Iranian EFL female students' think aloud protocols were analyzed to find out what knowledge sources informed them as they tried to make lexical inference when reading an English text. The study also intended to find out if students' level of their L2 proficiency would affect the pattern of their use of the knowledge sources and if there is a relationship between students' lexical inference ability and their L2 reading performance. Five elementary, five intermediate and five advanced female students were asked to think aloud as they read a text, specifying the knowledge sources they used to guess the meaning of unknown words. They also took a multiple-choice reading test. Results revealed that elementary students used contextual, intralingual and interlingual clues; intermediate students used contextual and advanced students used contextual and intralingual clues in making lexical inference. Though elementary students made the highest number of lexical inference, the highest correct lexical inferencing belonged to advanced students. Overall lexical inference did not show any relationship with the students' reading performance. This study can inspire teachers, textbook writers, and students to attend more to different knowledge sources and lexical inference.

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Introduction

Language learners are likely to come up with new words and vocabulary items in their interaction with a text. Not knowing the meaning of the new words, they are advised to employ some compensation strategies to tackle the problem. Otherwise, the real intention of the speaker or writer may be understood wrongly or even, communication may break down completely. Oxford (2002) defines compensatory strategies as techniques used "to make up for limited knowledge" of the language (p. 128). One such strategy is inference which has been defined as "the process of arriving at a hypothesis, idea or judgment on the basis of other knowledge, ideas or judgments" (Richards, Platt & Platt, 1992).

As evident from the definition, to generate inference, one has to rely on certain knowledge sources. Various researchers have put forth different sources of knowledge one may resort to in constructing lexical inference. Haastrup (1991 cited in Soria, 2001) suggested three sources, namely, contextual, intralingual, and interlingual, that readers may use in making lexical inference. Contextual clues refer to one or two words from the immediate co-text of the new word, the whole sentence containing the new word, a specific

part of the co-text beyond the sentence containing the new word or unspecified part of the text which may help the global understanding of the whole text. Intralingual clues pertain to the features of the new word and the inference maker's reliance on his/her information about phonology, orthography, morphology (the meaning of stem, prefix, and suffix), word class and collocations to guess the meaning. Finally, interlingual sources have to do with a language other than the second language, e.g. readers' first language. Using this clue, inference makers rely on their knowledge of mother tongue or another language to guess the meaning of a word in their second language. As far as L1 is concerned, one can rely on phonological, orthographical, morphological, lexical and collocational similarities between L1 and L2.

This study sought to describe the knowledge sources Iranian EFL female students relied on to make lexical guesses and if their proficiency level had any significant relationship with their choice of knowledge source and lexical inference ability. Finally, the study intended to find out if there was a relationship between students' L2 reading comprehension skill and their lexical inference ability.

Types of Inference

As relates to the type of inference, depending on the location of knowledge source used to make an inference, a distinction has been made between local and global inferences (McKoon & Ratcliff, 1992), and regarding the time of generation, online inferences have been differentiated from offline ones (Graesser, Singer & Trabasso, 1994). As McKoon and Ratcliff (1992) put it, local inferences involve pieces of explicitly stated information close to each other while global ones have to do with separate pieces of information in a text. According to Graesser, Singer and Trabasso (1994), online inferences are made during the process of comprehension while offline ones are generated after that, during a retrieval task.

Models of Inference Generation

The kind of inference people generate and the situation under which they do so have been controversial issues. A number of researchers in the field have proposed various models for inference generation, trying to account for the characteristics of inferences people draw and the situation under which they generate them when reading a text (Garnham, 1992). Among different models suggested for inference making, we can refer to the Minimalist Hypothesis (McKoon & Ratcliff, 1992) and Constructionist Theory (Graesser, Singer & Trabasso, 1994).

According to Minimalist Hypothesis (McKoon & Ratcliff, 1992), only a few number of inferences are likely to be generated during comprehension. Moreover, only local inferences are constructed given that the availability of knowledge source is of utmost importance and that in the generation of local inferences, the knowledge source is within the adjacent clause or sentence of the new word. In addition, this model asserts that the linguistic form of the text is represented in the memory and finally, background knowledge is limitedly used while drawing inference.

On the other hand, Constructionist Theory (Graesser, Singer & Trabasso, 1994) suggests that many inferences can be made during comprehension, and not only local inferences but global ones can be made too. Besides, what is represented in the memory is the situation referred to by the text and that background knowledge is extensively used while an individual is generating inference.

Background to the Study

Quite a good number of research studies have been conducted on lexical inference and experts in the field have attempted to determine what factors influence a lexical inference task and what variables have to do with it. Some of these studies are presented below.

Huckin and Block (1993), using think-aloud protocols, conducted a case study with three Chinese graduate students of international business in America. They noticed that readers relied mostly on local clues when they tried to guess meanings from context. The researchers proposed that readers use context to recheck their guesses and double check the use of other strategies like word analysis.

Dubin and Olshtain (1993) examined the situations in which educated L1 readers used context to infer the meaning of unknown words holding the belief that if native speakers could not do it, it was not realistic to expect it of non-native speakers. Results revealed that the greater the contextual support, the more likely that the guesses made were correct or acceptable substitutes. The researchers came to the conclusion that textual support was necessary for word meaning to be retrievable. They also cautioned L2 teachers and material developers to keep a realistic expectation for L2 learners when it comes to inferring word meanings.

Lee and Wolf (1997) investigated native speakers versus non-native speakers' behavior in dealing with unknown words to address the question of whether L2 learners infer in a similar way and if native speakers pay attention to part of speech as non-native speakers do. Results of their study showed that beginner non-native students could only infer an average of two out of fifteen words. Native speakers did not achieve a perfect success rate either. Advanced L2 learners did not differ significantly from native speakers while beginner and intermediate students were significantly less successful.

Nassaji (2004) examined the relationship between ESL students' depth of vocabulary knowledge, their lexical inference strategy use and their success in generating lexical inference. He found that those who had stronger depth of vocabulary knowledge used certain strategies more frequently than those who had weaker depth of vocabulary knowledge. Furthermore, the stronger students made more effective use of certain types of lexical inference strategies than the weaker ones. Finally, depth of vocabulary knowledge contributed a great deal to inferential success over and above the contribution made by the learner's degree of strategy use.

Cain, Lemmon and Oakhill (2004) performed two pieces of research on the individual differences in reading comprehension skill, vocabulary knowledge and memory capacity in making lexical inferences. One result of the first study was that readers with less comprehension skill had difficulty in generating lexical inferences. Besides, such readers had deficit with the acquisition of vocabulary in general. In their second study, they came to the conclusion that:

children with poor reading comprehension were not impaired in learning novel vocabulary taught through direct instruction, but children with both weak reading comprehension and vocabulary were. (Cain et al, 2004, p. 671)

Having a look at research done in the area of inference in general and lexical inference in particular, one would come to some points. First is the method by which the researchers collected data. Since inference generation is a mental activity, the best possible method to investigate it has been claimed to be verbal protocol analysis. In fact, in order to determine the processes going on in the mind of readers while doing a kind of inference task, the researcher can possibly analyze the protocols they generate and eventually come to the desired conclusions.

Another point worth mentioning is the number of participants the researchers used to obtain data. It can be understood that unlike many quantitative research studies in which the

researchers recruit a relatively large sample, in qualitative studies only smaller number of participants are involved. This is mainly because of the hard task of data collection in such situations. Another point observed in most studies was that narrative texts were used to investigate the inference making ability of the participants.

The present study
Having reviewed previous studies on lexical inference, the present study was designed to find out what knowledge sources are used by Iranian EFL female students in making lexical inferences using think-aloud protocols. Details of the study are presented below.

Participants
Participants of this study were chosen from among Iranian EFL female students of a language institute. Five advanced, five intermediate and five elementary female, adolescent and adult learners were randomly selected. To recruit the participants, classroom teachers were requested to randomly choose the students and introduce them to the researchers. They were all female to control the sex factor and adolescent or adult to be able to handle think-aloud task easily. Their age range was between 16 and 51. The total number of the participants was 15, given the fact that think-aloud protocols were to be collected.

Instruments
Task
To have the participants generate lexical inference, of the four passages selected and included in each level's reading comprehension test (see below), one was randomly selected to be used for the task of lexical inference. Students were asked to read the text and guess the meaning of the words they did not know and reveal how they arrived at that meaning through think aloud.

Reading Comprehension Test
To check students' reading comprehension performance, a reading test was developed. To develop the test, first a number of texts in the students' textbooks were selected and the Flesch readability index was calculated for each level. Then, four texts with almost the same Flesch readability indexes were selected from other similar textbooks. Six multiple-choice items were written for each text and a test of 24 items was produced for each proficiency level. The selected texts were all narrative because this was the genre used in the previous studies and also it was assumed that if participants face the same genre as the ones used in their textbooks, they would most probably carry out the task more successfully on account of the fact that they were already familiar with the text type and could focus on lexical inference.

     Test-retest method was used to check the reliability of the tests. The two sets of marks for each level gained over a three-week interval were correlated. For the elementary level, Pearson Correlation was 0.89. For the intermediate level, Pearson Correlation was 0.86 and for the advance level, Pearson correlation was 0.81. All correlations were significant at 0.05 level.

Data Collection Procedure
During individual meeting sessions, each participant was familiarized with the think aloud procedure. Then, they were provided with one of the randomly selected texts to think aloud while they were making lexical inference of unknown words. Moreover, they were asked to mention any knowledge source they were using to work out the meaning of unknown words.

Verbal reports in the form of think aloud, concurrent and mediated, were gathered from the participants while they were engaged in lexical inference task.

The concurrent think aloud was used because it is said that if the task performance and verbalization do not take place simultaneously, it is probable that some part of the information is missing while individuals are producing verbal reports. Moreover, the information may be filtered in the sense that the participants may well report what they think the researcher is after and ignore what they attended to at the time of accomplishing the task (Green, 1998). On the other hand, mediated think aloud was used to collect the required data as completely as possible while it was also found appropriate to trigger the participants to get access to what they already had in their memory before it was forgotten.

All auditory evidence was recorded by participants' permission, transcribed and codified according to the coding scheme adapted from Haastrup's (1991 cited in Soria, 2001) taxonomy of knowledge sources.

Results

The codes assigned to the segments of think aloud protocols were extracted and categorized to reveal patterns of lexical inference among participants. Organization and analysis of the coded data revealed that elementary students used all the three knowledge sources—contextual, intralingual and interlingual—in guessing the meaning of the unknown words, while intermediate and advanced students relied on contextual clues. Chi-Square test showed that the difference in lexical inference among the three groups was significant at 0.01 level. Table 1 provides details for this finding.

Table 1: Frequency of specific knowledge sources used in each level

	Contextual					*Intralingual*			*Interlingual*	
	Con. Ict	Con. sct	Con. kw	Con. 1&2 ict	Con. unst	Intr. st	Intr. ph/or	Intr. pre	Inter L1 lex	Total
Elem.	19	4	4	3	1	5	4	1	8	49
Int.	11	3	1	0	0	0	0	0	0	15
Adv.	14	5	0	0	3	0	1	0	0	23

Notations:
Con ict: Context, immediate co-text
Con sct: Context, specific part of co-text beyond the sentence of the test word
Con kw: Context, knowledge of the world
Con 1&2 ict: Context, one or two words from the immediate co-text
Con unst: Context, unspecified use of the text
Intr st: Intralingual, stem
Intr ph/or: Intralingual, phonology/orthography
Intr pre: Intralingual, prefix
Inter L1 lex: Interlingual L1 Lexis

The next step in analyzing the data was to find out to what extent students' inferences were correct and if this was related to students' level of proficiency. Thus, the frequency and percentage of the number of times the learners in each level had made correct and incorrect lexical inferences were calculated and are shown in Table 2.

Table 2: Frequency and percentage of correct lexical inferences

	Total number of lexical inferences	Number of correct inferences	Number of Incorrect guesses	Percentage of correct inferences	Percentage of incorrect guesses
Elem.	36	4	32	11.1	88.8
Int.	11	6	5	54.5	45.4
Adv.	12	7	5	58.3	41.6

While elementary level students made the most number of lexical inferences, advanced students made the most number of correct lexical inference. In fact, the frequency of making lexical inference and the percentage of correct inferences for elementary and advanced students are in reverse.

Finally, to find out whether there is any relationship between students' lexical inference ability and their reading comprehension, a correlation was run between the number of times participants had made correct lexical inferences and their reading comprehension score. The correlation between reading comprehension scores and correct lexical inferences was .270 and was not significant.

Discussion

The first point to be discussed is that it was found that elementary students resorted to all clues including contextual, intralingual and interlingual to guess the meaning of unknown words, while intermediate students relied on contextual clues only and advanced learners made use of contextual and intralingual (just in one case) sources. Whether students' guesses were correct or not is another point will be discussed later, however, the fact that participants in general relied on context, especially immediate co-text, more than other clues in guessing the meaning of unknown words is in line with the result of the research performed by Huckin and Block (1993), who also came to the idea that readers relied mostly on local clues when they used context to guess the meaning of unknown words. This might be related to the accessibility of this knowledge source which includes the surrounding words of a vocabulary item or even the whole text containing it which can shed light on the meaning of unknown words.

Moreover, the fact that in this study different kinds of contextual clues were relied on lends support for constructionist hypothesis (Graesser, Singer & Trabasso, 1994) which claims that in the process of inference making, both local and global inferences are generated. Table 2 reveals that within contextual source, not only immediate co-text but also specific parts of the text and collocations were used by the participants. One probable reason for the rare application of intralingual clues relates to the fact that such clues seem to be demanding in that students need some knowledge of the meanings of different affixes, as well as word class and collocations especially when it comes to elementary students. This explains why elementary students who had relied on such sources ended up with a wrong guess about the meaning of the unknown words.

According to Haastrup (1991 cited in Soria, 2001), interlingual clues pertain to a language except L2, which includes either the individual's L1 or Ln. In the present study, these clues were used only by elementary students and in all cases, the final guess turned out to be wrong. Some of the unknown words for elementary students who tried interlingual source of knowledge to unfold the meanings were *flat, mobile*, *print* and *field.* The first two words are used in Persian, the mother tongue of the participants; however, in the text given to

the students, they appeared to have a different meaning. *Flat* was taken to mean *level* and *mobile* meant *a kind of sculpture*. *Field* meant *a piece of land* and finally, *print* was used in the sense of *facsimile*. Contrary to the fact that intralingual clues, especially morphological ones, seem to be the most immediate source to rely on (Soria, 2001), they were demanding especially for low proficient students who were not successful in their guesses using these two knowledge sources.

The finding that advanced (more proficient) students were more successful in making correct lexical inferences, is in line with the findings of the studies conducted by Lee and Wolf (1997) and Nassaji (2004). Based on the findings of Lee and Wolf (1997) who recruited both native speakers and elementary, intermediate and advanced non-native ones, beginning level students could only infer an average of two out of fifteen words. Advanced L2 learners did not differ significantly from native speakers while beginning and intermediate level students were significantly less successful. Such a result can be justified in the light of Nassaji's (2004) findings which indicated that lexical inference is significantly influenced by the richness of the learner's pre-existing semantic system. Obviously, this system develops cumulatively; therefore, such richness is brought about gradually as the learners' proficiency improves.

The final point to be discussed is that lexical inference ability did not show any significant relationship with students' reading comprehension performance. This finding is in contrast with the one resulted from Cain, Lemmon and Oakhill's (2004) research. One justification for this finding is the participants' scores in reading comprehension test which did not show much variation. In other words, students performance on the reading test resulted in almost limited range of scores. This fact was more vivid with regard to intermediate and advanced students who performed almost the same on the reading comprehension test.

The final account would have to do with the sample size. As mentioned earlier, 15 participants were invited to take part in this investigation. The small number is in fact due to the nature of the work which is qualitative. Therefore, any generalization of the findings should be done cautiously. In other words, had the number of the contributors exceeded that of this study, the results could have been more valid.

Implications
Limitations of the study

This study had some limitations which might have affected the findings. The first limitation of the study was the low sample size. As stated before, a total of 15 students participated in this study with five students in each proficiency level. While this was mostly due to the difficulty of performing think aloud protocols with larger numbers of participants, it has certainly affected the findings to the extent that one should be cautious in the generalization of the findings. The other limitation of the present study was the reading comprehension test used. Since it was only multiple-choice test, it could not assess students' reading performance well. This showed itself in the low variability of the scores.

Implications for EFL Teachers

Despite the limitations of the study, it has some implications for teachers and textbook designers. Vocabulary is an important component of the language that learners need to learn in order to be able to use the language. However, it seems quite implausible to expect learners to know every single word or vocabulary item which appears in a text. At the same time, providing learners with the meanings of all new words or encouraging dictionary use do not sound appropriate. This is mainly because such approaches prevent students from searching for and applying suitable strategies such as guessing the meaning of a word from context or

doing word analysis in unfolding the meaning of unknown words. The fact that in most real life situations, learners have to deal with unknown words in the texts, therefore, in their classes, teachers should avoid both providing the learners with the meanings of all new words and encouraging dictionary use all the time, though the importance of dictionary use can not be denied. Instead, teachers should familiarize students with lexical inference making strategies and have them practice doing so in the classroom so that they will apply them in target situations outside the classroom.

Implications for Textbook Designers

As pointed out earlier, lexical inference is a very important factor which must be taken into account seriously. Therefore, textbook designers and material developers should avoid providing glossaries for every reading comprehension text and allow learner to construct lexical guesses themselves.

In addition, material developers should provide learners with some exercises which pave the way for them to practice lexical inference. One possible way is including such exercises within reading comprehension exercises, asking students to infer the meanings of some vocabulary items in the text.

Suggestions for Further Research

Considering the findings of this study, the following areas are worthy of further investigation.

1. A similar study can be carried out with male EFL students and the results can be compared with those of this study to see whether the participants' gender may affect their pattern of lexical inference.

2. Since inference in general and lexical inference in particular include receptive skills, i.e. reading and listening comprehension, in another piece of research, listening comprehension of the learners can be investigated to see whether the knowledge sources they use are similar to the ones used in reading comprehension or not.

3. The present study used narrative texts. In similar studies, texts of different genres can be used to see whether the results would remain the same or not.

References

Cain, K., Lemmon, K., & Oakhill, L. (2004). Individual differences in the inference of word meaning from context: The influence of reading comprehension, vocabulary knowledge, and memory capacity. *Journal of Educational Psychology, 96,* 671-681.

Dubin, F., & Olshtain, E. (1993). Predicting word meanings from contextual clues: Evidence from L1 readers. In T. Huckin, M. Haynes & J. Coady (Eds.) *Second Language Reading and Vocabulary Learning* (pp. 181-202). Norwood, NJ: Ablex Publishing Corporation.

Garnham, A. (1992). Minimalism versus constructionism: A false dichotomy in theories of inference during reading. Psycholoquy [Online serial], 92 (3). Retrieved on December 29, 2003, from http://www.ai.univie.ac.at/archives/Psycoloquy/1992.V3/0062.html

Graesser, A. C., Singer, M., & Trabasso, T. (1994). Constructing inference during narrative text comprehension. *Psychological Review, 101* (3), 371-395.

Green, A. (1998). *Verbal protocol analysis in language testing research: A handbook.* Cambridge: the Press Syndicate of the University of Cambridge.

Huckin, T., & Bloch, J. (1993). Strategies for inferring word-meanings in context: A cognitive model. In T. Huckin, M. Haynes & J. Coady (Eds.) *Second Language Reading and Vocabulary Learning* (pp. 153-178). Norwood, NJ: Ablex Publishing Corporation.

Lee, J., & Wolf, D. (1997). A quantitative and qualitative analysis of word-meaning inferencing strategies of L1 and L2 readers. *Spanish Applied Linguistics, 1*, 24-46.

McKoon, G., & Ratcliff, R. (1992). Inference during reading. *Psychological Review, 99* (3), 440-466.

Nassaji, H. (2004). The relationship between depth of vocabulary knowledge and L2 learners' lexical inferencing strategy use and success. *Canadian Modern Language Review, 61*(1), 107-134.

Oxford, R. L. (2002). Language learning strategies in a nutshell: Update and ESL suggestions. In J. C. Richards & W. A. Renandya (Eds.), *Methodology in language Teaching An anthology of current practice* (pp. 124-132). Cambridge: Cambridge University Press.

Richards, J. C., Platt, H., & Platt, J. (Eds.). (1992). *Longman dictionary of language teaching and applied linguistics* (2nd ed.). London: Longman Group UK Limited.

Soria, J. (2001). A study of Ilokano learners' lexical inferencing procedures through think-aloud. *Second Language Studies, 19* (2), 77-110.

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