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Second Language Word Processing Abilities of Kurdish-Persian Bilinguals

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Abstract

The present study investigates the applicability of word association model to the second language word processing abilities of Kurdish learners of Persian. The aim of this study was to examine whether beginning L2 learners use their L1 as a mediating tool to process L2 words, or whether pictures representing pre-existing concepts facilitate L2 word processing. 10 Kurdish-Persian bilingual adults at the beginning stages of learning Persian were compared with 10 native speakers of Persian who were fluent in Kurdish. Participants in two groups performed a translation-recognition task. They had to decide whether words in two languages were translation equivalents. They were also compared in a picture recognition task in order to compare the reaction times (RTs) of L1-L2 and picture-L2.The findings showed that Kurdish- Persian bilinguals performed faster in L1-L2 than in picture-L2 but the performance of Persian- Kurdish bilinguals were comparable on both L1-L2 and picture-L2, predicted by the word association model. These results suggested that L1 and pictures have different effects on the word processing abilities of bilinguals.

Keywords: bilingualism, processing, translation, word association model low

1. Introduction

"Bilingualism is a major fact of life in the world today. It is estimated that there are approximately 5000 languages which are spoken in the world" (Bhatia & Ritchie, 2006: 19). Crystal (1997) estimated that more than half of the children throughout the world are matured in a bilingual setting. Many of these individuals learn their second language in school environment. In Iran, many people are bilingual or even multilingual. These people are exposed to languages like, Kurdish, Laki, and Turkish as their native language and learn Persian as their second language in classrooms. However, there are some bilinguals who learn their second language as adults in classroom setting. Investigation of language processing in bilingual adults can provide a clear picture of the structure of their minds. Such studies can also be very helpful in teaching a second language to bilinguals. When discussing matters such as second language processing, first and second language relationships, bilinguals use of first language as a mediating tool to retrieve the words in second language or word processing in second language directly and independent of their first language, it is necessary to explain two more concepts regarding the bilingual's mental representations. First, do they have a shared conceptual system for first and second languages or they have two distinct conceptual systems for each language? Second, because words are the basic units of language, investigating how and at what level lexical and conceptual systems are connected in the minds of bilinguals is of great importance.

1.1 The representation of conceptual and lexical systems

There are different definitions for bilingualism. Weinreich (1953) identified three kinds of bilingualism in terms of how concepts of a language were stored in the bilingual brain: coexisting bilingualisms, merged bilingualisms, subordinate bilingualisms.

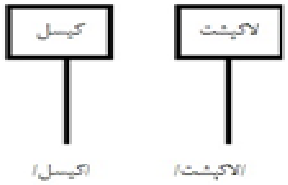

Figure 1. coexisting bilingualism

Coexisting bilinguals learn each language in a distinct environment, and words of the two languages are stored seperatedly so that each word has its own particular meaning. Thus for کیسل (kisal) and لاکپشت (lâkpɔʃt), Kurdish-Persian bilinguals had two distinct representations. On the other hand, in merged bilingualism (see figure 2), two concepts are represented with a single representation.

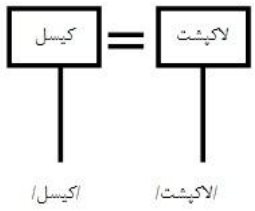

Figure 2. coexisting bilingualism

In subordinate bilinguals, the words in first language were directly translated into the second language concept (See Figure 3).

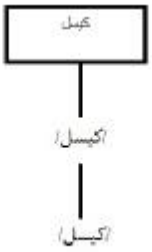

Figure 3. subordinate bilingualism

For example, for Kurdish-Persian bilinguals, /کیسل/ is directly translated into /لاکپشت/. Weinreich (1953) did not consider these classifications as mutually exclusive. According to him, a subordinate bilingual can become a merged bilingual. Later on, this classification was reformulated by Ervin and Osgood (1954) as a psychological model. In their model, coexisting bilingualism equals coordinate bilingualism and the merged bilingualism equals compound bilingualism. In coordinate bilingualism, each language has its own distinct set of linguistic concepts and codes. Thus, Ervin and Osgood considered bilingual's mind to be consisting of two distinct structures. Therefore, this kind of bilingualism develops in situations where the bilingual learns to use each language in different environment (i.e., home vs. school environment). To sum up, coordinate bilingual's assign different meaning or partially different meanings to words in their two languages (McLaughlin, 1984). They also indicated that in compound bilingualism there are two distinct sets of linguistic concepts for each language which are associated with the same set of representational mediating processes. Therefore, compound bilinguals assign identical meanings to corresponding words and expressions in their two languages. Later on, Kolers (1963) reformulated compound bilingualism as the shared memory model and the coordinate bilingualism as the separate memory model. According to shared-store hypothesis, there is one storage system for the two languages. On the other hand in the separate-store hypothesis there are two separate memory storage for words in two languages.

1.2 The bilingual processing models

1.2.1 Word association Model and Concept association Model

Regarding the word's organizations in the memory of second language learners, two models were proposed by Potter, So, Von Eckardt, and Feldman (1984), the first of which was the word association model. This model assumes that the two lexical stores are associated and translation is performed at the lexical level (See Figure 4). This matched the intuition of many learners according to Potter et al. (1984). For example if a fluent English speaker translated a word from L2 (English) to L1 (French) or the other way around; they would only retrieve the lexical form of the word, that is the translation equivalent not the concept.

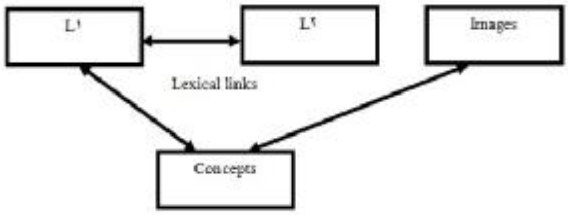

Figure 4. Word Association Model

The concept mediation model, on the other hand, assumes that L2 words were not directly associated with L1 words. They shared one common conceptual memory store which was the only connection between the two separate lexical stores. (See Figure 5). For example, if an English speaking learner translated a word from L2 to L1 or the other way around, the lexical form activates its concept which subsequently activates the translation equivalents. Access to the concept is therefore required in order to retrieve the translation equivalent (L1) and vice versa.

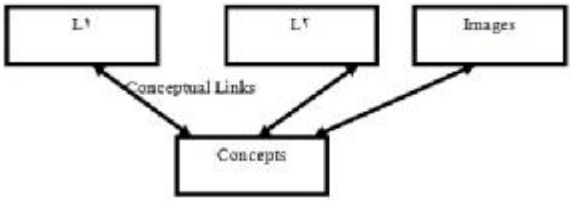

Figure 5. The Concept Mediation Model

2. Literature Review

In order to compare the predictions of the two models, Potter et al. (1984) compared the performance of a relatively high and low proficient group on picture naming and translation in their second language. There is a general agreement in the literature that picture naming requires concept mediation, therefore translation should resemble picture naming only if it is conceptually mediated. However, if translation can be lexically mediated, then translation should be faster than picture naming. Results showed that word translation took the same amount of time as picture naming in L2, thus it is conceptually mediated. Therefore, they concluded that the Concept Mediation Model was the most accurate model that best characterized the bilingual lexicon of less and more proficient bilinguals, regardless of their level of L2 fluency, appeared able to mediate conceptually.

Although Potter et al.'s (1984) experiments supported the concept mediation model, Kroll and Curley (1988), Chen and Leung (1989), Chen (1990), and Kroll and Stewart (1990) referred to the differences between high proficient and low proficient bilinguals, they supported both the concept mediation model and the word association model. For example, Kroll and Curley (1988) compared two groups of bilinguals: a group of native English speakers at the beginning stages of learning German and a group of high proficient English-German bilinguals on two tasks: a translation production task and a picture naming task. The first group's performance on Translation task supported the association model (Kroll & Sholl, 1992). That is, they performed L1 to L2 translations faster than L2 picture naming. Results from the high proficient bilinguals supported the concept mediation model. Their performance showed that Naming L2 pictures took less time than translating from L1 to L2 (Kroll & Sholl, 1992). Based on these results, Kroll and Stewart (1990, 1994) argued that Potter et al. (1984) did not find differences between their high and low proficient bilinguals since the low proficient bilinguals were too advanced thus behaving more like high proficient bilinguals (See also Chen, 1990).

Some studies provide evidence that there is a difference in lexical mediation between fluent and less-fluent bilinguals. Talamas, Kroll, and Dufour (1999) tested less and more proficient bilinguals on the translation recognition task. Subjects had to determine whether the two words presented were the correct translation equivalents or not (e.g. man-hombre [man]). The study also included distracters that were similar in form to the L2 words (e.g. man-hambre [hungry]); and similar in meaning (e.g., man-mujer [woman]). Results revealed that low proficient bilinguals were more distracted by form related distracters than meaning related distracters; whilst more proficient learners were affected to a greater extent by meaning related distracters. The results confirmed that low proficient bilinguals were lexically oriented unlike more proficient learners who were mainly relying on conceptual links.

Chen (1990), studies a group of native Chinese speaker in three experiments. Participants were asked to to do a reading task, a translation production task and a picture naming task using their native and non-native languages. In the first Experiment, four groups of bilinguals with various degrees of proficiency in their second language, English, participated. In second and third Experiments, before performing the tasks mentioned, participants first learned a set of French words using either Chinese words or pictures as media. When response was in Chinese, All participants had a better performance in the reading task than in picture naming. When responding in the non-native language (English or French), high-learning participants performed equally efficient in translation and picture-naming tasks. However, relying on their learning strategies, Low-learning participants had a better performance in either the translation or the picture-naming task. These results showed that both proficiency in a non-native language and the language acquisition

strategy are main determinants for the pattern of lexical processing in that language. Together these studies indicated that the amount of exposure to the learned language as well as the learning strategy could be part of the contributors to bilingual's lexical processing. On the whole, these studies indicated that low proficient bilinguals are more lexically oriented and high proficient bilinguals are more conceptually oriented.

3. The present study

The researches mentioned above were mostly performed on fluent or less fluent bilinguals employing either groups with the same native language background and different L2 proficiency or two groups with completely distinctive languages. The present study uses a quite different group of participants, native Kurdish-speaking adults in a beginning stage of learning Persian, to examine lexical processing and extent of applicability of the word association model (Potter et al, 1984) and native Persian-speaking adults who were fluent in Kurdish.

3.1 Research Questions and Hypothesis

The present study aims at answering the following questions:

1. Are reaction times of picture-L2 translation longer than those of L1-L2 translation?

For the Kurdish group, since they were beginning learners of Persian, the word association model predicts that reaction times of picture-L2 will be longer than that of L1-L2.

2. Are L1-L2 response times shorter than those of picture-L2 response times?

The word association model would also predict that L1-L2 character RTs is shorter than picture-L2 character RTs.

4. METHODS

4.1 Participants

10 Kurdish speaking male students at the beginning stage of learning Persian were compared with 10 native male speakers of Persian who were fluent in Kurdish. The first group acquired Kurdish as their native language and used it for everyday communication in home. They were all students of Persian enrolled in Persian class at the Literacy Movement classes in Eyvan-e-Gharb. Their Persian class was one hour a day, 3 days a week. They spoke Persian as a second language in the classroom environment only for formal communication with Teachers. They were at the same level of proficiency. Participant's reading comprehension scores reported by their teacher have been taken as proficiency measure. Only those participants, whose median of reading comprehension scores was 14 or less were selected. The second group were native in Persian and were fluent Kurdish speakers since they had been in Eyvan-e-Gharb for at least 8 years. They used Kurdish in everyday communication. The selection of participants in this group was also based on the median of their reading comprehension scores reported by their teacher. Students whose median of reading comprehension scores was 19 or more were selected.

Two tasks were used in this study: the first one was a bilingual translation recognition task (De Groot, 1992 & Talamas et al., 1999) which was adapted to Kurdish and Persian languages. In this task, participants are presented with a word in one language and then the second word in another language, and they had to decide whether those words are the correct translation equivalent. One of the advantages associated with the translation recognition task used in this study was that because the Kurdish participants were not fluent in Persian, they feel comfortable not to speak it aloud. The translation-recognition task avoids having them miss responses due to the unfamiliarity with L2 or the discomfort or embarrassment of speaking out loud. De Groot (1992) indicated that translation recognition bypasses the translation-retrieval process that occurs in translation production, and can eliminate the possible confusion of the locus of the observed effects as opposed to translation production. The second task was a picture-recognition task. The aim of this task was to compare the reaction times (RTs) of L1-L2 and pictures-L2.

4.2 Materials

4.2.1 Stimuli

The test comprised 84 pairs, so that the first word or picture was presented as the stimulus and the second as the target. Pairs were divided to four blocks, so that there were 21 pairs in each block. These blocks were as follow:1) Kurdish-Kurdish, 2) pictures-Kurdish, 3) Kurdish-Persian, and 4) pictures-Persian. The presentation order of blocks was counterbalanced across subjects. The pictures were line drawings and the Persian words were chosen from Persian textbooks which were familiar to the students. All the words were of high frequency and relatively low difficulty. All words were concrete nouns. The selected Kurdish words had a mean length of 3.4 letters which ranged from 2 to 4 letters. The selected translation equivalents (Persian words) mean length was 3.6 letters which a range from 2 to 5 letters.

The test started with 12 practice pairs presented, including a combination of four conditions with 3 practice trials in each conditions which were performed with completely different words than those in the real test. Therefore subjects had four training sessions, the first was before performing Kurdish-Kurdish, the second was before pictures-Kurdish, the third one was before Kurdish-Persian and the fourth was before pictures-Persian.

The presentation order of words within four sets was counter balanced across the subjects. In addition the presentation of words within each set was randomized. The stimuli were presented to participants using DELL monitors, operating at 1366x768 resolutions, with a refresh frequency of 100Hz. In cm, the dimensions were 47cm horizontal, 30cm vertical, and the viewing distance was 60cm. The computers were DELL (2.4GHz processor, 4GB RAM, 320GB disk drive).

The experiment was designed using E-Prime version v2.0.8.90 (Psychology Software Tools).

4.2.2 Design

All the participants went through a familiarization stage in which each of the critical stimuli was presented by a picture and its Kurdish and Persian equivalents. Familiarizing the subjects with the items in the upcoming experiment ensured that these elementary learners would avoid missing too many responses, and ascertained that all subjects were at the same baseline of picture recognition. This was another way to control for the frequency of the stimuli as well, given that the available vocabulary pool was not very large. The testing stimuli and the trial stimuli were different in order to avoid the potential effects of long-term priming or psychological training association.

4.2.3 Experimental procedures

Participants were placed in front of a computer at a viewing distance of 60cm in a sound proof lab. They were tested individually and were requested to perform a bilingual word translation task. They had to translate words from Kurdish-Kurdish, 2) pictures-Kurdish, 3) Kurdish-Persian, and 4) pictures-Persian. The experimenter was not present when subjects start the test.

The test started initially when the first word or picture appeared on the screen for one second followed by a fixation point, a plus sign for one second and a then by a second word for a maximum of five seconds. The participants were instructed to make a decision as to whether or not the second word presented was the correct translation equivalent of the first word or picture. Participants were also requested to respond as fast as possible. The computer recorded response latencies automatically. Response latencies were measured from the onset of the next trial until the participant pushed the yes/no button on the computer.

5. Results

5.1 Reaction Times

Table 1 shows the accuracy of both groups in the four blocks. A three-factor analysis of variance (ANOVA) was performed on mean percent accuracy to the target word with two within group factors, type of critical stimuli (Kurdish and pictures) and type of target word (Kurdish and Persian) and one between-group factor, Proficiency (Kurdish-Persian). The analysis showed that for the Kurdish group, the only significant contrast was the target language difference: L1-L1 and picture-L1 had a higher percent accuracy (M=97.9 %) than L1-L2 and picture-L2 (M=87.6 %), [F (1, 52) =13.3, p<.001]. For the Persian group, one significant difference occurred when the stimuli type was L2, Kurdish, with a higher accuracy of L2-L1 (M=97.5 %) than L2-L2 (M=87.8 %), [F (1, 40) =24.8, p<.001].

Table 1. the Accuracy of Response in the four conditions

	Persian group (n=10)	Kurdish group (n=10)
	Accuracy	Accuracy
Kurdish- Kurdish	87.8	97.9
Picture-Kurdish	98.5	97.9
Kurdish-Persian	97.5	90.8
Picture-Persian	98.5	84.4

5.2 Latencies

A three-factor ANOVA analysis was performed on the mean correct response latencies to the target word, with one between-group factor, native language (Kurdish and Persian), and two within-group factors, type of critical stimuli (Kurdish and pictures) and type of target word (Kurdish and Persian). The mean response times for the four blocks of the two groups are represented in Table 2.

Table 2. Mean response latencies (in ms) of the Kurdish group and the Persian group in the four conditions.

	Persian group (n=10)	Kurdish group (n=10)
	Latencies	Latencies
Kurdish- Kurdish	1231	898
Picture-Kurdish	815	745
Kurdish-Persian	852	1403
Picture-Persian	853	1739

5.2.1 The Kurdish group

Having considered L2 (Persian) as the target language, a significant effect of stimuli type was observed, with L1-L2 (M=1403 ms) faster than picture-L2 (M=1739 ms), as shown in figure 6, [F (1, 453) =6.39, p<.012]. This finding supports our first hypothesis that in L2 novices, L1-L2 is faster than picture-L2 since there are direct connections between L1 and L2, according to the word association model.

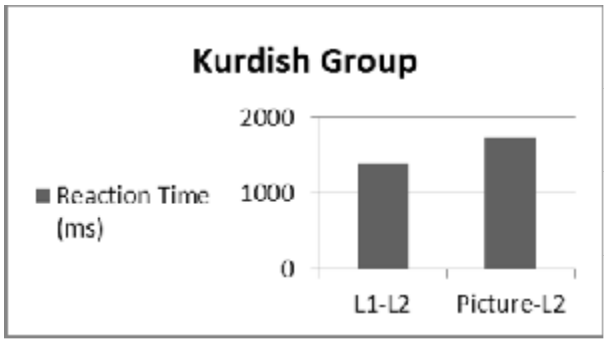

Figure 6. For Kurdish group, L1-L2 was significantly faster than picture-L2

5.2.2 The Persian group

For the Persian group, L1 was Persian while L2 was Kurdish. One-way ANOVA showed that when the target was L1, there was no difference between stimuli types (L2 and picture), [F (1, 390) =1.8, p>.232]. This supported our first hypothesis for the Persian group that picture-L1 RTs (M=852) would be approximately equal as L2-L1 RTs (M=853). The two-way ANOVA showed that when the condition was picture-L1 for both groups (picture-Kurdish for the Kurdish group and picture-Persian for the Persian group), there was a reliable effect of the native language: As shown in figure 7, picture-L1 for the Kurdish group was faster (M=745ms) than picture-L1 for the Persian group (M=853 ms), [F(1, 514)=51.7, p<.001].

Next, the results of the two groups for picture-L2 were examined. Picture-L2 for the Kurdish group (M=1739ms) was slower than Picture-L2 for the Persian group (M=815ms), [F (1,414) =181.4, p<.001]. As for picture-L2, the Kurdish group was slower than the Persian group, because the Persian group was relatively more fluent bilinguals than the Kurdish group. This can be explained by the word association model and concept mediation model (Potter et al., 1984), that beginning second language learners do not yet build a direct link between concepts and L2 while fluent bilinguals do.

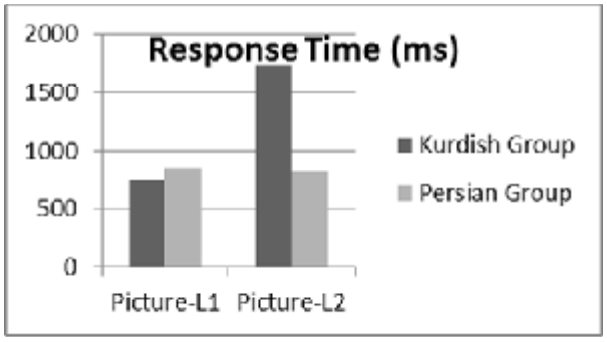

Figure 7. Response times in milliseconds in picture-L1& Picture-L2 for both groups.

The main findings of the present study are as follows: first, stimuli type L1 and pictures had different effects on the response latencies for the Kurdish group, showing that L1-L2 was faster than picture-L2, which was predicted by the word association model. Second, L2-L1 characters RTs were not significantly different from picture-L1 characters RTs for the Persian group, which supported the concept mediation model.

6. Discussion

The Kurdish group revealed that L1-L2 took less time than did picture-L2, while the results showed the reverse patterns in the two control blocks, with picture-L1 being faster than L1-L1. As beginning learners of L2, the Kurdish students might have a direct link between L1 and L2, rather than concepts-L2. Meanwhile, these Kurdish should possess a direct connection between L1 and concepts.

The Persian group showed no difference in processing the picture-L2, L2-L1 character, and picture-L1 character tasks. Picture-L2 was rather fast for the Persian group, however given that the exposure period of L2 for the Persian participants was long, and they had been exposed to L2 environment for 8 years, this result would not be unexpected.

Together these results demonstrated that beginning learners of an L2 might tend to use their L1 as a medium to process L2 words, as shown by the longer response latencies of Kurdish group's in the picture-L2 than in the L1-L2 conditions, but not in picture-L1 than in L1-L1. This indicated that L1 and picture play a different role when these L2 elementary learners process their L1 and L2. Nevertheless, as L2 proficiency increases, the link between concepts and L2 gradually builds, as shown by the performance of the Persian group where the processing of L2-L1, picture-L1, and picture-L2 were quite comparable. This was consistent with previous findings that for less fluent adult bilinguals, translation of L1 into L2 took less time than did naming pictures in L2, while more fluent bilinguals performed L1-L2 translation and picture naming in L2 equally efficiently (Kroll & Curley, 1988; Chen & Leung, 1989; Chen 1990). It demonstrated that less fluent bilinguals use L1 as a medium to process their L2; picture-L2 is thus slower than L1-L2. More fluent bilinguals, on the other hand, use the direct link between L2 and concepts to process their L2; picture-L2 is thus not processed longer than L1-L2.

The results also suggested that both groups showed relative difficulty (significantly longer response latencies) in processing the Kurdish- Kurdish task versus the picture- Kurdish task. For the Persian group, this difficulty was not only shown by the longer RTs, but by relatively higher error rates (12.2 %) than in the other three blocks. This reflected the fact that these Persian- Kurdish bilinguals were not as fluent in Kurdish as in Persian.

Both the Kurdish group and the Persian group showed a significant effect from different target languages, as shown by the error rates. For the Kurdish group, the highest error rates lay in the longest RTs block, picture-L2. For the Persian group, there were relatively higher error rates and longer response latencies in L2-L2 (test) block.

7. Conclusion

Most of the previous studies focus on fluent or less fluent bilinguals employed either groups with the same native language background and different L2 proficiency (Chen & Leung, 1989; Chen 1990), or two groups with completely distinctive languages (Potter et al. 1984). This study contributes to the literature by using two groups, while one (the Persian group) served as another's (the Kurdish group) control, to examine how the Kurdish participants process Persian words as compared to the Persian participants. In addition, the Persian group also served as a contrasting group, to compare language processing in terms of different L2 fluency. The major findings were as follows. First, for less fluent bilinguals of an L2, L1-L2 was processed faster than picture-L2. This indicated that they processed their L2 through their L1. This was compatible with the hypothesis based on the word association model.

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