

Cognitive Representation in Bilinguals

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Abstract

The present investigation examined the representation of bilingual's knowledge and aimed at differentiating between the two competing hypotheses, the independence hypothesis and the interdependence hypothesis. Twenty Arabic-English and four English-Arabic bilingual subjects were presented with 30 paragraphs, half Arabic and half English and were instructed to paraphrase or translate each Arabic or English paragraph, to recall as many of the paragraphs they had been shown as they could, and to indicate the language of presentation of each paragraph they had been shown. The free recall measure indicated higher recall performance for the translated paragraphs than for the paraphrased paragraphs. Analysis of the recognition data demonstrated high level of recognition of the language of input material. Overall, the pattern of results obtained for the recall and the "language" recognition was taken as support for the independence hypothesis which maintains that bilinguals have distinct semantic memory representation for their bilinguals' knowledge.

A topic of interest to cognitive psychologists as well as those interested in bilingual education is way information is represented in the cognitive systems of bilinguals. Recent literature on this issue has centered on two competing hypotheses: The independence (separate store) hypothesis maintains that the bilingual's memory has two separate representations of meanings that are accessed by two surface forms (e.g., Kolers & Gonzales, 1980; Gardner & Desrochers, 1980; Paivio & Lambert, 1981). Some examples of research supporting this hypothesis are studies in which it is found that switching from one language to another is a process that takes time (Macnamara & Kushnir, 1980); bilinguals are able to recognize the language of the encoded material at the time of its recall (Rose et al., 1975; Paivio & Lambert, 1981); intralanguage associations are stronger than interlanguage associations (Macnamara, 1976; Taylor, 1971); and changing language produces a release from proactive inhibition (Goggin & Wickens, 1971; Newby, 1976). The second hypothesis is the interdependence (single store) hypothesis which maintains that bilinguals have a common semantic representation that subserves two distinct sets of entries for their two languages and which can be accessed equally by a bilingual's two languages (McCormack, 1977; Magiste, 1980; Shanon, 1982). Some examples of research supporting this hypothesis are studies in which the followings are found: Interlingual interference in picture-word tests (Ehri & Ryan, 1980; Smith & Kirsner, 1982), in Stroop tasks (Preston & Lambert, 1965; Kiyak, 1982), in word association tasks (Lopez, Hicks, and Young, 1977), in reading comprehension tasks (Magiste, 1979), and in lexical decision tasks (Saegert, Obermeyer, and Kazarian, 1973); interlingual transfer of Learning in same-order serial-learning paradigms (Young & Saegert, 1966); and priming effects in classification tasks (Wolf, 1977; Caramazza & Brones, 1980).

This investigation shared the interest in and enthusiasm for the examination of the cognitive representation² in bilinguals that marks previous research on bilinguals' memory. Hence, the purpose of the present work was to provide further evidence about the form of the representation of bilinguals' knowledge and to disentangle, to the extent possible, the independence and the interdependence hypotheses.

From the review of previous literature, the researchers noted that there was considerable disagreement over the definition of bilingualism. It became clear-- to the researchers -- that the failure to resolve the independence-interdependence issue may be, partly, attributed to the naive conceptualization of the term "bilingualism". The position here is that the only defensible definition of bilingualism is a "balanced" level of proficiency in two languages. The researchers also noted that the majority of the studies reported in the literature used English speaking bilinguals

whose second language was French, Spanish, or German. Since these languages share a number of common words as well as an orthographic system, their use in tests of the interdependence and independence hypotheses might bias the results in favor of the interdependence hypothesis. For this experiment, bilinguals who were approximately equally proficient in Arabic and English were used. Finally, the researchers noted that many of the prior investigations used isolated lexical items only. Such a strategy presupposes a one-to-one correspondence between meanings and words and ignores such factors as context, synonymy and so forth. Thus, a true test of the interdependence and the independence hypotheses requires the use of meaningful text. In this study, short paragraphs presented in both English and Arabic were used in the experimental task.

METHOD

Subjects

A total of 26 Arabic-English and English-Arabic bilingual students in the age range (27-40) years with a mean of 32 years volunteered to participate in the present study. The Arabic-English bilingual group (bilinguals whose native language is Arabic and English is their second language) consisted of 22 graduate students at Indiana University, Bloomington/Indiana, 18 males and 4 females, whose formal exposure to English ranged from (15-29) years with an average of 20 years. Subjects' residence time in the U.S.A. varied from (3-8) years with a mean of 5 years.

The English-Arabic bilingual group (bilinguals whose native language is English and Arabic is their second language) consisted of 4 graduate students at Indiana University, Bloomington/Indiana, 2 males and 2 females who had high standards of competence in Arabic language since they had all majored in Arabic and had all studied it for at least 8 years.

Proficiency Measures

Subjects were classified as balanced bilinguals according to their performance of four proficiency measures. The first three measures were common for both English-Arabic and Arabic-English bilinguals. The fourth measure was specific to the two groups—one for Arabic-English bilinguals only, the other for English-Arabic bilinguals only. (1) A Language Background Questionnaire Inquiring About Language Experiences and Proficiencies: On (1-7) point scale, each subject was instructed to rate his/her reading, writing, speaking, listening, comprehension, and translation proficiencies twice, once in English and once in Arabic. Only those bilinguals whose

self-ratings for each ability differed by two scale points or less were included in this study (Ehri & Ryan, 1980; Blair & Harris, 1981).

Each subject was then instructed to provide some demographic information about his/her native language, native languages of his/her mother and father, languages spoken at home, languages of instruction at school, countries in which he/she had lived, and countries he/she had visited in which English (for Arabic-English bilinguals) or Arabic (for English-Arabic bilinguals) functions as the native language.

(2) Word Naming Test: This test measures the speed of verbal production in two languages. In this test, subjects were tested individually during a tape-recorded interview. Each subject was asked to say as many different words--sentences excluded--in one language as he/she could. The experimenter read three words (table, chair, and door). Each subject was instructed not to repeat any word once he/she had used it and to say as many different words as possible. After 60 seconds, he/she was to stop for 60 seconds and then to name as many different words as he/she could in his/her other language. The results of a Chi Square test for differences in word naming indicated that for each subject the Arabic and the English word naming scores were more or less equal ($X^2 < 1$ in all cases).

(3) A Shortened Version of Ervin's (1961) Language-Dominance Test: This test measures the speed of naming pictures in two languages. In this test, subjects were presented individually during a tape-recorded interview with a shortened version of Ervin's test (Ervin's test consists of pictures of 120 common objects which subjects have to name as quickly as possible, first in one language, and then in the other). Each subject was presented with a series of 60 pictures which represent common objects and was instructed to name each picture in one language as quickly as possible. After the completion of the test, he/she was to stop for 60 seconds and then to name the same pictures in his/her other language. The order of tests was counter-balanced as that half of the subjects, chosen randomly, used each language order. Subjects who had language differences in mean reaction times (naming latencies) of less than 5% were considered balanced bilinguals (Ervin, 1961; Magiste, 1980).

(4) Test of English as a Foreign Language (TOEFL). The test measures the English proficiency of examinees whose native language is not English in listening comprehension, structure and written expression, and reading comprehension and vocabulary. Subjects who scored at least 55 which is equivalent to percentile rank of 75% on each section or a total score of 550 were considered proficient in English.

(5) Teachers' Ratings of English-Arabic Bilinguals' Level of Competence in Arabic. The English-Arabic bilinguals who participated in this study are all graduate students at Indiana University who had all majored in Arabic. Each of them had successfully met the requirements for the Arabic language program. Everyone of them spent some period of time in an Arab country and thus, he/she had been exposed to Arabic in its

natural environment. Major professors in the Near Eastern Languages and Cultures Department of Indiana University indicated that these bilinguals feel comfortable in any cultural setting of Arabic due to their broad experience and rich exposure to Arabic.

Criteria for “Bilingual Balance”

To be included in this study, each bilingual subject had to successfully meet the requirements of at least three proficiency measures provided that his/her performance on the fourth measure was not poor. Of the 26 bilingual subjects who volunteered to participate in this experiment, 24 subjects met the criteria for bilingual balance. Of these, twenty were Arabic-English bilinguals and four were English-Arabic bilinguals. Two subjects who did not meet the requirements for bilingual balance were dropped (both Arabic-English bilinguals).

Materials

- (1) Two lists were constructed. List A consisted of 15 Arabic and 15 English paragraphs. Paragraphs of approximately 25 words each were taken from Arabic and English newspapers and magazines. Each paragraph consisted of four specific ideas related to a single and neutral topic. List B was generated by changing the language of presentation of each paragraph in List A. Thus, the English paragraphs in List A were the Arabic paragraphs in List B and the Arabic paragraphs in List A were the English paragraphs in List B. Samples of the paragraphs are presented in the appendix.

Indices of reliability: For List A, Kuder-Richardson reliability = 0.83.

The standard error of measurement = 2.01.

For List B, Kuder-Richardson reliability = 0.86.

The standard error of measurement = 1.92.

Indices of validity: Paragraphs of each list have moderate to high, positive discrimination indices (e. g., 0.75) and are at or near moderate difficulty (e. g., 0.58).

- (2) A bilingual version of Safrin's (1962) anagram task: Two lists were constructed. List 1 was constructed in such a way that 5 anagrams (an anagram is a word with letters disarranged), chosen randomly, were presented in Arabic and 5 anagrams, chosen randomly, presented in English. List 2 was generated by changing the language of presentation of each anagram in List 1. Thus, the English an-

agrams in List 1 became Arabic anagrams in List 2, and the Arabic anagrams in List 1 became English anagrams in List 2.

PILOT STUDY

METHOD

Subjects and Procedures

A total of 8 Arabic-English bilinguals, 6 males and two females who met the criteria for bilingual balance were tested individually in one two-hour session in an incidental memory situation in which they were not told that later they would be instructed to recall the paragraphs they had been shown. Subjects were randomly assigned to two groups. Half of the subjects in each group, chosen randomly, were presented with List A, half with List B. Group 1 subjects were instructed to paraphrase the Arabic paragraph and to translate the English paragraph into Arabic. However, Group 2 subjects were instructed to paraphrase the English paragraph and to translate the Arabic paragraph into English.

In order to create a bilingual atmosphere and to avoid a set in one language, subjects were given instructions in one language, followed by a brief summary in the other, with half of them, chosen randomly, receiving English first, half Arabic first.

Each subject was presented with 30 paragraphs, one at a time, typed on 3 × 5 in. cards. The order of presentation of the paragraphs within each list was randomized across subjects. Each paragraph was presented via a separate card. Each card was exposed for 65 seconds, during which time, he/she was to translate/paraphrase the English/Arabic paragraph and to write down the response on the appropriate space of his/her booklet. Following this task, bilinguals in each group were presented with a bilingual version of Safrin's (1962) anagram task and were instructed to look at each anagram and to try to unscramble its letters in order to make a word. Then they were unexpectedly instructed to recall as many of the paragraphs they had been shown as they could using the language of the slide. Finally, they were presented with both the Arabic and the English version of each paragraph—typed in capitals in 3 × 5 in. Cards—and were asked to then indicate the language of presentation of each paragraph as they had been shown it. The order of presentation of the Arabic and the English forms of each paragraph was randomized across subjects.

Scoring

The criterion for scoring the recall data is based on the literal recall of the idea

units or their paraphrased semantic interpretations (the reader will recall that each paragraph in Lists A and B contains four idea units). The total recall score for each subject equals the sum of the correctly recalled idea units or their paraphrased semantic sense. Three bilingual judges independently graded subjects' responses on the recall test. The interjudge reliability index was 0.95.

The recognition data for each subject were scored in accordance with the particular list which was originally presented to him/her. For each subject, the total recognition score was sum of the correct scores for the individual paragraphs.

Results

The recall data were analyzed by a $2 \times 2 \times 2$ factorial analysis of variance with repeated measures on the last factor to assess effects of groups (group 1 vs. group 2), lists (List A vs. List B), and task (paraphrasing vs. translation) on recall. Main effects of the group factor and the list factor were not significant at $\alpha = 0.01$ ($F < 2$ in both cases). None of the interactions was significant at $\alpha = 0.01$ ($F < 2$ in all cases). However, the main effect of the within subjects factor (task) was highly significant. Recall of the translated paragraphs was significantly higher than that of the paraphrased paragraphs [$F(1,4) \times 63.52$]. Similar analyses were performed on the post-experimental accuracy of language recognition ability. The analysis of data for the recognition test indicated that neither the main effects nor the interaction effects were significant at $\alpha = 0.01$ ($F < 1$ in all cases).

Analyses were then conducted on the frequency of correct recognition of the language of presentation of the previously presented paragraphs. The computed χ^2 ratio ($\chi^2_{(1)} = 163.35$) was highly significant ($\alpha = 0.01$). When a standard correction for guessing was applied, the resulting χ^2 ratio ($\chi^2_{(1)} = 130.54$) was still significant ($\alpha = 0.01$). Accordingly, subjects were able to recognize the language of presentation of the input material at a level far beyond that expected on the basis of chance alone.

Despite the clear results, certain limitations of the pilot study called for a systematic replication and extension. First, both the exposure duration of each card and the time interval between the presentation of each card and the subsequent one were not fully controlled due to the fact that it was handled manually (by a stop watch). Second, the inclusion of only Arabic-English bilinguals did not permit the researchers to generalize the findings of the pilot study to English-Arabic bilinguals.

To respond to the above objections, a modified replication of the pilot study

was conducted. In the main experiment, 30 slides were presented, one at a time, via a slide projector. Both the exposure duration of each slide and the time interval between the presentation of each slide and the subsequent one were controlled via a Wollensak 3 M cassette tape recorder which was connected to the slide projector. Moreover, the main experiment was extended to include English-Arabic bilinguals.

THE MAIN EXPERIMENT

METHOD

Subjects

The subjects were 12 Arabic-English bilinguals, 10 males and 2 females, and 4 English-Arabic bilinguals, 2 males and 2 females who met the criteria for balanced bilinguals. All subjects were graduate students at Indiana University, Bloomington/Indiana, who had high standards competence in both Arabic and English languages.

Materials

The test materials were the same 30 Arabic and English paragraphs that were used in the pilot study, but presented in this case on 2×3 in. slides.

Procedure

The 12 Arabic-English bilinguals were randomly assigned to two groups. Group 1 consisted of 6 subjects, 5 males and 1 female. Similarly, group 2 consisted of 6 subjects, 5 males and 1 female. Half of the subjects in each group, chosen randomly, were presented with list A, half with list B.

The 4 English-Arabic bilinguals were randomly assigned to two groups. Group 1 consisted of 2 subjects, 1 male and 1 female. Similarly, group 2 consisted of 2 subjects, 1 male and 1 female. One subject in each group, chosen randomly, was presented with list A, the other, list B.

Subjects were tested individually in one two-hour session. They were instructed to perform the same tasks as in the pilot study, but the 30 paragraphs were presented in this case by means of a slide projector. Each paragraph was presented via a 2×3 in. slide. Each slide was exposed for 65 seconds. The time interval between the presentation of each paragraph and the subsequent one was 5 seconds. Both the

exposure duration of each slide and the time difference between any two successive slides were controlled by means of a Wollensak 3M cassette tape recorder which was connected to the slide projector.

Results

The mean recall percentages for the translating and the paraphrasing conditions for the pilot study showed that the mean recall percentage was higher (60.9%) for the translating condition than for the paraphrasing condition (39.1%). The mean recall percentages for the translating and the paraphrasing conditions in the main experiment were close replicate to those obtained in the pilot study with recall higher (58% for Arabic-English bilinguals and 61.2% for English-Arabic bilinguals) for the translating condition than for the paraphrasing condition (42% for Arabic-English and 38.8% for English-Arabic bilinguals).

The preliminary analyses of the recall data indicated that the overall pattern of results obtained in the main experiment (for English-Arabic and Arabic-English bilinguals) was identical to that obtained in the pilot study with recall higher for the translating condition than for paraphrasing condition. Accordingly, the data were combined for all the (24) subjects (8 subjects from the pilot study, 12 Arabic-English bilinguals, and 4 English-Arabic bilinguals) in order to maximize the power of the experiment.

The combined data were analyzed by a $2 \times 2 \times 2$ analysis of variance with repeated measure on one factor to assess the effects of the independent variables: groups (group 1 vs. group2), lists (list A vs. listB), and task (paraphrasing vs. translating) on recall. The last independent variable was a repeated measure. Main effects of the group factor and the list factor were not significant ($F < 1$ in both cases). So future analyses will collapse across groups and lists. However, the main effect of the within subjects factor (task) was highly significant. Recall of the translated paragraphs was significantly higher than that of the paraphrased paragraphs, [$F(1,20) = 53.02$]. None of the interactions was significant ($F < 2.5$ in all cases).

Error Analysis

Attention was given to one type of error that occurred in the subjects' responses on the recall test: When the subject recalled the semantic connotations of the correct ideas from the paragraph but not in the same language in which they were originally presented, the data indicated that this error occurred only 1.4% of

the time and that there were no systematic differences in this error rate across groups, lists, or tasks.

Recognition Data

The means for the recognition data for both the pilot study and the main experiment (English-Arabic and Arabic-English bilinguals) illustrated that the mean recognition of the language of presentation of the translated paragraphs (13.63 for the pilot study, 14.42 for Arabic-English bilinguals, and 14.75 for English-Arabic bilinguals) was nearly identical to that of the paraphrased paragraphs (13.75 for the pilot study, 14.42 for Arabic-English bilinguals, and 14.75 for English-Arabic bilinguals). The data also indicated that the mean recognition of the language of input obtained in the main experiment is close replicate to that obtained in the pilot study.

The preliminary analyses of the recognition data indicated that the overall pattern of results obtained in the main experiment (for English-Arabic and Arabic-English bilinguals) was identical to that obtained in the pilot study. Accordingly, the data were combined for all 24 subjects (8 subjects from the pilot study, 12 Arabic-English bilinguals, and 4 English-Arabic bilinguals).

The combined data for the recognition test were analyzed by a $2 \times 2 \times 2$ analysis of variance with repeated measures with groups (group 1 vs. group 2) and lists (list A vs. list B) as between subjects variables and the last variable, task (paraphrasing vs. translating), as a repeated measure. Neither the main effects nor the interaction effects were significant at $\alpha = 0.01$ ($F < 1$ in all cases). So future analyses will collapse across groups, lists, and task.

Analyses were then conducted on the frequency of correct "language" recognition. A correct "language" recognition score was one in which a bilingual subject, given the English and the Arabic forms of a certain paragraph, was able to recognize the language of presentation of that paragraph. The computed X^2 ratio ($X^2_{(1)} \times 579.6$) was highly significant ($\alpha \times 0.01$). When a standard correction for guessing was applied, the resulting X^2 ratio ($X^2_{(1)} \times 515.11$) was still highly significant ($\alpha \times 0.01$). Thus, it was concluded that bilingual subjects were able to recognize the language of the input material.

The analysis was then directed toward paragraphs that were recognized given that they were recalled. The measure used was the conditional proportion of correct "language" recognition, given recall [$P(L|R)$]. A correct "language" recognition was one in which a bilingual subject, given that he/she had previously recalled a cer-

tain paragraph, was able to recognize the language of presentation of that paragraph on a language recognition test.

The computed mean overall conditional probability was quite high, 0.92; when a standard correction for guessing was applied, the recognition of the language of presentation of the previously presented paragraphs was retained on 89% of the paragraphs recalled. Thus, it was concluded that bilinguals' ability to recognize the language of input material was far beyond that expected on the basis of chance alone.

Discussion

The results of this experiment are best described in two parts: The recall results and the recognition results.

Recall

Both the pilot study and the main experiment demonstrated greater recall performance for the bilingually encoded (translated) paragraphs than for the monolingually encoded (paraphrased) paragraphs. This finding was completely consistent with some previous research on bilingual memory. For example, Paivio (1975) and Paivio and Lambert (1981) have found that bilingual subjects demonstrated higher recall for bilingually encoded (translated) words than for unilingually encoded (copied) words. Moreover, the finding of this study was in essential agreement with prior bilingual research involving item repetitions. For example, Nelson (1971), Glanzer and Duarte (1971), Young (1972), Kolers and Gonzales (1980) have found that bilingual repetitions of an item (repetitions of an item in two languages) resulted in higher recall of that item than unilingual repetitions. Accordingly, the most obvious conclusion drawn from the results of this study was that bilingual encoding results in higher recall performance than unilingual encoding.

The analysis of the bilinguals' recall responses indicated specificity of recall. That is, bilingual subjects not only retained the meaning of the input material, but they also retained the language of presentation of that material. There were only very few instances of correct recall of the meaning of a given paragraph and false recognition of the languages of presentation of that paragraph. The overall error rate was 1.4% and there were no systematic differences in errors across groups, lists, or tasks.

In summary, the present finding may be taken as support for the independence

hypothesis which assumes that bilinguals' information is organized according to the way in which that information is acquired, and hence that two psychologically distinct memory representations will be accessed by two surface forms. The implication from this hypothesis is that translation involves coding of items in two separate memory systems, and hence, providing for more extensive encoding or for more contextual cues, which in turn, will enhance recall relative to the unilingual paraphrasing task which involves coding of items in one memory system.

Recognition

The results of both the pilot study and the main experiment demonstrated nearly perfect recognition of the language of input of linguistically mixed material. Moreover, the bilingual subjects in this study recognized correctly the language of nearly every paragraph that they recalled from a previously presented list. That is, when a given paragraph was correctly recalled, it became evident that the language of output was exactly the same as that of input.

To account for the high level of the bilinguals' ability to report the language of the input material, one can assume that when a linguistically mixed list of paragraphs is presented, bilingual subjects pay attention to the semantic as well as to the non-semantic attributes of the presented paragraphs and perhaps encode them in a language-specific way. For example, it is likely that in everyday conversation, bilinguals will retain the meaning as well as the language of a previously heard statement. They may even remember who uttered the statement and may remember what language that bilingual is more likely to speak (Keenan, MacWhinney & Mayhew, 1977).

The results of this experiment were completely consistent with previous, research on bilinguals' recognition memory. For example, Lambert, Ignatow, and Krauthamer, 1968; Kolers (1974); Rose et. al. (1975); Saegert, Hamayan, and Ahmar (1975); Paivio and Lambert (1981) all have found a high level of language recognition performance. Bilingual subjects were highly able to identify the linguistic form of the encoded material.

It would seem that the ease of language recognition supports the independence hypothesis (language-interdependence hypothesis). Such a hypothesis implies that if knowledge is conveyed via a particular language, its representation in memory must contain information about the language of transmission.

GENERAL DISCUSSION

The consistent pattern of results obtained both for the recall and recognition of

the language of presentation of the previously presented paragraphs suggests that the mental representation the bilingual obtains for a paragraph once it has been understood is affected by the language in which the paragraph is presented. These findings are taken as support for the independence hypothesis that maintains that bilinguals have distinct semantic memory representations for their two languages. Moreover, there is no evidence in the obtained results that is compatible with the proposal that bilinguals have a single semantic representation that subserves two separate entries for their two languages, at least, in the form presented here.

The independence hypothesis (the linguistic interdependence hypothesis) has clear relevance to proposals for designing and implementing bilingual education programs, most obviously in connection with decisions about when to introduce Arabic-speaking students to English. The linguistic interdependence hypothesis suggests that the student's level of Arabic proficiency at the time of English acquisition is an important determinant of the outcome of the language learning process. To illustrate, students must possess some degree of proficiency in Arabic before they are introduced to English, in order to avoid negative consequences from bilingualism in regard to cognitive flexibility, academic achievement, and general linguistic proficiency in Arabic.

Moreover, it follows from the linguistic interdependence hypothesis that older students would acquire cognitive-academic English skills more rapidly than younger students. To illustrate, in a school setting, where emphasis is placed on generalized competencies in verbal reasoning, abstraction, and mentalinguistic ability, older students do better than younger students. On the other hand, this would not necessarily be the case for those aspects of second language proficiency that are unrelated to cognitive-academic skills. The linguistic interdependence hypothesis suggests that oral fluency is in itself an insufficient measure of the student's ability to deal with schooling in a second language.

Furthermore, the implication from the independence hypothesis is that translation involves coding of items in two separate memory systems, and hence, providing for more extensive encoding or for more contextual cues, which in turn, will enhance recall relative to the unilingual paraphrasing task which involves coding of items in one memory system. Consequently, second-language teachers should pay more attention to translation classes in order to enhance their student's ability to recall the encoded material.

Clearly, the findings of the present investigation are by no means final. However, this study could well provide a stimulus for further research of the fundamental

issue regarding the description of the memory representation in bilinguals. It would seem advisable that future research concerned with the question posed in the present work should focus on: (1) Large units of meaning such as sentences, paragraphs, or even whole texts; (2) Bilinguals of remotely related languages; (3) Bilinguals whose use of both of the languages were dominant in at least some of the subjects (e. g., English-Arabic and Arabic-English bilinguals); and (4) Balanced bilinguals who are equally fluent in both languages. Previous researchers have studied bilinguals with a broad range of intra-individual differences in language competence in their studies of bilingual's linguistic memory. What level of proficiency in two languages must an individual attain in order to be called a bilingual? Does one consider a bilingual a person who has acquired few expressions and utterances in a second language that could be utilized in specific situations and limited contexts such as thank you, good morning, and how are you? The position here is that the only defensible definition of bilingualism is a "balanced" level of proficiency in two languages.

The future research which takes into consideration the above four suggestions should bring us closer to a more adequate understanding of the fundamental issue regarding the description of the bilingual's linguistic memory.

APPENDIX
SAMPLES OF:

- LIST "A"
- LIST "B"

LIST A

To drop a course on the day of open registration, obtain a drop-add petition from your college office, complete it, and take it to your academic advisor for his signature.

في الحياة غرضان مهمان: أن تظهر بما تبغي، وأن تتمتع به بعد ذلك. والحذر من يدرك الغرض الثاني.

Children's drawings are creative. They are not direct copies of things, because children draw things as they remember them. In their drawings, children do not adhere to dimensions and proportions.

للتقليد دور هام في اكتساب اللغة. فالأطفال الصغار لا يقلدون الصوت فحسب، بل يحاولون محاكاة حركة شفاه المتحدثين المهرة. ويتم تقليد الأطفال للأصوات خلال عملية التعلم.

LIST B

There are two important goals in life: to get what you want. And then to enjoy it. The alert man is he who achieves the latter.

لسحب أي مساق في اليوم المسموح به للتسجيل، ينبغي عليك الحصول على بطاقة السحب والإضافة من مكتب الكلية، ثم تعبئة هذه البطاقة، وتوقيعها من مرشدك الأكاديمي.

Imitation is important in the acquisition of language. Young children will not only try to imitate the sound but try to copy the lip movements of experienced speakers. children come to learn to imitate sounds.

إن رسوم الأطفال خلاقة. إنها ليست نسخاً مباشراً للأشياء. فالأطفال يرسمون الأشياء كما يتذكرونها غير عابئين في رسمهم بالأبعاد والنسب.

NOTES:

1. For more information about the independence and the interdependence hypotheses, refer to Tel 8 Cunningham (1986).
2. The term "Cognitive representation" refers to the act of symbolizing and recognizing all forms of knowledge in memory.

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