

Free Recall of Emotional Word Lists in Arabic-English Bilinguals

Dr. Ahmad M. Abd El-Aziz

Lecturer, Psychology Department, Faculty of Arts and Humanities,
The British University in Egypt

Abstract:

This paper tries to investigate if there is a difference in the memory recall of emotional words between Arabic-English bilinguals. The methodology involves an experiment of free-recall responses to emotional word stimuli by 68 Egyptian Arabic-English bilinguals where the Arabic language is their native language (L1) and English language is their second language (L2). The participants divided into early English learners who acquired L2 at year 6, and late English learners who acquired L2 at year 12. A design of 2 x 2 x 3 three-way mixed ANOVA was administered with three independent variables; the group of L2 language acquisition (i.e., early, and late), the language (i.e., Arabic, English), and the emotionality of words (i.e., positive, negative, and neutral). The result showed no significant difference between late and early L2 learners in memory recall. However, there was significant main effect of language as well as main effect of emotionality on memory recall. Furthermore, the results showed significant interaction between emotionality and whether subjects acquired L2 early or late, as well as the result showed significant interaction between language and emotionality. Finally, the results showed significant interaction between the language, emotionality, and whether the subjects acquired L2 early or late.

Key words: Emotion, memory, language, Arabic-English bilinguals.

التذكر الحر لقوائم الكلمات الانفعالية لدى متحدثي ثنائي اللغة (العربية
والانجليزية)

د. أحمد محمد عبد العزيز

مدرس بقسم علم النفس، كلية الآداب والانسانيات، الجامعة البريطانية في مصر
الملخص:

تحاول الورقة البحثية الحالية الكشف عما إن كان هناك فرق بين متحدث ثنائي اللغة (العربية - الإنجليزية) في تذكر الكلمات الانفعالية. تضمن منهج الدراسة إجراء تجربة هدفت إلى دراسة استجابات التذكر الحر للكلمات الانفعالية عند ٦٨ مشارك مصري ممن يتحدثون اللغة العربية كلغة أولى واللغة الإنجليزية كلغة ثانية. تم تقسيم المشاركين في التجربة إلى مجموعة ممن اكتسبوا اللغة الإنجليزية كلغة ثانية في سن مبكر (٦ سنوات)، ومجموعة ممن اكتسبوا اللغة الإنجليزية كلغة ثانية في سن متأخر (١٢ سنة). تم تحليل البيانات باستخدام تصميم تحليل التباين الثلاثي بطريقة 2X2X3 three-way mixed ANOVA بواقع ثلاثة عوامل مستقلة وهم: متغير العمر الذي تم اكتساب اللغة الإنجليزية فيه كلغة ثانية (مجموعة اكتسبت اللغة الثانية في سن مبكر، مجموعة اكتسبت اللغة الثانية في سن متأخر)، اللغة التي عرضت بها الكلمات (العربية، الإنجليزية)، وثلاثة قوائم من الكلمات التي تعكس ثلاث انفعالات مختلفة (كلمات تعكس الانفعالات الإيجابية، كلمات تعكس الانفعالات السلبية، وكلمات تعكس الانفعالات المحايدة). أظهرت النتائج عدم وجود فروق ذات دلالة في التذكر بين مجموعة من اكتسبوا اللغة الثانية في عمر مبكر وبين من اكتسبوها في عمر متأخر، ولكن أوضحت النتائج تأثير دال للغة التي عرضت بها الكلمات، كما أوضحت النتائج أيضاً تأثير دال للكلمات التي عكست الانفعالات المختلفة. كما أظهرت النتائج تفاعل دال بين اللغة التي عرضت بها الكلمات وبين الكلمات التي عكست الانفعالات المختلفة. وأخيراً، أوضحت النتائج تفاعل دال بين العوامل المستقلة محل الدراسة: اللغة، الكلمات الانفعالية، وما إذا كان الشخص اكتسب اللغة الثانية في سن مبكر أم متأخر.

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Introduction

The development of emotional language and emotion concept begins during one's early childhood as both are learned through contexts in which they are first experienced and first practiced through "sensor-motor interactions" that involve both linguistics and emotional intertwined (Altarriba, 2003). In other words, and in the early phases of human development, the child experienced and interacted with different situations full of arousing stimuli, they learned to express, associate, and retrieve their emotions about these situations by using language. Therefore, most of the prior work in this domain postulates a close relationship between emotion and language (Bloom & Capatides, 1987). In that sense, the words used to express some emotional state may be unique in each language and they are difficult to translate into a word or term in another different language(s). Consequently, the growing psychological work in this arena has been directed to investigate the ways in which emotional language are acquired, recognized, retrieved, and expressed by mono-, bi-, and multilingual speakers (Comanaru & Dewaele, 2005). Though the bilingualism is simply defined as the ability to use two languages, the definition is a problematic since it affected by numerous factors that make the definition a controversial issue. Factors such as age of acquisition, proficiency, and context of use (Bialystok, 2015), all impact on the development of the definition of bilingualism. Hence, the bilingual can be described in more than way and researchers generally decide on their own definition based on their subjects' classification, and their own research objectives (Cenoz, 2013). Through the bilingualism is found in almost age groups, in almost all level of society, and in most countries, the psycholinguistics have extended their work to examine the efficiency of emotional words retrieval in bilinguals, they also focus on the difference(s) between the valenced emotional words and the neutral words that

presented in their first language (L1) and their second language (L2). In addition, they investigate the characteristics that distinguish emotional words from other word types (i.e., abstract, and concrete words) (Basnight-Brown & Altarriba, 2018). Although many variables have been studied to examine the bilingual's memory retrieval of emotional words, the conflicting results have been a persistent problem that makes some of theoretical explanations remain uncertain.

Language advantage and proficiency

One of the most important variables that take much attention is language advantage, which is the advantage conferred by the language itself. Giving the assumption that processing of the L2 is emotionally less efficient than the processing of L1 for bilinguals (Marcos, 1976; Dewaele & Pavlenko, 2002), the past findings demonstrated that retrieval of valenced emotion words that presented in L2 is less efficient compared with the retrieval of emotion words that presented in L1 (Marian & Kaushanskaya 2004; Pavlenko, 2002), this was the case for both free- and non-free-recalling. Researchers justified the limited efficacy of L2 as when bilinguals used their L2 to process emotional information (e.g., emotional words), they processed it semantically not affectively (Pavlenko, 2012). For example, Altarriba (2008) and Pavlenko (2002) indicated in two different studies that L2 has relatively less emotional impact compared with the L1 in bilinguals. They argued that L1 is coded deeply for bilingual speakers because they are experienced in a wide range of contexts, and it applied in more settings and different situations. Consistently, Ayçiçeği and Harris (2009), and Harris (2004) suggested that the basic emotion-memory would be stronger for words presented in L1. In their work, they examined the performance of Turkish–English bilinguals in some deep processing task (e.g., emotional-intensity rating), shallow processing task (e.g., counting letter features) and two additional deep processing tasks (e.g., translation and word association). Their experiment involves five categories of words (taboo,

reprimands, positive, negative, and neutral words), followed by a surprise recall task. In (2002), Cerevantes's study demonstrated that L1 vocabulary acquires affectionate and autobiographic dimensions when it investigated the emotional conversations of 48 Mexican-descent families, focusing on their use of emotion labels and explanations during a videotaped storytelling task. The results of this study indicated that Mexican immigrant mothers used more explanations than labels. However, most of the previous findings showed that L2 on the other hand had an advantage compared with L1 when bilingual speakers asked to recall or express different word types (i.e., taboo words) (Altarriba, 2008; Dewaele, 2010). The variable of language advantage has been attributed in different studies to the proficiency level of L2. As an example, Dewaele and Pavlenko (2002) conducted an experiment to investigate the impact of language proficiency on the use of emotional words in 29 advanced French-Dutch interlanguage speakers. The results of the study revealed that the use of emotional words in interlanguage is strongly linked to the level of proficiency.

The acquisition age of the second language

The effect of the age in which bilinguals acquired their L2 has taken much attention in the prior work. Giving the assumption that infants at a very early age explore their external world through sensorimotor interactions that required affective interchanges (Anooshian & Siegel, 1985), Bloom and Capatides (1987) documented the close relationship in infancy between the expression of affect and language development. The conclusion drawn from the previous studies indicate that the L1 is commonly perceived and experienced as more emotional than languages acquired later in life. In (Pavlenko, 2012), the results show that the emotionality of words in L2 is processed less effectively compared with L1. The study assumed that if bilinguals have learned their L2 early in life, then both L1 and L2 are equally capable of activating the emotional response triggered by the word stimuli.

The valence of emotion words

A further important variable that may influence the emotional language of bilingual speakers is the effect of emotion word valence (e.g., positive, neutral, and negative) component of emotion. Despite the amount of research focused on emotion word processing in bilingual speakers, still the clear picture has not emerged due to the inconsistency in results. Most of the prior studies have selectively compared valenced (emotional) words with non-valenced (non-emotional) words (see Kensinger & Corkin, 2003; Xu, Zhao, Zhao & Yang, 2011), and fewer of them have compared positive and negative words. At the time of writing, studies conducted on the valenced words of bilinguals have yielded conflicting results. Some show processing advantages for L1 compared with L2. For example, Anooshian and Hartel (1994) examined a group of Spanish-English bilinguals in which Spanish was the participants' L1 for half of them, and English was the L2 for the rest. The study indicated that L2 has less efficiency compared with L1, and this is attributed to the fact that emotional words acquired in L1 are coded deeply because bilinguals are exposed to different contexts. Similar findings reached by Marian and Kaushanskaya (2004), the findings demonstrated that bilinguals expressed more intense affect when speaking their native language. Further studies provided evidence for an advantage in L2 compared with L1. For example, Ayçiçeği and Harris (2004) conducted research on Turkish-English bilingual speakers living in the United States for an average of 2.1 years. The study compared their emotional processing efficiency for positive, negative, and neutral words (i.e., 16 words for each category). The results revealed advantage memory retrieval and recognition for emotional words in both L1 and L2, and it was stronger more in L2 for some word stimuli. Inconsistently with the results that have been discussed by Anooshian and Hartel (1994), the study suggested that, even for bilingual speakers who acquired their L2 late (i.e., after age 12), words in L2 retain rich emotional associations. On the other hand, there were studies show no difference between L1 and L2 when they focus on other cognitive tasks rather than memory retrieval. For example, in (Soutton et al., 2007), the

emotional Stroop effect was investigated on a group of Spanish-English bilingual speakers, the study provided evidence of the automatic activation of emotional components in words appearing in both L1 and L2. A similar demonstration presented in (Bakvić & Škifić, 2017). In this study, they investigated the relationship between bilingualism and identity in expressing emotions and thoughts in a group of German-Croatian bilingual speakers, their findings demonstrated that L1 is not always chosen first when bilinguals attempt to express their emotions, and that sometimes L2 is chosen first, or that there may be a combination of the usage of both L1 and L2.

Based on the review, there is limitation of works that focus on Arabic-English bilinguals. In addition, there has been some disagreement concerning the effect of the age where bilinguals acquired their L2 on emotional memory retrieval. By addressing these limitations, the main aim of this study is to investigate the performance of free-recalling of emotional words compared to non-emotional words in Arabic-English bilinguals where the Arabic language is their L1, and the English is their L2. The current study tries to confirm the presence or absence of the significant differences of recalling the emotional words (positive, negative, and neutral) that presented in Arabic and English for Arabic-English bilinguals. In addition, the current study tries to investigate if there is a difference in the memory recall of emotional words between bilinguals who acquired their L2 early and those who acquired it late. To achieve this aim, the current study focuses on the category of Arabic-English bilinguals who are Egyptians and resident in Egypt, and they descent from both Egyptian fathers and mothers. They acquired their L2 after the L1 (sequential bilinguals) in schools. In this study, we expected to see no difference in memory recall of emotional words between participants who acquired L2 early and those who acquired L2 late. In addition, we expected to see better recall of emotional words compared to neutral words presented in L1 for both early and late English learners. Furthermore, the differences in recalling

emotional words between the positive and negative words that presented in L1 and L2 was hypothesized.

Method

Participants

The 68 participants were native Arabic speakers (36 Females, 32 Males). All participants are Egyptians, residents in Egypt, and they are of Egyptian descent from both their fathers and mothers. Participants were students and staff at the British university in Egypt (BUE). The average age of participants was 25.69 years (ranging from 18 to 44 years). To evaluate their English fluency, we administered a questionnaire that included two sections. In section one, participants rated their English fluency in reading, conversation, comprehension and writing on a 5-points scale (1 = native-like fluency, 5 = poor fluency). In section two, participants determined the extent to which English and Arabic languages are frequently used their communities (i.e., at home, work, or institutions, and in their daily life activities) on a 5-point scale (1 = always, 2 = very often, 3 = sometimes, 4 = rarely, 5 = never).

The participants were divided into two groups. The first group included 33 participants who were relatively late learners of English (18 Females, 15 Males) with average age 32.21 years (ranging from 22 to 44 years). Participants acquired English as a second language at the age 12 years. The first experience of English language occurred when they enrolled in the first preparatory year (i.e., after 6 years in primary school). Participants evaluated themselves most fluent in comprehension ($M = 2.06$, $SD = 0.85$) and reading ($M = 1.82$, $SD = 0.76$), and less fluent in conversation ($M = 3.30$, $SD = 0.80$) and writing ($M = 3.82$, $SD = 0.72$). The participants in this group stated that they use English language less frequently at work ($M = 3.30$, $SD = 0.63$), at home ($M = 4.48$, $SD = 0.61$) and in their daily life activities ($M = 4.00$, $SD = 0.55$).

The second group included 35 participants who acquired English language early (18 Females, 17 Males) with average age 19.54 years (ranging from 18 to 23 years). The early English language

participants enrolled in private English-language schools where they acquired English at age 6 years. Participants in this group evaluated themselves most fluent in comprehension ($M = 2.09$, $SD = 0.66$), reading ($M = 1.60$, $SD = 0.69$) and conversation ($M = 1.86$, $SD = 0.65$), and moderate fluency in writing ($M = 2.54$, $SD = 0.82$). The participants in this group stated that they use English language more often at work/institution ($M = 2.40$, $SD = 0.60$) and less at home ($M = 3.86$, $SD = 0.69$) and in their daily life activities ($M = 3.57$, $SD = 0.60$).

Design

This study compared the free recalled emotional words presented in Arabic and English language between Arabic-English bilingual participants. A design of 2 x 2 x 3 three-way mixed ANOVA was administered with three independent variables: the group of English language acquisition (i.e., early, and late), the language (i.e., Arabic as L1, and English as L2), and the emotionality of words (i.e., positive, negative, and neutral). The dependent variable was the mean of recalled words from the word lists presented both in Arabic and English lists. When the assumption of homoscedasticity was violated, we report approximate degree of freedom (df) that confirms to Greenhouse-Geisser. The significant effects were investigated using t -test and the significance level for all analyses was set at 0.05.

Materials

We have selected words from the Affective Norms for English Words (ANEW) dataset that has not been translated into Arabic (Bradley & Lang, 1999). In this dataset, each emotion word had been rated for three dimensions; valence (ranging from pleasant to unpleasant), arousal (ranging from calm to excited), and a less strongly related dimension called “dominance” or “control”. This had been done on a 9-points scale, with 1 being lowest, and 9 being highest. The positive words had a valence mean of 7.52 (ranging from 7.06 to 8.33) and arousal mean of 6.90 (ranging from 6.74 to 7.83). The negative words had a valence mean of 2.32 (ranging

from 1.29 to 2.93) and an arousal mean of 6.72 (ranging from 6.33 to 7.86). The neutral words had a valence mean of 5.42 (ranging from 5.06 to 6.26) and an arousal mean of 3.82 (ranging from 3.22 to 4.34).

To prepare the English word list, we selected 42 English words from the ANEW dataset and divided them into three lists: positive, negative, and neutral based on the value of valence and arousal. We prepared each words list to contain 14 words. The positive words were selected to be relatively high in valence ranged between 6.97 and 8.72 ($M = 7.91$, $SD = 1.39$) and relatively high in arousal ranged between 5.00 and 7.72 ($M = 6.37$, $SD = 2.50$). The negative words were selected to be relatively low in valence ranged between 1.23 and 3.00 ($M = 2.1$, $SD = 0.58$) and relatively high in arousal ranged between 4.75 and 7.17 ($M = 6.25$, $SD = 0.79$). The neutral words were selected to be neither high nor low in valence that ranged between 5.03 and 6.34 ($M = 5.51$, $SD = 0.42$) and neither high nor low in arousal that ranged between 3.6 and 5.12 ($M = 4.14$, $SD = 0.42$). In this experiment, we controlled three main factors that could be associates with the memory recall: the word class, the word frequency, and the word length (MacLeod & Kampe, 1996). As for the word class, we balanced each words list to contain 7 verbs and 7 nouns. Concerning the word frequency, the original English words frequency (per million) is taken from the norms that appeared in (Kucera & Francis, 1967). To take the frequency of the selected English words from the recent spoken and written sources, we used CELEX (celex.mpi.nl) that contains 17.9 million tokens and over 330 million words. A one-way ANOVA was conducted to examine the differences among the three lists in word's frequency. The results indicated a non-significant difference among the frequency of words in the three lists, $F(2, 39) = 0.10$, $p = 0.90$, $\eta^2 = 0.01$. As for the word length, the selected positive word length was ranged between 3 and 7 characters ($M = 5.14$, $SD = 1.29$), the selected negative word length was ranged between 4 and 9 characters ($M = 5.79$, $SD = 1.37$), and the neutral word length was ranged between 3 and 11 characters ($M = 5.43$, $SD = 1.99$). A one-way ANOVA was conducted to

examine the differences among the three lists in word length. The results indicated a non-significant difference among the word length in the three lists, $F(2, 39) = 0.58, p = 0.56, \eta^2 = 0.64$. The English word lists are presented in the Appendix.

To prepare the Arabic word list, the English positive, negative, and neutral word lists were translated into the Modern Standard Arabic (MSA) that commonly used in written media and education. The translated Arabic lists were reviewed by professor of English-Arabic translation in the department of English language and literature, faculty of arts and humanities at the British University in Egypt (BUE). To examine the emotionality of the translated Arabic word lists in the Egyptian culture, we conducted the same procedure in (Bradley & Lang, 1999). An anonymous survey of 42 Arabic words was published over the Internet. We explained that participation implied analyzing their responses toward the valence and the arousal of each single Arabic word on a 9-points scale, with 1 being lowest, and 9 being highest. The online survey was completed by 134 participants. There were 61.5% of female participants, and ages ranged between 16 and 38 years ($M = 24.9, SD = 5.4$). The result of the Arabic positive words indicated that the valence ranged between 6.81 and 8.09 ($M = 7.32, SD = 0.42$), and the arousal ranged between 5.75 and 7.68 ($M = 6.76, SD = .53$). For the Arabic negative words, the valence ranged between 1.63 and 2.23 ($M = 1.90, SD = 0.19$), and the arousal ranged between 5.28 and 7.50 ($M = 6.33, SD = 0.74$). The Arabic neutral valence ranged between 4.01 and 5.66 ($M = 5.17, SD = 0.43$), the arousal ranged between 3.14 and 5.05 ($M = 3.91, SD = 0.54$). Regarding the Arabic word frequency, we used ARALEX (aralex.mrc-cbu.cam.ac.uk/aralex.online/), see (Boudelaa & Marslen-Wilson, 2010). A one-way ANOVA was conducted to examine the differences among the three Arabic word lists in word's frequency. The results indicated a non-significant difference among the frequency of Arabic words in the three lists, $F(2, 39) = 0.06, p = 0.95, \eta^2 = 0.003$. As for the word length, the Arabic positive word length was ranged between 3 and 4 characters ($M = 3.79, SD = .43$), the Arabic negative word length was ranged

between 3 and 5 characters ($M = 4.29$, $SD = 0.83$), and the Arabic neutral word length was ranged between 3 and 6 characters ($M = 4.00$, $SD = .78$). To examine the differences among the three Arabic list in word length, a one-way ANOVA was conducted. The results indicated a non-significant difference among the word length in the Arabic three lists, $F(2, 39) = 1.79$, $p = 0.18$, $\eta^2 = 0.084$. The Arabic word lists are presented in the Appendix.

We analyzed the differences between English and Arabic words to confirm the presence or absence of the significant differences in word length, frequency, valence, and arousal. The results indicated that English words were longer ($M = 5.45$, $SD = 1.57$) than their corresponding translated Arabic words ($M = 4.02$, $SD = 0.72$), $t(82) = 5.38$, $p < 0.05$. While the result of the differences between the English ($M = 30.28$, $SD = 57.38$) and its corresponding translated Arabic words ($M = 16.23$, $SD = 30.37$) in word frequency indicated a non-significant difference, $t(82) = 1.40$, $p > 0.05$. For valence, all comparison results between English and Arabic words show no significant differences except for the positive list of words, as the positive English words ($M = 7.91$, $SD = 0.47$) are more valenced than Arabic words ($M = 7.32$, $SD = 0.42$), $t(26) = 3.48$, $p = 0.02$. For arousal, all comparison results between English and Arabic words show no significant differences for the positive, negative, and neutral words.

The experimental material in its final form was implemented using MS PowerPoint® to be presented on computer screen. The words list was presented so that 50% of the English and Arabic words were presented in visual form on the center of screen with font size 80 pt., font type "Times New Roman", black color, and white background. The remaining 50% of the English and Arabic words were presented in auditory form.

Procedure

The experiment was conducted in two groups, and it took place in the computer laboratory at the British University in Egypt (BUE). The experiment was administered individually to participants, so that each participant had a computer screen and a headphone.

Following Ayçiçeği and Harris (2004), the words presented randomly in terms of language and modality. The word was presented in English or in Arabic language, and each given word was presented visually or auditorily. We prepared the words list so that the overall number of words in each language and each modality was equal. Hence, the participant could not predict the next word's language or its modality. The participants were told that they would randomly see or listen to a group of English and Arabic words. The words were presented one after another with 30 seconds inter-word interval. After presenting each word, the participants were told to solve a mental arithmetic problem, including the last one. To ensure that participants understood the instruction before the experiment, we prepared a practice list included 6 words: 3 English and 3 Arabic words. Immediately and after participants finished the last arithmetic task, they were given an instruction to recall and write down as many words as they remembered from the list presented from the computer in a separate paper sheet without any order.

Results

The results of the Three-Way Mixed ANOVA showed that there was no significant main effect of English language acquisition (early vs. late) $F(1, 66) = 2.33, p = 0.13, \eta^2 = 0.03$ on the free memory recall of emotional word lists, with bilingual participants who learned English early ($M = 6.53, SD = 0.12$) and the bilingual participants who learned English late ($M = 6.79, SD = 0.12$) performing similarly overall.

The results showed that there was a significant main effect of language (English vs. Arabic) where the lists were presented in on the free memory recall of emotional word lists $F(1, 66) = 108.30, p = 0.00, \eta^2 = 0.62$. Descriptive statistics showed that participants recalled the words presented in Arabic language ($M = 7.36, SD = 0.10$) better than words presented in English language ($M = 5.96, SD = 0.11$).

In addition, there was a significant main effect of word emotionality (positive, negative, neutral) on the free memory recall of word lists $F(2, 132) = 130.99, p = 0.00, \eta^2 = 0.67$. A post-hoc Tukey Honesty Significant Difference (HSD) procedure indicated a significant difference in recalling of positive, negative, and neutral word lists, with negative words ($M = 7.70, SD = 0.14$) were better recalled than positive words ($M = 6.94, SD = 0.12$), $p = 0.00$, and these positive words were better recalled than neutral words ($M = 5.34, SD = 0.10$), $p = 0.00$.

Regarding the interaction between the language and its time of acquisition, the results showed that there was no significant interaction between the language where the word lists were presented in (English vs. Arabic) and whether the participants acquired the English language early or late $F(1, 66) = 3.11, p = 0.08, \eta^2 = 0.05$.

On the other side, the results showed that there was a significant interaction between the emotionality of word list (positive, negative, neutral) and whether the participants acquired the English language early or late $F(2, 132) = 39.99, p = 0.05, \eta^2 = 0.38$. Descriptive statistics showed that while the bilingual participants who acquired English late recalled the positive words ($M = 7.71, SD = 0.17$) and neutral words ($M = 5.50, SD = 5.19, SD = 0.14$) better than participants who acquired English early ($M = 6.16, SD = 0.17$) and ($M = 5.19, SD = 0.14$) respectively, the participants who acquired English early performed better in recalling negative words ($M = 8.26, SD = 0.19$) than participants who acquired English late ($M = 7.15, SD = 0.19$).

Additionally, the results indicated that there was a significant interaction between the language where the word lists were presented in (English vs. Arabic) and the emotionality (positive, negative, neutral) of word lists $F(2, 66) = 44.79, p = 0.00, \eta^2 = 0.40$. Descriptive statistics showed that positive word list ($M = 7.68, SD = 0.18$), negative word list ($M = 8.95, SD = 0.17$), and

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neutral word list ($M = 5.46$, $SD = 0.13$) that presented in Arabic language were better recalled than positive word list ($M = 6.19$, $SD = 0.15$), negative word list ($M = 6.46$, $SD = 0.16$), and neutral word list ($M = 5.23$, $SD = 0.12$) that presented in English language.

Regarding the interaction between the language, emotionality and the time of acquisition, the results showed that there was a significant interaction between the language where the word lists presented in (English vs. Arabic), the emotionality (positive, negative, neutral) of word lists and whether the bilingual participants acquired English language early or late, $F(2, 132) = 5.30$, $p = 0.006$, $\eta^2 = 0.07$. Descriptive statistics showed that participants who acquired the English language late recalled the positive word list ($M = 6.70$, $SD = 0.21$; $M = 8.73$, $SD = 0.26$) and neutral words ($M = 5.50$, $SD = 0.17$; $M = 5.52$, $SD = 0.19$) presented in English and Arabic language respectively better than participants who acquired the English language early who recalled the positive word list ($M = 5.70$, $SD = 0.20$; $M = 6.63$, $SD = 0.25$) and neutral word list ($M = 4.97$, $SD = 0.16$; 5.40 , 0.19). However, participants who acquired the English language early recalled the negative word list ($M = 7.20$, $SD = 0.23$; $M = 9.31$, $SD = 0.24$) presented English and Arabic language reactively better than participants who acquired the English language late ($M = 5.73$, $SD = 0.24$; $M = 8.58$, $SD = 0.25$). The means and standard deviation of recalled word list for participants who acquired L2 late and early are shown in Table 1.

Table 1. Means (SD) of recalled English and Arabic word lists for bilinguals who acquired English late and early (n = 68)

	Late English learners (n = 33)		Early English learners (n = 35)	
	Word lists			
	English	Arabic	English	Arabic
Positive	6.70 (1.24)	8.73 (1.61)	5.70 (1.18)	6.63 (1.37)
Negative	5.73 (1.03)	8.58 (1.37)	7.20 (1.59)	9.31 (1.45)
Neutral	5.50 (0.91)	5.52 (1.15)	4.97 (0.99)	5.40 (1.06)

Discussion

The main aim of the current study is to investigate the effect of language on recalling emotional words for Arabic-English bilinguals who acquired L2 early (6 years) and who acquired L2 late (12 years). This was achieved by presenting 42 emotional words presented in English and their translated Arabic version. Several findings emerged from the current study. Regarding the between-subject results, the current study found no differences between those who acquired L2 late and those who acquired L2 early in memory recalling as both performing similarly overall. This finding indicated that neither the language of word list (English or Arabic) was given, nor the emotionality of these words (positive, negative, neutral) affect the memory recall for participants who acquired L2 early and participants who acquired L2 late. regarding the main effect of language, the results showed that there was a main effect of language on memory recall as participants recalled the words presented in Arabic language better than words presented in English language. The higher performance of recalling Arabic words was expected because L1 may have a substantial role in facilitating the availability of words for sequential bilinguals who acquired L2 after L1 in schools. Regarding the main effect of emotionality, the current study found that negative words are better recalled than positive words and those positive words are better recalled than neutral words that presented in L1 and L2. These findings can be explained by the recognition characteristics of the negative words as they had been more deeply encoded in memory and facilitates memory for visual detail (Anooshian & Hertel, 1994). Furthermore, the finding of negative words advantage in L1 reflects the fact that the negative emotion may be more connected to early language learning (Arabic in our case), and thus the emotion-word advantage may be restricted to negative words in the first language.

Regarding the interaction between language and emotionality, the current results showed that participants recalled negative, positive, and neutral words presented in Arabic better than negative, positive, and natural words presented in English. Hence, our

prediction of better recalling of emotional words that presented in L1 was confirmed. Researchers justified the limited efficacy of L2 as when bilinguals used their L2 to process emotional information (e.g., emotional words), they processed it semantically not affectively (Pavlenko, 2012). In addition, these findings are consistent with the ones that found in (Anooshian & Hertel, 1994; Marian & Kaushanskaya, 2004; Pavlenko, 2005) as they discussed the role of L1 in facilitating the availability of emotional word content.

Furthermore, the results showed that late English learners recalled positive words presented in Arabic better than positive words presented in English. On the other hand, the early English learners recalled negative words presented in Arabic better than negative words presented in English. The finding of superior recall memory for emotional words either positive or negative presented in L1 could be attributed to the age of the second-language acquisition that plays an important role in emotional memory. In the current study, the subjects acquired English language after 6 years, this means that they practiced in expressing emotion in Arabic at their very first early age. In addition, this result was consistent with one found in (Anooshian & Hertel, 1994). In their study, they explained the superior recall of emotional words as infants explore their world through sensorimotor interactions that necessarily involve affective interchanges. This result also supported the assumption in Pavlenko (2002) as they stated that the retrieval of emotional words presented in L2 is less efficient compared with the ones presented in L1. Hence, the current results indicated that L1 had advantage in emotional memory recall because bilinguals acquired L2 after their infancy stage.

Conclusion

The previous psychological work in the area of memory has paid much attention to the influence of affect and/or language that may have on bilingual memory retrieval. The influence of word emotionality on Arabic-English bilingual's memory performance

has not been discussed before. In that case, the main goal of the current study is to extend this domain area by involving Arabic-English bilingual speakers which are neglected in the previous studies, as well as to investigate the effect of word emotionality on the recalling performance for bilinguals. Although we were successful in translating and creating an Arabic version of 42 emotional word list which could be used by the researchers who intend to focus on the emotional memory for Arabic words in their research, we recognize that this list should be extended to cover all the English words in the ANEW dataset and it should be evaluated by a large sample size in Egypt before it can be widely used. Future research will determine whether this emotional memory advantage holds for other kinds of stimuli (e.g., taboo words) that presented in Arabic and English language. In addition, further research will determine the category of Arabic-English bilinguals who are growing in countries where English is its first language.

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Free Recall of Emotional Word Lists in Arabic-English Bilinguals
Dr. Ahmad M. Abd El-Aziz

مجلة وادي النيل للدراسات والبحوث الإنسانية والاجتماعية والتربوية (مجلة علمية محكمة)

Appendix

The English emotional word list

Positive				Negative				Neutral			
Word	Len.	Freq.	Class	Word	Len.	Freq.	Class	Word	Len.	Freq.	Class
Admire	6	4	V.	Annoy	5	1	V.	Air	3	251	N.
Baby	4	183	N.	Assault	7	1	V.	Ankle	5	10	N.
Cash	4	50	N.	Betray	6	2	V.	Banner	6	7	N.
Cheer	5	2	V.	Blackmail	9	1	V.	Concentrate	11	7	V.
Desire	6	2	V.	Bomb	4	1	V.	Flag	4	9	N.
Fame	4	10	N.	Cancer	6	75	N.	Ink	3	9	N.
Gift	4	31	N.	Crash	5	1	V.	Invest	6	4	V.
Heaven	6	33	N.	Death	5	223	N.	Journal	7	18	N.
Inspire	7	1	V.	Devil	5	26	N.	Museum	6	31	N.
Love	4	32	V.	Drown	5	1	V.	Paint	5	4	V.
Profit	6	33	N.	Funeral	7	22	N.	Part	4	5	V.
Rescue	6	2	V.	Jail	4	30	N.	Plant	5	1	V.
Success	7	102	N.	Misery	6	20	N.	Rattle	6	1	V.
Win	3	13	V.	Surgery	7	12	N.	Spray	5	1	V.

The Arabic emotional word list

Positive				Negative				Neutral			
Word	Len.	Freq.	Class	Word	Len.	Freq.	Class	Word	Len.	Freq.	Class
يعجب	4	1.8	V.	يضايق	5	.4	V.	هواء	4	5.7	N.
طفل	3	23.0	N.	يعتدي	5	.3	V.	كاحل	4	.1	N.
فلوس	4	2.1	N.	بخون	4	7.0	V.	راية	4	8.5	N.
يشجع	4	11.7	V.	يبتر	4	.2	V.	يركز	5	17.3	V.
رغبة	4	67.2	N.	يفجر	4	2.8	V.	علم	3	94.2	N.
شهرة	4	11.6	N.	سرطان	5	3.6	N.	حبر	3	2.2	N.
هدية	4	10.2	N.	يصطم	5	3.6	V.	يستثمر	6	4.0	V.
جنة	3	6.8	N.	موت	3	153.5	N.	جريدة	6	34.8	N.
يلهم	4	.6	V.	شيطان	4	1.6	N.	متحف	4	25.5	N.
يحب	3	17.1	V.	يغرق	4	2.9	V.	يدهن	4	.1	V.
مكسب	4	4.4	N.	جنازة	5	7.5	N.	يقسم	4	4.1	V.
ينقد	4	3.7	V.	سجن	3	28.5	N.	يزرع	4	2.8	V.
نجاح	4	84.4	N.	بؤس	3	1.7	N.	يهز	3	2.4	V.
يفوز	4	12.3	V.	جراحة	5	9.2	N.	يرش	3	.2	V.