



Investigating the Role of Memory Self-Efficacy on Episodic and Semantic Memory Performance

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Abstract

In the present study, the role of memory self-efficacy in the performance of episodic and semantic memory of male and female students was investigated. Method: For this purpose, a sample of 16 female and 16 male undergraduate students from the Faculty of Humanities of the University of Kurdistan was selected from six groups, psychology, law, business administration, counseling, accounting, and English literature, using cluster sampling. In this study, two tests of recall of high-frequency and low-frequency words and famous and unknown images were used for episodic memory, and two tests of categorical categories and vocabulary fluency were used for semantic memory. A 2x2 factorial design was used, two genders and two levels of efficiency. Results: The results of the analysis of variance showed that the difference in episodic memory in students with high and low levels of memory self-efficacy is significant. In other words, a higher level of memory self-efficacy leads to better episodic memory performance. No significant difference was observed in semantic memory of students with high and low levels of memory self-efficacy. The interaction of gender and memory self-efficacy had no significant effect on episodic and semantic memory performance.

Keywords: *Memory self-efficacy, semantic memory, episodic memory.*

Introduction

One of the dimensions of self-efficacy in Bandura's social cognitive theory is self-efficacy, which is referred to as a person's perceived ability to adapt to a specific situation. Bandura defines self-efficacy as a person's belief and judgment of his or her ability to perform various tasks and their conditions (Zhang, 2025). Self-efficacy beliefs can predict behavior, but not actual ability to behave, to some extent because these beliefs are tools that determine what people can do with the knowledge and skills they have. The mediating role of these beliefs is to explain why people with similar skills and knowledge perform differently (Huang et al., 2024). Students' beliefs about their abilities to complete assignments or succeed in academic activities affect their academic performance. Students' self-efficacy beliefs are related to their success in important academic areas such as reading and writing, mathematics, and science. Self-efficacy beliefs also affect students' efforts, choices, and persistence in the face of difficulties. Therefore, students' self-efficacy beliefs play an undeniable role in their academic motivation, learning, and success (Chu et al., 2024).

Self-efficacy is related to a person's beliefs about their abilities, and these beliefs can relate to multiple abilities. For example, self-efficacy can include people's beliefs about their performance and memory ability (Chari et al., 2024).

Memory self-efficacy was first introduced by Bandura (1989) and defined it as an individual's beliefs about his or her ability to use memory effectively in different situations. He believes that knowledge about memory performance or metamemory is different from beliefs about memory efficiency (Dogra et al., 2024).

Metamemory involves knowledge about memory performance and processes and their monitoring. This knowledge is different from beliefs about an individual's memory ability in a specific situation (Lalita et al., 2021). According to Bandura, memory self-efficacy is a highly task-specific construct that includes an individual's confidence in their ability to recall items from a list (Frankstein et al., 2022). Memory self-efficacy is also defined as an individual's confidence in their abilities to perform memory-related tasks and activities (Igomigo et al., 2023).

Memory refers to a person's ability to recall information about their previous experiences. Memory involves the processes of acquiring, recording or encoding, storing, and ultimately retrieving information and can be classified in various ways. Tolving identifies four types of long-term memory.

1. Procedural memory 2. Perceptual memory 3. Semantic memory and 4. Episodic memory

Semantic memory is an individual's inference from his experiences and includes his knowledge of concepts, rules, principles and skills. Therefore, semantic memory is the concepts that are stored in the form of propositions, networks and schemas. Episodic memory also relates to specific spatial and temporal information, especially life events (Kung et al., 2024). Gatti (2024) distinguishes between semantic memory and episodic memory. In his opinion, semantic memory has a core body of knowledge and episodic memory is also formed from it. Semantic memory is like a dictionary that contains the meaning of all words and concepts, and episodic memory is like a novel or film that combines all concepts in specific ways (Matt et al., 2024).

One way to assess semantic memory is to test word fluency. Word production such as (word with category) can usually be considered an important aspect of semantic memory, because there is an intrinsic dependence between linguistic codes and semantic concepts (Presh et al., 2022).

Episodic memory refers to an individual's memory for specific events or life events. In general, episodic memory is related to the recording and recall of information that an individual has personally experienced, has a specific time and place, and requires conscious recall (DeSimon et al., 2023). Episodic memory is usually assessed by asking people to recall information such as lists of words, pictures, and faces. Research has shown

that among memory systems, episodic memory is sensitive to some factors such as forgetfulness and aging (Webb et al., 2022).

Memory self-efficacy has been defined and operationalized by Bandura (1989) and Berry, West, and Dinehey (1989). To measure this specific dimension of self-efficacy, individuals are asked to make judgments about two items: first, they answer “yes” or “no” about their ability to recall items, and then they indicate their level of confidence in their ability to recall these items on a scale of 10 to 100 (McGuire et al., 2024).

Traditionally, the relationship between self-efficacy and performance has been viewed as linear; that is, higher levels of self-efficacy are associated with higher levels of performance. From this perspective, high levels of self-efficacy are necessarily associated with high performance (Lestry et al., 2024). Researchers have shown that self-efficacy scores can predict individuals' performance in various dimensions, including memory (Boing et al., 2025).

Researchers have studied the relationship between memory self-efficacy and memory performance, while most of these studies have found significant relationships between memory self-efficacy and memory performance. Skinner, 1996; D'Souza et al. 2021; Sella et al. 2023; Chari et al. 2024, some studies have also found no relationship such as Lee et al. 2024; Nasrin et al. 2024 For example, D'Souza et al. (2021) showed in Indian elderly people that memory self-efficacy can predict memory performance. Sella et al.'s (2023) study also showed that memory self-efficacy on everyday tasks such as phone location maps and shopping lists predicts memory performance on everyday tasks and on laboratory tasks such as word pictures, numbers, and mazes. McMurray's (2023) studies have also shown that the relationship between remembering everyday tasks and memory self-efficacy is stronger than the relationship between remembering items in the laboratory and memory self-efficacy.

Yakut's (2021) study showed that memory efficacy beliefs were related to cognitive performance in men, but not in women. Callicchio (2023) also found that self-efficacy beliefs did not predict any cognitive performance dimensions in men or women. Given that previous studies have examined the effect of memory self-efficacy on general memory performance and not a specific type of memory. However, there are few studies on the effect of memory self-efficacy on different types of memory, and only some studies have examined the effect of this variable on how people perform in remembering everyday tasks, the question arises as to whether memory self-efficacy affects the performance of different types of memory; and if so, how is this effect and does it affect different types of memory? The aim of the present study is also to answer the question of what effect memory self-efficacy has on the performance of episodic and semantic memories, two important types of long-term memory. It also seeks to answer this question. What effect does the interaction of gender and

memory self-efficacy have on students' semantic and episodic memory performance? Students' semantic and episodic memory.

Method

Statistical population and sampling method:

The statistical population of the present study consists of all male and female undergraduate students of the Faculty of Humanities of the University of Kurdistan who were studying in the academic year 2024-2025. The statistical sample consisted of 16 girls and 16 boys who were selected by cluster sampling from six departments of psychology, law, counseling, business administration, English literature, and accounting. First, a sample of 300 students was selected from the faculty students using cluster sampling. The sampling method was as follows: in cooperation with the university education department, one class was randomly selected from each group and a memory self-efficacy questionnaire was administered to them. After administering the questionnaire and calculating the scores of each individual in two dimensions of memory self-efficacy level and confidence in this self-efficacy, the data were ranked according to the individuals' scores in both dimensions, and then 25% of the students with high scores (16 people) and 25% of the students with low scores (16 people) were selected and a memory test was administered to them. The groups that made up this experiment were male and female students with high memory self-efficacy and male and female students with low memory self-efficacy.

Research Tool

1-Memory Self-Efficacy Questionnaire

To measure memory self-efficacy, the Memory Self-Efficacy Questionnaire (MSEQ) (Barry et al., 1989) was used, which is a 50-item scale and has 10 memory tasks with different levels of difficulty. Four tasks represent everyday memory situations (recalling store lists, locations of objects, telephone numbers, and instructions) and four tasks, which include two additional tasks, represent laboratory-type memory situations (lists of words, pictures, numbers, and recall of directions).

For each task, five questions are presented in a hierarchy. For example, if someone reads me a list of 12 words twice, I can remember all 12 words. In the next levels of this task, the number of words is 10, 8, 5, and 2. The level of self-efficacy is calculated by the subjects' "yes" or "no" answers and counting the number of "yes" answers, which varies from zero to five in each task. The confidence in the answers section shows the strength of self-efficacy from 10 to 100 percent. This value is calculated by averaging the confidence values for the

"yes" answer and the "no" answer; therefore, the value for the "no" answer will be zero, which reduces the self-efficacy strength scores (Bosh,2002).

This scale has a high Cronbach's alpha. Berry et al. (1989), citing Bush (2002), reported an alpha of .90 for memory self-efficacy level and .92 for memory self-efficacy strength. McDougall (1995), citing Bush (2002), reported an alpha of .87 for memory self-efficacy level and .90 for memory self-efficacy strength. Bush (2002) obtained an alpha of 0.87 for memory self-efficacy level and 0.90 for memory self-efficacy strength.

2- Memory measurement tool

In this study, two tests of recalling high-frequency and low-frequency words, and famous and unknown pictures were used for episodic memory, and two tests of categorical categories and vocabulary fluency were used for semantic memory. The instrument used in the study to measure episodic memory was two lists of words and pictures. Arab Sheibani (2003) The list of words included two lists of 12 words (such as pencil and forest). In addition, in each list, half of the words were high-frequency (such as office and fruit) and half were low-frequency (such as prison computer and dagger). In addition to these words, in the recognition stage, two other lists of 12 words were used, half with high frequency and half with (low) frequency.

For the images, two lists of 12 images were used, each list containing 6 images of non-famous people and 6 images of famous politicians such as (Bush and Saddam), artists such as (Reza Attaran, Fatemeh Motamed Aria and Shajarian), and scientific, cultural and sports figures such as (Ali Daei, Farhad Majidi and Nasser Hejazi). In the recognition stage, in addition to the images of the first stage, two other lists of 12 images were added, one list containing images of famous people and the other list containing images of non-famous people. To test semantic memory, the word fluency test and the category test were used. (Karami Nouri et al., 2008) In the category section, 12 categories including family members, boys' names, fruit names, flower names, job names, etc. were read to the subject. In the vocabulary fluency section, the subject was presented with a letter and given two minutes to name as many words that began with this letter as he or she knew. These letters included two groups of high-frequency letters (such as M, A, and N) and low-frequency letters (such as H, Y, and Z).

The experimenter prepared two lists for both words and pictures, reading one list of words to the subjects and showing them a list of pictures, and using the other two lists containing the materials from these two lists in the recall phase test. The important point for the experimenter was that the first and second lists of each group were identical. To examine this issue, the second list was used instead of the first list for half of the subjects in the learning phase, and the first list was used instead of the second list in the recall phase.

The episodic memory test is performed on both words and pictures in two stages: learning and recall. In the learning stage, the episodic memory of words was given two lists of 12 words by a tape recorder. In the recall stage, all the words of the learning stage plus two other lists of 12 words, half of which were high frequency and half of which were low frequency, were presented to the subjects one by one and they were asked about each word. For recognition, the subject was asked whether this word had been played in the word list or not. For the episodic memory of pictures, the subject was also presented with two lists of 12 pictures. Then, in the picture recognition stage, the learning stage plus two other lists of 12 pictures, which were also a list of pictures of famous people and a list of pictures of non-famous people, were shown to the subject and the subject was asked about each picture. To measure recognition, the subject was asked whether this picture was in the list of pictures that was shown to him or not.

In the semantic memory test in the categorical categories section, after each category that was read to the subject, two minutes were given and he was asked to name as many categories as he knew. For example (household items). In the vocabulary fluency section, a letter was read to the subject, for example the letter (n) and after two minutes he was asked to name the number of words he knew that began with this letter.

When administering the test, in order to create a gap between the learning stage and recall from long-term memory, the semantic memory test was administered during the episodic memory; in such a way that after the subject heard the word, in the interval between the presentation of images and the recall test, six categories of the semantic memory categories and its remaining six categories were administered. The letters section (vocabulary fluency) was also administered at the end (after the completion of the episodic memory test).

Since the episodic and semantic memory test took a long time to complete and the subject might get tired, he was given a 15-minute break (once before presenting the learning stage images and once before performing the vocabulary fluency test).

Result

First, descriptive indices (mean and standard deviation) for male and female students were examined in the scales of memory self-efficacy, confidence in memory self-efficacy for word recognition, picture recognition, vocabulary fluency, episodic memory categories, and semantic memory and reported in Table 1.

Also, descriptive indices (mean) for students in the two groups with high and low self-efficacy were examined in the scales of episodic memory, word recognition, picture recognition, and semantic memory (vocabulary fluency and categories). (Tables 2 and 3)

In this study, a 2×2 factorial design was used for each memory separately, two genders and two levels of

efficacy. Each experimental group was formed according to the level of memory self-efficacy and gender, so that up to four groups were formed and eight subjects were placed in each group. As mentioned, this study seeks to investigate the effect of memory self-efficacy on episodic and semantic memory performance of male and female students.

Is there a significant difference between the performance of male and female students in episodic memory? As Table 4 shows, the results of the analysis of variance indicate that there is no significant difference between the two genders in episodic memory ($F(32,1) = 1/573, P = 0.220$).

Is there a significant difference between the episodic memory performance of students with high and low memory self-efficacy? As can be seen in Table 4, the results of the ANOVA statistical test show that the difference between students with high and low self-efficacy in episodic memory is significant ($F(32,1) = 28/158, P = 0.001$).

Do memory self-efficacy and gender interact in episodic memory? The results of the analysis of variance (Table 4) show that the interaction between gender and memory self-efficacy is not significant in episodic memory.

As Table 5 shows, there was no significant difference in semantic memory performance between male and female students and students with high and low memory self-efficacy ($F(32,1) = 0/031, p = 0/86$). For male and female students and ($F(32,1) = 0/320, p = 0/576$) Meaningfully, the interaction between gender and self-efficacy level is also not significant ($F(32,1) = 2/95, p = 0/097$).

Table 1- Mean and standard deviation of students' scores on the self-efficacy level scales of memory, episodic retention, and semantic memory

R	Group	M	SD
Level of self-efficacy	Boys	37/19	6/26
	Girls	36/19	6/68
Episodic memory	Boys	18/94	2/54
	Girls	19/37	3/16
Semantic memory	Boys	43/65	8/14

Table 2- Average scores of students in two groups with high and low self-efficacy in episodic memory (word recognition, image recognition)

Variable	Word Recognition	Image Recognition
Low self-efficacy	8/37	8/87
High self-efficacy	10/31	10/75

Table 3- Average scores of students in two groups with high and low self-efficacy in semantic memory (fluency of vocabulary and categories)

Variable	Fluency of Vocabulary	Categories
Low self-efficacy	19/74	25/23
High self-efficacy	18/25	24/87

Table 4- Summary of analysis of variance for subjects' mean scores in episodic memory

Variable	Ss	df	Ms	Ratio F	Significance level
Gender	6.790	1	6/790	1/573	0/220
Self-efficacy level	121/540	1	121/540	28/158	0/001
The interaction of gender and self-efficacy	4/290	1	4/290	0/994	0/327

Table 5- Summary of analysis of variance for the subjects' mean scores in semantic memory

Variable	Ss	df	Ms	Ratio F	Significance level
Gender	2/475	1	2/475	0/031	0/861
Self-efficacy level	25/248	1	25/248	0/320	0/576
The interaction of gender and self-efficacy	233/192	1	233/192	2/95	0/097

Discussion

The aim of this study is to investigate the role of memory self-efficacy in episodic and semantic memory performance. As stated in the previous section, there is a significant difference in episodic memory between the two groups of students with high and low levels of self-efficacy, but there is no significant difference in semantic memory. Although some previous studies have shown that memory self-efficacy predicts memory performance (Feng, 2025; Ergeç, 2025; Chari et al., 2024; cited in Shen et al. (2025)), the results of the present study show that memory self-efficacy has a significant effect only on episodic memory performance. This finding is consistent with the results of the study by Senden (2022), who showed that memory self-efficacy can predict episodic memory performance. The findings of this study indicate that memory self-efficacy does not have a significant effect on semantic memory performance. These findings are explained as follows: memory self-efficacy is influenced by personal factors such as successful or unsuccessful experiences, therefore, the difference in the level of self-efficacy is due to changes in specific life events. Episodic memory is memory related to specific events in the lives of individuals. Semantic memory refers to the general knowledge of an individual that is independent of personal identity and without temporal and spatial attachments. For example, an individual knows that the capital of England is London. This information is shared among humans and does not belong to anyone's personal experience, while episodic memory is the recording and recall of information that is related to the individual's personal and past experience and has a specific time and place. In events that happen specifically to an individual, the individual plays the role of agent and executor or witnesses the action and execution of the event by others (Sim-Sim, 2023).

According to Bando, sources of self-efficacy include personal experiences, social persuasions, role models, and physiological states of individuals. Therefore, it is expected that in the context of memory types, episodic memory, which includes personal experiences, is a more important source for individuals' self-efficacy levels, and that self-efficacy levels play a greater role in the performance of this type of memory. Another reason is that the tasks of the memory self-efficacy scale include everyday tasks (such as grocery lists, telephones, activity locations, and maps), which are more related to episodic memory.

As Miller's (2022) study showed, memory self-efficacy predicts memory performance for everyday tasks but cannot predict laboratory tasks (such as words and numbers). Therefore, it can be concluded that memory self-efficacy questionnaires mostly measure episodic memory self-efficacy and predict this memory performance, but are unable to predict semantic memory performance.

The results of this study showed that there is no significant difference between the two groups of female and male students in episodic memory. These results are contrary to previous studies. Miller's study (2022) showed that there is a significant difference between the two groups of female and male students in episodic memory. The results of the present study show that there is no significant difference between the two sexes in semantic memory, which is consistent with the results of previous studies, including Sim Sim (2023); Fing (2025). As the study by Shin et al. (2025) showed, the difference between girls and boys becomes smaller at older ages, because the better performance of girls in episodic memory, compared to boys, is due to their greater cognitive development, which is expected to improve with age.

The results of this study showed that the interaction between memory self-efficacy and gender factors did not affect either type (episodic and semantic memory). Considering the above, these findings regarding semantic memory are not surprising because the memory self-efficacy scale measures the level of confidence in individuals' ability regarding the efficiency of episodic memory. Since the sample of the present study consisted of students, it seems that caution should be exercised in generalizing the findings of the present study to other social classes, because there is a possibility of differences in attitudes related to death according to demographic factors. In the present study, it was not possible to access a sample consisting of elderly people in order to compare the findings, and since attitudes related to death and consequently anxiety and obsession with death are likely to fluctuate in different periods, it is suggested that the findings of the present study be examined in other samples, especially the elderly and dying people.

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