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# On Arabic Abstract and Concrete Words Recall Using Free Recall Paradigms: Is It Abstractness, Concreteness, or Zero Effect

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**Abstract:** Purpose: To see whether abstract or concrete words are better recalled in free recall type and to measure primacy and recency displayed effects in free recall paradigms. Method: 9 undergraduates in King Saud University, Saudi Arabia, participated in this study where they were trained to differentiate between abstract and concrete words. Then, a list of 20 Arabic abstract and concrete words was given to them to be classified into abstract and concrete words based on four factors: concreteness, imageability, meaningfulness, and age of acquisition. An observation sheet was provided to the experiment administrator to document observed recall effects and recalled words. Three methods were used to facilitate this experiment: auditory, visual, and hand-writing. Five of the participants were asked to recall freely only 5 Arabic abstract words and 5 concrete words. On the hand, 4 were asked to recall freely the 10 Arabic abstract words and 10 Arabic concrete words. Results: Descriptive and referential statistics tools were run to analyse the collected data. The computed referential statistics tools indicated generally acceptable values and positive usability of the administered measures in this study. Descriptive statistics results indicated a (100) score for the frequency of zero effect over both abstractness and concreteness effects. Results also indicated a negative effect of list length of Arabic abstract and concrete words where the total number of words was recalled completely in both short and long lists of words. Finally, recency effect approved an advantage over primacy effect with (65%) for the former and only (35%) for the latter. Conclusions: There was neither an advantage for abstract words over concrete ones nor an advantage for concrete words over the abstract ones, it was a rather a zero effect. List length effect didn't affect memory recall during free recall paradigms. Last but not the least, recency effect is more frequent than primacy effect in free recall paradigms.

**Keywords:** Abstract Words, Concrete Words, Free Recall, Primacy Effect, Recency Effect, List Length Effect, Concreteness Effect, Abstractness Effect, Zero Effect

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## 1. Introduction

Basically, words operate in two levels either abstract (e.g. mind, soul, etc.) or concrete (e.g. brain, body, etc.). (Paivio, 1990) defines abstract and concrete words as 'concrete word logogens have more direct connections with referent images than do abstract words', (p 123). The difference between these two types of words is 'concrete words exceed abstract words in their rated capacity to evoke images and in reaction time measures of imagery arousal to them', (ibid).

Comparatively, there are two approaches for abstract and

concrete words representation: *dual coding theory* vs. *context availability theory*. *Dual coding theory* according to Paivio in (Faust, 2012) abstract words are represented in the memory by means of 'verbal representation' as compared to concrete words which are represented by means of both 'image representation and verbal representation', (p 489). On the contrary, in *context availability theory* according to Schwanenflugel in (Faust, 2012) 'concreteness advantage comes from the richer availability of contextual information for concrete words', (p 192).

Several studies were conducted examining processing both

abstract and concrete words and revealing both major and minor differences and/or similarities between them. Among these studies is (Harad's & Coch, 2009) who investigated the concreteness effect on the ability of processing words and backward recall. 14 normal adults participated in the study where 120 abstract and 120 concrete words were used. It should be noted that 60 words from each type were old and 60 words were considered as new. Memory tasks including press button judgment were used as tools of this research. It was concluded that concrete word are more remembered than abstract ones. The researchers supported their empirical conclusion with that concrete words have more "meaning-based features" than do have the abstract ones, (Walker & Hulme in Harad & Coch, 2009, p. 1).

Consider also Neitzsche's study who emphasized that meanings of concrete words should be really explained in the real word itself; otherwise, there will be a great possibility to be "... misleading deliberately or inadvertently" (2006, p. 4).

Additionally, (Caramelli, Setti, & Maurizzi, 2004) attempted a study with the aim of identifying distinctive information between abstract and concrete concepts in school aged children. 120 middle school Italian native-speakers children with the age range (8-12) took part in the study. The researchers made use of 80 concepts (20 abstract and 20 concrete) as material of this study. The researchers made a small booklet where a student can write his/her produced word for each concept among the 4 sets of 80 concepts and a scale (1-7) rating his/her familiarity with the word along with a space to write anything that comes to his/her mind when reading the concept. It was concluded that the concrete concepts are more familiar than the abstract ones to the school age children. Moreover, the concrete concepts activated more relations than did the abstract ones.

Moreover, (Schwa, Akin, & Luh, 1992) examined the concreteness effects of automatic-imagery, strategic-imagery, and context availability hypothesis predictions to recall abstract and concrete words. The researchers conducted three experiments supporting the view that abstract words "are remembered more poorly than concrete materials", Paivio in (Schwa, Akin, & Luh, 1992, p. 96). The researchers concluded their research with results supporting the "strategic-imagery view of concreteness effects in free recall", (Schwa, Akin, & Luh, 1992, p. 96).

Besides, (Bergelso & Swingley, 2013) investigated the acquisition of abstract and concrete words by infants whose age range from 6-16 months old. 50 infants participated in the study and were divided into three age groups. The researchers used 14 videos displayed on an LCD screen. A general conclusion in this research is that infants of 10 months old were able to "identify novel referents of common words that do not refer to concrete objects, but young infants do not", (p. 396). More importantly, it is proposed that both abstract and concrete words' acquisition do differ "ontogenetically" and "may require skills with differing developmental trajectories", (ibid).

Furthermore, (Duñabeitia, Avilés, & Afonso, 2005) conducted a research about the representation of abstract and

concrete words where in this topic was investigated and supported from a qualitative point of view. In other words, unlike the above mentioned studies which investigated this topic quantitatively supporting their claim by that concrete words have more cognitive bases over abstract words due to more referents, in this study the qualitative views are supported where it is assumed that abstract word are recognized and represented in terms of semantic associations and concrete ones are represented in terms of semantic similarity.

Again, (Fließbach, Weis, & Klaver, 2006) examined abstract and concrete words processing on the basis of the notion that concrete words are generally better than abstract ones in terms of more successful remembering. The study was based on two theories, both supporting the view that concrete words, but not abstract ones are more accurately remembered. The first theory is called dual-coding theory and the second one is called context-availability theory. The former theory states that concrete words are over abstract ones because they possess "dual coding ... in the form of a verbal and sensory code", (Fließbach, Weis, & Klaver, 2006, p. 1413). The latter theory states again that concrete words are over abstract ones because they possess "a more accessible semantic network", (ibid). The researcher made use of the even-related functional magnetic resonance imaging (fMRI) technique as a tool for testing their proposed prediction. Twenty one (21) subjects without any neurological or psychiatric history in the age range (19-43) participated in the study. The material of the study was 180 abstract words and 180 concrete words, selected and identified as among the most frequent German words. The drawn conclusion was in favour of more significance in the case of concrete words over the abstract ones in terms of activated places in the brain.

Once again, (Borghi, Flumini, & Cimatti, 2011) conducted four experiments investigating possible differences between the acquisition of abstract and concrete words. 60 students in experiment 1, 32 in experiment 2, 18 in experiment 3, and 18 in experiment 4 who were native Italian speakers participated in the study. The researchers used 3D figures of novel objects and related new labels as material of the study. The researchers were able to identify a number of certain characteristics associated with the acquisition of abstract and concrete words. Among these findings is that those observed characteristics were typical for the abstract words but not for the concrete ones. Besides, the researchers state that abstract words are non-manipulable though recognizable.

In addition to the above mentioned studies, (Dahlstrom & Ultis, n.d) investigated the view that concrete words but not abstract ones are generally recognized more by humans. Using an attractor network "a recurrent neural network designed to settle to a stable output over time", (p. 1) the researchers attempted analysing the human behaviour towards language processing. It was concluded that the concrete words are more recognizable than the abstract ones, not because of their highly intensive representation, but of being more "reinforced" (Dahlstrom & Ultis, n.d, p. 6) in terms of learning [input].

Once again, (Walker & Hulme, 1999) evaluated in their study immediate serial recall (ISR) and maximal speech rate (MSR) of abstract and concrete words differing in length. Four experiments were conducted and the general conclusion was that concrete words have an advantage over abstract ones in terms of being recalled faster than the abstract ones, yet in terms of the direct semantic effect in relation to short-memory.

One more study is that by (Dukes & Bastian, 1966) tested immediate free recall (IFR) of abstract and concrete words using a list of 10 abstract words and 10 concrete words, more specifically nouns. The words were shown to the participants by a projector twice. It was concluded that the participants recalled more concrete words than abstract ones.

Also, (Bauer & Altarriba, 2008) investigated sex differences in vivid ratings of abstract, concrete and emotion words. 192 native-speakers of English from University of Albany, State University of New York participated in the study. The researchers made use of 48 abstract words, 48 concrete words, and 48 emotional words, where in each participant rated each type of word in terms of concreteness, imageability, context availability, and emotionality on a 7-points scale. Results indicated the existence of sex differences in terms of cognitive processing of information, mainly abstract, concrete, and emotional words, more specifically here in rating concrete words where females rated them as more emotional than males did.

Another perspective of searching on processing of abstract and concrete words is in the case second language acquisition and/or more technically called psycholinguistic words information, or word learnability. For example, (Salsbury, Crossley, & McNamara, 2011) conducted a longitudinal-study investigating this issue in terms of: concreteness, imageability, meaningfulness, and familiarity. The researchers made use of words from Medical Research Council (MRC) Psycholinguistic Database to analyse the collected words. Six L2 learners: (3 with Arabic Language as L1, 1 with Japanese Language as L1, 1 with Korean Language as L1, and 1 with Spanish Language as L1) who were attending an intensive English Language courses participated in this study and attended 18 sessions for a year. It was generally concluded that L2 learners of English Language showed more positivity towards the learning of concrete words which is in consistent with results of processing abstract and concrete words by L1 learners. In other words, abstract words are more difficult to remember and use even for L2 learners.

In addition, (Pichette, Serres, & Lafontaine, 2011) investigated the effectiveness of writing and reading sentences in incidental acquisition of new vocabulary in second language. The researchers hypothesized that: 1) writing sentences will be better to promote more new vocabulary acquisition than reading sentences, 2) concrete words will be better remembered than abstract ones, and 3) writing leads to better recall of new words than reading and concrete words are better to recall than abstract words. The participants were 203 English-speaking from Québec. The

researchers made of use of 9 rare abstract and 9 concrete nouns. Immediate and delayed serial recall analyses indicated superiority of writing task over reading task and of concrete words recall over abstract words. Thus, this plus point for both writing task and concrete words in terms of delayed recall—vanishes gradually.

One more last study, (Yao et al., 2013) investigated the effect of semantic size on abstract and concrete concepts activation. The participants were 60 neuro-typical males and females. All participants were native speakers of English. A list of words (abstract and concrete) and non-words were given to the participants. The study assumed that words of big semantic size will be more activated than words of small semantic size (e.g. garden and rose for concrete words and big and small for abstract words). Results indicated that both abstract and concrete words of big size showed more activation than abstract and concrete words with small semantic size in spite of the positive correlation between semantic size and emotional arousal.

On the basis of this, a major controversial issue in regard to abstract and concrete words is their recall which can be examined using different recall types. Basically, there are three core processes in the memory: storage, encoding and recall. Taking the third process which is the used method in this study, there are three types of recall: free recall, cued recall, and serial recall, (Dewey, 2007).

Free recall is defined as ‘a term used in memory experiments where a person is asked to recall a list of items. The list can be in any order and not that in which it was given’, (Psychology Dictionary, 2012). One more definition of free recall is ‘the presentation of material to the learner with the subsequent task of recalling as much as possible about the material without any cues’, (Psychology j-rank, 2014). In (Oxford Index, 2014) free call is also presented as ‘retrieval of information from memory without the help of cues and ... retrieval of a number of items of information in any order...’. In comparison to other two types of recall, free recall is described as ‘the simplest form of memory test where a person inspects a list of items then (after the desired retention interval) tries to recall the items in any order. The items can be letters, words, trigrams, sentences, or longer passages such as stories’, (Dewey, 2007).

As a matter of fact, free recall can be performed either orally or in written paradigms. Meanwhile, two types of effects could be observed, namely, primacy and recency effects. Primacy effect refers to ‘the ability to recall information presented first more easily’. Recency effect, on the other hand, refers to ‘the ability to recall information presented last more easily’, (Van-Ness, 2014). For instance, let’s assume that we have the following list of words: (phonetics, phonology, morphology, semantics, syntax, and pragmatics). Now, if the recalled words are mostly from the first ones and end with those among the last ones, it would be considered as a primacy effect. On the contrary, if the first recalled words are from those among the last words, then it would be considered as a recency effect. Thus, the core hypotheses of this study are:

1. Abstract words are better recalled than concrete words in free recall paradigms (abstractedness effect other than concreteness effect);
2. Regardless of whether more abstract or concrete words are recalled, the shorter the list of words are, the more the recalled words are in free recall paradigms [list length effect(s)]; and finally
3. Recency effect is more frequent in occurrence than primacy effect in free recall paradigms of both abstract and concrete words.

## 2. Method

### 2.1. Sample

The population of interest in this study was all university students in the undergraduate level who met the following criteria: 1) native-speakers of Arabic Language; 2) registered in the university as undergraduate students; and 3) typical neurological and clinical history. The following table (1) shows the characteristics of the subjects in this study.

*Table 1. Characteristics of subjects.*

Age range	20-24
Mother tongue language	Arabic Language
Dialect	Saudi Arabic Language
Ethnicity	Arab, Islam
Other languages	English (EFL use)
Gender	Male (single and married)
Nationality	Saudis
Specific characteristic	Be enrolled in a BA programme in the university level (King Saud University).

Probability sampling method, mainly stratified sampling method was used in this study where one class out of many available classes was picked randomly to take part in this study. 9 students were randomly selected from the the class which had 36 students from the College of Engineering who are enrolled in prerequisite English Language course, the College of Languages and Translation, King Saud University, Riyadh, Kingdom of Saudi Arabia, in February, 2014.

The selected sample is aimed to be representative of the population of interest and that reached results are generalizable for populations with similar characteristics. In other words, the study investigates a language acquisition topic from both cognitive and psycholinguistic perspectives and the targeted population is native speakers of Arabic, so, external effects like time, place and people cannot affect the generalizability of this study as long as they have similar characteristics to the above mentioned ones.

### 2.2. Measures

Two measures were used in this study: one is a list of 20 Arabic abstract and concrete words and an observation sheet of the observed effects of recall types.

To start with the first measure, a list of 20 Arabic words where 20 abstract and 20 are concrete was used in this study.

The words were selected on the basis of semantic relationship where one word could relate to another in terms of meaning but differ from one another in terms of concreteness. For instance, the words: mind and brain which are both semantically related but actually different from one another. It should be noted that by stating semantically similar is to mean that they share some associations and a person can think of both words when provided by certain cues and/or associations.

The list of the 20 abstract and concrete words were selected to measure abstract and concrete words processing and recall through free call tasks. The words are also expected to allow observing different recall effects and/or factors in free recall type that would support the view either abstract words are more recalled than concrete ones or vice versa. The following table (2) shows the intended effects and/or factors.

The list of the words, yet more procedural issues could be followed in the procedures section below and in the appendix.

*Table 2. Intended observed effects during free recall tasks.*

Recall type	Intended observed effect
Free recall	Primacy effect
	Recency effect
	List-length effects

Both validity and reliability were calculated in the used measurement tools. In detail, in the case of construct validity: both face and content validities were calculated to represent translation validity. Face validity was calculated by the principal researcher and another PhD student of Arabic Language from the Department of Arabic Language and Literature, College of Arts, King Saud University, Riyadh, Kingdom of Saudi Arabia. Both of them indicated very good face validity for the list of the words. For content validity, again, the list of the words was divided into two types in terms of content: abstract and concrete, yet in terms of semantic relationship between abstract and concrete pairs of words. In other words, the abstract word must have an association with the concrete word in order to be included in the list; otherwise, it will be excluded and replaced by another pair of words. One type only of criterion-related validity, namely, predictive validity, was calculated in this study (see tables 3-5 below).

To move to reliability, two types of reliability were calculated: inter-rater and internal consistency reliability. Inter-rater reliability was measured by the principal researcher who divided the words into two lists: abstract and concrete words on the basis of the following criteria: concreteness, imageability, meaningfulness (Paivio Norms), and age of acquisition, (MRC Psycholinguistic Database, 1987). The list of words was rated twice to make sure that the list of the abstract words are those with negative significant concreteness, zero or negative imageability, and vague and/or ambiguous meaning(s), and the concrete words are those with positive significant concreteness, high or positive

imageability, and clear-cut meaning(s). Tables (3-5) below display and summarize the calculated validity and reliability types and their values.

**Table 3.** Reliability & validity results of abstract and concrete words scale.

Reliability	Statistical tool & result		Validity	Statistical tool & result	
Inter-rater	Tool	Result	Face	Tool	Result
	Pearson	.80, .80, .78		2 raters	High
Internal	Cronbach	.82	Content	Categories	Excellent
			Predictive	Pearson	.49
			Concurrent	Uncalculated	
			Convergent	Uncalculated	
			Discriminant	Uncalculated	

**Table 4.** Internal consistency reliability of the abstract and concrete words scale.

Feature	Corrected Cronbach's alpha	Cronbach's alpha if item deleted
Concreteness	.71	.78
Imageability	.70	.78
Meaningfulness	.69	.80
Concreteness and abstractness	1.00	.71

**Table 5.** Construct validity of the abstract and concrete words scale.

Feature	R value	R Value	R value	R value
Concreteness	.46	.47	.40	.80
Imageability	.46	.44	.37	.80
Meaningfulness	.46	.44	.38	.78
Age of acquisition	.40	.37	.38	.49
Concreteness and abstractness	.80	.80	.78	.49

\*Indicates insignificant values, \*\* indicate low level validity, all other values are significant at the 0.01 level.

The second measure was an observation sheet where in the administrator of the research was provided with—to document his observations following the given instructions in the provided sheet (see appendix).

**2.3. Design**

A single group non-experimental randomized design was used in this study. The design can be depicted in notational form as:

$$R X_{1,2,3} O_{1,2} O_{1,2}$$

where:

- R = indicates that the group was randomly assigned
- X- = indicates words processing methods (1 = auditory, 2 = visual, and 3= writing), (-) indicates that it is non-treatment research
- O = indicates the measurement tools used in the study
- O = the first O stands for the observation sheet for recall types and the lower case numbers stand for the possible observed effects in free recall type (2 in free recall in addition to list length effect)
- O = the second O stands for observing which type of words comes over which, that is abstract words are better recalled than content words or vice versa. The numbers in lower case stand for (1 = abstract words, and 2 = concrete

words)

The group was split into two small groups where 4 were requested to recall 10 abstract and concrete words and 5 were requested to recall only 5 abstract and 5 concrete words. The purpose was to measure occurring recall effects and see which words are better recalled, that is abstract or concrete words—abstractness or concreteness effect?

**2.4. Procedure**

Between 01.02.2014 and 01.03.2014, the study was conducted and all the following procedures were arranged and followed.

*Data collection:* an observation sheet for documenting the observed effects was designed where the subjects were first provided with a list of 20 words and asked to classify them into both abstract and concrete words. Before that the students were provided with very basic information about the differences between abstract and concrete words. Moreover, they were introduced with related terms to classification process: concreteness, imageability, meaningfulness (Paivio Norms), and age of acquisition, (MRC Psycholinguistic Database, 2013). Having done that, then the list of words was presented to the students using three methods:

1. Auditory methods: the administrator of the research reads the words aloud to the students;
2. Visual method: the administrator of the research presents the list of words to the students using an over-head projector (OHP) and powerpoint slides where each word is presented as a card (pictures are may be provided next to each word); and
3. Writing method: the administrator of the research asks the students to read the words aloud and write them from the over-head projector in the paper-notes they are provided with.

The next step was asking the students to start recalling the words they can recall from both abstract and concrete words.

1. The following effects were observed:
  - a. Primacy effect;
  - b. Recency effect; and
  - c. List length effect.

*Authenticity:* the students were informed by their instructor and were given the chance to take part or not before being the subjects of the study. Having agreed, the students were assured to have full authenticity about the collected data and restricting its use for research purposes only. Needless to say,

all the above procedures were officially documented using a consent form signed by each student confirming his free willingness to participate in the study.

*Measures administration:* the two used measures were administered by the instructor of the course after being trained by one of the researchers. The instructor was provided with all kinds of instructions that should be followed (detailed procedural issues can be seen in the appendix).

*Time and environment of the measurement tools:* the study was conducted at the College of Languages and Translation, King Saud University, Riyadh, Kingdom of Saudi Arabia. Each student was called individually into a well-prepared classroom with a comfortable chair, over-head projector, good air conditioning, and lightening. The used time for all the above described steps to be performed was about 26 minutes (4 minutes for each for those who were assigned to recall 20 words, and 2 minutes for each for those who were assigned to recall only 10 words).

*Administering:* the following steps were followed for administering the measurement tools in this study:

1. The administrator of the research provides the students with the list of 20 words requesting them to classify them into two lists: abstract and concrete words;
2. The administrator of the research collects the words' lists from the students;
3. The administrator of the test makes sure that none of the students has any words lists remaining with them;
4. The administrator of the test reads the list of words aloud (abstract-concrete or concrete-abstract) to the students;
  - a. The students are requested to say the words which they can recall;
  - b. The administrator of the research documents the recalled words in both cases; and
  - c. The administrator of the research also documents the observed required recall effects (three effects in this case: primacy, recency and list length effects).
1. The administrator of the research presents the words to the students using an over-head projector (OHP) requesting them to:
  - a. Read them silently;
  - b. Read them either aloud, finger pointing or lip-moving; and finally
  - c. Write them down
- The students are requested to note down the words they could recall

*Assessing:* one of the researchers but not the administrator of the research (the instructor of the course) did the calculations for the following:

1. Observed effects; and
2. Number of recalled abstract words as opposed to number of recalled concrete ones.

*Recall prompts:* No prompts were provided since it is a

free recall task.

*Preliminary analysis steps:* Using the 17<sup>th</sup> version of SPSS (Statistical Package for Social Sciences), both descriptive and referential statistics tools were used to test the proposed hypotheses in this study.

### 3. Results

17<sup>th</sup> version of SPSS (Statistical Package for Social Sciences) was used for the statistical analysis of the collected data. Both descriptive and referential statistics were used where different yet suitable statistical tools were used from each to serve the purposes of the study. Table (6) below presents the used type of statistics, the selected tool and performed function. To recall the three proposed hypotheses in this paper, they are:

1. Abstract words are better recalled than concrete words in free recall paradigms (abstractedness effect other than concreteness effect);
2. Regardless of whether more abstract or concrete words are recalled, the shorter the list of words are, the more the recalled words are in free recall paradigms [list length effect(s)]; and finally
3. Recency effect is more frequent in occurrence than primacy effect in free recall paradigms of both abstract and concrete words.

**Table 6.** Summary of the statistical tools used in analyzing the data of this study.

Statistics type	SPSS tool(s)	Purpose of use
Descriptive statistics	Frequency	Total number of recalled words
		Total number of recalled abstract words
	Mean	Total number of concrete words
		Observed primacy and recency effects
Inferential statistics	Standard Deviation	The central location of the recalled words in free recall paradigms
	Frequencies: graphs	Measuring variability among recalled words in free recall paradigms
	Pearson	Description and comparisons purposes
	Cronbach alpha	Reliability and validity issues
		Reliability

The total number of the participating students in this study was 9 undergraduates. They were trained to recall abstract and concrete words where 5 were requested to recall 10 Arabic abstract and 10 Arabic concrete words (total 20) and 4 were requested to recall only 5 Arabic abstract and 5 Arabic concrete words (total 10).

Descriptive statistics, namely frequency tool, was run to calculate the total number of recalled abstract and concrete words in each trail. Figure 1 illustrates the total number of recalled abstract and concrete words.

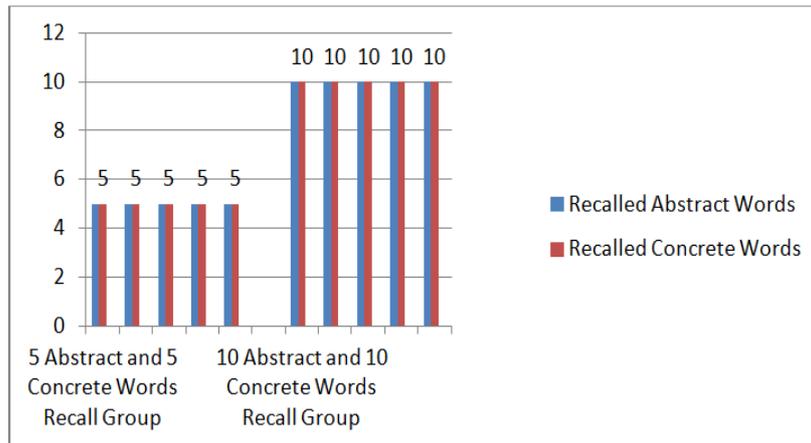


Figure 1. Recalled Number of Abstract and Concrete Words in Free Recall Paradigms.

Looking at figure 1, it is immediately apparent that the total number of non-retrieved words is zero. In other words, in both trails of recalling 10 and 20 abstract and concrete words, the 9 participants were able to recall successfully the total number of words using free recall paradigms. The presented frequency statistics above gives us an early indication that there might be neither abstractness effect nor concreteness effect. The confirmation of this inference is that the participants were able to retrieve the same number of abstract and concrete words without any minor differences.

Figure 2 below shows the percentages of recalled words in the two trails where part of the group of the participants was requested to recall 20 Arabic abstract and concrete words and the other part of the group was requested to recall only 10 Arabic abstract and concrete words.

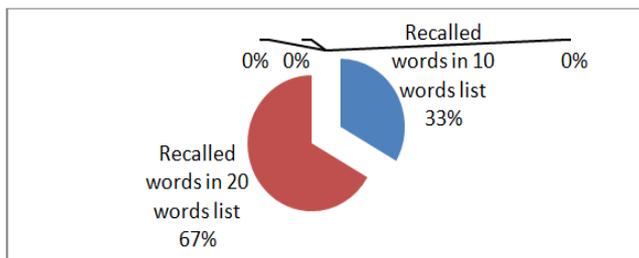


Figure 2. Total Recalled Abstract and Concrete Words in Free Recall Paradigms.

It is very clear from the above figure that the percentage of the recalled words in 20 words list is two times as the percentage of the recalled words in 10 words list. In other words, the above pie chart approves clearly that there was no effect yet difference between recalling 10 and 20 Arabic abstract and concrete words. Thus, it is clear that in both cases, the participants were able to successfully recall the whole number of both Arabic abstract and concrete words.

Other than the total number of recalled abstract and concrete words, the main claim of this study was to see the type of effect in recalling Arabic abstract and concrete words using free recall paradigms. Figure (3) answers the question whether is it abstractness, concreteness, or zero effect.

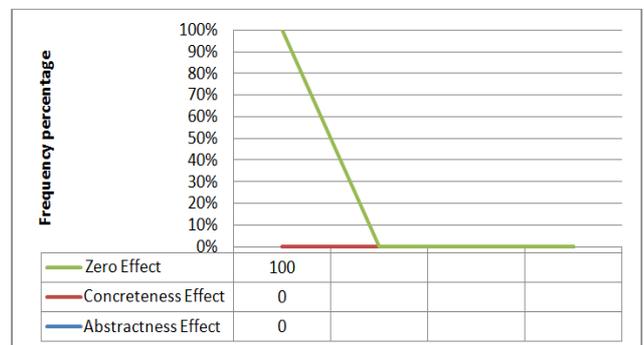


Figure 3. Abstractness, Concreteness, or Zero Effect.

According to the presented frequency calculations on percentages, figure 3 above illustrates apparently that the recall effect between abstract and concrete words in our study is neither abstractness effect (means the total number of recalled abstract words is more than the the total number of recalled concrete words) nor concreteness effect (means the total number of concrete words is more than the total number of recalled abstract words); it is rather a zero effect (means that the total number of recalled abstract words is identical to the total number of concrete words). By this means, the statistical results of our study show that there is no difference between the total number of recalled Arabic abstract and concrete words using free recall paradigms.

We proposed that regardless of whether more abstract or concrete words are recalled, the shorter the list of words, the more the recalled words are in free recall paradigms [list length effect], table (7) below presents in means and standard deviations the answer for this claim.

Table 7. Means and standard deviations of recalled words in free recall paradigms .

Variable	N	Mean	Std. Deviation
Recalled abstract and concrete words	9	20.00	.00
Recalled Abstract words	9	10.00	.00
Recalled concrete words	9	10.00	.00

The above results indicate similar means (20.) for the recalled abstract and concrete words in 20 words list, (10.)

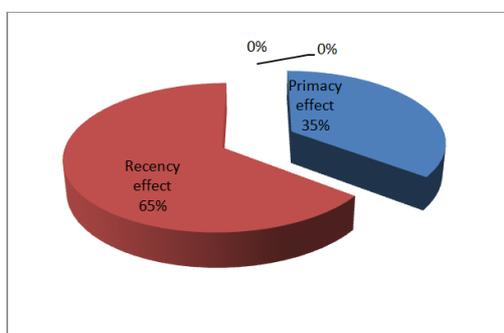
for the recalled abstract words and (10.) for the recalled concrete words. This means that list length effect does not show any effect in our study as the recalled number of words is exactly the same be it in long list words (20 words) or short list words (10 words).

It was also hypothesized in our study that recency effect is more usual in occurrence than primacy effect in free recall paradigms of both abstract and concrete words. Both table 8 and figure 4 below present the statistical results for the collected data in regard to this hypothesis.

**Table 8.** Means and standard deviations of observed primacy and recency effects in free recall.

Variable	N	Mean	Std. Deviation
Observed effects	130	1.65	.48

According to table 8 above, the frequency number for the total number of observed effects is 130 with a mean of (1.65) and standard deviation of (.48).



**Figure 4.** Comparison of primacy and recency effects in free recall paradigms.

Figure 4 above confirms the impressions in table 8 where it is very clear that the occurrence of recency effect is more frequent than the primacy effect. In other words, the recall of abstract and concrete words tended to be from the most recent to the earliest ones other than from the top list to the the most recent ones. The percentage of the recency effect (65%) is about two times as the primacy effect (35%). To conclude, recency effect is more frequent than the primacy effect when using free recall paradigms, according to the presented data and results in our study.

## 4. Discussion

The results of this study were partially yet clearly contrary to initial expectations. We proposed three hypotheses where two of which did not come true. The above presented statistical results in relation to each hypothesis are presented argumentatively below.

First we proposed that there will be an abstractness effect rather than concreteness effect for recalled Arabic abstract and concrete words. We argued in the introductory part of the current study that our participants would retrieve more abstract words than concrete words. We also presented a number of theories in relation to our study including dual-

coding theory (Paivio, 1965; Paivio & Yuille, 1966; Paivio, 1968; Paivio & Foth, 1970; Paivio & Okovita, 1971; Paivio & Csapo, 1973; Paivio, 1974; Paivio, 1975; Paivio & Desrochers, 1981; Paivio, 1990) and context availability theory (Schwanenflugel & Akin 1993; Schwanenflugel, Akin, & Luh, 1992; Schwanenflugel, Henderson, & Fabricius, 1998; Schwanenflugel in Faust, 2012) in which both; though differently, support concreteness effect and/or the advantage of concrete words over abstract ones attributing this advantage to means of verbal representation and image representation for the former theory and availability of contextual information for the latter theory.

We presented our data theorizing that there will be verbal representation plus [emotional representation]—semantic association for abstract words vs. semantic similarity for concrete words (see Crutch & Warrington, 2005) for abstract words as there are verbal and imagery representations for concrete words. Yet, we assumed that the contextual information based on emotional and imaginative links to support the recall of abstract words as contextual information do support concrete words recall. However our statistical results came to disapprove our proposed claims. It was reported that the total number of recalled Arabic abstract and concrete words are identical. These results are not only against our proposed hypothesis in favour of abstractness effect but also against the reached results in the presented studies in this current study in favour of concreteness effect. Concreteness studies included but were not limited to (Dukes & Bastian, 1966; Schwa, Akin, & Luh, 1992; Walker & Hulme, 1999; West & Holcomb, 2000; Binder, Westbury, & McKiernan, 2005; Wiemer-Hastings, 2005; Fliessbach, Weis, & Klaver, 2006; Il'yuchenok, Sysoeva & Ivanitskii, 2008; Harad & Coch, 2009; Lagishetti & Goswami, 2012; Hanley, Hunt, Steed & Jackman, 2013).

A few number of our presented studies presented results that either indicated equivalence of abstract and concrete words in recall attributing this to different memory strategies which are different yet are presented in equivalent base where there is no advantage for one over another, or possible advantage of of abstract words over the concrete ones though the term abstractness was never mentioned in such studies. These studies included: (Prior, Cumming, & Hendy, 1984; Rastatter, Dell, & McGuire, 1987; Duñabeitia, Avilés, & Afonso, 2008; Mestres-Misse', Muñte, & Rodriguez-Fornells, 2009; Campos, 2009; Pobric, Ralph, & Jefferies, 2009; Crutch & Warrington, 2005; Wang, Conder, & Blitzer, 2010; Borghi, Flumini, & Cimatti, 2011; Weiss, Mueller, & Mertens, 2011; Farley, Ramonda, & Liu, 2012; Marques & Nunes, 2012; Yao, Vasiljevic, & Weick, 2013).

Our second hypothesis which was also rejected is that which assumed the longer the list of abstract and concrete words were the less the number of retrieved words would be. With reference to our presented statistics, it was shown clearly that our participants were able to retrieve the whole list of 10 Arabic abstract and concrete words and also whole list of 20 Arabic abstract and concrete words. We attribute this contradictive result to the fact that the difference between

the two presented lists 10-20 was not significant and that is why clear results displaying the list length effect were not reached.

The last hypothesis in our study was the only one which came true where we assumed advantage of recency effect over primacy effect during observation of our participants in free recall paradigms. Our presented statistical analysis showed clearly the advantage of recency effect over primacy effect where the percentage of the former was as nearly two times as the former—( 65%) for the observed recency effect and only (35%) for the observed primacy effect. We consider this as a normal outcome as tendency to recall the recent is a normal memory activity especially when the participants were encouraged to recall freely.

## 5. Conclusions

In the current study, we investigated Arabic abstract and concrete words recall using free recall paradigms with the purpose of measuring the effect frequency for three types of effects: abstractness effect (advantage of abstract words over concrete ones), concreteness effect (advantage of concrete words over abstract ones), and/or zero effect (negative advantage for abstract words over concrete ones and vice versa). We proposed also minor objectives including primacy, recency and list length effects observation during free recall paradigms. We used single group non-experimental randomized design that consisted of 9 undergraduates. Our results indicated that there was neither an advantage for abstract ones over concretes ones nor for concrete ones over abstract ones, it was zero effect, instead. This outcome was not in agreement with our presented studies which mostly approved concreteness effect, that is, the ability to retrieve freely more concrete words than abstract ones. We also reached the conclusion that there was a negative effect or no effect for the list length effect where our participants were able to retrieve completely both the short list (10 words) and the long list (20 words). Our last outcome was that we reached a significant difference between primacy effect and recency effect in favour of the latter.

## Implications

This study has two implications for researchers, educators, psychologists, and more importantly for cognitive sciences specialists. The first implication is that teaching and learning of vocabulary in general and abstract and concrete words in particular seems to be dependent on memory restrictions. In other words, it was very easy for our participants to recall the 20 words when they were informed that they had the choice to just recall the words regardless of their order. By this means, free recall paradigms could be recommended for teaching and learning purposes be it first or second language.

The second implication is that relating to human memory where the results of this study indicated clearly that human memory, mainly short-term memory, works better with fewer restrictions or when it is required to work independently. Say

it another way, recalling freely seems to let the memory specially the short-term memory more active.

## Limitations and Future Work

This study has one limitation, namely, the small number of population where we assume that larger population would have given us more plausible results and outcomes albeit our outcomes are reasonable and statistically justifiable. Future research needs to consider the inclusion of larger population.

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