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**ON ARABIC ABSTRACT  
AND CONCRETE WORDS  
RECALL USING CUED  
RECALL PARADIGMS:  
IS IT ABSTRACTNESS,  
CONCRETENESS, OR ZERO  
EFFECT?**

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## ABSTRACT

The purpose of the study is to see whether abstract or concrete words are better recalled in cued recall type and to measure forward and backward displayed factors in cued recall.

9 undergraduates in King Saud University, Saudi Arabia, participated in this study where they were trained to differentiate between abstract and concrete words. A list of 20 Arabic abstract and concrete words was then 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 the observed recall effects and recalled words. Three methods were used to facilitate this experiment: auditory, visual and writing methods. The sheets were designed to measure both forward and backward recall factors.

Both descriptive statistics and inferential statistics were run to analyse the collected data. Computed referential statistical tools indicated acceptable yet significant values for the researchers-designed measures. Descriptive statistics indicated zero effect as the most frequent effect which meant that there was no advantage of abstract words (M: 10, SD: .00) over concrete words (M: 9, SD: .00) or vice versa though a minor insignificant difference was calculated in favour of the abstractness effect. There was also no significant percentage between forward and backward recall tests (51%) for the former and (49%) for the latter. The percentage of the non-recalled words was generally less than (1%), (M: 19, SD: .00).

The total number of recalled abstract words was slightly yet insignificantly higher than the total number of recalled concrete words in cued recall paradigms of Arabic abstract and concrete words recall. Also, there was no statistically significant difference between forward and backward recall tests; although, a minor noticed difference was statistically calculated. Lastly, using more than a cue in cued recall paradigms increased the chances of words recall.

**Key words:** abstract words; concrete words; words recall; cued recall; Abstractness effect; concreteness effect; zero effect; forward recall; backward recall.

## Introduction

Psycholinguistically, words acquisition, production, comprehension and also attrition go through different mechanisms and processes where the achievement of each is dependent on the occurrence and/or achievement of such mechanisms and processes, (Scovel, 1998). Moreover, words could be investigated from different points of view be it linguistic, psychological, or even cognitive. Basically, human words-store are 'referred to as the mental dictionary' or the 'the mental lexicon', (Aitchison, 1987, p. 7). The study of abstract and concrete words, for instance, has been greatly yet intensely examined from different points of view, (Paivio, 1999; Faust, 2012).

For instance, (West & Holcomb, 2000) introduced abstract words as 'words that refer to more general and/or complex concepts, e.g., honesty' as compared to concrete words which were introduced as '(words that refer to specific objects or events, e.g., bicycle', (p. 1024). In terms of language acquisition, (Schwanenflugel, Akin, & Luh) in (Altarriba & Basnight-Brown, 2011) stated that 'concrete words... like table and paper are typically learned prior to abstract words... like liberty and myth' (p. 446). Similarly in terms of processing, it is stated that 'concrete words have also been shown to be processed faster and remembered better than abstract words' (ibid).

Major theories accounting for abstract and concrete words include: *dual coding theory* introduced by (Paivio, 1990) and *context availability theory* (Schwanenflugel and colleagues) in (Marques & Nunes, 2012).

To return to studies that investigated the concreteness effect or the advantage of concrete words over abstract words be it in acquisition, learning, processing, comprehension, production and more importantly recall, consider, for instance, (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 words 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 re-

membered 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; Walker & Hulme, 1999).

Also, (Schwa, Akin, & Luh, 1992) examined the concreteness effect 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", (ibid).

Moreover, (West & Holcomb, 2000) conducted an experimental study supporting the previously finding that concrete concepts and/or words over abstract ones in terms of cognitive processing. The study consisted of 36 students in the age range (19-23), divided into three groups where each group represented one investigated level: imagery, semantic and surface levels. The researchers made use of reaction time (RT) and even-related brain potential (ERP) as tool measurements for their research. The ERs were shorter in both the imagery and semantic tasks for concrete words than abstract ones specially the imagery task. Besides, concrete words elicited more negative ERPs than abstract ones.

Furthermore, (Duñabeitia, Avilés, Afonso, Scheepers, & Carreiras, 2008) conducted a research about the representation of abstract and concrete words where 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 word have more cognitive base over abstract word due to more referents. In this study the qualitative view is 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.

In addition, (Fliessbach, Weis, Klaver, Elger, & Weber, 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", (p. 1413). The latter theory states again that concrete words are over abstract ones because they possess "a more accessible semantic network", (ibid). The researchers made use of the event-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.

Besides, (Borghi, Flumini, Cimatti, Marocco, & Scorolli, 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 stated that abstract words are non-manipulable though recognizable.

Additionally, (Mestres-Misse, Muñte, & Rodriguez-Fornells, 2008), examined the contextual acquisition of abstract and concrete words using a functional neuroanatomy approach and/or technique. 15 native Spanish speakers with no neurological or psychiatric history participated in the study where 80 abstract words and 80 concrete words structured in paired sentences were used as material of the study. The tool of

the study was fMRI. Results indicated different qualitative revealed associations for the learned abstract and concrete words.

Again, (Dahlstrom, & Ultis, 2014) investigated the view that concrete words but not abstract ones are generally recognised 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" (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. 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) who 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.

In addition to the above mentioned studies, (Hill, Korhonen, & Bentz, 2013) presented an analytical study evidencing the different organization of abstract and concrete concepts in the mind. The researchers made use of the three sources of words: 1) University of South Florida norms (USF), 2) Word-net programme, and 3) Brown corpus. The researchers concluded that: 1) abstract and concrete concepts have differing patterns of associations with other concepts, 2) abstract words are organized in terms of associations compared with concrete ones which are organized in terms of semantic similarity, and 3) concrete representations are more feature-based than the abstract ones.

Lastly, (Binder, Westbury, McKiernan, Posing, & Medler, 2005), examined distinct brain systems for processing abstract and concrete concepts. 24 literate adults whose first language

is English participated in the study where the researchers made use of fMRI as a measurement tool in addition to 200 stimuli and task words. The 200 words were divided in terms of abstract, concrete and word-like non-words in English Language. Results indicated that while abstract concepts are “left-lateralized”; the concrete ones are “bilateral”, (p. 909). According to the researchers in this paper is that their research results’ indication are in consistent with the implications of both *dual coding theory* and *context availability theory*. In other words, in the former, it is assumed that brain consist of a semantic system in the left hemisphere reserved for both abstract and concrete words in addition to a non-verbal semantic system in the right hemisphere reserved only for the concrete words and this is actually what has been approved in this research as shown by the fMRI results in terms of involvement of both hemispheres in processing the concrete words, but not the abstract ones which involved only the left hemisphere. In the latter case, again this theory assumes that more activation happens when processing concrete words due to having more semantic associations than the abstract words. In this research, the researchers approved more neural activation for concrete words over the abstract ones.

Another perspective of approaching abstract and concrete words processing is in the case of bilinguals. Consider, for instance, (Francis & Goldmann’s, 2011) study where 72 self-identified Spanish-English bilinguals participated in the study using Repetition Priming as a measurement tool with a list of selected abstract and concrete words. It was concluded that both abstract and concrete words share conceptual representation across languages, yet the “degree of overlap in conceptual representations of translation equivalents does not differ for concrete and abstract words”, (p. 661).

Consider also, (Farley, Ramonda, & Liu, 2012) who conducted an experimental study investigating the impact of adding visual imagery to abstract words on meaning recall by L2 learners. The targeted languages were Spanish and English. The participants were 160 American university students, but later only 87 were included in the analyzed data in this study. In order to select unfamiliar abstract and concrete words, the participants were given 33 abstract

and 33 concrete words. Later, 12 abstract and 12 concrete words were only used to be taught to the students. The two groups were referred to picture group and non-picture group. Results demonstrated that “participants in the abstract picture group outperformed those in the abstract non-picture group on both posttest and delayed posttest; however, no such effect was found for concrete words”, (p. 449).

Additionally, Immediate Serial Recall (ISR) in terms of forward and backward recall of abstract and concrete words affected by word length and age was examined by (Baker, Tehan, & Tehan, 2012). The study was based on the assumption that words of short lists are better recalled than words of long lists. More importantly, the study raised the importance of backward recall and age influences on word recall. Two experiments were conducted and 20 different participants were included in each. 20 short words and 20 long words were drawn from the (MRC) Psycholinguistic Database. Reached conclusions include but not limited to that: 1) age effects are weaker when forward recall is required, 2) no age effects in recognition, and 3) pattern of word length effects is similar for both younger and older participants.

The last study to be mentioned here is that by (Hanley, Hunt, Steed, & Jackman, 2013) who examined concreteness effect on abstract and concrete words’ production. Two experiments were conducted where in 56 undergraduates from the University of Essex participated in Experiment 1 and 58 participated in Experiment 2. 68 words where 34 are abstract and 34 are concrete with their dictionary definitions were used to measure the productions of the words in terms of semantic lexical weights and phonological lexical weights. Findings indicated that “poor performance during attempts to retrieve abstract words from their dictionary definitions... associated with more omissions, more alternates, and more tip-of-the-tongue-state (TOTs) than is the case for concrete words”, (p. 374).

On the basis of the above reviewed studies, it can be seen clearly that the study of human memory is a very complex issue. (Baddeley, 1999; Baddeley, 2004) concludes that ‘memory does not comprise a single unitary system, but rather an array of interacting systems, each capable of encoding or registering information, storing



it, and making it available by retrieval', (p. 17). Actually, human memory undergoes three core processes: storage, encoding, and recall. Memory storage 'is an umbrella term used to describe the passive storage of any memory within a human or other organism', (Psychology Dictionary, 2012a). It is the 'the process of memory storage covers the internalization and then encoding of information into the memory stores within the brain, there is a range of theories which attempt to explain this process', (ibid). Encoding is 'converting sensory input into a form able to be processed and deposited in the memory' (ibid). This memory process used 'to convert input so it can be placed in our memory', (Psychology Dictionary, 2012). Recall is 'the ability to retrieve processed and/or stored information', (ibid).

In the case of recall, there are three types: free recall, cued recall, and serial recall. Cued recall which is the concern of this paper is defined as '...the retrieval of memory with the help of cues. Such cues are often semantic', (Moult, 2014). It is also defined as 'an aspect of recall in which the retrieval of information from memory is facilitated by the provision of cues, for example the initial letter of a word to be remembered or suggestions as to the category in which the item belongs', (PsychologyWiki, 2012). Cued recall is also introduced as 'an experimental memory process wherein an object that is to be recalled is displayed for examination in addition to a cue and the party involved then tries to remember the object whenever presented with the cue',

(Psychology Dictionary, 2012b). A major advantage of cued recall as being compared to free recall is that 'cued recall is useful for detecting unconscious or automatic aspects of a subject's interpretation of a stimulus', (Dewey, 2007).

There are actually two experimental methods to conduct cued recall either study-test method or the anticipation method (more details will be provided in the method section), (Psychology Dictionary, 2012c). A participant in a cued recall experiment can be tested for either forward recall where, for instance, Ai is presented as a cue for Bi, or backward recall, where Bi is presented as a cue of Ai. To conclude, this study accounts for the following hypotheses:

1. The possibility of abstractness effect (disadvantage of concrete words over abstract ones) other than concreteness effect (advantage of concrete words over abstract ones) using cued recall paradigms; and

2. The possibility of any advantage of forward recall test over backward recall test or vice versa.

### Method

#### 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 were enrolled in prerequisite English Language course in the College of Languages and Translation, King Saud University, Riyadh, Kingdom of Saudi Arabia, in 2014, February.

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.

### 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.

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

Recall type	Intended observed factors
Cued recall	Forward recall test
	Backward recall test

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 the abstract and concrete pair 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,

To start with the first measure, a list of 20 Arabic words where 20 are 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 same 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 cued call tasks. The words are also expected to allow observing different recall effects and/or factors in each 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.

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 researchers 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, 2013). 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	
	Tool	Result		Tool	Result
Inter-rater	Pearson	.80, .80, .78	Face	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	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 the administrator of the research was provided with to document his observations following the given instructions in the provided sheet (see appendix).

### Design

A one 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 groups were 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 type and the lower case numbers stand for the possible observed factors in cued recall task (forward recall test and backward recall test)

O = the second O stands for observing which type of words comes over which, that is abstract words are better recalled than concrete words or vice versa. The numbers in lower case stand for (1 = abstract words, and 2 = concrete words)

The same participants within the group were compared to see whether in (forward or backward recall tests) more words are remembered and which words are better recalled, that is abstract or concrete words.

### 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 student 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:
  - α. Forward recall, and
  - β. Backward recall.

*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 are 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 the 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 in 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 comfortable chair, OHP, 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;
  - α. The students are requested to say the words which they can recall;
  - β. The administrator of the research documents the recalled words in both cases; and
  - γ. The administrator of the research also documents the observed required recall effects (four effects in this case: primacy, recency, word and list length effects).
5. 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 lips-moving; and finally
  - c. Write them down
  - d. The students are requested to note down the words they could recall

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

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

*Recall prompts:* First letter prompt and semantic associations (miming and or sign-language).



*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 proposed hypotheses in this study.

### 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) be-

low presents the used type of statistics, the selected tools and performed functions. The proposed hypotheses in this study were:

1. The possibility of abstractness effect (disadvantage of concrete words over abstract ones) other than concreteness effect (advantage of concrete words over abstract ones) using cued recall paradigms; and
2. the possibility of any advantage of forward recall test over backward recall test or vice versa.

**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
		Total number of concrete words
	Mean	Observed primacy and recency effects
		The central location of the recalled words in free recall paradigms
Standard Deviation	Measuring variability among recalled words in free recall paradigms	
Inferential statistics	Frequencies: graphs	Description and comparisons purposes
	Pearson	Reliability and validity issues
	Cronbach alpha	Reliability

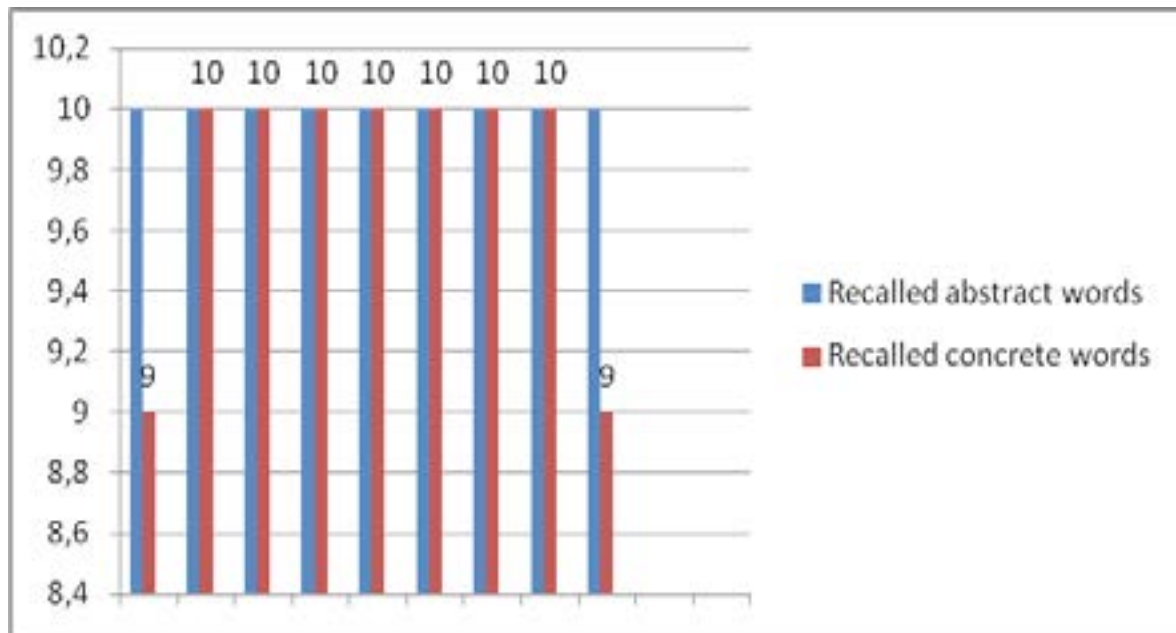
The total number of participating undergraduates was 9 where both forward and backward recall tests were performed. The following table below illustrates the cued recall paradigms in both forward and backward recall tests.

**Table 7: Presentation of cued recall paradigms in forward and backward recall tests**

Forward recall test		Backward recall test	
A1	B1	B6	A6
A2	B2	B7	A7
A3	B3	B8	A8
A4	B4	B9	A9
A5	B5	B10	A10

The number of recalled Arabic abstract and concrete words is shown in figure 1 below.

**Figure 1: Recalled Number of Abstract and Concrete Words in Cued Recall Paradigms**

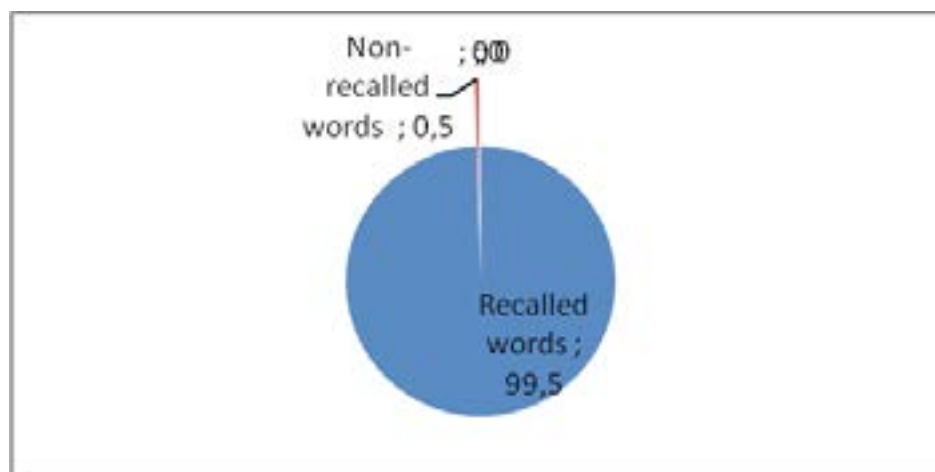


According to figure 1 above, abstract words were all recalled but not the concrete words. The participants were able to retrieve successfully all abstract words. Although the over majority of the participants retrieved all the words successfully, two of them retrieved only 9 concrete words. By

this means, we could initially conclude that the total number of recalled abstract words is merely more than the total number of recalled concrete words though statistically insignificant.

The percentage of recalled Arabic abstract and concrete words is shown in figure 2 below.

**Figure 2: Total Recalled Abstract and Concrete Words in Cued Recall Paradigms**



The percentage of total number of recalled words is highly significant than the total number of non-recalled words. In comparison, the percentage of the recalled abstract and concrete words is over (99%) and the percentage of the non-recalled abstract and concrete words is less than (1%). This means that the recalled number of words in cued recall paradigms is highly significant.

Our study proposed the possibility of abstractness effect (disadvantage of concrete words over abstract ones) other than concreteness effect (advantage of concrete words over abstract ones) using cued recall paradigms. The statistical result of the collected data for this claim is presented below in figure 3.

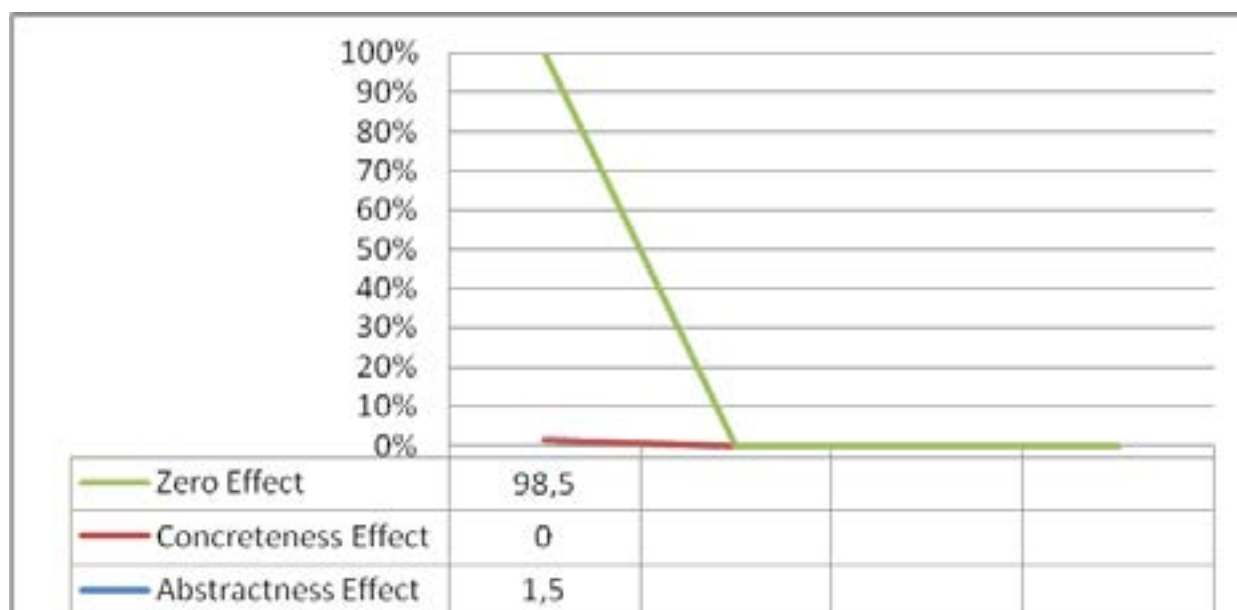
**Figure 3: Abstractness, Concreteness, or Zero Effect?**


Figure 3 presents statistical data for abstractness, concreteness, and zero effects of recalled Arabic abstract and concrete words using cued recall paradigms. It is immediately apparent that there is neither abstractness effect nor concreteness effect though an insignificant effect occurs in the case of abstractness effect (1.5). The major effect in cued recall paradigms

is zero effect, that is, the number of the recalled abstract words is nearly similar to the number of recalled concrete words with minor yet mere advantage for abstract words.

Recalled abstract and concrete words together and recalled abstracted words separated from concrete words are presented in table 8 in means and standard deviations.

**Table 8: Means and standard deviations of recalled words in cued recall paradigms**

Variable	N	Mean	Std. Deviation
Recalled abstract and concrete words	180	19.00	.00
Recalled Abstract words	90	10.00	.00
Recalled concrete words	90	9.00	.00

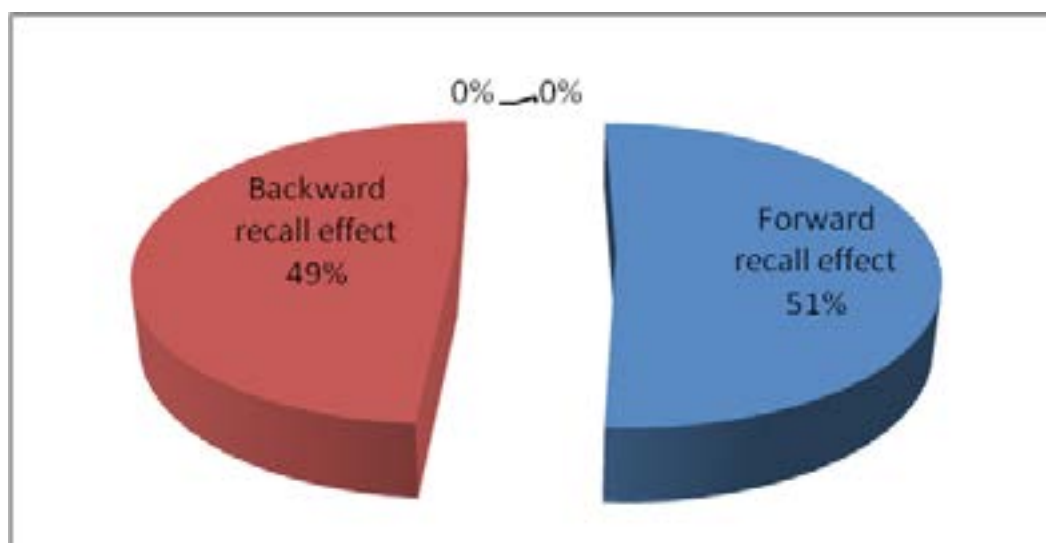
The central mean for the total number of recalled Arabic abstract and concrete words using cued recall paradigms is (19.0) with a (.00) standard deviation. While the central mean for the recalled abstract words in cued recall paradigms is (10.00) with a (.00) standard deviation, the central mean for recalled concrete words is only (9.00) with a (.00) standard deviation. These statistical results indicate that

difference between the means and standard deviations of recalled abstract words and recalled concrete words is clearly insignificant.

With reference to table 7 above, cued recall paradigms were performed using two different tests and/or procedures: forward and backward recall tests. The results of the possible differences between these two used procedures are shown in table 9 and figure 4 below.

**Table 9: Means and standard deviations of forward and backward effects in cue recall**

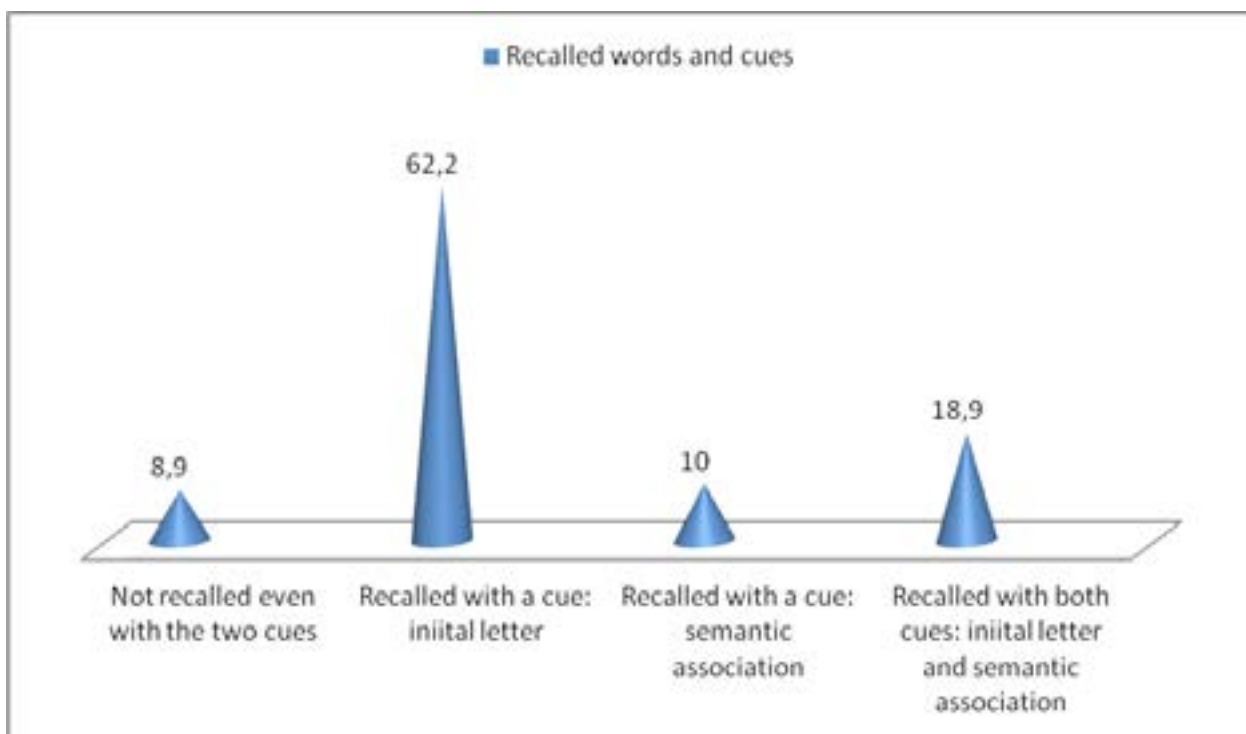
Variable	N	Mean	Std. Deviation
Observed effects	180	1.49	.50
Forward recall	9	10	.00
Backward recall	9	9.78	.44

**Figure 4: Comparison of forward and backward effects in cue recall paradigms**


The results in figure 4 confirm the impressions in table 9 in regard to the advantage of forward recall test over backward recall test of vice versa. In other words, the percentage of the forward recall effect is nearly similar to that of the backward recall effect, (51%) for the former as compared to (49%) for the latter. This means again that the difference between the two types of

tests in cued recall paradigms of Arabic abstract and concrete words is statistically insignificant.

Since we used cued recall paradigms in this study; two types of cues were used during cued recall paradigms. The percentages of recalled words with no cues, with two cues, and with one cue only are shown in figure 5 below.

**Figure 5: Comparison of recalled words in cue recall with and without using cues**


In spite of the fact that Arabic abstract and concrete words were presented in pairs to the students but two additional cues were also provided, namely initial letter and semantic

association. The highest percentage of recalled abstract and concrete words in cued recall paradigms is with an initial letter cue and the least is the non-recalled word with even using



the two cues to help the participants retrieve the word(s). Recalled words with the semantic association is significantly less than the recalled words with an initial letter cue, (10) for the former and over (62) for the latter. The total number of recalled words that required using both cues (18.9) to retrieve the words was also higher than the total number of recalled word with the semantic association cue (10) yet less than the total number of recalled word with an initial letter cue (62.2). Hence, the initial letter cue seems to be more effective than the the semantic association cue according to the presented result in our study. Yet, the semantic association cue seems to be very supportive when the initial letter cue fails to enable the memory to recall the required word.

### Discussion

The results of the current study were partially in agreement to the proposed expectations. We proposed two hypotheses where both of them didn't show significantly statistical difference albeit very slight statistical differences were calculated.

Firstly, we proposed that there will be a disadvantage of concrete words over abstract words in cued recall paradigms. We argued in the introductory part of our study that our participants will be able to retrieve more abstract words than concrete ones in cued recall paradigms. This argument was clearly presented through a number of studies either partially in favour of the proposed hypothesis or totally against it. We also presented a number of the theories in relation to our study including *dual-coding theory* and *context availability theory* 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. For *dual coding theory*, consider, (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 for *context availability theory* (Schwanenflugel & Akin 1993; Schwanenflugel, Akin, & Luh, 1992; Schwanenflugel, Henderson,

& Fabricius, 1998; Schwanenflugel in Faust, 2012).

Studies supporting concreteness effect assume that there are both verbal and imagery representation for concrete words as compared to their counterpart abstract words which have only verbal representation. Studies supporting this view included: (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).

On the other hand, other studies support the view that it is not a matter of advantage for one over another, it is rather having a different mechanism for each where each will be superior to another in a certain factor. (Crutch & Warrington, 2005) presented this in terms of semantic similarity for concrete words and semantic associations for abstract words. Other studies with similar perspective included: (Prior, Cumming, & Hendy, 1984; Rastatter, Dell, & McGuire, 1987; Duñabeitia, Avilés, & Afonso, 2005; Mestres-Misse', Muñte, & Rodriguez-Fornells, 2008; 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).

We followed a different approach and we presented two new terms: abstractness effect and zero effect. Abstractness effect assuming the advantage of abstract words over concrete ones and zero effect means the disadvantage of abstract words over concrete words and/or disadvantage of concrete words over the abstract ones. Our argument was based on the argument that as there are both verbal and imagery representations for concrete words there are also both verbal and emotional representations for abstract words. In spite of this and surprisingly, the presented yet reached statistical results did not approve this claim clearly. The most frequent effect was zero effect with over (98) frequency level, with less than

(2) frequency level for abstractness effect and (0) frequency level for the concreteness effect. The total number of recalled abstract words was very slightly yet insignificantly higher than the total number of recalled words in free recall paradigms.

Secondly, we proposed that there will be significant difference in the performance of cued recall paradigms between forward recall test and backward recall test. These results did not also come totally true because the calculated statistical difference between the two tests was slightly yet inconsiderably different. The percentage of forward recall (51%) was slightly yet unnoticeably different from that of backward recall (49%). This means that the memory recall performance of our participants was nearly the same in both forward and backward recall tests in cued recall paradigms of Arabic abstract and concrete words recall.

Since our study was about cued recall so we also accounted for the frequency and/or the major cue which helped our participants retrieve the list of words better. With reference to figure 5, it can be seen clearly that initial letter was the most effective cue which helped the participants recall more words. Nevertheless, the role of semantic association is very major albeit it was less frequent than the initial letter cue. This could be interpreted in that semantic association cue played a major role in increasing substantially the number of recalled words in cued recall paradigms when the initial letter cue failed to do so. In other words, semantic association is a vital yet effective priming-tool for short-term memory when it comes to words recall.

### Conclusions

In the present study, we proposed that there will be an advantage of Arabic abstract words over Arabic concrete words in terms of short-term memory recall in cued recall paradigms. Our presented results approved that it was a zero effect other than abstractness and/or concreteness effect albeit there was a slight yet inconsiderable effect in favour of the

abstractness effect as opposed to concreteness effect. We attributed this to the small population size. It was also concluded that there was no significant statistical difference between forward and backward recall test in either increasing or decreasing the total number of retrieved abstract and concrete words during cued recall paradigms. Lastly, it was inferred that semantic association is an effective memory primer which helped considerably in increasing the number of recalled words in addition to the initial letter as a preliminary cue in cued recall paradigms of Arabic abstract and concrete words. These results were not in agreement with our presented studies, but they stand as a base for reconsideration of concreteness effect and moving toward two more types of effect, namely, abstractness effect and zero effect.

### Implications

This study has two implications. First using more than a cue as we did in this study (initial letter and semantic association) may have a great chance of increasing the number of recalled words abstract, concrete, or words in general.

Second, cued recall paradigms seem to be effective vocabulary learning strategies if integrated and initiated by language teachers Arabic, English, or whatsoever.

### Limitations and future work

There is one limitation for this study that the number of population was very small. We do believe that including large size of population would have lead to more reasonable and generalizable results in regard to short-term memory recall of Arabic abstract and concrete word in cued recall paradigms.

### Acknowledgments

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## APPENDIX

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

Group ( ) Classification of abstract and concrete words Participant ( )

**Note:** This form is used to classify abstract and concrete words

Instructions:

1. Write:

- A. No. (1) in the first column if the word has a concrete meaning
- B. No. (3) in the first column if the word does not have a concrete meaning
- C. No. (2) in the first column if you think that the word can have a concrete meaning, but you are not sure

2. Write:

- A. No. (1) in the second column if you can imagine a clear picture of the word in your imagination
- B. No. (3) in the second column if you cannot imagine any clear picture of the word in your imagination
- C. No. (2) in the second column if you think that you can imagine but the word does not seem to have a clear picture to be imagined.

3. Write:

- A. No. (1) in the third column if you think that the word has a clear meaning without any difficulty.
- B. No. (3) in the third column if you think that the word does not have a clear meaning and may have a complex meaning and it is not easy to recall.
- C. No. (2) in the third column if you think that the word looks simple and at the same time complex and difficult to understand.

4. Write:

- A. Try to remember the year during your life time where you think you acquire the word.

Note: Acquisition here means the first time in your life you feel that you can practice using the word.

### Classification Form

List of Words	Characteristics of classification				
	Concreteness	Meaningfulness	Imageability	Age of Acquisition	
The Word					
Inspiration					
Human					
Insight					
Data					
Body					
Jinn					
Paradise					
Brain					
Spirit					
Poet					
Charity					
Conscience					
Torment					
Mind					
Eyes					
heart					
Computer					
Money					
Fire					
Happiness					


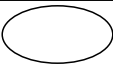














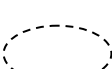



### On Arabic Abstract and Concrete Words Recall Using Cued Recall Paradigms: Is It Abstractness, Concreteness, or Zero Effect?

Participant (1)

(Cued recall)

Group (2)

**Note:** This form is used to record oral recall

List of words		Aids to remember	
Concrete words	Abstract words	First Letter	Semantic association
 Poet	 Inspiration	[Sh]	Poem
 Eyes	 prevision	[b]	Point to your eyes
 Computer	 Data	[k]	Move your hand as if you are printing.
 Human	 Jinn	[j]	Satan
 body	 Spirit	[g]	Point your hands to your body.
 Money	 Charity	[s]	Move your hands as if you are having your food.
 Heart	 Conscience	[q]	Move your fingers to mimex heartbeat
 Fire	 agony	[aa]	Use gestures to show suffering from fire
 Brain	 Mind	[d]	Point your finger to your head as if you are thinking.
 paradise	 Hell fire	[n]	Imitates alternative torch fire
Total recalled words	Total recalled words		

**Instructions:**

1. Please mark (√) the word that the student can remember or mark (×) to the word, which the student could not remember.
2. Please mark (√) to the assistance aid that you gave to the student. If the student was able to remember the opposite word without any means of help, then do not do anything in the third and fourth columns either if they do not remember the opposite word even using assistance aids. Place the sign (×) on each. If the student can remember the word using the first assistance aids, place the mark (√) and let the second blank. But if the student could not remember the first assistance, place the mark (×) and on the second (√) if the student was able to remember to use or (×) if the student could not remember them.




















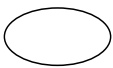
## On Arabic Abstract and Concrete Words Recall Using Cued Recall Paradigms: Is It Abstractness, Concreteness, or Zero Effect?

Participant (1)

(Cued recall)

Group (2)

**Note:** This form is used to record oral recall

List of words		Aids to remember	
Concrete words	Abstract words	First Letter	Semantic association
 Poet	 Inspiration	[Sh]	Poem
 Eyes	 Prevision	[b]	Point to your eyes
 Computer	 Data	[k]	Move your hand as if you are printing.
 Human	 Jinn	[j]	Satan
 Body	 Spirit	[g]	Point your hands to your body.
 Money	 Charity	[s]	Move your hands as if you are having your food.
 Heart	 Conscience	[q]	Move your fingers to mime heart beat
 Fire	 Agony	[aa]	Use gestures to show suffering from fire
 Brain	 Mind	[d]	Point your finger to your head as if you are thinking.
 Paradise	 Hell fire	[n]	Imitates alternative torch fire
Total recalled words	Total recalled words		

### Instructions:

1. Please write the words that you can remember in the blanks, and do not write anything inside the oval circles. If you cannot remember the word, use the helping aids available to you (the first letter or the semantic association), which will be provided by the person who runs the research process.
2. Please, do not write anything in the third and fourth columns unless you are using any of the means of help to remember the word(s) you want. In case you did that, you must check (✓) in the event of using the first help, and helped you to remember the word, or check (×) in the event of using the first help and did not help you to remember the word.
3. Follow the same steps to deal with the helping aids in the fourth column (semantic association).