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The Effectiveness of Active Interaction in Interactive Visual Imagery as Created by the Keyword Method



Honors Thesis

Morgan Pair

Department: Psychology

Advisor: Robert Crutcher, Ph.D.

April 2016

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Abstract

A proven mnemonic method called the Keyword Method can be used to learn concrete word pairs, such as when learning a foreign language. In the Keyword Method, an English word that sounds or looks similar to the foreign word (the “keyword”) is used to relate the foreign word and its English equivalent (Raugh & Atkinson, 1975). There are two steps to the keyword method. The first is to learn the foreign word, English translation and English keyword. The second step is to then create an interactive visual image using the English word and keyword (Raugh & Atkinson, 1975). This second step was the focus of this study. To date, there is little research on why interactive visual imagery is so effective for learning and memory. This experiment investigated this question by using the interactive visual images created by the keyword method to learn Indonesian-English word pairs. One possible reason tested in this experiment was the nature of the interaction described. An active interaction creates an active image where one subject is acting upon another, and a static interaction when no action is evident. This experiment presented participants with two sentences for each word pairing with one sentence describing a static relationship, and the other describing an active interaction. In addition, participants took part in a control condition where they were instructed to learn the foreign word pairings using rote rehearsal only. It was hypothesized that the static interaction group would recall significantly more word pairs than the control group, while those presented with the active interactions would learn and recall the highest number of word pairs overall. The results showed a significant effect of type of interaction on word

recall, with the active interaction condition scoring high than both the static and control conditions on a cued recall test.

Keywords: mnemonic devices, foreign language learning, keyword method, interactive visual imagery,

Disclaimer

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The Effectiveness of Active Interaction in Interactive Visual Imagery as Created by the Keyword Method

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Abstract

A proven mnemonic method called the Keyword Method can be used to learn concrete word pairs, such as when learning a foreign language. In the Keyword Method, an English word that sounds or looks similar to the foreign word (the “keyword”) is used to relate the foreign word and its English equivalent (Raugh & Atkinson, 1975). There are two steps to the keyword method. The first is to learn the foreign word, English translation and English keyword. The second step is to then create an interactive visual image using the English word and keyword (Raugh & Atkinson, 1975). This second step was the focus of this study. To date, there is little research on why interactive visual imagery is so effective for learning and memory. This experiment investigated this question by using the interactive visual images created by the keyword method to learn Indonesian-English word pairs. One possible reason tested in this experiment was the nature of the interaction described. An active interaction creates an active image where one subject is acting upon another, and a static interaction when no action is evident. This experiment presented participants with two sentences for each word pairing with one sentence describing a static relationship, and the other describing an active interaction. In addition, participants took part in a control condition where they were instructed to learn the foreign word pairings using rote rehearsal only. It was hypothesized that the static interaction group would recall significantly more word pairs than the control group, while those presented with the active interactions would learn and recall the highest number of word pairs overall. The results showed a significant effect of type of interaction on word recall, with the active interaction condition scoring high than both the static and control conditions on a cued recall test.

Keywords: mnemonic devices, foreign language learning, keyword method, interactive visual imagery,

The Effectiveness of Active Interaction in Interactive Visual Imagery as Created by the Keyword Method

Mnemonic devices have been proven to be extremely effective methods for learning and subsequent retention of information. In recent years, as our country becomes more multicultural and the need for bilingualism increases, mnemonic devices have been increasingly utilized in foreign language learning. One of the most effective mnemonic devices being used in this way is the keyword method. The keyword method uses paired-associate learning and visual imagery to more strongly encode the English and foreign word pairs (Raugh & Atkinson, 1975). Recent research has shown the effectiveness of visual imagery increases when there is an interaction shown between the paired words (Crutcher, 1990). However, there have not been any sufficient investigations into what aspect of the interactive visual imagery makes it so effective for learning and retention. This study sought to answer this question by investigating the nature of the interactions used to relate the English translation and keyword mediator pair.

Mental Imagery

Imagery was once widely regarded as the main mental representation of meaning (Paivio, 1969). Throughout time, this opinion has held strong as more information about imagery has been learned. How easily mental imagery is formed and how readily available it is has been assumed to vary directly with the image-evoking or concreteness of the item, whereas strictly verbal processes are independent of concreteness and rely instead on meaningfulness (Paivio, 1969).

Concreteness

Concreteness of an object is very important when forming a visual image. The greater the concreteness of an item, the more likely it is to evoke sensory images that can function as mediators and facilitate memory and retention (Paivio, 1969). The most important alternative to concreteness is meaning of the object, which has been linked to verbal mediating processes. However, experiments involving a sample of 925 nouns that have been rated on concreteness and meaningfulness (Paivio, Yuille, & Madigan, 1968) have shown decisively that concreteness is more effective than meaningfulness when controlling for all other variables (Paivio & Yuille, 1967; Smythe & Paivio, 1968).

Dual-Coding Theory

Another important aspect of mental imagery to understand is dual-coding theory (Paivio, Walsh, & Bons, 1994). Dual-coding theory is the idea that the mind has two different encoding systems, one symbolic and one verbal. As is pertains to mental imagery, the image is encoded both symbolically and verbally. Symbolically, because the mind creates a mental image to represent the words, and verbally because the brain automatically labels the image. Dual coding theory is used to explain the overall independent and additive effects that pair concreteness and relatedness have on all recall measures (Paivio, Walsh, & Bons, 1994). An image of a more concrete word is easily created and subsequently, more easily labeled. This makes the word pair easier to remember and better encoded so it can be later recalled.

Paired-Associate Learning

Paired-associate learning is characterized by building a link between two pieces of information, with one element of the pair serving as cue for the retrieval of the second element

(Soemer and Schwan, 2012). In a seminal study done by B.R Bugelski, Edward Kidd, and John Segmen in 1968, the topic of paired-associate learning was investigated and analyzed. In the experiment, a numerical rhyming system (later to be called, the “peg” method) was used to facilitate the learning of a list of words. The rhyme associated the item’s numerical place on the list with a word rhyming with the number. For instance, at spot one on the list, the word “bun” was used to remember the item’s place because it rhymes with “one.” In order to learn the object’s place on the list, subjects would learn to associate not only the rhyme and numerical place on the list, but also a word that connected the two. For instance, participants associating “one” with “bun” would also learn a mediating word such as “chair” and create the association *one-bun-chair*. Participants were told to imagine the item and corresponding rhyme interacting in some way, allowing participants to provide their own scenario using the words “bun” and “chair.” No instructions were given to the control group on how to learn the list of items, and most ended up simply repeating the list over and over to themselves using a method called rote rehearsal. Students who were given the instruction to visualize an interaction, did far better on a resulting recall task than students who simply used rote rehearsal (Bugelski, Kidd, & Segmen, 1968). The strategy used by the experimental group in this study is called interactive visual imagery.

Interactive Visual Imagery

Interactive visual imagery can be simply explained as two or more aspects of mental imagery interacting with each other. Interactive visual imagery has been proven countless times to be an extremely effective method for memory encoding and retention. In particular, interactive visual imagery can be very useful for paired-associate learning. As was described above in the Bugelski study, the two objects (bun and chair) form a mental image, and this mental image helps make

the items more memorable and easier to recall. One reason for this is suggested in “The Neuropsychology of Mental Imagery” by S.M Kosslyn, M. Behrmann, and M. Jeannerod (1995). This research suggests that imagery draws not only upon mechanisms used in perception, but also upon motor functions. As a result of this, interactive visual imagery where the subjects are interacting with each other actively triggered the mechanisms used for motor control and made the image more memorable and retainable (S.M Kosslyn, M. Behrmann, & M. Jeannerod, 1995). A meta-analysis of multiple studies done to ascertain the differences in learning using static versus animated pictures revealed a significant advantage of animated over static pictures (Tim N. Höffler, and Detlev Leutner, 2007). Along the same lines, a study done by Soemer and Schwan (2012) focused on using static versus animated morphs for language learning. Typically, research in the field of interactive visual imagery has always focused almost exclusively on static pictures or imagery. However, recent research has used dynamic visualizations to serve as visual mediators in paired-associate learning as well (Soemer and Schwan, 2012). Visual mediation, like an interactive visual image, can be seen as a possible form of elaboration in paired-associate learning. The interactive visual image serves as a type of bridge within the word pair. Visual mediators are also called encoding mnemonics because inserting them between the items of a pair is thought to improve the encoding of additional cues (Bellezza, 1981, 1996). Based on this, it is not a far extrapolation to say that the more cues available in a mnemonic, such as an interactive visual image, the richer the encoded representation of the word pair, and the higher chance of later recognition and recall of the word pair (Soemer and Schwan, 2012).

The Keyword Method

The Keyword Method was a procedure designed by Raugh and Atkinson (1975) for associating a spoken foreign word with its English translation. This method involves two stages.

Stage one involves relating a linking “keyword” based upon the sound of some part of the foreign word to the English translation. For instance, the Spanish word for *goat* is *cabra*. An effective keyword mediator would be *cab*. Stage two involves mental imagery in which an image of the keyword interacts with an image of the English word. For example, using *cabra*, *cab*, and *goat* again, a mental image that could be created is a goat driving a cab (Rough and Atkinson, 1975). One of the most important aspects of this mnemonic method is identifying a “good” keyword. Rough and Atkinson give three criteria for an effective keyword (1975):

1. The keyword sounds as much as possible like a part of the foreign word.
2. It is easy to form a memorable imagery link connecting the keyword and the English translation, meaning that the keyword is concrete and image –evoking.
3. The keyword is unique, meaning it is different from other keywords used in the list.

However effective the keyword method is, there are also limitations in terms of the study of foreign language vocabulary. While it may be tempting to have subjects determine their own keywords, research shows that conditions where students were provided keywords based upon pretesting and analysis were superior to conditions where subjects generated their own keywords (Hall, Wilson, & Patterson, 1981). Another limitation is the difference in effectiveness between a Spanish-English direction, and an English-Spanish direction. This study found that Spanish-English is a more effective direction for long term learning (1981). Whatever the limitations, the keyword method has been consistently proven to be superior to other mnemonic devices (Tavakoli and Gerami, 2011). Another way to investigate the efficacy of the keyword method is to use sentences instead of pictures. This way, the participants create their own images instead of being told what image to create by the instructor, and they create more meaningful images

(Pressley, Levin, & McCormick, 1980). However, the results from this study show that image evoking (concreteness) is still more important than meaningfulness, and those that followed images instead of sentences performed better on an eventual recall task (1980). This suggests that the interaction of the visual image is the most important part of the method.

This experiment used a paradigm previously established and tested in multiple studies on the keyword method (Crutcher and Ericsson, 2000; Crutcher, 1990). In it, participants are given a list to learn consisting of foreign words, their English equivalents, and keyword mediators. The key to a good keyword and subsequent interactive visual image is concreteness and memorability. However, the question remains as to what makes an interactive visual image so memorable and consequently, so effective.

Using this paradigm, this study investigated one possible explanation for the effectiveness of interactive visual imagery: the nature of the interaction in the mental image. An interaction can be either static or active in nature. An active interaction is one where one subject is acting upon another. For instance, “the goat driving a cab” is active because the goat is acting upon the cab. A static interaction is one where the subjects are not acting upon each other. For example, “A goat and a cab” is static because neither the goat nor the cab is acting upon the other.

Given the amount of research that has already been done on the keyword method, it was hypothesized that results of this study show significant differences between the control condition and both experimental conditions. This effect will demonstrate the effectiveness of the keyword method over rote rehearsal and establish a baseline to which the experimental conditions can be compared.

If my hypothesis is correct, we should also see more words recalled on average in the active interaction condition as compared to the static condition. Because of the nature of an interactive visual image, an image where one subject is actively interacting with the other is more memorable than an image that does not have active interactions.

Methods

Participants

There were 150 total participants for this study, 50 per condition. Participants were college students from Psychology 101 classes at the University of Dayton and were ages 18-22. Participants were run in groups of sixteen, with one group having only ten participants.

Design

This study employed a between subjects design with three different conditions: two experimental (active and static) and one control (rote rehearsal) with type of interaction acting as independent variable and words recalled as dependent variable. Counterbalancing measures by Latin Square were implemented to ensure randomization

Materials

A powerpoint presentation of the 32 stimuli which included Indonesian words, English keywords, and English translations was presented to participants using a projector screen. A full list of the stimuli used is available in Appendix C.

Procedure

For the two experimental conditions, participants learned a list of 32 Indonesian-English word pairs using the previously described keyword mediators to relate the pair. The third

condition acted as the control and did not include any manipulation of the stimuli. Participants in the active interaction condition were taught the keyword method including the importance of creating the visual image. Participants were also told not to use any other strategies they may already know for learning vocabulary. They were then given instructions to utilize the keyword method to learn the foreign words. The active condition viewed a presentation that presented the Indonesian word on the far left of the screen and the keyword mediator in the middle simultaneously for six seconds. Next, the keyword appeared again in the middle and the English word on the far right of the screen. Additionally, a sentence that related the English translation and keyword actively such as “a singer riding a lion” appeared beneath the stimuli at the bottom of the screen. This presentation also occurred for six seconds before automatically moving on to the next stimulus. The static condition followed the same design, however the sentence that appeared related the keyword and English translation in a static manner instead of active, such as “a singer and a lion.”

Condition three was a control condition where participants were told to use rote rehearsal to try and learn the English-Indonesian word pairs. After being given a brief explanation of rote rehearsal, participants were presented with a similar presentation to the experimental conditions. The foreign word appeared on the far left of the screen, and the English translation appeared on the right for six seconds. However, unlike in the experimental conditions, no keyword was included, nor a relating sentence. All three conditions were then tested using a cued recall task in which the participants had to provide the correct translation of the item on the test. The participants were told to recall the English translation of the word and write it down next to the corresponding Indonesian word. Ten minutes were given for this task.

Results

Using SPSS 23, results were analyzed and average scores found for each condition. As can be seen in Figure 1, the active condition yielded the highest number of words recalled on average ($M=8.12$, $SD=5.14$) and the static condition the next highest ($M=5.22$, $SD=4.07$).

As predicted, the control condition had the least number of words recalled on average ($M=3.50$, $SD=1.94$). A one-way Independent Samples ANOVA was performed on the means, $F(2, 147)= 17.512$, $MSE=.356$ to determine if the differences in the means were significant ($p<.05$) and this test revealed that there was an overall main effect of interaction type on words recalled. ($p<.001$). Given this result, further tests were performed. A Tukey's HSD test ($Q_{crit}=3.31$, $SE=0.789$) was run to determine which of the three conditions yielded significant results. It was found that the active condition ($M=8.12$) was significant when compared to both the static and control conditions ($M=5.22$, $HSD=5.197$, $p=0.00097$, and $M=3.50$, $HSD=8.14$, $p=0.00094$, respectively). However, the static condition ($M=5.22$) was not significant when compared to the control condition ($M=3.50$, $HSD=3.08$, $p=0.078$).

Discussion

The hypothesis for this study was that active interactions would show higher recall scores overall than static interactions. Additionally, both of these conditions would show higher recall scores on average over the control condition of rote rehearsal. The results from this experiment show that the interactions that were described with active verbs do lead to higher recall scores on average than those that were described using static verbs. However, the differences between the average number of words recalled in the static condition and control condition were not significant. This is an interesting finding considering that the keyword method has been proven

to be an effective technique for learning vocabulary and has been proven to be more effective than rote rehearsal. These results suggest that active interaction in mental imagery has an even greater importance than originally thought, with static interaction yielding such low word recall that it does not differ significantly from the control rote rehearsal group.

However, this lack of a difference also could have been caused by experimenter error, mainly in the language chosen to test. Indonesian is a difficult language, with very few English cognates. The original purpose for choosing this particular language was because the words are phonetically spelled and pronounced, and it is a less common language in the United States. More commonly known and studied languages such as Spanish, French, and German were not chosen in order to avoid having participants with prior knowledge of the words being tested. However, it is possible that Indonesian was too hard a language to pick and students struggled with learning the words themselves and did not focus on the keywords or interactions.

This study showed an effect of type of interaction (static versus active) on memorability of stimulus and because of this there could be many possible implications both in everyday life and in future research in this topic. Mnemonics are often used in education. Frequently utilized in schools for learning math, vocabulary, history, and foreign language as it was used in this study, mnemonic devices are shown to be very effective and conducive to learning. This study could potentially provide new strategies both for teaching and learning foreign language. Students can use the keyword method and more importantly use active verbs to create the visual image so that the image and subsequently the word pair is more memorable. As it is becoming more and more important to be multilingual in our constantly diversifying country, this research could help streamline the keyword method and make it even more useful for learning.

In terms of future research, given the varied nature of interactive visual imagery and the keyword method, many different aspects could be investigated. Both the keyword method and interactive visual imagery have proven to be very effective in learning foreign word pairs (Bellezza, 1974) and there is not much research on why this is. I am investigating one possible reason in my study, but other studies could investigate topics like what aspects of a keyword make it a good mediator, or whether or not the use of an abstract and not concrete word (“friendship” versus “cat”) would affect the strength and subsequent memorability of an interactive visual image. Another possible direction would be to investigate whether or not the actual mental image has an effect on memorability. One aspect of this study that lacked control was the idea that participants still are able to make any interaction they want in their head. To use the cab and goat example from earlier again, one participant could imagine the goat in a moving cab, the other in a parked cab, or even the goat could be different, one goat could be black, the other could be white. One way to eliminate this possible issue is to create the actual images themselves instead of simply describing the interaction that participants are to imagine.

References

- Bellezza, F.S (1996). Mnemonic methods to enhance storage and retrieval. *Memory*, 345-380.
- Bellezza, F.S (1981). Mnemonic Devices: Classification, characteristics, and criteria. *Review of Educational Research*, 51(2), 247-275.
- Bellezza, F.S., and Poplawsky, A.J (1974). The function of one-word mediators in the recall of word pairs. *Memory and Cognition*, 2(3,) 447-452.B
- Bugelski, B., Kidd, E., & Segmen, J. (1968). Image as a mediator in one-trial paired associate learning. *Journal of Experimental Psychology*, 76(1p1), 69.
- Crutcher, R.J (1990). The role of mediation in knowledge acquisition and retention: Learning foreign vocabulary using the keyword method. (No 90-10). *Tech Report*.
- Crutcher R.J, & Eriksson, K.A. (2000). The role of mediators in memory retrieval as a function of practice: Controlled mediation to direct access. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 26(5), 1297.
- Hall, J.W., Wilson, K.P., & Patterson, R.J. (1981). Mnemotechnics: Some limitations of the mnemonic keyword method for the study of foreign language vocabulary. *Journal of Educational Psychology*, 73(3), 345.
- Höffler, T.N., & Leutner, D. (2007). Instructional animation versus static pictures: A meta-analysis. *Learning and Instruction*, 17(6), 722-738.
- Kosslyn, S.M., Behrmann, M., & Jeanerrod, M. (1995). The cognitive neuroscience of mental imagery. *Neuropsychologia*, 33(11), 1335-1344.

Paivio, A. (1969). Mental imagery in associative learning and memory. *Psychological Review*, 76(3), 241.

Paivio, A., Rogers, T.B., & Smythe, P.C. (1968). Why are pictures easier to recall than words? *Psychonomic Science*, 11(4), 137-138.

Paivio, A., Smythe, P.C., & Yuille, J.C. (1968). Imagery versus meaningfulness of nouns in paired-associate learning. *Canadian Journal of Psychology/Revue Canadienne de Psychologie* 22(6), 427.

Paivio, A., Walsh, M., & Bons, T., (1994). Concreteness effects on memory: When and why? *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 20(5), 1196.

Paivio, A., Yuille, J.C., & Madigan, S.A. (1968). Concreteness, imagery, and meaningfulness values for 925 nouns. *Journal of Experimental Psychology*, 76(1, Pt.2) 1.

Pressley, M., Levin, J.R., & McCormick, C.B. (1980). Young children's learning of foreign language vocabulary: A sentence variation of the keyword method. *Contemporary Educational Psychology*, 5(1) 22-29.

Raugh, M.R., & Atkinson, R.C. (1975). A mnemonic method for learning a second-language vocabulary. *Journal of Educational Psychology*, 67(1), 1.

Soemer, A., & Schwann, S. (2012). Visual mnemonics for language learning: static pictures versus animated morphs. *Journal of Educational Psychology*, 104(3), 565.

Tavakoli, M., and Gerami, E. (2013). The effect of keyword and pictorial methods on EFL learner's vocabulary learning and retention. *Porta Linguarum: Revista Internacional de Didáctica de las Lenguas Extranjeras*, 19, 299-316.

Appendix A

Figure 1

Average Number of Words Recalled According to Interaction Type

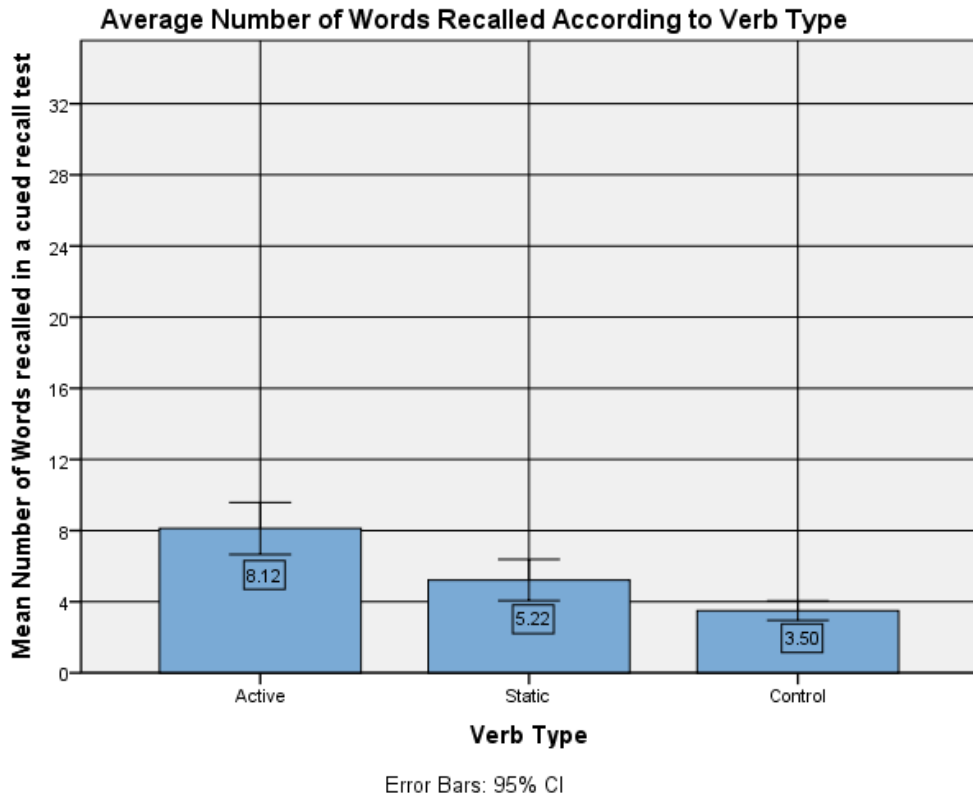


Figure 1 shows a means comparison between the three conditions, with the active interaction condition yielding the highest number of words recalled and the control condition yielding the lowest.

Appendix B

Instructions for Control Condition

Spoken

Instructions-Control Condition-to be read while instructions ppt is on screen

First Slide: In this study you will be learning a series of Indonesian words using rote rehearsal. Rote rehearsal is pretty self-explanatory, you just repeat the words to yourself over and over in your head.

For an example, lets take the Spanish word, “cabra.” In Spanish, this word means “goat.” Using rote rehearsal, you repeat “cabra, goat” over and over in your head, “cabra, goat, cabra, goat, cabra, goat” and so on for the allotted time.

Do you understand how rote rehearsal works? Any questions?

Next Slide: Okay now I am going to show you an example of how this will look during the study, using the example already given of “cabra, goat.”

In this example the word is Spanish, but during the presentation the word will be Indonesian like I said before. So, the Indonesian word will be on the left of the screen, and the English translation on the right. The Indonesian word will appear first for six seconds. Then the Indonesian word will be joined by the English translation for 6 seconds and then will automatically move on to the next word. Okay, just to make sure everyone gets that, lets go through that a couple more times.

Any questions?

It is very important that you follow these directions as they are. Most likely you have been learning vocabulary for many years and so have your own techniques and strategies for learning new words. In this study I ask that you do not use any other techniques than rote rehearsal as it was explained to you for learning the Indonesian words. Do not do anything more or less than what I have asked you to do.

Okay now that you know what you are supposed to do, are you ready to begin?


RUN THE EXPERIMENT-APPROX 14 MINUTES



Okay, now that you have learned all the words there is going to be a test. The test will give you the Indonesian word and your job is to write the English translation next to it in the blank. You will have ten minutes to complete this task. Do you understand what I am asking you to do?

Presented

Instructions

- Rote Rehearsal
- A proven method for learning vocabulary
 - Repeat words over and over in your head
 - Indonesian words
 - Stimuli will appear like this
 - Do not do anything else!

CABRA

FOREIGN WORD

CABRA GOAT
 
FOREIGN WORD ENGLISH TRANSLATION

Appendix C

Instructions for Experimental Conditions

Instructions-Active and Static Conditions-to be read while instructions ppt is on screen

First Slide: In this study you will be learning a series of Indonesian words using a mnemonic technique called the keyword method. The keyword method is a device that employs a two-step method for learning. The first step involves learning the Indonesian words, English translations and English keywords. The keyword is a previously chosen word that is similar to the foreign word by sharing syllables, sounding the same etc.

The second step of the keyword method is to create an interaction using the English word and keyword.

For an example, lets take the Spanish word, "cabra." In Spanish, this word means "goat." Using the previously determined keyword based on the criteria of an effective keyword, "cab" is chosen as the keyword. Now that you have all three of the components, a sentence is created that shows an interaction between the English word and keyword in some way. For instance with "goat" and "cab" for the Spanish word "cabra," a sentence interacting the two English words could be "A goat driving a cab."

Any questions on the keyword method as I have explained it to you?

Next Slide: Okay now I am going to show you an example of how this will look during the study, using the example already given of "cabra, cab, goat."

There are two parts to this study as there are to the keyword method. In the first part, you will be presented with the foreign word, English keyword, and English translation. In this example that word is Spanish, but during the presentation that word will be Indonesian like I said before. So, the Indonesian word will be on the left of the screen, the keyword in the middle, and the English translation on the right. The Indonesian word and keyword will appear first for six seconds. Then the Indonesian word will disappear and the keyword and English translation will be presented on the screen along with a sentence relating the English word and keyword. This will also last for 6 seconds. During this time, you are to create an interactive visual image described by the sentence. Okay, just to make sure everyone gets that, lets go through that a couple more times.

It is very important that you follow these directions as they are. Most likely you have been learning vocabulary for many years and so have your own techniques and strategies for learning new words. In this study I ask that you do not use any other techniques than the keyword method as it was explained to you for learning the Indonesian words. Do not do anything more or less then what I have asked you to do.

Okay now that you know what you are supposed to do, are you ready to begin?

RUN THE EXPERIMENT-APPROX 14 MINUTES

Okay, now that you have learned all the words there is going to be a test. The test will give you the Indonesian word and your job is to write the English translation next to it in the blank. Not the keyword, not the sentence, but the English translation. You will have ten minutes to complete this task. Do you understand what I am asking you to do?

TEN MINS FOR TEST- COLLECT AND THEN DEBRIEF

Okay, that is it! Thank you for coming and have a nice day!

Presented

Instructions

Keyword Method

- In this study you will be learning a series of Indonesian words using a mnemonic technique called the keyword method.
- The KW employs a two step method for learning:
 - 1. Learning the Indonesian words, English translations and English keywords
 - 2. Create an interaction using the English word and keyword

Example using Spanish:

CABRA



Foreign word

CAB



English keyword

Example using Spanish:

CAB



English keyword

GOAT



English translation

GOAT DRIVING A CAB

Appendix D

List of Stimuli Used

Pedang-Pedal-Sword

Active: A sword slicing a pedal

Static: A pedal and a sword

Singa-Singer-Lion

Active: A singer riding a lion

Static: A singer and a lion

Telur-Telephone-Egg

Active: A telephone smashing an egg

Static: An egg and a telephone

Mata-Mat-Eye

Active: Rolling an eye on a mat

Static: An eye and a mat

Salju-Salad-Snow

Active: Spilling salad on snow

Static: Salad in the snow

Cacing-Case-Worm

Active: A case squishing a worm

Static: A case and a worm

Tawon-Table-Bee

Active: Table crushing a bee

Static: A table and a bee

Lembing-Lemon-Spear

Active: Piercing a lemon with a spear

Static: A lemon and a spear

Bulan-Bullet-Moon

Active: Bullet striking the moon

Static: A bullet on the moon

Paku-Package-Nail

Active: Nail poking a package

Static: Nail and a package

Sodok-Soda-Shovel

Active: Spraying soda all over a shovel

Static: Soda and a shovel

Kakek-Cake-Grandfather

Active: Throwing cake at grandfather

Static: A grandfather and a cake

Anjing-Ant-Dog

Active: An ant crawling on a dog

Static: An ant and a dog

Jarum-Jar-Needle

Active: A needle piercing a jar

Static: A needle and a jar

Taraf-Tar-Leg

Active: Pouring tar over her leg

Static: A leg in tar

Pantai-Pants-Shore

Active: Burying pants on shore

Static: Pants on shore

Rumput-Rum-Grass

Active: Pouring rum on grass

Static: Rum on the grass

Kolong-Coal-Vault

Active: Throwing coal at a vault

Static: A piece of coal and a vault

Boneka-Bone-Doll

Active: A bone falling on a doll

Static: A doll and a bone

Jurang-Jersey-Cliff

Active: A jersey blowing off a cliff

Static: A jersey on a cliff

Siku-Cigar-Elbow

Active: A cigar burning her elbow

Static: A cigar on her elbow

Belalang-Bell-Grasshopper

Active: A bell crushing a grasshopper

Static: A grasshopper and a bell

Rebab-Rib-Fiddle

Active: A rib playing a fiddle

Static: A rib next to a fiddle

Penjara-Pen-Jail

Active: Pen writing on the jail wall

Static: A pen on the jail floor

Api-Apple-Fire

Active: An apple rolling into a fire

Static: An apple next to a fire

Gelang-Jelly-Bracelet

Active: Spreading jelly on a bracelet

Static: Jelly and a bracelet

Peperangan-Pepper-Battle

Active: Sprinkling pepper on a battlefield

Static: Pepper shaker on a battlefield

Jendela-Gentleman-Window

Active: Gentleman jumping through a window

Static: Gentleman next to a window

Batu-Bat-Rock

Active: A bat hitting a rock

Static: A rock and a bat

Peta-Pet-Map

Active: A pet eating a map

Static: A pet on a map

Bantal-Band-Pillow

Active: A band snapping against a pillow

Static: A band and a pillow

Bagian-Bag-Desk

Active: A desk crushing a bag

Static: A bag on a desk

Appendix E
Cued Recall Test

Recall Test:

Indonesian

English

Indonesian

English

Mata

Taraf

Paku

Tawon

Pantai

Telur

Pedang

Leming

Penjara

Kolong

Peperangan

Kakek

Peta

Jurang

Rebab

Jendela

Rumput

Jarum

Salju

Gelang

Siku

Cacing

Singa

Bulan

Sodok _____

Boneka _____

Indonesian

English

Batu _____

Bantal _____

Bagian _____

Api _____

Belalang _____

Anjing _____