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Allan Alva
CUNY City College

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Running head: THE EFFECTS OF THE KEYBOARD AND COGNATE METHOD ON SPANISH
LANGUAGE VOCABULARY ACQUISITION

The Effects of the “Combined Method” on Spanish Language Vocabulary Acquisition in English
Speaking Participants

Allan Alva

City College of New York

Department of Psychology

Submitted to Professor Vivien Tartter

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Abstract

The use of English-Spanish cognates and the keyboard method of Spanish vocabulary learning were studied in a recall experiment consisting of three stages. Of major interest was the effect that combining the keyboard and cognate methods would have on Spanish vocabulary acquisition by City College students. Time of testing proved to have a significant effect on learning Spanish vocabulary words. All conditions improved after one hour of treatment and forgot after one week at similar rates.

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Spanish Vocabulary Acquisition Through the Combined Keyboard and Cognate Method

I. Introduction

According to Eliot (1999), language develops as it interacts with its “end organs,” which are its contact with the external world. The end organs in turn consist of: the sensory systems that pick up incoming information from the environment, such as ears while listening to aural language and eyes while reading written language, then the motor systems that interact with the physical and social environment during literacy learning, such as the mouth while producing oral language to express ideas and the hands when producing written or signed language to express ideas. When learning a native language all this happens almost unbeknownst to the learner. This is not always the case when learning a second language. What can help a person interact with the "end organs" in a second language? The present study focuses on the Spanish vocabulary acquisition of English speakers.

Nagy and Scott (2000) wrote that vocabulary knowledge consists of the stock of words known by a person. Word knowledge requires multiple identities and dimensions: a phonological identity, including phonemes and pronunciation; syntactic identity, including the word's form class and function in a sentence; semantic identities, which entail the meanings of words in various contexts; and orthographic identity, or the word's spelling.

A vocabulary learning task may include a word's formal definition, its use in various sentence contexts, or a picture of its referent. It may require learning a new concept or learning a new label for a known concept. Vocabulary learning may result from explicit instruction by a teacher, or it may emerge from incidental encounters with unknown words (Nagy & Scott, 2000). One may learn words and their meanings by hearing them spoken or by reading them. The ability to recall this newly learned vocabulary is of much importance in

order to build vocabulary knowledge. This study explores two recall methods for learning and retaining new vocabulary words in Spanish.

In the present study two methods to help recall of Spanish vocabulary are studied in two separate recall tests. This study aims to investigate how the combination of the keyboard method, first introduced by Rough and Atkinson in 1975, and the cognate method, which the author coined for the purpose of this experiment, can influence the acquisition of Spanish vocabulary. The keyboard method is a three-stage mnemonic device utilized for the teaching of foreign language vocabulary. It uses acoustic and orthographic similarities to create visual associations between English and foreign words in order to facilitate their recall. The second method, called cognate by the author, focuses on cognates, words that have etymological acoustic and/or orthographic similarities to help English-speaking participants associate English words with their Spanish counterparts and facilitate their recall.

1.1 Research on the Keyboard Method

First, in the keyboard method, a common English word (the keyword) is derived from the foreign word based on acoustic and/or orthographic similarity; second, a stable association is built between the foreign word and the keyword; and third, a visual image containing the referents of the keyword and the English translation is produced by the learner (Rough & Atkinson, 1975). For example, consider the Spanish word *candado*, which means *padlock*. Step 1 is to derive from *candado* a keyword, *candy* in this case. It is important to rehearse the *candado-candy* pair enough so that *candy* becomes a reliable mediating link in the chain between *candado* and *padlock* (Hall, Wilson & Patterson, 1981). The keyword can also be *dad*; however according to Rough and Atkinson (1975) keywords derived from the first syllable are likely to be more effective than those derived from later syllables. Another keyword for *padlock* could be *candid*, but less concrete keywords are harder to generate linking images with (Hall, Wilson & Patterson, 1981). While initial studies showed the keyboard method to be an effective mnemonic technique, this method has been the subject of considerable research attention, where virtually all of this research has been “directed toward determining whether or not the method works and under what conditions” (Pressley & Levin, 1978).

The Keyboard method has been researched extensively and only a few research articles have been selected for the purpose of the present study. Miller and Berry (1980) tested the effectiveness of the keyboard method in five different experiments, concluding that the keyboard method “proved superior to even the most challenging control condition when subjects had to produce English responses given foreign equivalents.” Control conditions in this study referred to a combination of the keyboard method with other methods; for instance, keyboard and repetition is one of the groups in this study. Experimenters in this study attempted to answer the question: “how does the keyboard method affect foreign word acquisition?” In this study the effectiveness of the method was tested with 120 sixth graders from a parochial school in the Midwest. For this purpose the experimenter created four different conditions: (a) keyboard - no strategy control, in which subjects first learned keywords (stage 1) and then (in stage 2) were allowed to study the foreign word – English word pairs any way they wished; (b) keyboard-repetition control, which differed from the first group only in the requirement that subjects adopt an item repetition study method during Stage 2; (c) keyboard - no strategy , in which subjects studied the pairs in any way they wished during both stages; and (d) no keyboard - repetition control, in which subjects studied the pairs however they wished during Stage 1 and were then required to use the repetition strategy during Stage 2. Results of this study showed that the keyboard-repetition condition was superior to any of the other conditions.

However, another study performed by Hall, Wilson and Patterson (1981) tested the keyboard method on college students, with inconclusive results. In this study a list of 32 pairs of Spanish nouns was presented to participants who studied them using either the keyboard technique or no strategy: The no strategy students were instructed to study using a simple repetition method. Results showed that recall by the participants from the keyboard condition, where keywords were supplied by the experimenter, was inferior or similar to the recall rate of participants in the no strategy condition (Hall, Wilson & Patterson, 1981). This might imply that keywords that are created by the experimenter, in some cases, make more sense for the experimenter only, than forcing participants to come up with his/her own mnemotechnique, preventing keywords from being a reliable source for recall.

In sum, the keyboard method is a widely researched mnemonic device; however its effectiveness seems to vary with individual differences in both subjects and instruction specifics. Perhaps using a keyword that is more universally accepted or a word closer in meaning to the target foreign word could be more effective. For instance, *big* in Spanish is *grande*, and thus an orthographical, phonetically and semantic English word that could be more effective is the word *grand*.

1.2 Research On the Use of Cognates

Another way to help recall between Spanish and English is to identify similarities between the two languages in order to facilitate memorization. These commonalities between languages are also called cognates, which are translations similar in meaning and form (Gollan, Tamar, Forster, Frost, & Ram, 1997). Spanish-English and Dutch-English cognates share a common root for historical reasons and, as a result, are similar in both phonological and orthographic form, e.g., *rico-RICH* (Gollan et. al 1997). For example, consider the Latin-based English word “accept,” which means the same thing as *aceptar* in Spanish, or “copy,” which in Spanish is *copiar*, or “prepare,” which in Spanish is “*preparar*”, and so forth. On the other hand, non-cognates are words that are only similar in sound and in orthographic form but do not share a common root and do not mean the same (Gollan et. al 1997). For instance the word *rope* is similar to *ropa* in Spanish, which means clothing. Graham and Cunningham (2000) wrote that “not only have numerous researchers found that cognate vocabulary increases the ease with which second language (nondominant language, hereafter referred to as L2) vocabulary is acquired, but Arnaud (1982) also found that a greater knowledge of general vocabulary in the first language (dominant language, hereafter referred to as L1) can have a positive influence on vocabulary learning in the L2.” (Graham & Cunningham, 2000). According to Ard and Homburg (1983) vocabulary development is the area where knowledge of similarities of L1 and L2 has the greatest benefits. Hancin-Bhatt and Nagy (1994) further support that “The ability of learners to benefit from semantic/lexical similarities across languages appears to increase with age through childhood. Also, a conscious focusing of learners' attention on the

similarities of lexical items and morphology across languages appears to increase learners' benefit from cognate relationships (Banta, 1981).

In another study on cognate words, Cunningham and Graham (2000) analyzed the effects of Spanish immersion on children's native English vocabulary. Experimenters matched 30 5th and 6th grade immersion students with 30 monolingual English controls by grade, sex, and verbal scores on a 4th-grade Cognitive Abilities Test (CAT) and then asked all to complete 60 consecutive Peabody Picture Vocabulary Test (PPVT) items. Results in this experiment showed there were beneficial consequences for English-speaking children, and that positive transfer (crosslinguistic influence) occurs from Spanish as a foreign language to native English receptive vocabulary.

The use of cognates as a language method could entail priming. Tulving, Schacter and Stark (1982) wrote that priming is the part of implicit memory where previous exposure to a stimulus aids in the performance of a task without conscious awareness of these previous experiences. Because priming is believed to occur outside of conscious awareness, it is different from memory that relies on the direct retrieval of information. Direct retrieval utilizes explicit memory, while priming relies on implicit memory (Tulving, Schacter, & Stark 1982). Priming can be used when guessing the meaning of a cognate word. For instance, when guessing the meaning of the word *calculadora* most English speakers would guess calculator, although we have never seen the words before; our previous knowledge of the cognate *calculator* can help us predict the meaning of the word. Note that guessing the meaning of a cognate word can also be done implicitly – priming - rather than explicitly. This is something that would not happen as readily for instance between Chinese and English.

Moreover, studies performed by Brown, Black and Horowitz (1997) on guessing the meaning of a word found that the agreement between subjects about the meaning of the foreign words was as high as 97% and, also, the number of correct guesses for each language was considerably higher than chance expectation. In this experiment 86 English-speaking participants were asked to guess the English meanings of 21 pairs of antonyms presented in three foreign languages: Hindi, Czech, and Chinese. In this study, the authors considered their results as supporting the hypothesis that there is some sort of intrinsic correspondence between the phonetics of certain words and their meanings regardless of language (Brackbill, Yvonne, Little & Kenneth, 1957).

In sum, using cognates as a foreign vocabulary learning technique could be beneficial, especially when foreign vocabulary words share common roots and are similar in form and meaning. However, in other cases, when cognates are not known form similarities could send one in the wrong direction, as for instance in the case of non-cognates where words are similar in form only but not in meaning.

1.3 Research on introduction to Spanish textbooks from Columbia, CCNY and New York University

After reviewing textbooks from three New York colleges (Columbia University, New York University and the City College of New York), this researcher concludes that Spanish is taught in college as though there were no similarities between the languages, as though both languages were alien. It is the experimenter's observation that introduction to Spanish textbooks emphasize the differences not only between Spanish and English but also among all the Spanish-speaking countries and cultures.

The introduction to Spanish textbook reviewed by the author is *Gente*, the textbook used at Columbia; *Portafolio*, CCNY's introduction to Spanish textbook; and *Dos Mundos*, the introduction to Spanish textbook from New York University. The aforementioned Introductions to Spanish books divide the vocabulary learning sections into different contexts with the vocabulary related to that given context. They all have a section on: the alphabet, learning to count, nationalities, greetings, taking vacations, shopping, the calendar, the time, etc. All these Spanish textbooks come with a practice manual designed to help students incorporate into their vocabulary the newly learned terminology/expressions, whether these are verbs, nouns or adjectives. Some of these books cover certain distinctions among Spanish-speaking countries, for instance, a T-shirt in Argentina is called *remera*, in Colombia, *camiseta*, in Spain *playera*, in Peru *polo* (De la Fuente, Martin & Sans, 2007; Ramos, & Davis, 2008; Andrade, Terrel, Egasse & Munoz, 2007).

Thus, it is the researcher's assessments that the traditional introduction to Spanish language approach does not utilize mnemo-techniques to aid better recall and learning of new foreign vocabulary. After reviewing the above textbooks, the experimenter believes that the present study can help improve vocabulary learning not only by separating vocabulary into different contexts but also by highlighting cognate words and non-cognate

words. Another device to help Spanish vocabulary recall could be an additional keyword section to help students with difficult words. Based on research on other Romance languages, the experimenter also believes that the addition of cognate and keyword aids could be beneficial in other romance languages such as Italian, Portuguese and French.

1.4 The Present Study

The innovation of the proposed study is based on the unilateral perspective of previous studies in the field. For instance, most of the research in this field focused on the keyboard method as the only potential teachable mnemonic device. The present study proposes to use the keyboard method in combination with the use of cognates. Also, the proposed study attempts to find the common ground between Spanish and English through the use of cognates in order to make the challenges of learning a foreign language less foreign and more relatable to the student's native tongue.

1.5 Measures

IV: The independent variable in this study is the method used, which has 4 levels: no strategy condition, the keyboard method condition, the cognate method condition, and the combined method condition. Along with the Spanish-English word pairs in the learning set, each condition presented different stimuli: the stimulus for the keyboard method were keywords, the stimulus for the cognate method was the Latin root of the word, the combined method contained both keywords and Latin roots of the word, while the no strategy condition contained only the pair of English and Spanish words.

DV: The dependent variable was accuracy, measured in the number of words written correctly on a piece of paper. Accuracy was measured initially at baseline, one-hour later after study, and, for some subjects, two weeks following the initial one hour experiment.

- *Hypotheses*

My first hypothesis is that the learning strategy will make a difference in items remembered by the participants. More specifically we expected that the no strategy group would have fewest items remembered; the cognate method would be at least as good as the keyboard method; and that combining cognate and keyboard would produce a net gain over either alone. My second hypothesis was that all methods would show an improvement over baseline, and that there would be some decline in performance from immediate study to two weeks later. Finally, we expected that differences in strategy might be more robust at the two week period, having caused a differential slowing of forgetting.

2. Methods

2.1 Subjects/Participants /Recruitment

The sample consisted of 96 male and female English-speaker psychology students enrolled at the City College of New York. All participants were recruited from the university's subject pool in exchange for college credit. The age of the participants ranged from 18 to 25 years old, and subjects were asked to enroll only if they had no experience or little knowledge of the Spanish language. Prior language experience screening (please see Appendix A) was employed in order to determine participant's eligibility. All participants had normal or corrected to normal vision. Following selection, the participants were randomly assigned equally to the four instruction conditions; screening after resulted in 27 participants in the combined method, 23 in the no strategy, 21 keyboard method, and 22 in the cognate method. Some participants were eliminated after failing the demographic questionnaire, which was only scored after the first session was completed, and thus the number of participants in each group is not equal.

2.2 Instrument/materials

A list containing 42 pairs of English and Spanish words was utilized with each group's list containing different stimulus (please see Appendix B). Half of the selected words were cognates and half were keywords.

In addition a demographic questionnaire (Appendix A) was administered to assess participants' prior knowledge of Spanish. Keywords were selected based on research studies, all of them used the first syllable and were concrete nouns. Most keywords were also used in previous studies.

2.3 Procedure

The study was conducted in an ordinary classroom. 96 participants were randomly assigned to the four different conditions, with 24 participants in each group. Students were tested in small groups of 4-12 per session. Each group was given general written instructions, and an informed consent form which explained the purpose and described the study. Questions were encouraged. When subjects were satisfied, they signed the consent form and then filled out the demographic questionnaire. Next each subject was given the English word list and asked to fill in the Spanish equivalent, as baseline for either guessing or basic knowledge. Then each group was given its own instructions, followed by a practice, and then given the word lists and Spanish equivalents to study for 15 minutes using the trained techniques. Although the same pairs of English and Spanish words were shown to all participants, the three strategy groups were provided additional words to trigger or enhance recall. Participants of the cognate method were shown the Latin roots and English equivalents. Participants in the keyboard condition were shown the pair of words together with the keyword. The combined keyboard / cognate method group was presented with both the keyword and the Latin equivalent of the English word. Not every English-Speaking word pair had a cognate or a keyboard and thus half of the keyboard and cognate lists were "no-strategy.

To distract them from rehearsal all subjects were next given a fifteen minute break during which they needed to read a short article and answer two questions. Following the break they were re-administered the English word list by itself and asked to write the Spanish equivalents. Then they were thanked and given credit for participating.

A week later all subjects were contacted and asked to return for a second administering of the test, which took place two to three weeks after the original session. In the second session, each subject was simply

given the English word list and asked to write the Spanish equivalent, to test long-term retention. Subjects who returned were given additional course credit.

Results

A total of 96 students at the City College were tested; however 14 participants were dropped due to their proficiency in Spanish, having answered correctly more than 12 words in the word recognition task. Spanish-speakers' baseline scores were much higher than the other non-Spanish speaker participants and this could have impacted/affected the overall means for each condition. The remaining 82 students spanned the four groups consisting then of 23 in the combined method, 22 in the no strategy, 18 in the keyboard and 19 in the cognate method participants received one point for each word written correctly with a maximum score of 42, for each of the two (or three) time periods. Scores for all subjects were input into a 2X4 analysis of variance (baseline-immediate learning X 4 instruction groups). A second 3X4 ANOVA was conducted for those subjects who had returned for the second session.

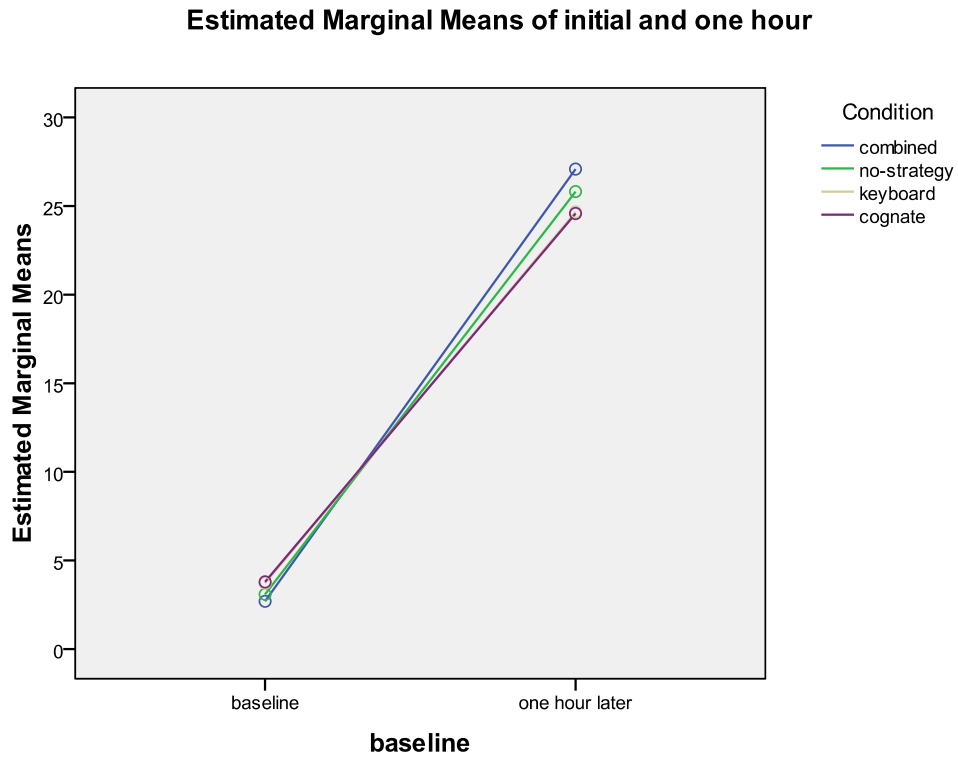
Results for study 1 baseline and 1 hour later for 82 ss

Table one shows the means, standard deviations and Ns for all learning conditions: combined, cognate, keyboard and no-strategy at baseline and one hour after treatment for all 82 participants. Table 1

Table 1: Mean, N, and standard deviation for the 82 subjects who participated in the first session.

Conditions	Combined	Cognate	keyboard	no-strategy
Time Testing				
Baseline	M=2.70, n=23 SD=2.51	M=3.79, n=19 SD=4.577	M=3.72, n=18 SD=4.2	M=3.09, n=22 SD=2.67
one-hour	M=27.09, n=23 SD=8.3	M=24.58, n=19 SD=11,62	M=24.67, n=18 SD=9.8	M=25.82, n=22 SD=9.5

Figure 1 shows more clearly the considerable improvement in learning in all conditions at one hour presumably as a result of the studying.



Graph 1

A 2x4 repeated-measures ANOVA (Table 2) performed with all participants ($n= 82$) testing the significance of these results revealed that the time of testing significantly affected participants' recall, $F(1, 81)= 376.597$, $p<0.01$, Partial Eta Squared $\eta^2 =.707$). There was no significant difference either between conditions overall $F(2,81)<1$ or their interaction with time ($F(3,156)<1$). In other words, there was similar increase in learning for all groups after one hour of treatment compared to baseline.

Anova table for all 82 ss

Tests of Between-Subjects Effects

Dependent Variable: initial and one hour

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	20591.514 ^a	7	2941.645	55.321	.000	.713
Intercept	33808.030	1	33808.030	635.797	.000	.803
Condition	13.986	3	4.662	.088	.967	.002
Testingtime	20025.285	1	20025.285	376.597	.000	.707
Condition * testingtime	90.400	3	30.133	.567	.638	.011
Error	8295.187	156	53.174			

a. R Squared = .713 (Adjusted R Squared = .700)

1- Second analysis of 34 ss testing the long term effects of study

The second ANOVA that involved only those people who came back two weeks later (n=34) to test the long-term effects of the treatment revealed similar results to the ones obtained with the entire group: that only the time of testing significantly affected participants' accuracy in recall ($F(2,34)=168.713$, $p<0.01$, Partial Eta Squared $\eta^2=.009$), again with the possible effects of Learning Condition and its Interaction with Time yielding $F<1$. The results can be viewed in Figure 2 and the ANOVA can be seen on Table 3.

Table 3 graph of means only of those 34ss

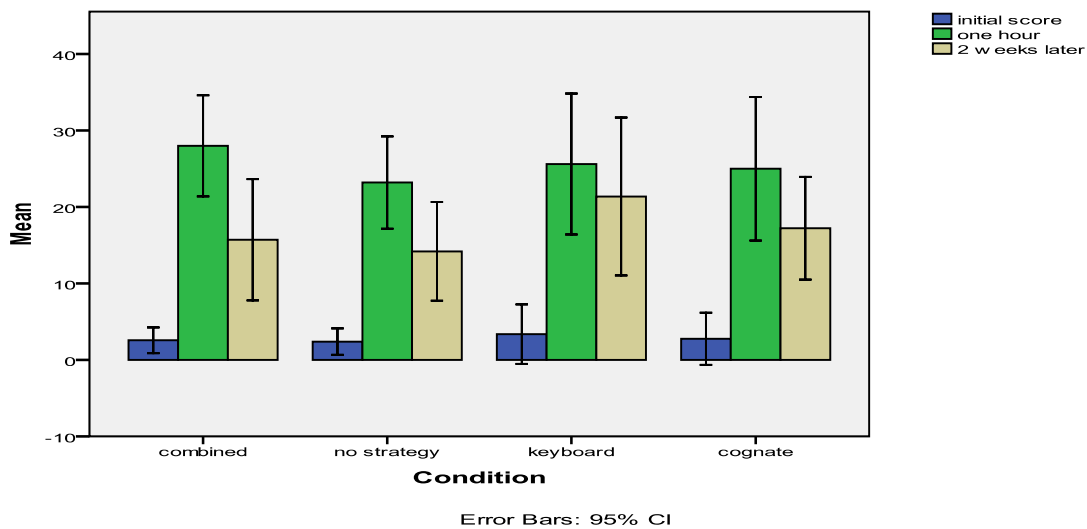


Table 3 ANOVA table for 34 ss testing the within subject effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	38755.333	1	38755.333	646.522	.000	.777
Condition	105.069	3	35.023	.584	.626	.009
testingtime	20226.763	2	10113.382	168.713	.000	.645
Condition * testingtime	314.681	6	52.447	.875	.514	.027
Error	11149.646	186	59.944			

Thus, in the entire experiment it was found that there is a significant effect of time only: All conditions improved similarly and no significant difference was found between conditions.

Discussion

This study was conducted to test the efficacy of a new method of learning foreign language vocabulary, building on a deeper understanding of language origin and commonality than previous methods. To that end we recruited non-Spanish speakers, provided them with a list of Spanish-English word equivalents, and allowed them a brief study period with instructions to learn them (no strategy), learn them using a look-alike word as intermediary (keyboard method), learn them using a cognate word as intermediary, or learn them with both look-alike and cognate words as intermediaries. While results for the keyboard method are inconsistent in the literature, the majority show that it improves relative to no-strategy, so we expected at least to replicate that finding in both the keyboard and combined strategy groups.

Despite recruiting non-Spanish speakers, some number seemed to have entered perhaps because Spanish is relatively ubiquitous in New York City with signs in the subway and bus, for example, typically in both languages. Thus, some subjects needed to be dropped from the analysis: Those who knew the words at baseline could not demonstrate learning. A second concern at baseline was an apparent (though not significant) difference in the number of words correctly guessed between groups, with the combined group being somewhat less than the other groups.

Not surprisingly, after studying all groups did better and in fact learned some Spanish words. Moreover for those subjects who returned two weeks later, many learned words were retained. No significant differences were found in learning strategy either immediately after study or two weeks later.

There are a few factors that might explain the failure to replicate significant results for the keyboard. Studies in the introduction section of the present research that showed equivocal results for the keyboard, illustrate that it is not reliably as good as was touted and should not have been seen as a “gold-standard” for this study. This is why this experiment combined the keyboard with another method in an attempt to find significant differences between conditions. Note that the keyboard method lacks the use of the Spanish equivalent with similar orthographic characteristics. Studies on the keyboard method showed that participants usually improve and become better at the keyboard method with practice over time. Something that could have helped participants in

the keyboard condition was the use of grammatically similar words. In English there is usually a Germanic and a Latin based word for many vocabulary words; one of them is usually similar to Spanish, for instance, *door* in Spanish is *puerta* which is closely related to *portal*. *Year* in Spanish is *año*, which is similar to *annual*, *hand* is *mano* similar to *manicure*, *bedroom* in Spanish is *dormitorio* similar to *dormitory*, and *living room* is *sala* similar to *salon*. Using this blend of keyboard and cognate could have helped participants in the keyboard method to retain and accurately write their Spanish equivalents. The cognate method, while building on “real” similarities between the languages actually uses a learning strategy similar to the keyboard, with an intermediary word as memory aid, and one that has some sound- or look-alike features. So perhaps it was to be expected that it would not yield a significant difference from the keyboard method.

A factor that could explain the failure of the combined method to produce significant results is time. The combined method perhaps could have shown a significant difference over a period of time; however, the strategy was taught in only one hour, and may have “bombarded” the subjects with words – in this condition they saw four words to associate, while in each of the cognate and keyboard they saw three, and in the no-strategy they saw two. Because of time restrictions the combined method then became perhaps more confusing for the participant.

In order to find significant differences between groups, future studies could teach each technique to a group of participants for a few weeks. Something that could be tried into the keyboard and combined methods is adding a graphic or drawing next to the newly learned word. This could be beneficial because it is easier to remember images than it is to remember written words. Most previous studies on the keyboard have only used the written word as a learning aid. One study (reference) used graphics, for instance when trying to link the word *letter* to *carta*, experimenters used the picture of a letter inside a shopping cart. However, graphics did not help when the drawing included more abstract objects.

Also during this longer learning period, the cognate and combined methods could be enhanced by teaching basic common patterns between Spanish and English enabling English speakers to experiment and figure out many vocabulary words in Spanish by understanding the basic cue or idea. For instance, all words ending in “ion” are similar in both languages: *communication*, in Spanish *comunicación*; *education* in Spanish

is *educación*; *alienation* in Spanish is *alienación*, etc. Also it would help English speakers to know that there are over 100 words that are homographs (words written the same) between Spanish and English i.e: aura, doctor, era, familiar, general, global, hospital, idea, similar etc. The amount of vocabulary coming from these mnemotechniques could help provide a solid foundation and understanding of the similarities with the new foreign language, thus making more accessible the overwhelming challenge of learning a foreign language.

Finally, it is assumed that the no strategy condition would only work on rote memorization. that subjects would spend time repeating the pairs and simply keeping the English and Spanish words linked together to enhance recall. If this is what was done and would be maintained with a longer study the increased time could exaggerate differences in learning between groups and make the combined method the most beneficial group.

I experienced a few difficulties during my study, in future studies I expect to address these issues more effectively. Some factor that affected the results of my study is that subjects in the no-strategy condition were told to rote memorize or just repeat. If they did not follow instructions, they could have invented their own technique or others may have looked on their own for similarities and so self-invented a keyboard or cognate method, reducing the chance of difference. Also, in order to improve my study's group assignment selection of Spanish-English word pairs and selected pairs that have cognate and keywords. Data could have been analyzed better, for instance, each word individually could have been studied to determine which words were easier to recall, also, isolating all the no-strategy words, those in the cognate and keyboard conditions and just looking at the ones that there were actually mnemonic keys too.

There are many other factors that could have influenced the results of this study; for instance, most participants spoke foreign languages other than English. Some participants were bilingual and others multilingual, speaking more than three languages, particularly participants from India and Africa. The City College of New York has students from over 130 countries where 40% of students are Spanish speakers. Perhaps performing a study with a more uniform population could have been more successful.

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Appendix A

Demographic Questionnaire

Participant # _____

Please answer the following questions:

Do you speak a Romance language (Italian, French, Portuguese) ? Y N if yes, specify _____

What second language did you study in High School? _____ for how long? _____

Have you studied a foreign language after High school? Y N is yes, specify _____ for how long? _____

Have you been exposed to any language method previously? Y N, if yes, please specify _____

Do you currently reside in a Spanish speaking neighborhood? Y N if yes, for how long? _____

What language do you speak at home? _____

Have you been exposed to Spanish in your daily life? _____

Word Recognition Test

Circle the words that you do not recognize and try to guess the Spanish equivalent of all words in English.

1. Generation _____
2. Geography _____
3. Helmet _____
4. Girl _____
5. Hemoglobin _____
6. Hydrogen _____
7. Jury _____
8. Sleep _____
9. Verb _____
10. Verify _____
11. Flag _____
12. Meeting _____
13. Tweezers _____
14. Graphic _____
15. Hit _____
16. Rooster _____
17. Calligraphy _____
18. Claw _____
19. Archive _____
20. Architect _____
21. Limb _____
22. Plank _____
23. Bell _____
24. Table _____
25. Sweet Potato _____
26. Pediatrician _____
27. Philosophy _____
28. Blowtorch _____

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29. Shame _____
 30. Beneficiary _____
 31. Dermatologist _____
 32. Letter _____
 33. Padlock _____
 34. Adverb _____
 35. Vacant _____
 36. Boat _____
 37. Fireman _____
 38. Smile _____
 39. Clothing _____
 40. Audience _____
 41. Audition _____
 42. Chlorophyll _____

Appendix B

Instructions for combined condition, keyboard and cognate method ? This isn't the pretest is it, but the study words?

You have been selected to participate in the combined keyboard and cognate condition. For every pair of words you will be provided with a hint in parenthesis. Some of the words in parenthesis indicate similar sounding words to the Spanish equivalent. For instance: Bell (Camp) Campana; Tray (Band) Bandeja; Letter (Cart) Carta.

Other words in parenthesis indicate the Latin origin of the words as well as its English equivalent: For instance: Contradict (dic, speak) Contradecir; Indication (dic, speak) Indicacion; Transfer (fer, carry) Transferir. The following is a short list similar to what you will see in the experiment:

1. Dictation (dic, speak) Dictado
2. Pipe (Tuba) Tubo
3. Genetic (gen, birth) Genetico
4. Twilight (crepes) Crepusculo
5. Genuine (gen, birth) Genuino
6. Breast (Peach) Pecho
7. Biography (bio, life) Biografia
8. Stain (Man) Mancha
9. Geometry (geo, earth) Geometria
10. Grandmother (Bull) Abuela

Instructions for keyboard condition

You have been selected to participate in the keyboard condition. The words in parenthesis indicate similar sounding words to the Spanish equivalent. For instance: Bell (Camp) Campana; Tray (Band) Bandeja; Letter (Cart) Carta.

The following is a short list similar to what you will see in the experiment:

1. Robber (Ladle) Ladron
2. Pipe (Tuba) Tubo
3. Twilight (crepes) Crepusculo
4. Stain (Man) Mancha
5. Grandmother (Bull) Abuela
6. City (Dad) Ciudad
7. Child (Chinchilla) Chiquillo
8. Forehead (Friend) Frente
9. Faked (Finger) Fingido
10. Breast (Peach) Pecho

Instructions for cognate condition

You have been selected to participate in the cognate condition, the words in parenthesis indicate the Latin origin of the words as well as its English equivalent: For instance: Contradict (dic, speak) Contradecir; Indication (dic, speak) Indicacion; Transfer (fer, carry) Transferir.

The following is a short list similar to what you will see in the experiment:

1. Predict (dic, speak) Predecir
2. Genetic(gen, birth) Genetico
3. Genius(gen, birth) Genio
4. Genuine (gen, birth) Genuino
5. Autograph (graph, write) Autografo
6. Biography (bio, life) Biografia
7. Abbreviation (brev, short) abreviacion
8. Sympathy (path, feeling) Simpatia
9. Empathy (path, feeling) Empatia
10. Geometry (geo, earth) Geometria

Instructions for no strategy condition

You have been selected to participate in this study. The following are pairs of English words and its Spanish equivalents, similar to the ones you will see in the experiment:

1. Dictation Dictado
2. Pipe Tubo
3. Genetic Genetico
4. Twilight Crepusculo
5. Genuine Genuino
6. Breast Pecho
7. Biography Biografia
8. Stain Mancha
9. Geometry Geometria
10. Grandmother Abuela

In the following chart; the combined method condition see condition A, B, C and D, the keyboard condition see columns A, B and D, the cognate condition see columns A, C and D conditions while no strategy condition see columns A and D

A	B	C	D
English	Keyword	Cognate	Spanish
1. Generation		(Gen, birth)	Generacion
2. Geography		(Geo, earth)	Geografia
3. Helmet	(Casket)		Casco
4. Girl	(Chick)		Chica
5. Hemoglobin		(Hemo blood)	Hemoglobina
6. Hydrogen		(Hydro, water)	Hidrogeno
7. Jury		(Jur, law)	Jurado
8. Sleep	(Door)		Dormir
9. Verb		(Verb, word)	Verbo
10. Verify		(Very, truth)	Verificar
11. Flag	(Bandit)		Bandera
12. Meeting	(Mitten)		Mitin
13. Tweezers	(Pins)		Pinzas
14. Graphic		(Graph, write)	Grafico
15. Hit	(Gulp)		Golpe
16. Rooster	(Gal)		Gallo
17. Calligraphy		(Graph, write)	Caligrafia
18. Claw	(Guard)		Garra
19. Archive		(Archeo, ancient)	Archivo
20. Architect		(Arch, chief)	Arquitecto
21. Limb		(Member)	Miembro
22. Plank	(Tablet)		Tablon
23. Bell	(Camp)		Campana

24. Table	(Mess)	Mesa
25. Sweet Potato	(Bat)	Batata
26. Pediatrician	(Pedi, children)	Pediatra
27. Philosophy	(Filo, love)	Filosofia
28. Blowtorch	(Soap)	Soplete
29. Shame	(Pain)	Pena
30. Beneficiary	Bene, good)	Beneficiario
31. Dermatologist	(Derma, skin)	Dermatologo
32. Letter	(Cart)	Carta
33. Padlock	(Candid)	Candado
34. Adverb	(Verb, word)	Adverbio
35. Vacant	Vacante	
36. Boat	(Bark)	Barca
37. Fireman	(Bomb)	Bombero
38. Smile	(Sunrise)	Sonrisa
39. Clothing	Rope)	Ropa
40. Audience	(Audi hear)	Audiencia
41. Audition	(Audi, hear)	Audicion
42. Chlorophyll	(Chloro, green)	Clorofila

Word Recall Test

Circle the words that you do not recognize and try to guess the Spanish equivalent of all words in English.

1. Generation _____
2. Geography _____
3. Helmet _____
4. Girl _____
5. Hemoglobin _____
6. Hydrogen _____
7. Jury _____
8. Sleep _____
9. Verb _____
10. Verify _____
11. Flag _____
12. Meeting _____
13. Tweezers _____
14. Graphic _____
15. Hit _____
16. Rooster _____
17. Calligraphy _____
18. Claw _____
19. Archive _____
20. Architect _____
21. Limb _____
22. Plank _____
23. Bell _____
24. Table _____
25. Sweet Potato _____

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26. Pediatrician _____
 27. Philosophy _____
 28. Blowtorch _____
 29. Shame _____
 30. Beneficiary _____
 31. Dermatologist _____
 32. Letter _____
 33. Padlock _____
 34. Adverb _____
 35. Vacant _____
 36. Boat _____
 37. Fireman _____
 38. Smile _____
 39. Clothing _____
 40. Audience _____
 41. Audition _____
 42. Chlorophyll _____