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Original Paper

English Education Method Influence Mechanism Analysis

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Abstract

Upon mastering novel words in a second language (L2), students' initial vocabulary expressions and associations may not be accurate. When studying these new words, these concepts should be more precise to stay clear of errors. This study looked into whether words that are similar could aid in learning and sharpening skills. 114 adults were given comparable spelling and semantic L2 terms through comparison in certain targeted learning tasks. Participants compared words from their second language in Test 1, and terms from their first language in Test 2. Only comparisons of L2 characters written in a similar manner can help their absorption. Our conclusion is that comparing undefined characteristics can act as a learning mechanism that guides people in acquiring relevant terminology knowledge. Therefore, it allows students to build more precise concepts to facilitate learning. The possibility of further research and its possible effects on second language teaching were talked about.

Keywords

Foreign language learning, Lexical specificity, Vocabulary instruction, Contrasting Similarity

1. Introduction

Projects for learning a second language are similar in that they can be beneficial to students but also confusing and prone to errors. Therefore, determining the circumstances is essential for enhancing instructional strategies and instructor supervision. We tackled this problem in a multivariate study where participants analyzed words with similar forms and meanings while learning a new language lexicon, in an effort to gain a better understanding of the cognitive mechanisms underlying similarity effects.

New representations are inserted into dictionaries and their relationships with existing representations are reconstructed during the process of learning one's home tongue and foreign languages. These words have grown more exact and varied as a result of the expressing process and their relationships with one another. Because exposure to similar initiatives strengthens the boundaries between them, similarity has always been a guiding principle. It's interesting to note that terms that could both harm and enhance learning results have commonalities, nonetheless, it's uncertain when these words appeared. In order to explain this question and to find out whether the tasks contribute to the standardization of new forms of presentation and improvement of learning, we will examine how the similarity of word and semantic forms between mother tongue and second language affects the learning methods used. Now that the foundation for our research has been established, let us discuss the nature of psychological vocabulary, the significance of task planning, and the similarity effects that are shown during the learning process.

1.1 The Conceptual Vocabulary of L2 and Native Speakers

1.1.1 Qualities of the Mental Vocabulary

Because it includes information on both spoken and written word forms (pronunciation and spelling) as well as the meanings (concepts) connected to these forms, the psychological vocabulary is adaptable. Similarity promotes the connection between similar words and concepts and similar brain activation models. The dictionary furthermore interacts, since the word can trigger the expected words along with other words that have a similar form or meaning when used during comprehension and production. Co-activation can lead to mistakes in the learning process, but it can also be helpful in the treatment.

1.1.2 Adding L2 Words to the Mental Lexicon

Words in previously unknown languages need to be committed to memory in multilingual education. Literature shows that the new word has been included in a comprehensive multilingual dictionary covering all meanings and representations in formats L1 and L2. Additionally, research shows that while imparting the new L2 term, the form is immediately added to the meaning, such as the low frequency word L1. Accordingly, knowing two languages is a conceptual medium. At first, the representation of a shape L2 may not be clear and easily accessible because of the weak connection between shape and meaning. Thus, there is proof that form and meaning are crucial early on in the multilingual learning process.

Learning can concentrate more on production or understanding, form or meaning. For example, the subject's direction can affect their relative focus; it can go from shape or value L1 to L2 (production direction) or from form L2 to shape or value L1 (acceptance direction). As a result, there are distinct priorities and procedures involved in two-way learning: defining the L2 form is crucial in the production direction, and attaching L2 elements to the appropriate values is crucial in the acceptance direction.

1.2 How Similarity Affects L2 Learning

Contrary to popular belief, resemblance in another language does not always result in learning confusion or errors. We know very little about the significance of linguistic similarity in the learning process, despite the abundance of research on the effects of similarity between languages on learning and the relationship between the recognition and emergence of similarity between languages and concept words. However, it is evident that high performance in learning outcomes is significantly influenced by similarity.

1.2.1 Representational Specificity is Influenced by Similarity

The caliber of terminology expression depends partly on the specificity of structure and significance. Therefore, the pertinent query is: how to refine the presentations during the learning process. The standardization process is predicated on commonality, which is one response.

Drawing from the research on L1 words and the theory of vocabulary adaptation, the explanation of the vocabulary rearrangement has become stronger over time, allowing students to distinguish words further as the vocabulary evolves. While there may be enough roughly split views to identify items in a few dictionaries, the more words you type into the dictionary, the higher the likelihood that these words resemble other words. To avoid confusion, differences between words should become clearer over time. There is also a similar mechanism for learning bilingual words. For example, when learning the word "cat" English students studying another language can concentrate on the word's initial letter and understand that hairy quadrupeds are words that have the letters "a" and "c" in them. However, when the word "car" comes into the dictionary in a similar form, they ought to be aware that the initial letter distinguishes a word from its counterpart. Similarly, at the beginning, students may not know that an L2 shaped cat refers to animals, but once they know that an L2 shaped dog has a similar meaning, the connection to the meaning becomes more accurate. In short, when you get a similar word L2 shape, the L2 shape should be more accurate. When studying semantically similar words L2, the connection between the shape L2 and the meaning should be more precise.

It is important that the similarity of form and meaning often leads to errors only when the expression and relationship of new words are not completely clear. Once these things become established, students no longer get confused by the similarities after the name is recognized.

1.2.2 Similarity Effects during L2 Learning

Among the viewpoints on learning is that poor presentations can lead to confusion of similar words when teaching production directions (for example, if a car is shown in CAT or FAR format, learning may be more difficult). Regarding learning direction, learning semantically comparable words might become confusing due to a weak connection between L2 form and meaning (for example, if students also learn about dogs, it may be more difficult for them to remember that cats are cats).

When studying several similar words simultaneously, their original "global" representations can be very similar, this may interfere with learning and result in subpar academic achievement. Therefore, a few investigators warn of one word research to prevent confusion.

There are different opinions about learning a second language in the series. Some studies have shown that semantically similar words are harder to learn together and thus harder to remember. However, additional research has demonstrated that certain semantically related traits might influence how well students learn. The researcher found that general categories are more difficult to learn (such as fruit types), conversely, terms that are related (more likely to appear simultaneously, like gaga and frog) are simpler to learn. Although exposure size has not been reported, this suggests that semantic similarity may impair and promote learning. The results are similar to the term access which has been observed in similar production effects in models. Visual similarities between the terms described in the phrases could be the cause of the semantic faults. This research showed that semantically but visually unrelated words learn more easily than unrelated terms (distortion 0.15-0.25).

The function of bilingual form similarity in the learning process is not well understood. The researchers described the problem of "synonyms" or similar forms of L2 words (such as "magazine" and "magazines") as a student problem. According to a recent analysis of learning errors in study, form similarity creates confusion, which results in errors. On the contrary, researchers have found that learning a second language can better represent similar formulations. In two distinct learning settings, participants were instructed to acquire phony words. In the first scenario, participants pick up related terms and expressions (puzzles, for example). In the second scenario, words appear more accurate after learning under similar conditions, while dictionary presentations are more similar under different conditions (albeit without effect). However, since this study solely addresses textual research—combining a word with a translation is not covered in this study—we must point out that it only indirectly addresses our query. This study's mention of correctness only relates to the extent of morphological memory assessed in language decision-making tasks. This shows how the combined learning of similar words affects the specificity of representation, but it does not fully reflect the results of learning in obtaining formal meanings. If the study includes this and uses memory tasks (word translation) as learning indicators, learning outcomes may vary. In fact, the decision-making tasks of the visual vocabulary are similar to identification tasks and may be too simple to allow students to gain more precise characteristics, meaning that the potential benefits of learning productivity are still possible.

To put it briefly, it is still uncertain whether formal and semantic similarities help or impede language acquisition of foreign terms. A common problem in word similarity research is that word lists can vary according to circumstances, which means that certain characteristics of words can affect results. Ideally, research designed by people can help them learn the same words in all circumstances. When studying the role of different similarities in the learning process, this must be taken into account.

1.3 Encouraging Similarity-based Learning: Contrasting

Different methods are used to teach words in a foreign language during the learning process, such as word lists or image names. The requirements for these jobs vary; for instance, word lists concentrate on converting L2 forms to L1, whereas image titles concentrate on meaning. Whether particular tasks influence the significance of similarity in the learning process is an open subject. When language becomes more precise, certain tasks can speed up learning and, if necessary, define similar words by encouraging you to distinguish similar words from each other. These challenges, which we call opposing challenges, possess varying consequences on learning.

Professional terminology training is one instance of the difficulties associated with learning a language, requiring students to carefully analyze elements thought to have comparable motivations. Special vocabulary training was initially used to train Japanese students in English for difficult-to-understand phonetic contrasts such as "R" and "L". Like the study of sensory learning, recent language studies have shown that students with a focus on unique vocabulary knowledge increase perception between voices and refine their performance.

Research has also demonstrated that phonetic comparison enhances vocabulary quality and comparison tasks can increase vocabulary learning in second languages. According to previous research outcome, specialized language training is one of the requirements for the learning task. Students saw a four-word test where two of them were sometimes the smallest pair (one word had different pronunciation, as in the maze in Metz). When they hear a word, they have to choose the right answer. Learning a word by comparing words with similar pronunciation can achieve better learning outcomes than active control (binary measurement), especially for people with less English vocabulary (sensitivity to the effect from 0.39 to 0.75 is obvious). The author believes that these students' language performance is not very accurate, so they benefit the most from comparing languages.

Therefore, attaching course-related information throughout the learning process and closely comparing similar alternative solutions seems to improve learning efficiency. Now let's consider some hypotheses about situations where learning is more useful.

1.3.1 Three Theories Concerning Opposing

The first scenario is that it can bring general learning benefits. Based on general knowledge, several studies were conducted using several selection tests, some of which manipulated the effectiveness of the reaction system. Additionally, it was discovered that comparing response plans that were equally reasonable would essentially result in better academic achievement. Students who ask multiple choice questions should remember why the wrong choice is wrong, and this is less obvious when the choice is more reasonable because the choice of the answer is not important. This requires that they pay attention to unique information that is useful for memory. Additionally, this alteration results in "complete difficulty". Therefore, regardless of the comparison dimension, our first assumption is that more comparable or similar words can indicate an ideal complex form that generally improves learning efficiency.

However, according to our learning perspective set out in point 1.2.2, this comparative task has quite different effects and is more or less challenging. In terms of production, ambiguity in spelling can complicate similar spellings, while if the spellings are significantly different, semantic representations can be distinguished. In terms of acceptance direction, words with similar spellings can be distinguished in meanings with clarity, but words with weaker connections between L2 form and meaning can be confusing when comparing semantically identical words. Thus, an alternative hypothesis posits that the efficacy of comparison is contingent upon the learning direction.

Research has shown that perceptual learning can be specialized to help with learning, particularly when it comes to unfamiliar or ambiguous symbols. When people compare visual stimuli with sensory stimuli, they are better able to perceive minor changes in visual stimuli. It is crucial to remember that a task in one dimension might enhance the distinctiveness of two parts that you have learned to distinguish. It makes sense to extend this perspective to the study of words in another language, assuming that students need to focus only on unique vocabulary knowledge and carefully compare similar words in unknown or undefined dimensions. This increases the differences in their views and refines their statements. This is consistent with the findings of other researchers. Thirdly, we assume that the effectiveness of learning can only be proven by comparing new similar L2 forms.

1.4 The Ongoing Research

In this work, we examine the relationship between similarity (e.g., spelling or semantics) and learning direction (acceptability or performance) in relation to the efficacy of close comparison of similar variations. In particular, we have developed many selective learning tasks that allow students to learn the semantics and spelling of words in another language. Half of the participants believed that similar words would interfere with several responses. To make the best decision, these participants must carefully weigh the pros and cons of many possibilities. The other 50% thinks that various disturbances are variations in the reaction, so they do not compare them. We need to use a hybrid system to ensure that the words learned under different circumstances are the same, thereby eliminating the effect of lists as explanations in group comparisons. Therefore, multiple choice questions are a simple way to incorporate mechanisms into the learning process. It has also proven to be a good method for learning a second language, including testing effectiveness and finding useful memory data for learning. The advantage of the multi-choice model is two-way test learning. The target word is found in L1 for production, and L2 is where the interference and proper response must be compared (Test 1). Likewise, in Test 2.

The table below summarizes these two trials.

2. Productive Direction (L1 to L2) in Experiment 1

2.1 Approach

2.1.1 Subjects

Driver data (n=24) was evaluated using a SIMR software based on Monte Carlo simulation in order to establish the proper sample size for the investigation. The most significant effect (inclination) was between 0.26 and 0.75. The power needed to identify the study's most important interaction plans was conservatively determined to be 0.13 (comparison of similarity, similarity and inequality) and showed that 80% of the power required 56 participants. We tested 58 participants. Recruitment takes place through the recruitment system of Ningfenbao University, and the sole need for selection is that they shouldn't struggle with reading. Subjects will receive loans or gift cards.

Before the analysis, we removed hard-to-reach data from at least two criteria: they reported using more than 50% of the words in their own learning strategy (see process below), which contradicts our protocol. Skills for identification testing of FNAL learning modules and/or real-time translation; Bilingual/highly qualified French-speaking staff may lead to incorrect forms and semantic connections (albeit improbable; see to section 2.1.3.2). As a result, two players were eliminated. We additionally checked the Z points of the remaining individuals in all sections of the test (learning phase, memory, and identification tests) to make sure that our results weren't affected by excessive variances. The individuals who have an indicator Z that differs from the mean by more than 2.5 will not be included in the analysis that follows. This demonstrates that our data is normal. Data analyzed from 56 participants (44 women, Mage=23.3).

Table 1. An overview of the theories. Empty cells indicate that no effect is anticipated, whereas crosses indicate whether an advantage is anticipated.

Hypothesis	L1 →L2		L2→L1	
	Orthography	Semantics	Orthography	Semantics
Contrasting is a desirable difficulty	+	+	+	+
Contrasting depends on learning direction	+			+
Contrasting works only for under specified representations	+			

2.1.2 General Model

This study included a learning phase followed two weeks later by a repeated night test as memory tests. We also measured a number of potential co-exposure promoters (Refer to section 2.1.4.2).

2.1.2 Training Phase

In the learning phase, there are multiple question options. To select one before receiving feedback, participants should see the target term together with three possible translations (i.e., answer options). The word list is categorized based on similarity criteria into three distinct groups: spelling words (os, n=25) and semantic words (os, n=25). As a cross-topic condition, the list is organized or modified in two ways: either sorting or separating words that share the same spelling and semantic meaning for the purpose of comparison, or not sorting them for comparison (further details are provided in Section 2.1.3.3). The condition labeled FD does not involve similarity, hence it remains consistent across both scenarios and serves as a baseline. This experimental design implies that one group of participants received the words 'os', 'ss', and 'fd', and were tasked with comparing them, while another group studied the identical set of words without the requirement to compare them.

2.1.2.2 After testing

The night test includes a memory translation test and an identification test, which are tested again a week later in the memory test.

Participants in the memory test were instructed to input the accurate translation for each word they had learned in L1, which was presented to them at random.

The identification test shows whether the translation is correct in an arbitrary sequence and requires participants to specify the accuracy of the translation. One third (27) of 75 tests were correct. The wrong combination is to combine the word with another problem with the word studied (e.g. drilling hole). These pairs are balanced, so incorrect translations of the operating system and SS often have one of the following guiding features: inequality, contrast (8), inequality, lack of contrast (9) to ensure a balance between experience and complexity of circumstances.

2.1.3 Stimuli

2.1.3.1 Dutch vocabulary

In Dutch, names with four to six identically sized and dense letters in various groupings and circumstances are translated as such. Dutch library subtly search frequency. These terms fall into general groups (like kinds of insects) under SS circumstances.

2.1.3.2 Pseudowords

We use pseudonyms to better control the similarity of spelling and ensure that information does not exist. Wucky software creates pseudo speech that does not cause speech problems for students, which is freely separated from French speech restrictions. The only rule is that their singing style allows them to speak French. High school students have limited opportunities to learn French, and ensuring that pseudo words do not contain unknown combinations of letters makes the task unnecessarily difficult. Most words differ from French names and can be pronounced in Dutch. The fact that they were manufactured, but in French, was not disclosed to the participants. All words range in length from four to five letters, reflecting the various groups' lengths and conditions.

In the operating system, select a word that corresponds to the maximum distance of Levenstein 2.

To avoid the results based on unusual words, such as words that are difficult to learn, we looked at the Z points in all parts of the experiment. Deleting words with an average deviation greater than 2.5 deviations from the mean would be excluded. This shows that every word in our vocabulary list is used for analysis; there are no deviations.

2.1.3.3 Composition of word lists

There are 25 words in each similarity condition (OS, SS), thus 50 words must be learned in all. Each group consists of FVE words that can be combined with six individual threes, one target word and two disturbances (except for the target, choose two of the four disturbances, which means that the number of options is 4!/2! (4-2)!. Every word in the list appears six times as an object and twelve times as a distraction during the learning process, which translates to one appearance for each trilogy.

Now, for the purpose of clarity, we refer to this process as "sorting", while 'distraction' means the absence of a benchmark. In sorting terms, each word group FVE contains words with the same spelling or semantic meaning. Thus, each of the three responses consists of three similar responses that encourage participants to make comparisons. In combined circumstances, you can create new FVE phrases using the words in the sorting criteria. Make sure that each three consists of different answers. Therefore, participants learn the same words under sorting and mixing conditions to avoid confusion in words or lists. In all circumstances, each group contains words that differ from other groups, so there is no similarity between the conditions.

Under classification and deletion conditions, 25 words differ under FD conditions, resulting in a completely different trilogy. We continue to group words in FVE so that each participant views the identical trilogy.

2.1.4 Measures

2.1.4.1 Measures from the posttest and learning phase

Accuracy and binary functions (right/wrong) were tested during the workout period. We also measured the time required to respond to surveys in milliseconds, although this is not an important part of the analysis. Memory tests measure accuracy with binary and continuous methods. In testing, we did binary precision measurements.

2.1.4.2 Extra actions

We added memory capacity as a standard in our design because it is important in other languages. More word recall is anticipated from participants with strong working language memory compared to those with weak working language memory. We assess speech memory using currently available reading width tasks.

Furthermore, we tested the compression management of side tasks. The secondary task measures the participants' ability to ignore irrelevant information in the study. Participants in this exercise will see an arrow with two fan-shaped, competing arrows on either side. It is your job to choose the direction shown by the middle arrow, avoiding the sector arrows. It should be emphasized that in half of the studies, the fan-shaped arrow points in the same direction as the middle arrow, whereas in the other half, it does not. Measure attenuation by calculating the reaction time difference (in milliseconds) between inconsistent and continuous experiments and show how difficult it is to prevent data from accessing working memory by deleting non-target data. Therefore, people with more power can better ignore irrelevant incentives and focus only on their own goals. In second language acquisition, those with strong inhibitory control are more likely to block non-task language (e.g. L1 when acquiring L2 vocabulary). We think that blocking control in another language is particularly important for our work, in addition to its importance in other languages. We assume that individuals who receive higher scores in horizontal assignments are less effective in our assignments because they may choose not to ignore the confusion, especially in comparison assignments that demand people to weigh all available options and not ignore it.

Given that the majority of these pseudonyms are based on French, one of the exclusion criteria was that participants answer a questionnaire about their linguistic background and level of French proficiency. All known languages, with the exception of Dutch, are required by the questionnaire to give special attention to French.

2.1.5 Procedure

The University of Nymphenburg's Ethics Committee gave its approval to this study (ECSS 2014-2411-276). The experiment was carried out in a soundproofed room at the Donders Cognitive Center and was scheduled at Expirement. There are two distinct phases to the entire experiment. The language training questionnaire was completed by the participants in the first class, and then came the training session and night exams.

There are six units in the learning phase, and each one appears once. There are 75 businesses in each block, or 450 businesses total. In every test, there is a single Dutch word with three potential faux translations shown vertically.

It was requested of the participants to carefully compare the translations and use the buttons to select the accurate translation. We also explicitly told them not to gauge the success of their jobs using their own methods. Specifically, we hope that our strategy will 'mask' the impact of comparisons. By marking the target word with green and translating it correctly and marking the distracting word with red, give 4-second feedback. Therefore, whether the response is right or wrong, the same feedback is given. If they do not respond within five seconds, they will give their opinion and proceed to the next test. Participants were asked to avoid unanswered investigations. Participants can prevent overspending on their own learning tactics (such conscious associations) by establishing time limitations. Prior to beginning, participants go through a brief training unit where the researcher verifies whether or not they finished the task accurately and if it was necessary. There is now more information available. During the training phase, the experimenter remains in the room to make sure that participants follow the protocol. Participants can pause the meeting briefly and receive progress updates in between each group meeting. Participants were asked to report whether they had utilized any of their own methods, which ones they had used, and how many words they had used after finishing all of the courses. Typically, the learning phase lasts for sixty minutes.

Following the training period, participants receive a short disturbance task (simple arithmetic) and then an evening test. The night test will take about 15 minutes. The first test lasts for about ninety minutes in total.

The participants again passed two tests (in the same order) in the second phase. They then completed the breadth and side task carried out in Expirint, and the second session lasted a total of about 30 minutes.

2.1.6 Data analysis

The LME4 data package in R and a linear generalized regression model of mixed effects with logical coupling function were used in the data analysis of the baseline state. The specifications of these models enjoy great freedom; We continue Meteyard and Davies's (2020) work. They suggest choosing the fixed and random model parameters in accordance with the experimental setup and research question. In order to prevent overuse, only related interactions are added to the model. The mean is the focus of sideline and quantity stimuli data, which are scaled using the Z-score normalization and added as control variables to all models.

Random word and theme abbreviations can be found in all models. There was no random bias included, because in theory there is no reason to believe that bias varies between objects, so random bias would create unnecessary complex models.

All models defined a contrast between similar variables. In particular, we use Hermett's comparison method to compare spelling and semantic words; and compare similar words (spelling+semantics) with completely different words. This will enable us to assess the effectiveness of similarity metrics and observe how sorting affects two related dimensions.

2.1.6.1 Generalized linear mixed effects regression model in the learning phase

Data accuracy is a measure of learning outcomes (binary: right/wrong). Sorting (sorting/appearance), similarity (spelling/semantics/integer difference), and block (continuity) are the additional independent variables introduced to the original model. We only include blocks to review work to ensure participants learn when working on the learning task. The data on the first block was significantly impacted by conjecture, so we excluded it. Specific interactions are sorted on the basis of consistent occurrence between the blocks. Two related interactions of the result were produced by the Hermett comparison we used: one sorting the data by spelling and semantics, and the other by similarity and inequality. It is possible to ascertain from the first comparison whether metrics—that is, words with comparable writing and semantic meaning—are necessary to establish whether the order is valid. See hypothesis 2 and 3. A second comparison can be used to determine whether the order has a common effect (i.e. similar and unequal words, see hypothesis 1).

2.1.6.2 Regression models with linear mixed effects were generalized by posttests

I'm examining the results of the ID and memory tests. In both models the results are accurate(binary: accurate or inaccurate). Sorting is one of the independent variables that were introduced to the initial model (sorting/appearance), similarity (spelling/semantics/completely different) and time (snapshot/recording). These interactions are classified by testing time, similarity, contrast, spelling and semantics, similarity and difference.

2.2 Outcomes

2.2.1 Statistical descriptions

Table 2 displays the mean inhibition control values, phonological memory levels and French skill levels for each sorting criterion. In order to ascertain whether variations in the variables' sorting criteria could have an impact on the outcomes, we conducted an odd Wilcoxon test (because data are not distributed under normal conditions). Verbal memory did not differ according to these assessments, but there was a significant difference between inhibition control group ($w=1084000$, $p<0.001$) and French knowledge classification group 1 ($w=11778750$, $p<1.001$). We also looked for any correlation between the sideline readings and the unverified data. The test shows that this is not the case, the correlation coefficient is -0.04 and $p = 0.74$.

Following the training, participants chose on average 80.2% of the correct answers (SD=41.1%), which is 61 out of 75 words. The experimental results are presented in Table 3.

Participants were able to appropriately identify the translation's accuracy in memory tests conducted one week after the training. After learning, they can accurately pronounce one-third of the words, but it takes about a week for leadership to take effect. The average horizontal distance between incorrectly created words under similar conditions and between correctly written words after learning was 2.66 and 3.35 weeks. In different situations, after one week of learning, the average distance between wrong words and correct spelling is 2.57 Levenstein, and after a week it is 3.17 Levenstein.

Table 2. Average scores for verbal working memory, inhibitory control, and French knowledge under various sorting settings. The verbal working memory scores, which indicate the percentage of correct trials throughout the reading span, are based on the raw scores; the inhibitory control scores are based on the raw scores, measured in milliseconds; and the French knowledge scores are the average of the participants' reading, writing, speaking, and listening skills on a scale from 0 (no knowledge) to 10 (native proficiency). The standard deviations are shown in parenthesis.

	Inhibitory control	Verbal working memory	French knowledge
Sorted	142(68)	0.65 (0.12)	3.12(2.19)
Shuffled	98(59)	0.66(0.08)	1.82(2.10)

Table 3. The raw performance scores from the posttests, expressed as a percentage of right answers and as an approximation of the number of words. Standard deviation values are indicated via brackets.

	Immediate	Retention	Average
Recognition	85.9(38.6)	73.9(45.7)	77.3(40.8)
	~65	~58	~55
Recall	34.5(48.2)	7.8 (28.7)	19.4(38.3)
	~26	~7	~20

2.2.2 Phase of Learning

2.2.2.1 Main factors

Table 4 provides a brief explanation of the mixed effects regression model. First, we document the main factors followed by the interaction between investment and similarity, which is most relevant to our hypothesis. Except for the block effect, all major effects are calculated according to the blocks.

Table 4. The summary of the learning data generalized linear mixed-effects model, together with estimates, z-values, standard errors (SE), and significance level. Values in bold are important. Non-significant and orthography are denoted by N.s. and Ortho.

	Est/Beta	SE	Z	P
Intercept	-0.70	0.12	-5.88	<.004
Ortho vs. Semantics	0.22	0.11	2.12	<.08
Similar vs. Dissimilar	0.08	0.09	1.15	N.s.
Sorting	-0.15	0.15	-0.73	N.s.
Block	0.56	0.08	40.21	<.002
Flanker	0.11	0.09	2.07	<.04
Reading span	0.38	0.10	5.31	<.002
Sorting* Ortho vs. Semantics	-0.08	0.10	-0.08	N.s.

Sorting * Similar vs. Dissimilar Random Effects	0.12	0.11	2.51	<.006
			S.D.	
Word (Intercept)			0.47	
Subject (Intercept)			0.44	
Model fit R2			Marginal	Conditional
			0.20	0.28

Model equation: accuracy ~ similarity*sorting + block + rescaled_fanker + rescaled_reading_span + (1|subject) + (1|word).

Analysis of the exercise data shows that locking has a significant baseline effect, indicating an improvement in the accuracy of the subjects during the test period. We also observed similar significant effects. In particular, words with similar spelling ($M_{prop-cor}$=0.62, SD=0.51) are significantly smaller than words with similar semantic meaning.

Most significantly, and in line with our prediction, we also discovered a substantial interaction between similarity and placement. Specifically, it was discovered that there was no difference in the learning accuracy of distinct words, but that the learning accuracy of comparable words in the mixing mode ($M_{prop-cor}$=0.63, SD=0.45) was higher than in the sorting mode ($M_{prop-cor}$=0.60, SD=1.45). Put differently, examining synonyms during learning can have a detrimental effect on precision.

2.2.2.2 Extra actions

The study reveals that participants with less inhibitor control learn more accurately than those with higher inhibitor control. Furthermore, those who have a stronger speech memory study more intently.

2.2.3 Posttests

2.2.3.1 Test of recall

The post-memory evaluation revealed a strong time effect: word memory points were nearly zero and words learned right away performed better than words learned a week later ($M_{prop-cor}$=0.33, SD=0.47).

There is also a clear interaction between rank and similarity in relation to the variables of interest in our hypothesis: words with the same writing method are more accurate compared ($M_{prop-cor}$=0.20, SD=0.40), while words with the same semantics are not accurate. There is another important interaction between sorting and similar and unequal words. Especially in mixed conditions, similar words are not remembered, as well as different words in shuffled conditions; In sorting conditions, similar words are stored in sorting conditions just like different words. By observing the first interaction, it can be concluded that this effect is due to better memory storage for writing similar words under sorting conditions. Table 5 summarizes the memory test findings.

To write related terms, we also investigated whether participants' error kinds rely on sorting, especially if they are more accurate in sorting conditions than in mixed conditions. For example, the answer "BION" not "NION" means more accurate representation than "ADET". For this purpose, the distance between the Lewinstein reaction (no correction and no reaction) and the target was calculated. We did

Wilcoxon tests in two examples (because data is not distributed under normal conditions) to determine whether, in sorting settings as opposed to mixed situations, participants' responses were more in line with the aim. The results of this test show that the error response under sorting conditions (M=2.64, SD=1.23) is, in fact, more in line with the objective than the reaction in shell damping circumstances (M=1.82, SD=2.26), W=1.25604, $p<0.05$. We also look at if there are terms in this context that have comparable semantic meanings and words that have distinct meanings in order to verify the specificity of this effect. With these two words the situation is different, w=159060, p=50,w=160066,p=92.

Table 5. Standard errors (SE), z-scores, estimates, and significance level for the generalized linear mixed-effects model applied to the recall data. Values in bold are significant. Non-significant = N.S.; Orthography = Ortho.

Fixed Effects				
	Est/Beta	SE	Z	P
Intercept	-1.12	0.25	-4.70	<.002
Ortho vs. Semantics	-0.05	0.16	-0.16	N.S.
Similar vs. Dissimilar	0.09	0.11	1.43	N.S.
Sorting	0.11	0.28	0.38	N.s.
Time	-2.45	0.14	-20.93	<.005
Flanker	0.20	0.18	1.39	N.S.
Reading span	0.61	0.16	3.87	<.007
Sorting* Ortho vs. Semantics	-0.25	0.12	-3.41	<.005
Sorting * Similar vs. Dissimilar	-0.15	0.16	-2.16	<.07
Sorting* time	0.15	0.21	0.75	N.S.
Random Effects				
			S.D.	
Word (Intercept)			0.91	
Subject (Intercept)			1.05	
Model fit				
R2			Marginal	Conditional
			0.35	0.45

Model equation: accuracy~similarity*sorting + time*sorting + rescaled_reading_span + rescaled_fanker + (1|subject) + (1|word).

2.2.3.2 Recognition test

According to the expected results, the effect of time was greatest when one does a word search as soon as they learn ($M_{prop\text{-}cor}$=0.84, DP=0.37) was better than word search after a week ($M_{prop\text{-}cor}$=0.73, DP=1.45). Take note of that after one week, the percentage of retention is still much higher than the probability. Furthermore, the analysis revealed the main effects of similarity. In particular, words with similar spelling ($M_{prop\text{-}cor}$=0.74, SD=0.44) are stored less than words with similar semantic meaning ($M_{prop\text{-}cor}$=0.79, SD=1.47), and corresponding words are stored less than irregular words.For the variables related to our hypothesis, sorting does not interact with each other.

Table 6. Standard errors (SE), z-scores, estimates, and significance level for the generalized linear mixed-effects model applied to the recognition data. Values in bold are important. Non-significant and Orthography are denoted by N.S. and Ortho.

Fixed Effects				
	Est/Beta	SE	Z	P
Intercept	1.74	0.13	14.58	<.002
Ortho vs. Semantics	0.30	0.11	2.88	<.004
Similar vs. Dissimilar	0.15	0.08	2.66	<.06
Sorting	-0.07	0.12	-0.31	N.S.
Time	-0.69	0.12	-9.48	<.002
Flanker	0.13	0.06	1.67	N.S.
Reading span	0.28	0.15	5.03	<.002
Sorting * Ortho vs. Semantics	-0.15	0.13	-1.72	N.S.
Sorting* Similar vs. Dissimilar	-0.05	0.13	-0.51	N.S.
Sorting* time	0.14	0.09	0.89	N.S.
Random Effects				
			S.D.	
Word (Intercept)			0.51	
Subject (Intercept)			0.52	
Model fit				
R2			Marginal	Conditional
			0.08	0.21

Model equation: accuracy~similarity*sorting+time*sorting+rescaled_reading_span+rescaled_fanker+(1|subject)+(1|word).

2.2.3.3 Extra actions

The majority of the variations in the memory test were explained by phonological working memory, and individuals with higher phonological working memory also did better on the obituary test. Additionally, there is a positive link between the accuracy of post-recognition tests and speech working memory. The control of the blockage is unaffected by the next two checks.

2.3 Discussion

Experiment 1's findings indicate that learning should benefit from comparable words. Especially spelling similar words helps to remember them better at night. No differences were observed between conditions, suggesting a successful comparison. The comparison only exists in memory testing. This demonstrates that there are only specific goals that may be met by using the proportional rewards of learning.

In relation to extra assessments, we discovered that those with less inhibitory control outperformed others in the learning task, perhaps because they did not account for their expected reaction to disruptions. In addition, throughout the entire experiment, there was a positive association found between learning and phonological working memory.

While the second and third hypotheses do not allow us to draw any clear conclusions just yet, these findings refute our initial hypothesis, which held that comparison would be the perfect challenge to support learning in every learning domain. While choosing similar words for many tasks can provide advantages for general learning. If "difficulty" is described as "similarity", we anticipate it to be effective in both spelling and semantics, but it is not. Alternatively, we can assume that the conditions of the orthogonal order are relatively complex in this direction. In fact, this is the sole instance in which participants' original character sets were insufficient to discern words, such as spelling or semantic differences. If the sorting criteria are actually more challenging, in this scenario, players should slow down as a reflection of the longer processing time brought on by difficulties, but this is not the case. Naturally, this does not always imply that there are no further difficulties in this situation, but similarity is a general requirement of the definition.

A warning is that semantically similar words can only be identified when participants already (partially) know the form of the word. Comparable benefits can therefore only arise at later stages and cannot be exploited by our research project. However, since each block contains translations of all words and each word is detected several times (as object and distraction), participants may notice this similarity in the early stages of the experiment.

The findings of experiment 1 allow us to rule out the hypothesis that the comparison is complete and complex. Experiment 2 compares the direction of the receiver to determine whether the comparison depending on the learning's trajectory or if it's beneficial for learning in just vaguely defined aspects. The difficulties that cannot be overcome are intolerable.

3. Receptive Direction (L2 to L1) in Experiment 2

3.1 Approach

3.1.1 Individuals Involved

Similar to experiment 1, model-based performance analysis was used to determine the number of participants. This indicates that in order to detect a 0.13 tilt in the relevant interaction with 80% power, 40 participants are required. We used the same exclusion criteria as in exam 1 to measure 60 participants. A subsequent examination of the data from 60 participants (44 women, mage=22.4) eliminated two persons. The rewards for recruitment and participation in Experience 1 are the same.

3.1.2 General design

Its structure is the same as Experiment 1, but the difference is that its implementation direction is opposite, meaning the answer to many variants is in Dutch. Use the same type of night test as Test 1. However, it is unforgettable that the test subjects had to enter a Dutch translation instead of a pseudonym. This ensures that the test matches your learning direction.

3.1.3 Stimuli

3.1.3.1 Dutch vocabulary

The Dutch terms used in Test 1 are SS and FD. Still, Dutch words under OS conditions have now been chosen because of the similarity of spelling (semantic differences). We use CLEARPOND to identify sufficiently similar words. The standards of similarity, frequency and length are the same as in Test 1.

3.1.3.2 False terms

The incorrect terms from exam 1 are the same as SS and FD. However, because there are similar words in Dutch, the word "os" is different. In the operating system, the spelling of falsified words is distinct from other words. The other rhythm ratios and lengths are the same as in test 1. The criteria for word deletion is the same as in Test 1.

3.1.3.3 Composition of word lists

The list was created by shuffling the same cards as in Experiment 1.

3.1.4 Measures, procedure, data analysis

Use the same measurement method as Test 1. This process is similar to experiment 1. Every erroneous object is found six times in this direction (once each block). The procedure used for Experiment 1 was followed for the model specification, exercise model, and night test model.

3.2 Outcomes

3.2.1 Statistical descriptions

Table 7 demonstrates the suppression control value, speech memory level and French proficiency for each sorting criterion. In order to ascertain whether variations in the variables' classification conditions could have an impact on the outcomes, we conducted the Wilcoxon test without a pair analysis (because data are not distributed in normal mode). No differences were observed in French in these tests, but significant differences were observed between the inhibition control group ($w=1129500$, $p<0.001$) and phonological memory group ($w=1.17$ million, $p<1.001$). Since our model contains the last variable, these differences do not affect our outcomes. Since there is no difference between the groups and French skills are not the primary variable of interest, French skills are not included in the model. The relationship between Frank's test results and the measuring range has been verified once more. According to the test results, there was no discernible association between the two; $p=0.79$ and the correlation coefficient was 0.04.

Participants successfully chose 79.4% of the words at the conclusion of the last hour (standard deviation = 40.4%). That is 60 of the 75 actual words.

In the post-certification test, participants had the opportunity to determine the accuracy or inaccuracy of the translation in a memory test within one week of the completion of the training. Less than one third of words were performed correctly in memory tests, compared to more than two thirds. The total energy of the following tests is shown in Table 8.

3.2.2 Phase of learning

3.2.2.1 Main variables

A summary of the analysis is given in Table 9. Analysis of the exercise data shows that the inhibition effect is significant and the improvement in accuracy indicates that students have learned.

With respect to the factors associated with our hypothesis, we discovered a marginally significant interaction between similarity and placement. In particular, the participants studied different words ($M_{pop\text{-}cor}$=0.66, SD=0.48) closer than comparable terms ($M_{pop\text{-}cor}$=0.61, SD=1.47), but the Shuffling condition had no effect.

Table 7. Mean scores for verbal working memory, inhibitory control, and French knowledge across sorting situations. The verbal working memory scores, which indicate the percentage of correct trials throughout the reading span, are based on the raw scores; the inhibitory control scores are based on the raw scores, measured in milliseconds; and the French knowledge scores are the average of the participants' reading, writing, speaking, and listening skills on a scale from 0 (no knowledge) to 10 (native proficiency). The standard deviations are shown in parenthesis.

	Inhibitory control	Verbal working memory	French knowledge
Sorted	105(70)	0.71 (0.15)	3.18(2.21)
Shuffled	125(72)	0.70(0.12)	2.58(2.31)

Table 8. Raw performance results from the posttests, together with the approximate number of words and the percentage of right answers. Standard deviation values are indicated in brackets.

	Immediate	Retention	Average
Recognition	85.5(36.8)	73.5(45.6)	77.6(42.9)
	~66	~56	~57
Recall	41.6(50.2)	16.8% (38.1)	29.5% (46.3)
	~30	~13	~20

Table 9. The summary of the learning data generalized linear mixed-effects model, along with estimates, significance level, z values, and standard errors (SE). Values in bold are significant. Non-significant = N.s. ; ortho = orthography.

	Est/Beta	SE	Z	P
Intercept	-0.66	0.10	-5.66	<.002
Ortho vs. Semantics	0.08	0.09	0.78	N.S.
Similar vs. Dissimilar	0.07	0.05	1.05	N.s.
Sorting	-0.10	0.11	-1.02	N.s.
Block	0.39	0.05	38.15	<.002
Flanker	-1.06	0.13	-2.45	<.06
Reading Span	-0.05	0.10	-0.44	N.S.
Sorting*Ortho vs. Semantics	-0.04	0.05	-0.29	N.s.
Sorting*Similar vs. Dissimilar Random Effects	0.06	0.03	2.09	<.04
			S.D.	
Word (Intercept)			0.36	
Subject (Intercept)			0.47	
Model fit R2			Marginal 0.09	Conditional 0.21

Model equation: accuracy~similarity*sorting + block + rescaled_reading_span + rescaled_fanker + (1|subject) + (1|word).

3.2.2.2 Additional measures

We found that patients with higher inhibition control as measured by lateral testing learned better than those with lower inhibition control (Figure 14). From the perspective of reading volume, oral working memory does not affect.

3.2.3 Follow-up Examinations

3.2.3.1 Test of recall

The post-memory test shown that the most important effect of the test period was that words born immediately after learning ($M_{prop\text{-}cor}$=0.41, SD=0.49) were more precise than those created a week later ($M_{prop\text{-}cor}$=0.16, SD=1.37). The results are presented in Table 10.

3.2.3.2 Test of recognition

The identification test's analysis reveals that time is the sole factor that significantly influences learning, with words taught right away ($M_{prop\text{-}cor}$=0.84, SD=0.37) doing better than words taught a week later. Table 11 presents the findings. Consequently, the two reception rates' control exhibits neither a sorting effect nor a resemblance.

3.2.3.3 Extra actions

Participants with greater inhibition control produced more correct words than those with weaker inhibition control in a post-memory test based on side test data. This effect was not found in the tests. The reading width of these two types of night tests does not affect speech working memory.

3.3 Discussion

Experiment 2 shows that comparing the receiving directions (L2-L1) does not interfere with or facilitate the recording of the word L2. While comparing words that are similar in L1 (Dutch) may reduce learning accuracy, terms stored in Nachtest are unaffected.

Table 10. The overview of the recall data generalized linear mixed-effects model, along with estimates, z-scores, standard errors (SE), and significance level. Values in bold are significant. Non-significant = N.s.; Orthography =Orthography.

	Est/Beta	SE	Z	P
Intercept	-0.58	0.12	-5.78	<.002
Ortho vs. Semantics	0.06	0.08	0.88	N.S.
Similar vs. Dissimilar	0.04	0.05	1.04	N.s.
Sorting	-0.10	0.16	-0.97	N.s.
Block	0.37	0.02	38.04	<.002
Flanker	-1.21	0.08	-2.27	<.06
Reading Span	-0.04	0.08	-0.39	N.S.
Sorting*Ortho vs. Semantics	-0.02	0.05	-0.37	N.s.
Sorting*Similar vs. Dissimilar Random Effects	0.06	0.03	2.20	<.06
			S.D.	
Word (Intercept)			0.38	
Subject (Intercept)			0.45	
Model fit R2			Marginal	Conditional
			0.09	0.15

Model equationn: accuracy~similarity*sorting+time*sorting+rescaled_reading_ span+rescaled_fanker + (1|subject) + (1|word).

Table 11. Standard errors (SE), z-scores, estimates, and significance level for the generalized linear mixed-effects model applied to the recognition data. Values in bold are significant. Non-significant = N.s.; Ortho = Orthography.

	Est/Beta	SE	Z	P
Intercept	1.76	0.10	15.40	<.002
Ortho vs. Semantics	-0.05	0.08	-0.44	N.s.
Similar vs. Dissimilar	0.07	0.06	1.39	N.s.
Sorting	-0.12	0.17	-0.48	N.5.

Time	-0.66	0.10	-9.39	<.002
Flanker	-0.15	0.11	-2.07	N.S.
Reading Span	-0.10	0.12	-1.25	N.S.
Sorting* Ortho vs. Semantics	-0.07	0.12	-1.08	N.s.
Sorting* Similar vs. Dissimilar	-0.12	0.13	-0.17	N.S.
Sorting* time	0.09	0.13	0.95	N.s.
Random Effects				
			S.D.	
Word (Intercept)			0.41	
Subject (Intercept)			0.45	
Model fit				
R2			Marginal	Conditional
			0.06	0.15

Model equation: accuracy ~ similarity*sorting + time*sorting + rescaled_reading_span + rescaled_fanker + (1|subject) + (1|word).

Experiment 2 shows that verbal working memory does not affect learning, suggesting limited cognitive strain and limited demand for working memory. Compared to experiment 1, higher inhibition control in this experiment yielded better results after learning and memory tests. Careful comparison of the different response options does not benefit from training related to specific tasks. On the contrary, there is a "traditional" inhibitory control effect in which the participants who best suppress L1 learn this effect better.

The findings of experiment 2 support hypothesis 1 by showing that comparing words that are similar is not a perfect universal challenge, and show that measuring excellent learning through comparison does not depend on learning directions that are opposite to hypothesis 2. According to this assumption, comparing L2 words written in a similar way in a productive sense should promote learning. For example, knowing that Nion differs from Mion requires a very precise orthogonal representation. From the point of view of acceptance, we only hope that semantically similar words have a relative advantage, as students should offer bilingual forms with more precise meanings. For instance, understanding that Mion signifies ant rather than wasp calls for a more exact link form and meaning than understanding that it is not a belt. Experiment 2 did not support the second part of the prediction, even though the data supported the first portion of the hypothesis.

A plausible rationale for this outcome could be that the learning of our task is based on vocabulary rather than concepts, which means that the semantic effect is minimal. From this vantage point, students prefer to utilize form to separate words rather than compare ones that are semantically similar, but this is not totally consistent with our knowledge for two reasons. First of all, if the teaching is done entirely with the help of vocabulary, we also hope that the word L1 will be compared with similar spellings in Nachtest, but we have not seen it. Secondly, comparing semantically similar words during the learning process, including Experiment 1, can impair accuracy. This result shows that students can learn semantics during the learning process. However, it is interesting that words that look like letters actually weaken the accuracy of the learning process. Since words don't affect learning, why? We assume that regardless of the sorting criteria, during the learning process, our task design causes disruptions due to similarities. Semantically comparable terms do not improve learning results under sorting settings, although we did find in experiment 1 that they are not very accurate in the learning process. By writing comparable Dutch terms, we intend to disrupt the form and attract people's attention in Experiment 2. That's why our tasks are always disruptive, but comparison only affects learning outcomes when clearer performance is needed. Comparing the word L1 to similar spellings requires no sharp data (known form L1), so no effect was observed in Nachtest. Although our research may show the relative importance of second language forms in beginner learning, this is consistent with Talamas et al., which may be a unique feature of our task design, as vocabulary-based second language learning cannot explain possible comparison mechanisms. Conversely, the findings support the third hypothesis, which states that the comparative yield is less than the specified dimension. During the general debate, we looked in more detail at the results and possible mechanisms.

4. General Discussion

This study looked into the potential benefits of similar word comparisons in various selective learning tasks for both reception rate (L2-L1, test 2) and production direction (L1-L2, test 1) in second language acquisition. Our goal is to determine which languages and tasks are necessary to support learning, as well as if comparison is a universal learning mechanism that also applies to picking up new vocabularies in a foreign language. To the best of our knowledge, this is the first investigation of the relationship between word similarity and the design of bilingual word acquisition problems. We propose three hypotheses: (1) Learning global comparative advantage as it is a generally necessary challenge; (2) The change according to the direction of learning；(3) Applying only to statements that are not explicitly mentioned.

In conclusion, tests 1 and 2 only support the third hypothesis. A more specific dimension (such as semantics or L1 format) is not good, perhaps because there is nothing to improve. On the contrary, in Experiment 1, comparison only promoted research into the spelling of similar words, and we found that after comparison they had better memory in memory tests. After a week these effects were maintained, which was significant for learning problems related to L2-type wording.

These outcomes align with earlier research on second languages that have shown that the comparison of difficult and blurred speech has a stimulating effect. Our findings extend these concepts on the assumption that orthogonal dimensions can also be compared. This is an important observation because although spelling expressions are not fully defined, the difference between them and phonetic expressions is that they are always visually accurate (in the same writing system). Our findings imply that although inaccurate measurements are required for comparison, they can be unpredictable.

Therefore, our research shows that comparison is more useful in second language learning, but also that comparison can become a more universal learning mechanism that can be extended to more fields and measurements.

4.1 The Underlying Mechanisms of Learning

4.1.1 Building Models Rather than Relationships

Based on the result model, the comparison shows only an improvement in L2 spelling. We assume that the comparison focuses mainly on the development of representations and not on relations between representations. In fact, L2 spelling is the only problematic presentation that needs editing: L2 spelling is new to students, while L1 form and concept are known. Meanwhile, new connections are created in all circumstances (acceptability, performance, spelling and semantics). Since these effects are more prone to L2 spelling than generic words, unspecified developments seem to be the key to opposing effects.

This corresponds to the effects of language education mentioned above and the broader implications of category learning, discrimination, and observation. Recent studies have shown that comparable items especially pictograms have improved memory without connections compared to more diverse objects. This could imply that the reverse results is also produced when comparing L2 phrases unrelated to L1 or related terms. Further study is required to correlate this viewpoint with developmental characteristics and ascertain long-term learning outcomes in order to bolster it.

4.1.2 Accuracy of the Depictions

Our findings demonstrate that following the training, individuals were able to construct more accurate formulations for terms with which they were unfamiliar. The comparison shows that the difference between students' partial performance and Lewinstein's correct response is relatively small. Focusing selectively on relevant information (i.e. similarity of words), code this information for a more accurate presentation and "strengthen" the standardization process. These clearer concepts improve the quality of presentations and facilitate learning.

This comparative advantage was only observed in post-memory tests, indicating that more accurate cognition does not always help to overcome the signs of memory roughness. Simpler tasks, such as testing, do not necessarily need to compare the accuracy achieved and it is also useless. The researcher investigated the impact of L1 density on L2 word research and discovered comparable outcomes. They found that in recall problems, high L1 neighborhood density has an advantage over L2 words, but in forced selection tests, two variants do not have an advantage. Their explanation for this result is that the correct generation of L2 characters requires high formal accuracy, while the identification task is still very accurate for undefined forms that match the results.

While it is unclear in what circumstances students use this accuracy, the results may indicate that students prefer to use a global vision based on assignment requirements rather than an accurate vision.

4.1.3 Selective Focus on Pertinent Lexical Data

A significant increase in specificity may be due to selective attention to certain dimensions (in this case, special differences in letters). Our findings align with the focused attention hypothesis in perceptual learning, indicating that selective concentration in one dimension can affect the observation conditions of two similar stimuli. The outcomes of dictionary learning and research on new language categories can also be explained by these models.

Based on these models, our task is to draw participants' attention to relevant terminology in order to highlight significant differences between words. Finding the accurate translation of Nachtest proved to be more challenging for those who engaged in silent learning because they failed to carefully consider the minute distinctions between these words. In addition, recent language studies support this view as they have found that taking into account relevant differences helps to form language contrast with cryptographic difficulties. The study of Van de Ven et al. (2018) suggests that these models serve as a foundation for both larger learning of new concepts and illustrative learning, which may include similar mechanisms.

In experiment 2, L1 words were found to be more similar and less accurate in the learning process than disproportionate words. However, this did not weaken the accuracy of the post hoc tests, which demonstrates that word similarity is also taken into consideration. This makes the learning process challenging and consistent with research, according to which learning similar words in a group can cause difficulties for learners, but comparing and coding these similarities is meaningless, as measurements have already been fully confirmed.

4.2 Limitations

This study focuses on the similarity of spelling forms. Given that learning a word requires both spelling and pronunciation, we can also indirectly measure the impact of language. Some researchers recently suggested that clear voice expression during the learning process can help develop more accurate writing methods for learning new words. We found that false words have a low phonetic and spelling distribution and provide relatively clear phonetic information. Based on previous knowledge about vocabulary learning, the speech seems to increase the effectiveness of contrast, which may affect our results, but more validation is needed.

In addition, our carefully controlled research clearly shows that this comparison promotes second language learning and provides an opportunity to explore its working environment beyond artificial similarity, pseudo-synonymous strategies of human systems and limited autonomous learning. Replicating our experiences in a more natural environment would be useful, where students learn existing languages and vocabulary that are not very similar. The authors demonstrated the opposite effects when they did this in classrooms with students learning English as a second language. Future studies will therefore be able to examine the impact of longitudinal alterations in authentic learning settings.

4.3 Future Research Directions

Subsequent investigations ought to consider the degree to which comparisons serve as essential learning tools and expand upon them to encompass diverse domains, assignments, and age cohorts. Specifically, it might be presumed that comparisons revealing the presence of undefinable performances aid in the learning of new ideas (e.g. when purchasing L1). The linked concern is how our work comparison might help young students whose mother tongue is uncertain and who have trouble expressing themselves semantically.

Future research can also address concerns using different measurement methods. For instance, employing strategies like eye tracking can improve comprehension of specific elements of the mechanism (e.g., the frequency with which students identify distractions, the amount of time they devote to examining particular word segments). In addition, EEG research has the potential to monitor and reflect attention-related events, aiding in the investigation of this possible mechanism's time process.

Ultimately, it's fascinating to note how this effect changes based on how many and how similar the alternative solutions are, as too many or too few can cause cognitive overload and impede learning. It would be useful to examine this issue on the basis of a gradual comparison of objectives. These questions are particularly useful for learning. For example, in these tasks, the probability of disturbances may initially be different, then gradually "expand" and become increasingly similar or the primer may be smaller and then gradually more words. Therefore, attention can gradually shift to appropriate information that inspires. This will assist in identifying the most appropriate reference framework for training implementation as well.

4.4 Consequences for the Profession

The findings of our study have significant ramifications for instructional strategies. In fact, the study of these words has become a long-standing question. As a result, for at least L2 words that are written identically, this comparison may provide an answer. The comparison in our study revealed an average learning advantage of 7% or 34.7% of all words recorded. It is of great benefit to learning to calculate the total number of letters that students need to master relatively.

In addition, the multi-choice problem is easy to implement a format that is valuable to dictionary developers. By combining similarity dimensions with learning computer languages, several selected problems can be classified and optimized based on similarity.

Based on this comparative task, the results show that it is important to pay attention to how comparable words differ from one another; this can also be done qualitatively. By utilizing preexisting language that is commonly categorized based on similarities, educators can create assignments that lessen the likelihood of misunderstandings, since these effects apply only to unspecified sentences. For example, teachers can select words with similar spelling so students can highlight similarities and differences in color.

5. Conclusion

This study looked into how learning a second language is impacted by closely comparing the spelling and semantic similarity of terms. Comparing L2 terms with similar spellings facilitates these words learning more effectively and lends credence to the theory that learning might be facilitated by comparing L2 words with ambiguous dimensions. The comparison focuses on the main differences between similar words and codes them in more detail to facilitate learning. Although this mechanism has been proposed for speech measurement, to the best of our knowledge, the extension of these learning mechanisms to orthographic measurement has not been studied previously. This demonstrates that the comparison takes into account general learning mechanisms that are applicable to various domains. In a broader sense, our research results highlight the importance of considering the effect of similarity on learning when planning learning tasks.

To put it briefly, our research provides a novel approach to comparing bilingual word studies and opens up a variety of research avenues, including (a) investigating potential comparative mechanisms in various learning domains; (b) creating fresh comparative models to address learning process similarities; and (c) putting these approaches into practice and testing them in various learning environments.

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