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Whether Different Languages Can Have Different Impacts on the Learning of Different Subjects?

Kanyi Chen[1,a,*]

[1]*Guangzhou College of Commerce, Guangzhou, 510002, China*
a. m18702090618@163.com
**corresponding author*

Abstract: In recent years, there has been an increasing amount of research on second language acquisition, basically looking at the benefits of second language learning and how it can be done better. However, it is not clear whether the language can strengthen some areas of the brain, thus leading to the learning of some subjects in the region where the local language is learned being more advantageous or even easier to learn than in other regions. For example, mathematical ability in Asia, artistic ability in Europe, and the ability to distinguish snow colors in Skimmers. Therefore, this study will use a case study method to investigate whether the effects of bilingualism (dialect) or different languages on the brain and learning can have the same reinforcement as natural learners. The case study reveals the effect of language on the learning of some subjects, such as teaching in Chinese, which makes it easier for students to understand math vocabulary, and the possibility of learning a language to strengthen other subjects, which means that it is possible to intervene at a certain age to strengthen the learning ability.

Keywords: Brain, Psychology, Psycholinguistics, Linguistics, Bilinguals Learning

1. Introduction

There are at least 6000 languages in the world, including nine major language families: the Indo European language family, the Sino Tibetan language family, the Altaic language family, the Semitic language family, the Daropian language family, the Caucasian language family, the Ural language family, the South Asian language family and the South Island language family. Different language families also develop different language trees in different regions and cultures, and different countries that use different languages also have different famous and powerful disciplines. For example, in China, under the Sino Tibetan language family, mathematics is more famous than other disciplines and is the most dominant in other disciplines. Compared with Indo European language family, Europe, America and India are respectively in art, Psychology, electronics and IT are more famous and powerful. Other language families may also, to some extent, help learners gain the advantage of a certain discipline or even strengthen it. Although this article is mainly aimed at mainstream languages such as Chinese and English, it will review the impact of different languages on the subject and explore whether the acquisition of a second language can increase part of the ability to achieve learning enhancement. It will analyze and put forward assumptions on these two issues, and it will also hope that the future can obtain other external reinforcement besides speech.

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2. Literature Review

In the past research on the relationship between language and mathematics, it can be found that Chinglish vocabulary is often considered clearer than English, and also the fixed compound words of Chinese seem to be well suited to depict mathematical concepts as the Chinese vocabulary will be more comprehensible than the English vocabulary [1]. The reason for this is that English vocabulary is mixed with vocabulary learners from other countries and cannot be fully understood, Because the ancient languages of the European Indian language family, Greek and Roman, also have no internal meaning of any syllable in some mathematical academic languages [2]. In addition, language plays a key role in learning and education. At the same time, language is also a cognitive tool, especially in shaping the mathematical learning and thinking of the brain. Because each language describes numbers in a different way, for example, China uses 10 as the base number. For example, 1, 10, 11, and 99 are combined according to the combination of 0-9, not French and English. French describes numbers according to the combination of numbers. For example, 71 is soixante et onze, that is, 60 plus 11. English is read by changing the number words, such as four and four. Therefore, other languages are not as easy to understand directly as Chinese. Previous studies have pointed out that language differences can affect students' scores in a certain subject. Miller, Smith, Zhu and Zhang all believed that Chinese can help the acquisition of counting [3].

In some studies, it also shows that when people read in different languages, there will be different triggers. In 43 fMRI and PET scans, the active regions of the brain when reading English, French, Italian, German, Danish, Chinese, and Japanese characters have been studied [4-5]. The researchers found some areas that can only be used when reading certain orthography. For example, the fusiform gyrus of the right brain is activated only when reading Chinese. This means that when reading Chinese, the fusiform gyrus on both sides of the brain will be used, but when reading the orthography of alphabetic characters, only the left half, that is, the visual morphology area, will be used. Researchers believe that this area, which is only used when reading Chinese, can relate the meaning, pronunciation and appearance of Chinese characters, and also represents that different languages will make the brain have different reactions to operate.

At the same time, many studies on second language acquisition have also shown that depending on language can affect human cognition. For example, the famous Eskimo study on snow [6]. For ordinary people, snow is only snow white or white, but for Eskimo people, snow has more than one color, and can even distinguish colors in detail. So if ordinary learners learn Newt, can they also distinguish colors? If so, does this mean that language can affect cognition, which will affect our learning? This is also the problem direction of this study.

3. Case Analysis

The case for this reference is an experiment conducted by Han, Y.and Ginsburg, H. P. to ensure that the level of the subjects is to meet the good requirements and to ensure the feasibility of the experiment [7]. This design can analyze the relationship between language clarity, test scores and math scores. The reason for choosing this case is that the experimental object used in this experiment is Chinese and English, as well as the impact of bilingualism on mathematics, which can be a good reference to whether language has an impact on the subject.

3.1. Participants

Eighty-two 8th grade Chinese students (46 males and 36 females) from mainland China were selected for this study, and the participants also shared eight 8th grade classes in a New York junior high school, where the classes were taught by two English-only math teachers and one Chinese-English dual math teacher.

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At the same time, the sample also selected three homogeneous language groups, 33 new immigrants in the Chinese group, monolinguals, Chinese speakers, and Chinese Americans (21 boys and 12 girls). The sample students are basically taught in Chinese, and the original score in the Chinese reading test is 42.2, which is a good score. The average original score of CAT is 32.7.

In the English group, there were 20 participants (7 boys and 13 girls), all of whom were Asian Americans who only knew English and had no ability to read and communicate in Chinese. This sample is from the same academic subject group, and the teachers teach in English. The average original level of English reading is 54.9, and the average original score of CAT is 31.5.

The students in the bilingual group are 29 students (7 boys and 22 girls) who are fluent in Chinese and English. Their teachers are bilingual and single English teachers. These students all spoke Chinese at home, and stayed in the United States for an average of 52 months. Their English and Chinese levels were lower than the other two groups' average original scores of 32.6 and 35.6, respectively, and their CAT was 31.7.

3.2. Procedure

Participants will be divided into small groups, and it will be explained to participants that this math test does not affect school grades, that it is not a citywide math test, and that their final scores will not be seen by any school employees. Each test will last between 35 and 45 minutes, and participants will be given the test questions in groups according to the language in which they begin, and that those who complete the test will not have access to those who do not. Selected Contacts.

3.3. Mathematics Test

This test consists of 33 items, each of which involves a different key math word as well as words that are frequently used or appear in the classroom. The test includes definitions, calculations, and representations, as well as topics.

- Identify the following geometric figures by filling in the blanks. Figure __is an equilateral triangle.
- Calculate the circumference of Figure A.
- The diameter of the circle in Figure B is ____.
- Write the following sentences in mathematical notation: Five to the fourth power.
- In the following numbers, 2, 3, 4, 5, 7, 10, 11, which are prime numbers?
- Round off 37.58 to the tenth.

Each question involves a math problem, and a correct answer is worth 1 point, so the final grade range is 0 to 33 points.

4. Results

In this study, it was found that, in addition to language, other variables had a stronger influence, such as the student's level of education, and the type of education. The study found that the longer the students studied outside the United States, the higher their scores, while the longer they studied inside the United States, the lower their scores. This result may indicate an advantage of Asian education, which may be stronger for math than American education, but it may also be due to the linguistic clarity hypothesis, which states that the stronger the Chinese language proficiency, the better the student understands the meaning of math equations and the higher the numerical clarity and sensitivity to numbers, resulting in higher scores on math tests.

This case also shows that Chinese mathematical terms are more transparent than English mathematical terms in concept. The main reason is that Chinese terms have compound words to

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present the picture of geometric objects (like "eight sided figure" for "octagon"). Although English terms also have compound words, as I mentioned earlier, most of them are ancient languages with Greek and Latin words, As a result, English users are difficult to understand or cannot understand in depth, which leads to the fact that English users cannot share or even agree with each other in terms of word clarity, which leads to disputes. Chinese is easier to share clarity and more simple, so being easy to understand may also be one of the reasons why Chinese communities are more united, while English communities tend to be individualistic.

In the present study, it was also found that Chinese and bilingual speakers outperformed English speakers in math, and that math scores were also associated with higher levels of Chinese reading proficiency. Students with higher reading levels in Chinese were found to have a higher level of clarity, gained from comprehension of mathematical terms in Chinese, and found that math proficiency was almost independent of the English language.

5. Discussion

From this case study, we can find that language does have an effect on subject matter ability, and the results of the case are in line with the hypothesis that the improvement of their math ability is due to the sharing of the clarity of Chinese language for math and the easier understanding of the meaning of its description. Moreover, the samples in this case also show that learning Chinese is also related to the improvement of math scores. From the comparison between the bilingual group and the English group, we can clearly see that learning a second language has the ability to improve their abilities because the bilingual group lives in an English-speaking environment and also uses a Chinese-speaking environment (although they only use it at home), but it can be seen that although they don't have the same high scores as the Chinese group, their scores are better than those of the English group, so it is important for them to learn a different language to improve their abilities in different subjects. Therefore, the hypothesis of learning different languages as a way to improve different abilities is much more likely.

At the same time, we can also see that language has a great influence on our cognition, and it is also possible to shape certain abilities, because the brain itself is moldable. However, depending on the fact that this kind of second language acquisition does not occur at a later stage, it is possible that the bilingual group is not able to gain much benefit from the long time of the Chinese language environment, or it is possible that the brain plasticity is higher in early childhood and young adulthood, which leads to a change in the benefit as the benefit of the second language acquisition decreases with the increase of the age . Whether the benefits of language acquisition are not realized if the learners cannot use the language at the same level as the Chinese speakers, whether the benefits are reduced due to the fact that second language acquisition is hindered by the cognition of other languages, or whether the lack of clarity is due to the fact that the English mathematical terminology is an archaic terminology from the ancient languages of Greek and Latin, will need to be further investigated in the future [8].

Also for other subjects such as IT and the arts, it is an advantage for Europe and the US because the IT industry itself uses systems that run on English logic and language and other countries need to interpret and transform the language. People in Europe and the US do not have the translation process, therefore more resources can be used to deal with other processes or to generate new ideas, and the same goes for maths because there may not be much of a connection resulting in a lack of clarity. India's first language is almost English, so it can also benefit from it, leading to the explosive development of the AI industry. Any region that has been colonized by English has found that everything based on technology and procedures will develop better than the development that has not been colonized. The reason is that the bilingual development like the bilingual group benefits from it. In addition, if the clarity caused by language can solve many problems of understanding and

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improving the analytical degree, then whether the future world can explore which language of each subject can bring the best clarity and change the terms and concepts of the subject to the expression of the language, so as to improve the education level and ability in all aspects of the world. At the same time, it can also make the world more peaceful because of the improvement in clarity.

6. Conclusion

Different languages have a certain impact on different disciplines. The reason is that the clarity of language for different terms and even understanding is high or low, depending on whether it can be shared, and as a second language, it will also have a certain improvement. Its guess is that the reading ability of the language is positively related. Due to the limitations of this paper, it is impossible to test whether other languages can have the same effect. At the same time, there are many other questions about the number of reading abilities and the improvement of the language. We hope that we can continue to study this issue in the future. It is hoped that this can help to find out whether the instruction of different languages can affect other aspects such as operation and movement to a certain extent in addition to clarity and learning, and whether there is any possibility of its efficiency and improvement.

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