



# Research on the Effects of Plurality on Minds

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**Abstract.** According to the study by Fausey et al., language patterns can reflect one facet of cultural diversity across numerous countries. His group's research focuses on the impact of language in molding individuals' attentiveness to and recollection of words and phrases that are attributed to a particular meaning. In line with this thought, the proposed study aims to uncover the effects of the utilization of plural and singular grammar among Mandarin and English speakers. The study provides answers to this inquiry by having bilingual participants do a series of tasks to demonstrate the effects of their native language on memory and culture. The study aims to test whether some languages mark plurality in their quantifiers more than others, particularly English vs. Mandarin. The study also wants to determine if the usage of plurality or singularity in a language affects an individual's memory and culture.

**Keywords:** Linguistic Relativity · Plurality and Singularity · Memory

## 1 Introduction

### 1.1 Background

Languages focus our attention and intellect on specific aspects of the environment rather than restricting our ability to observe or think about it [1]. The notion of spatial and temporal ideologies between languages is an excellent example investigated by people who study linguistic relativism [1]. Gentner and Boroditsky has conducted research and has discovered that English speakers see time horizontally. On the other hand, Mandarin speakers are more inclined to view time vertically [2].

This is also true when comparing how the English and Mandarin languages use grammatically valid quantifiers when referring to plural and singular items. When it comes to sentence formulation, Whorf claims that English speakers evaluate a variety of subjects. The Mandarin language, on the other hand, does not always equate numbers with a plurality [3]. According to language relativism studies, frequent speech rhythms alter how individuals consider quantitative markers [4].

Mandarin grammar and syntax are surprisingly comparable to English at their most basic level. Many simple Mandarin sentences provide a subject-verb or subject-verb-object form, like English. However, because Mandarin nouns as well as other elements

of speech are not usually indicated for numbers, plural forms are often interchangeable with single forms [2]. In this regard, one can say that distinct countries have different viewpoints on counting and numerology, which can be traced to variances in how one interprets plural and singular notions in the language [5].

The proposal examines how English influences people's mindsets and thinking, including memory. It also demonstrates how it compares to Mandarin speakers. The study involves observing how the use of their native language, in terms of quantifiers, affects the mental process of English-speaking communities and Mandarin-speaking communities. This is accomplished through an examination of the use of numbers or subject positions in identifying singular and plural contexts through the construction of sentences or vocal interactions. We hypothesize that due to linguistic differences, English speakers are more likely to notice and remember singular and plural differences than Mandarin speakers.

## 1.2 Theoretical Implications

A great deal of literature on structural linguistics has focused on the search for influences of different languages on cognition. This is in context as to when language is not utilized, either overtly or implicitly. This continues a long tradition of linguists attempting to link a language's grammatical and semantic systems to the worldview and culture of the language's speakers [1]. The two interrelated themes of it and how communication impacts the intellect refer to the meditative idea's origins. Since cognitive and vocabulary are so strongly tied, it's natural to assume they're intimately intertwined.

According to Slobin, the idea that speech regulates consciousness through one or even more respects, particularly when paired with the premise of structural linguistics, continues to divide people, and it periodically provokes wide critiques labeling the undertaking grossly inadequate [1]. The proposed study is linked to the setting of this proposal. It is possible to compare how English and Mandarin speakers use the plural and singular markers in sentences. The study can also address the question of whether using these quantifiers affects a person's style of thinking, especially in terms of memory or even their experiences with native culture and traditions.

## 2 Proposed Study

The proposed research investigates whether some languages emphasize plurality more than others in their quantifiers and whether the use of plurality or singularity in a language impacts an individual's memory and culture. This is accomplished by priming Mandarin and English speakers with singular and plural sentences. Images are shown to participants, and they will observe each. Following a series of brief questions, they would have to describe what they had seen. The Mandarin and English responses can be compared by supplying the answers. This could lead to the identification of cognitive differences between Mandarin and English speakers.

The study would have to get 24 volunteers who are bilingual, specifically, those who are fluent in both English and Mandarin. They would be randomly grouped into 14 participants each, creating 2 separate groups. The first task is an examination with

a time limit. These exams would be a test in English and Mandarin proficiency, with English for the first group and Mandarin for the second. Afterward, the participants will then be shown pictures and they would have to describe the image using proper sentence construction in English (for Group A) and Mandarin (for Group B). Results will then be compiled by the experimenter and drafted into similarities and differences. In this way, the study can compare the two languages that have been studied hereafter.

### 3 Method

#### 3.1 Participants

There will be 24 participants participating in this study, with no specific age, sex, or educational background. All participants are all bilinguals fluent in English and Chinese (people who learned the two languages in early childhood). The participants are selected at random from bilinguals in Hong Kong and the United States. They will then be randomly divided into 2 groups (group A and B), with 12 participants each. Group A would be tested in all English, and group B would be tested in all Mandarin. This minimizes cultural influence on the study because the bilinguals from different backgrounds are randomly selected and split.

#### 3.2 Material

This experiment will include 3 materials: one riddle examination, images with object(s), and a small questionnaire.

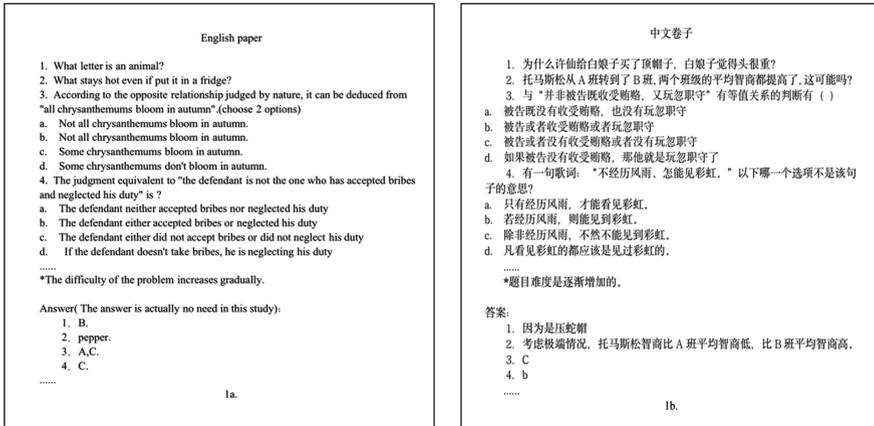
The examination paper includes a English version and a Mandarin version (Fig. 1). The two versions would not be direct translation of one another, but different riddles that are common and colloquial for each of the two languages. The riddles are word based and require thorough thinking of each sentence. This acts as a distracting factor to guide participants to think in a certain language.

The questionnaire is composed of simple questions that asks for a short description for the location and plurality of the object. The questionnaires (Fig. 2) are directly translated.

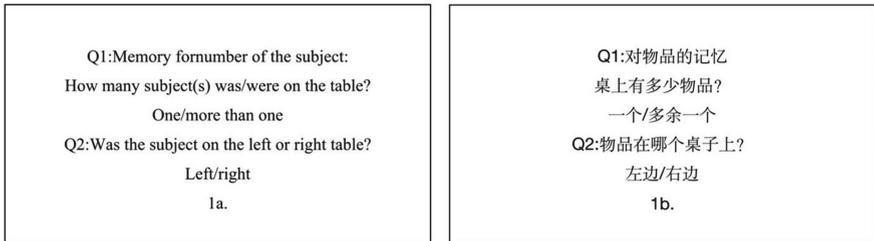
Images used in this study contain 8 everyday objects with different representations. The different orientations are the number and location of the object(s). The 8 images each show a distinct object, half showing one/single object and half showing more than one/plural objects. Each of these halves have 2 images showing object(s) placed on the right. This means the 8 combinations include: 2 left plural, 2 right plural, 2 left single, and 2 right single. For example, Fig. 3 shows a left single combination for a ball, a right plural combination of cups, and a right single combination of an apple. The order of displaying the images to the participants is random.

#### 3.3 Protocol

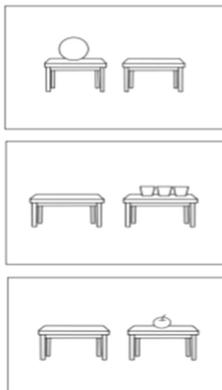
First, the participants are going to complete a distraction task. The 2 groups of participants would work on the riddle examination with a limited time of 20 min. This is not enough



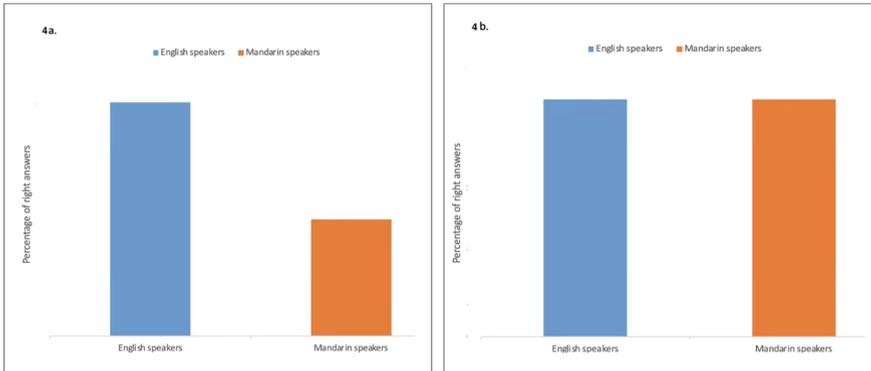
**Fig. 1.** Riddle examination. 1a. (Left): English version of riddles consisting of 4 questions. 1b. (Right): Mandarin version of riddles consisting of 4 questions.



**Fig. 2.** Questionnaires regarding the number and location of object(s). 1a. (Left): English version of questionnaire. 1b. (Right): Mandarin version of questionnaire.



**Fig. 3.** 3 examples of images used in the study.



**Fig. 4.** Predictions of the study. 4a. (Left): Predictions that follow Hypothesis 1. 4b. (Right): Predictions that follow hypothesis 2.

for them to finish all the riddles. The time limitation aims to make participants focus on the paper and think they are being tested on their intelligence and critical thinking. Second, participants will complete an image task.

We will follow the protocols from [6], except for different objects and the material used. The experimenter will show participants different images, and the participants are asked to describe the images aloud to the experimenter. All the conversations between experimenter and participants should be done in English for Group A, and in Mandarin for Group B.

The participants can observe each image for around 30 s at most. Third, a questionnaire consisting of 8 questions will be handed to the 2 groups. These questions refer and correspond to the image that the participants saw in part 2 of the experiment. Experimenter should pick out 3 of the subjects shown in the formal paper; participants recall the number and location of the object and answer the questionnaire in (i.) one or more than one, (ii.) left or right.

The answer for the location of the object is a distraction task that is irrelevant to the aim of this study, that the data from the location questions should not be displayed in the data table.

### 3.4 Predictions

According to the proposed study, English speakers should be better at noticing and recalling singular and plural differences than Mandarin speakers due to the use of quantifiers. This means they should have a better performance in recalling the plurality of the objects shown in the study. Therefore, English speakers should have a higher percentage of right answers for the memory questionnaire than the Mandarin speakers. In contrast, if the quantifiers do not influence the way English speakers and Mandarin speakers notice plurality, then their performance on recalling the plurality of objects should be the same. This means the percentage of right answers for memory questions should be the same for both English and Mandarin speakers.

## 4 Conclusion

If the result of the proposed study supports the prediction of this study (Fig. 4), this outcome would call into question that: even without any linguistic response, it is suggesting an anticipatory effect of language [7]. This affection appeared even more earlier than individuals think it could. Plurality or singularity in a language affect an individual's memory and culture the moment it being put into use. Though sometimes communication happens without linguistic response, this affection still hides behind.

Meanwhile, the Linguistic Relativity theory will also be supported. The usage of plurality or singularity in a language varies in different languages, and this leads to different speaking habits. And this habit difference will have correlation to an individual's memory and culture.

All in all, if the result of the proposed study supports the prediction of this study, correlation between plurality or singularity in a language and which part of the memory would be strong could be proved.

One important caveat in interpreting the predicted results: The proposed study will only test bilinguals as a first step toward the usage of plurality or singularity in a language affects an individual's memory and culture. Further studies in plural number would be needed to evaluate the clinical implications of it.

And there also may have boundedness due to this study only test 2 languages, more languages should be tested if anticipatory effect of language wish to be proved.

Furthermore, the results of the study would support Whorf's hypothesis of language shapes thoughts. If use of a certain language affects people's memory of things, it means people's focus point changes. People's focus point might have caused a difference in memory, not vice versa. The correlation between thinking in a specific language and focus point on a sentence would support Whorf's idea of how language shapes thoughts.

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