Comparing Linguistics Influences of Shapes and Materials between English and Chinese Speakers

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***Abstr*act—This research paper investigates and compares the** linguistics inf**luences of shapes and materials between English and Chinese speakers. One previous study compares animate entities, inanimate discrete, and inanimate non-discrete among English, Yucatec Mayan, and Japanese speakers. However, very few previous studies investigate the influences of shapes and materials on Chinese speakers. Therefore, this paper cited the data of A cross-linguistic study of early word meaning: universal ontology and linguistic influence Imai and Gentner, about American speakers and collected new data about Chinese speakers, comparing their different responses based on the Sapir–Whorf hypothesis. The results show that Chinese numeral classifiers are more forcibly used when referring to substances than complex and simple object references. English has its influence on those participants who, to some extent, encountered English during their past studies. As users of a language who does not require a numeral classifier adopt unless referring to substances, English speakers are anticipated to focus more on the material when addressing substances. Also, in this research, Chinese speakers have fewer respondents on shapes than American participants. It is a very meaningful study that can imply the linguistics influences of English and Chinese language on speakers' thoughts.**

***Index Terms*—Linguistics influences, shapes and materials, English and Chinese speakers.**

I. Introduction

Usually, in society, language is perceived as a tool that conveys meaning and consists of logic. The vast majority of people take for granted the dominance of thought in this relationship between "thought and language". However, in the linguistics field, linguistic relativity is a heated topic which is also called the 'Sapir–Whorf' hypothesis [1]. It is a theory developed by Edward Sapir and Benjamin Lee Whorf, who states that the structure of a language determines or greatly influences the modes of thought and behavior characteristic of the culture in which it is spoken [2]. This paper conducts a study comparing linguistics influences on speakers' cognitions by collecting a questionnaire to verify this hypothesis. The organization of this paper will be developed in the following sections: literature review, research methods, data analysis, and conclusions.

II. Literature Review

The debate on whether language influences thoughts has existed for many years. Linguistic determinism indicates that language and its structure play an essential role in determining human thoughts [2]. It also implies that those who have different mother tongues have different thought processes [3]. The Hopi language is one of the languages that can support language determinism, especially its time notions. In the Hopi language, there are seldom expressions of time. Their speakers also have fewer notions on time. Comparing with linguistic determinism, linguistic relativity is weaker form. Linguistic relativity means that native languages can, to some extent, construct speakers' minds, but not as strong as 'determine.' [4] Research on linguistics relativity tends to provide positive evidence to prove the relationship of linguistic influences to minds [5]-[7]. Although there are many inaccuracies present in this research, the subject of the study itself is worth discussing: whether the influence of language on thinking exists or not.

One of the previous studies cited many times in this paper is [1], which is the foundation and sample for this paper to study. There are four ages among its participants: 2-years, 2.5-years, 4-year-old children, and adults from two countries (the U.S. and Japan). The three levels of materials used are as followed: substances (e.g., sand in an S-shape), simple objects (e.g., a kidney-shaped piece of paraffin), and complex objects (e.g., a wood whisk) [1].' After the experiment, it was shown that children in English-speaking and Japanese-speaking environments have different views on generalizing simple objects and substances. For example, when mentioning a cup of water, English speakers tend to think about the cup, whereas Japanese speakers are more likely to have the first impression on their minds about the liquid. Although this study can, to some extent, prove linguistics relativity, it only contains English and Japanese speakers. However, there are very few studies on whether Chinese as a native language will influence Chinese speakers. Therefore, this study fills in this research gap and researches comparing American and Chinese speakers. In China nowadays, English is selected as one of the compulsory subjects within the scope of national compulsory education. English is gradually occupying a more important place in the daily lives of Chinese people than it did fifty years ago, and from this point of view, this study attempts to explore the impact of English and Chinese usage on users and the degree of impact that feeds back into the effects of social change [8]-[23].

III. Research Methods

This research uses questionnaires as the research method to collect 25 adults of Chinese speakers in the range of 30 to 60 years old. Due to COVID-19 circumstances, it is difficult to distribute questionnaires and collect data offline. The subjects were tested online due to the restrictions during the

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control of coronavirus. They were shown neutral Chinese words, which indicated the testing materials involved.

Therefore, participants agreed to attend this research online, and a Qualtrics link was sent to participants individually, allowing their privacy to be protected. As it is nearly impossible to fly to the U.S. to collect data in 2020, American speakers' data was cited [1]. Then a study was conducted to compare the linguistics influences in these participants.

In the questionnaire, there are about 20 questions of tests for participants. The researcher prepared pictures of complex objects, simple objects, and substances individually as options of choices. For example, one of the test questions is: "when you look at picture A, what comes first in your mind?" Then three options are provided for selection. Taking the first question as an example, participants can choose 'clear plastic clip,' 'iron clip,' or 'clear plastic piece' for one time. The other options are shown in Table I.

TABLE I: TESTING MATERIALS

	Standard	Shape alternative	Material alternative
		Complex object	
1	Clear plastic clip	Iron clip	Clear plastic piece
2	Ivory plastic T-shaped toy	Copper T-shaped toy	Ivory plastic piece
3	Porcelain bowl	Wooden bowl	Porcelain piece
4	Wood whisk	Black plastic whisk	Wood piece
		Simple object	
1	Cork pyramid	White plastic pyramid	A big chunk of cork
2	Orange wax round-shaped plate	Purple plastic round-shaped plate	Orange wax piece
		Substances	
1	Sawdust (omega-shaped)	Tiny pieces of leather (omega-shaped)	Two piles of sawdust
2	Sand (S shape)	Glass pieces (S shape)	Three piles of sand

IV. DATA ANALYSIS

After collecting data, this research utilized quantitative data analysis methods to interpret data. Frequency analysis was used in this research to observe the frequency and percentages of each group.

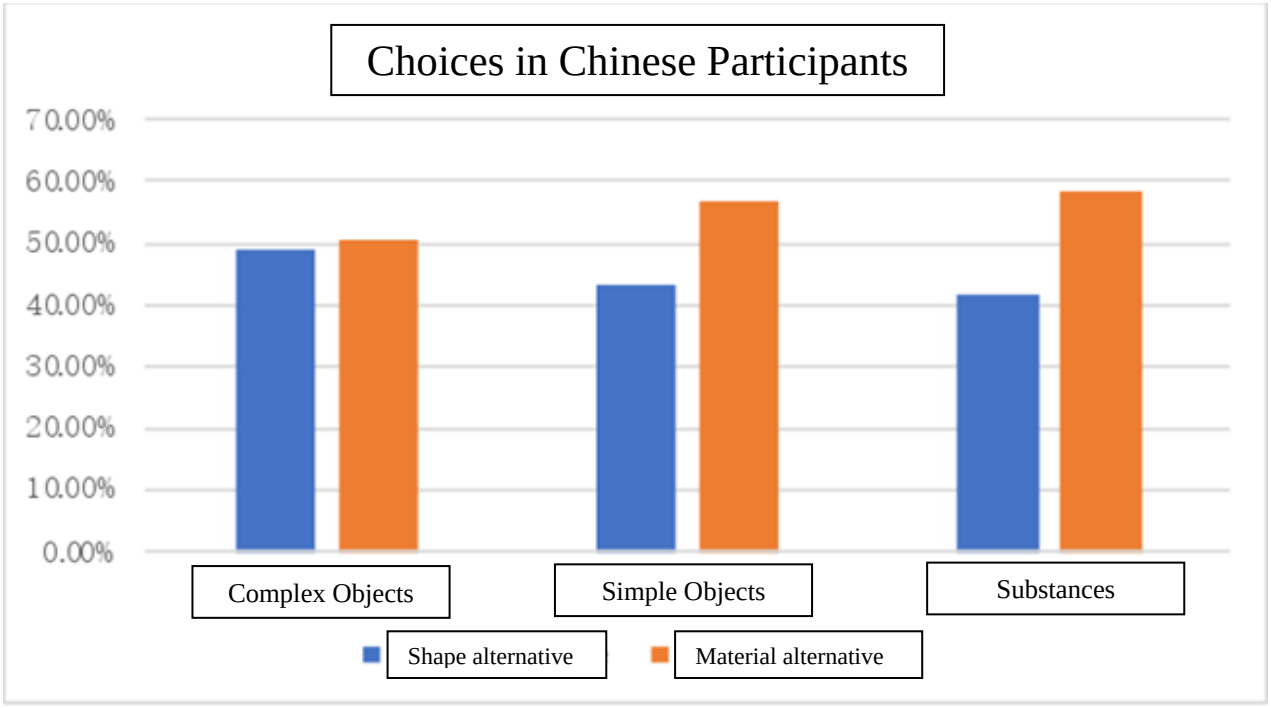

Fig. 1. Choices in Chinese participants.

V. Discussion

The graph in Fig. 1 shows that in the Chinese language, the percentages of material responses are slightly higher than the percentage shape responses. Complex objects have the 2% shape and material response difference, while simple objects have 14% and substances have 17% (with all material responses higher than shape). Additionally, shape responses gradually go down from complex objects to substances, causing material responses to moving up. The highest shape response percentage, 49%, from "complex objects", contradicts with the lowest 42%, from "substances". Accordingly, the lowest material response percentage, 51%, from "complex objects", contrasts with the highest 58%, from "substances". One possible explanation is those numeral classifiers, which are common in the Chinese language, are more forcibly required to be used when referring to substances, compared with complex and simple object references. Another similar interpretation would be that English has its influence on those participants who, to some extent, have encountered English during their past studies. As a language that does not require a numeral classifier used unless referring to substances, English speakers and learners are anticipated to focus more on the material when addressing substances such as water and sand. Moreover, the choices presented to the participants by descriptive words in Chinese can, to a small extent, influence the participants' decisions and cause a difference, as shown in this paper.

There is a big difference between the comparison of the two languages on complex objects and substances. According to Fig. 2, more than 90% of English speakers responded to complex objects, nearly twice as much as Chinese users. However, only about 50% of English users gave shape feedback of substances, merely 25% higher than Chinese speakers.

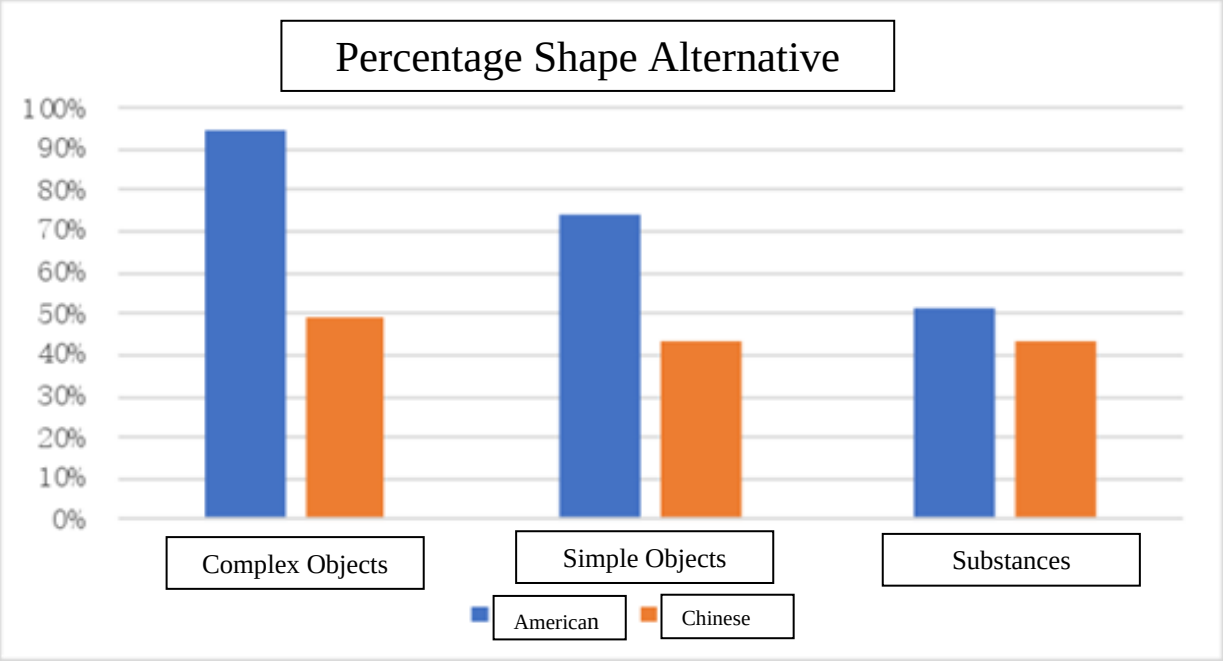

Fig. 2. Percentage shape alternative.

In Table I and Table II, the following are two examples of Chinese and English differences using numeral classifiers for objects and substances. Taking the sentence "I need a cup of tea" as an example; from the parts of speech in English and Chinese of the sentence, it can be clearly inferred that there are matching numeral classifiers, compared with the usage of article in the sentence "That is a book." The noun "tea", when used as a drinkable liquid, is usually considered as a kind of substance. Likewise, since they have no particular shapes and often need to be stored in containers, substances require more numeral classifiers than other nouns in the English language.

Therefore, English users focus more on the material of substances (e.g., water, sand, sea, air) than they do other nouns. And this forms the explanation of the graph. Focusing more on the materials rather than shapes when viewing substances, English speakers tend to give more material feedback, causing the shape response rate to drop. However, since numeral classifiers are required in every kind of noun in the Chinese language, the fluctuation of the Chinese language in Fig. 1 and Fig. 2 tends to be more stable than it is in the English language.

TABLE II: Example I

English:	That	is	a		book.
Part of Speech	Determiner	be	article		noun
Chinese translation:	那	是	一	本	书
pronunciations	nà	shì	yì	běn	shū
Part of Speech	Determiner	be	number	classifier	noun

TABLE III: EXAMPLE II

English:	I	need	two	cups	of	tea.
Part of Speech	pronoun	verb	number	numeral classifier	preposition	noun
Chinese translation:	我	需要	两	杯		茶。
pronunciations	wǒ	xū yào	liǎng	bēi		chá
Part of Speech	pronoun	verb	number	numeral classifier		noun

VI. CONCLUSION

This paper investigates the effects of using different languages (Chinese and English) on their speakers, especially the effect of digital classifiers on the way participants perceive objects with more focus on materials or shapes. The results show that Chinese speakers tend to focus more on materials, simple objects and substances of complex objects than English speakers. There was a downward trend in shape responses from complex objects to matter in both languages, but Chinese responses were more stable and less volatile. This is mainly because Chinese requires the use of numerical classifiers in most cases where nouns are considered, whereas in English, only some substances require numerical classifiers. These results were analyzed from several perspectives, for example, discourse. Thus, Chinese and English differ in their language use, especially considering numerical classifiers. In contrast to previous studies, this study does not agree on the deterministic role of language on thinking but shows a certain degree of influence of language on thinking styles. Although this experiment has some shortcomings in terms of time and setting constraints, it fills this research gap. It would be of interest to the field of linguistics if future research explores this direction more explicitly.

CONFLICT OF INTEREST

The authors declare no conflict of interest

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