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Effect of Grammatical Class in Chinese-English Bilinguals

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Abstract:

The present study was conducted in a Singapore, with two groups of participants: Chinese Singaporean citizens who speak proficient English but with less proficiency in Chinese, and Chinese citizens who speak proficient Chinese but with English as a foreign language. While the current research provides support for previous findings that bilinguals show less pronounced verb disadvantage, it seems that there was not a grammatical class effect in access speed and accuracy between the two groups. This shows that a Chinese background in some way does play a role in that it narrows the access difficulty between verbs and nouns.

Keywords*: Grammatical effect, Chinese-English Bilinguals.*

I. INTRODUCTION

Although a few studies show that in patients of aphasia, nouns are more challenging to retrieve or more vulnerable to damage [1], majority of studies find that the reverse is the case, not just in acquisition [2] but also in lexical access and picture naming experiments [3]. In other words, verbs are more difficult and pose greater challenge than nouns for both aphasia patients [4] and healthy adults [5].

This seems not difficult to explain. Verbs are different from nouns at many levels. In most of the world languages, especially the Indo-European languages such as English, verbs are morphologically more variable (for example, verbs have more inflected forms) (Vigliocco, 2011); verbs have shallower level of categories than nouns [6]; verbs are semantically less concrete and imageable [7-8]; verbs are syntactically more complex, involving at least one argument and in many cases at least two arguments [9]. All these differences pose a greater cognitive challenge for one to produce a verb than a noun.

Is the grammatical class effect also true in the case of bilinguals? Though bilinguals demonstrate many cognitive advantages than monolinguals [10-11], extensive research indicates that bilinguals are lexically disadvantaged compared with monolinguals both in their L1 and in their L2. This means that for a Chinese-English bilingual, he is compromised in lexical access in speed and accuracy both in Chinese if compared with his Chinese monolingual counterparts and in English if compared with monolingual English native speakers. This disadvantage has been called bilingual effect [12-13]. This effect is supported

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by evidence of more tips of tongue in bilinguals than monolinguals [14], fewer exemplars in verbal fluency tasks [15], slower speed and less accuracy in retrieval of lexical items in picture naming tasks [16].

This leads to a reasonable expectation that bilinguals might face an added challenge if they are put in language production task where they have to name pictures of objects with nouns and pictures of action with verbs. In other words, bilinguals are likely to be subject to both bilingual effect and grammatical class effect.

Many researches have shown that bilinguals persistently have this double disadvantage compared with monolinguals. They show less accuracy and slower naming latencies in both verbs and nouns than monolinguals, and more than that, their performance in verbs is worse than in nouns [17-19].

But an emerging finding is that the disadvantage in verbs is not that big as in nouns for bilinguals [20-22]. In the study conducted by Faroqi-Shah and Milman (2015), participants were asked to name animals and actions. Highly proficient Spanish-English bilinguals and Asian Indian-English healthy bilinguals performed worse on animal naming than monolinguals who were matched in age and education, but no significant difference was found in action naming fluency. In another study, Li, et al. (2018) investigated Chinese-English bilinguals' noun and verb retrieval in picture naming compared with monolinguals. The study found that in both groups, verbs were retrieved more slowly than nouns, but the gap between the two groups was smaller for verbs (177.24ms in Mandarin and 295.61ms in English) than it was for nouns (206.93ms in Mandarin and 311.71ms in English).

Why is the grammatical class effect less pronounced in bilinguals? One explanation is that cross-linguistic interference from nouns are bigger, which slows downs bilinguals' access to nouns because they have to face the competition from non-target words. This bigger cross-linguistic interference is, according to Gentner (1981), due to semantically more similarities of nous across different languages. For example, the Spanish word for "bottle" is "bottela," which is probably true if two languages are close. Take Spanish and English for example, they have similar orthographical system. Similarities at word level are quite common. But this explanation seems not to apply in the case of Chinese-English bilinguals since the two languages are remarkably different. For example, the target word of a picture of a boy is "boy", but the Chinese equivalent is "nán hái", which is phonetically and morphologically different.

Another explanation is language-specific properties. Though verbs and nouns are universal properties that exist across almost every language in the world, yet in different languages, verbs and nouns have different implications for speakers. Chinese language, for example, is considered to be a verb-friendly language because verbs in Chinese are not morphologically inflected by tense suffixes, agreement markers, or plural markings and in addition, verbs are syntactically more flexible because it can occur at the final position of a sentence; it can also appear at the start of a sentence [23]. Chinese language is a pro-drop language in which both subjects and objects may drop from finite sentences and so verbs are more salient compared to nouns [24]. Age of acquisition for verbs is earlier in Chinese than in other languages [25].

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These differences in Chinese may in some way have an influence on Chinese-English bilinguals in language processing in L2. They are likely to drop any marking for verbs or nouns, which is quite common in Chinese-speaking English learners in spoken and written production activities especially for beginners, and this is also possible according to linguistic transfer hypothesis. This influence could serve as an advantage in a picture naming task in which participants are often asked to produce only the uninflected form of the target word.

But such an explanation seems to need more evidence since this less pronounced disadvantage of verbs is observed in not just Chinese-English bilinguals, but also Spanish-English bilinguals and Russian-German bilinguals.

Based on previous research, the research question is: Do Chinese-English bilinguals who grew up and acquired English as a second language in China show less pronounced disadvantage in verbs than in nouns, compared with Singaporean English-Chinese bilinguals?

II. METHODS

2.1 Participants

Two groups of bilinguals participated in the study. In one group are Singaporean postgraduate students at NIE in Nanyang Technological University. They are English-Chinese (E-C) bilinguals. They are highly proficient in English. They speak Chinese but less often and less proficiently. The other group consists of students from China who are studying at the NIE. They are the Chinese-English (C-E) bilinguals. They have been studying at NIE for 3 months. They are highly proficient in Chinese, more so than they are in English. They use Chinese more often than English.

Chinese English bilinguals are assessed on their English proficiency by an objective vocabulary test, Lexical Test for Advanced Learners of English as a second language (www.lextale.com) [26]. This test is a lexical decision task to test vocabulary knowledge of medium to higher level of English as a second language, and it takes less than 3 minutes to complete. All participants scored above 70% (mean = 81%).

2.2 Stimuli

Two sets of pictures were chosen from the International Picture Naming Project (IPNP, www.crl.ucsd.edu/~aszekely/ipnp/actobj.html) [27]. One set consist of 29 objects pictures and the other 30 action pictures. These pictures are all black-and-white line drawings with similar PDF file size so that the variance in visual complexity of these pictures is hopefully minimized.

The target nouns and verbs of the two sets of pictures are matched for average frequency, rated age of acquisition, but not in imageability and concreteness (Table I).

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TABLE I. Stimuli match

	GROUP	N	MEAN	Std. D	SIG
freq	noun	29	66.6034483	70.11708546	
	verb	29	71.0762069	82.91204873	.825
AoA	noun	29	4.6482759	.78313504	
	verb	29	5.0241379	1.21351178	.168
imageability	noun	29	6.5241379	.17249259	
	verb	29	5.2344828	.66883473	.000
concreteness	noun	29	4.8510345	.17273731	
	verb	29	4.4493103	.23603769	.000

2.3 Procedures

Participants were tested individually in a relatively quiet place. They were tested in the following sequence: language proficiency test (only for English L2 participants), practice experiment, main experiment with object naming, main experiment with action naming.

To help participants to get familiar with the experiment, they were told to do a practice experiment in which they named six pictures of action and six pictures of verbs. These practice pictures are not used later in the final experiment. Participants were asked to name picture with only one English word as quickly as possible. They are told to use the uninflected form of word. For example, if they saw a picture describing a boy singing, the participants were expected to use the word “play” instead of “playing” or “plays”. If they saw a picture of a lion, they were supposed to say “lion” rather than “a lion” or “lions”.

The experiment was designed with the help of the software Psychopy (v1.83.01) [28] on Windows 10 OS of a MacBook Air computer.

During the experiment, participants wore a headset. The target picture was set on the screen after a fixation cross “+” appeared on the center for 1000ms. The onset time for the picture is 4000ms. Participants named each picture when it appeared on the screen and their voice was recorded. After they named one picture, they pressed the “right” key for the next one. The voice for each trial was automatically stored as separate files in the data folder. The time between each key response was recorded for data analysis.

III. RESULTS AND DISCUSSION

The accuracy rate was also calculated by removing those invalid responses which include empty response in which participants failed to provide any word, and responses that fail to meet the target word.

After excluding those invalid responses, the reaction time associated with each valid response was used for statistical analysis.

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The retrieval time and accuracy of nouns and verbs are compared in each group (Table II). Results show that in both groups of participants, although noun retrieval was faster and more accurate than verbs, the difference was not statistically significant.

Table II shows that performance in verbs was slower and less accurate than in nouns for both groups. But the verb-noun differences in these two groups were statistically significant? Table III shows that within each group, no significant difference was found in both verbs and nouns.

TABLE II. Comparisons of descriptive statistics between groups by grammatical class

GROUP	NOUN				VERB			
	TIME		ACCURACY		TIME		ACCURACY	
	M	SD	M	D	M	SD	M	D
C-E bilinguals	2.11	.78	.81	.11	2.25	.65	.72	.07
E-C bilinguals	1.01	.04	.89	.05	1.37	.18	.82	.03

TABLE III. Pairwise comparison between grammatical class within group

GROUP		M	SD	t
C-E bilinguals	nounTime-verbTime	-.135	.31	-1.045
	nounAccuracy-verbAccuracy	.086	.174	1.213
E-C bilinguals	nounTime-VerbTime	-.361	.206	-3.03
	nounAccuracy-verbAccuracy	.068	.091	1.309

From Table II we see that C-E bilinguals were slower and less accurate than E-C bilinguals. But is this difference significant? As indicated by Table IV, the comparison between the two groups of bilinguals in terms of their speed and accuracy in different grammatical classes shows that there was significant difference only in retrieval time of nouns, with E-C bilinguals performed better than C-E bilinguals. In all other aspects, though E-C bilinguals outperformed C-E bilinguals, no significant difference was observed.

TABLE IV. Comparison between two groups in terms of time and accuracy

GROUP		M	SD	t
nounTime	C-E bilinguals	2.11	.78	
	E-C bilinguals	1.01	.04	**2.362***
verbTime	C-E bilinguals	2.25	.65	
	E-C bilinguals	1.37	.18	2.218
nounAccuracy	C-E bilinguals	.81	.11	
	E-C bilinguals	.89	.05	-1.21
verbAccuracy	C-E bilinguals	.72	.07	
	E-C bilinguals	.82	.03	-2.12

*p<.05

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Previous research showed that generally, verbs are more difficult than nouns. The finding of the present study seems to be inconsistent with that. This is probably due to the number of stimuli being quite small. An effect or non-effect will be more reliable when the sample is large enough.

Previous research suggested that bilinguals were generally slower and less accurate than monolinguals in whatever grammatical class. The present study didn't find such a difference among the Chinese-English bilinguals and English-Chinese bilinguals. This is due to a methodological issue. In my study, what I have compared was two bilingual groups while in previous studies the comparison was between a bilingual group and a monolingual group.

Actually, in previous researches where two bilingual groups were compared, bilingual L2 (Chinese-English bilinguals speaking in English) was slower than bilingual L1. But at this stage I cannot relate to that because in my study there was not a bilingual L1 variable for comparison. Future study might include a bilingual L1 design.

Previous research also indicated that for bilinguals, the disadvantage in verbs was less pronounced than in noun. The finding of the present study seems to be consistent with that. The performance gap between C-E bilinguals and E-C in the speed of noun production was statistically significant, but this gap did not show up in verb production time nor in accuracy. This is even surprising considering that the verb stimuli in the present study were significantly less concrete and had lower imageability than nouns. This is probably due to the fact that selection of the stimuli in this study was restricted to nouns and verbs that are quite highly frequent and the age of acquisition was quite early in life. This might make the pictures equally easy for both groups.

Another possible reason is the Chinese background of both groups of participants. In a picture naming task, participants are required to name picture with single uninflected form of verb; this reduce the difficulty for them since in Chinese language we are used to using verbs and nouns without any inflection. But such a cross-language influence needs to be further explored with a comparison Chinese monolingual group.

IV. CONCLUSION

This study has the following findings:

(1) Verbs did not seem to pose a bigger challenge than nouns, for either Chinese-English or English-Chinese bilinguals.

(2) English-Chinese bilinguals did not seem to have a significant advantage over Chinese-English bilinguals except one aspect: time for noun production.

While the current research provides support for previous findings that bilinguals are less pronounced in verb disadvantage, it seems that there was not a grammatical class effect within each of the two groups under study. This is probably due to a small size of stimuli and participants. Future study design can improve on this by adding a naming task in Chinese. An even bigger improvement would be to include a Chinese monolingual group. In addition, a larger size of stimuli and a larger sample of participants should generate more reliable results.

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