An Empirical Study of College English Vocabulary Instruction Based on Prototype Category Theory

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Abstract. As one of fundamental theory of cognitive linguistics, the prototype category theory exerts an important influence on vocabulary acquisition and instruction. In light of this, in this paper a vocabulary instruction experiment was launched for 100 non-English majors to testify the effect of the application of the prototype category theory to college English vocabulary teaching. The results indicate that English vocabulary instruction based on the prototype category theory is effective in promoting students' vocabulary acquisition and arousing their interest in English learning.

Introduction

Vocabulary serves as an important component of language and plays a crucial part in language learning and teaching. Krashen and Terrell maintain that vocabulary is of primary concern in the second language setting because it plays a dominate role in classroom success [1]. Nevertheless, low efficiency and poor effect prevail in Chinese vocabulary learning [2]. In order to tackle this issue and promote the quality of vocabulary learning, researchers began to seek for and probe into some more effective ways of vocabulary learning instead of the traditional and inefficient rote-learning. Notably, with the development of cognitive linguistics, the prototype category theory, one of important theories of cognitive linguistics, has an important influence on vocabulary leaning and offer a new perspective for vocabulary teaching. Liang Xiaobo and Li Yongzhong theoretically explore the implications of prototype category theory on TEFL and claim that the prototypical effect of hyponyms and the comparison of the terms of basic-level category will promote the vocabulary teaching [3]. Empirically speaking, an experiment conducted by Du Bing showed that the application of prototypical knowledge into English vocabulary teaching for English Majors beneficially influenced memorization and produced better retention than simple rote-leaning [4]. Chen Xiaolan found that the application of prototype category theory broke through the limitation of traditional vocabulary teaching and gradually improved the students' comprehension and expression in senior high school [5]. Concerning the studies above, one limitation is that the samplings involved are generally confined to English majors and students in high school, exclusive of non-English majors. Therefore, this paper launches an empirical study on college English vocabulary instruction for non-English majors to testify the effect of the application of prototype category theory.

Rationale

As one fundamental theory of cognitive linguistics, the notion of prototype category theory was proposed by Eleanor Roach based on the Wittgenstein's family resemblance, a challenge to the classical theory of categorization assuming the category has clear boundaries [6]. Wittgenstein argued that the fixed boundaries don't exist among the members in a category [7]. Comparing category to a family, he pointed out that members in a family can resemble each other but not be the same or consistent with each other. The notion of family resemblance was confirmed and improved by Roach in a series of experiments which indicated that focal colors seem to be more perceptual-cognitively salient than non-focal colors. With the further studies, Roach put forward the term "prototype" to

replace "focal". As for the definition of the prototype, two interpretations were presented by Taylor [8]. On the one hand, the term can be referred to the central member or the cluster of central member. For instance, the specific artifact can be referred as the prototype of cup. On the other hand, he stated that the prototype, the best example of category, can be viewed as the schematic representation of a category.

Characteristics of Prototype Category Theory. Here follow the four major characteristics summarized by Geeraerts [9]. Firstly, prototypical categories display a family resemblance structure, which means that members in one category are linked by a network of clustered or overlapping similarities. Secondly, there is no fixed boundary between the categories which blurred at the edges. Thirdly, there aren't a set of criteria attributes (necessary and sufficient conditions) to define the prototypical categories. The interpretation of typical members in one category varies from racial, cultural and environmental factors. For example, while in the eyes of Englishmen a robin is more typical in the category bird, a sparrow is regarded as the most typical member for the Chinese. Fourthly, members in one category don't lie in the equal position as they reveal different degree of typicality.

Implications of Prototype Category Theory for English Vocabulary Teaching. The prototype category theory exerts the strong effect on vocabulary acquisition, which cannot be neglected in vocabulary instruction [10]. Specifically, to start with, the top priority should be given to the basic level vocabulary. As is mentioned above about the fourth characteristics, the status inequality exists among the members in one category. Some members are more salient than others. The category can be classified into the basic level, superordinate level and subordinate level, among which the basic level terms are more salient and first acquired by learners. In view of this, the basic level English vocabulary should be imparted prior to the others. It is advisable for teachers to help students to enlarge their vocabulary according to the frequency and usefulness of words instead of only acquires more complicated and non-pragmatic words. Moreover, enough attention should be paid to the exploration on the semantic link between Polysemy. The prototype category theory can be of great help to better understand and learn polysemy in an effective way. As it implies, the prototype is the most typical member in one category and other members are connected by family resemblance. As for the meaning of words, the most central meaning is the core meaning or prototypical meaning, which is the resource of other meanings. To master the polysemy, it is imperative for teachers to highlight the prototypical meaning and later to explain and infer the semantic link between the prototypical meaning and the derived meaning in different contexts. For example, green refers to a kind of color at first, and then its meaning develops in a radial way as is shown in Fig. 1. It is of great use to explore the connection between the prototypical meaning and the derived meaning to learn the polysemy efficiently.
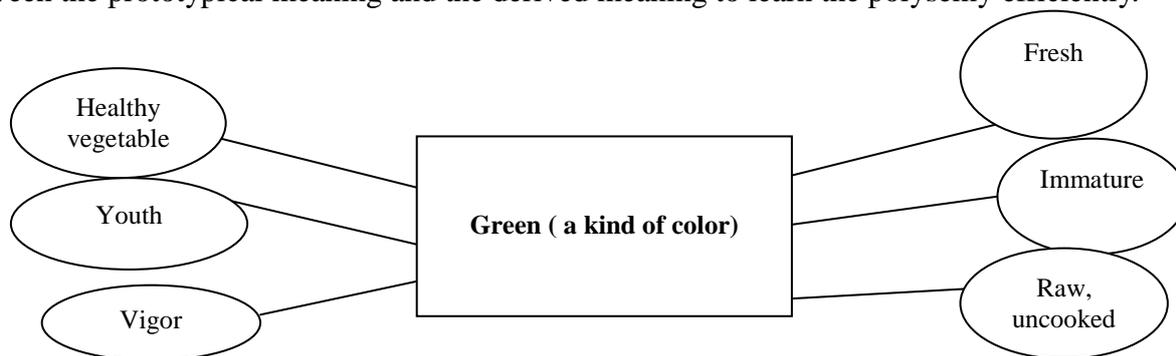

Figure 1. Semantic Link of "Green".

Finally, metaphorical awareness should be cultivated and enhanced to learning language. All languages are metaphorical [11]. As a kind of way of thinking and cross-domain mapping, it's the metaphor that can blend the two different domains, so that it's possible for people to associate the prototypical meaning with other abstract meaning of a word in other different domains. Take the word hit for example, its meaning evolves in a figurative way from the prototypical meaning "accidentally

strike (part of one's body) against something, often causing injury" to "make a strongly worded criticism or attack" or "take effect". Therefore, teachers should help the students to discern and understand the metaphorical meaning of words to cultivate their metaphorical awareness so as to expand the vocabulary.

Empirical Study

Research Questions. This study aims to testify the effect of application of prototype category theory to college English vocabulary instruction, which involves two questions as follows.

(1) Whether the instruction experiment with the application of the prototype category can efficiently facilitate college students' vocabulary learning?

(2) Whether the students' stronger interest in vocabulary learning can be aroused and enhanced in the instruction experiment?

Subjects. The subjects are 200 sophomores of non-English majors from the department of the electrical and electronic engineering with an average of six-year English learning experiences. They are randomly divided into two classes, the control class and the experimental class with100 students selected respectively.

Experimental instruments. As for the instruments, the vocabulary teaching material, two vocabulary test papers and a post-experiment questionnaire are taken into account. The teaching material mainly used in the two classes is the New Horizon College English Book III (Student Book). Notably, news words in the vocabulary list of the book will be marked in the boldface according to its frequency, usefulness and occurrence only for the students in the experimental class. With regard to the vocabulary test papers, the pre-test paper and the post-test paper are given to students in line with the two experiment tests. The pre-test paper, finished before the teacher instruction, includes 50 words selected randomly from the textbook (New Horizon College English Book II) with the item format spot dictation (two passages with 20 blanks to fill, each for one score) and multiple-choice (30 items for 30 words, with one score for each). And the post-test paper selects some new words from the word bank in New Horizon College English Book III, designed with the same item format. Also a post-experiment questionnaire by reference to Gu and Johnson's questionnaire chiefly invloving vocabulary learning strategies [12] is designed for subjects in the experimental class to investigate their interest and their evaluation about the instruction experiment.

Experimental Procedures. The experiment took sixteen weeks. First of all, before the experiment, a vocabulary pre-test was finished among the two classes to verify whether they have the same vocabulary level, as one perquisite to ensure the practice of the instruction experiment. Then the teaching experiment was performed as scheduled. Students in the two classes were taught by the same teacher with one vocabulary lesson each week. In the control class the traditional vocabulary teaching method was adopted including simple word explanation, meaning translation and sentence-making. However, in the experimental class, the vocabulary instruction combined with the knowledge of the prototype category theory was conducted consciously and systematically. Specifically, before class the proper and reasonable vocabulary items were carefully chosen by the teacher concerning the frequency, occurrence, usage and coverage. In class, students in the experimental class were encouraged to tell the meaning of a given word (usually the basic meaning or the prototypical meaning). When necessary, the category the given word belongs to, the superordinate terms or subordinate terms would be associated. Meanwhile, as to some active words, some additional meanings would be interpreted and the semantic link between the basic meaning and other meanings would be explored and taught by the teacher to enhance their understanding. Furthermore, a vocabulary post-test was launched to testify the effect of vocabulary instruction experiment based on the prototype category theory. Finally, a questionnaire was given to the students in the experimental class to find out students' interest in vocabulary learning and their comment on the instruction experiment.

Results and Analysis

The experimental data comprising two vocabulary tests and the post-experiment questionnaire are carefully collected and analyzed by SPSS 18.0, as are shown in Table 1, Table 2 and Fig. 2.

Analysis of Experiment Effect. The results of the pre-test are analyzed by the independent samples t-test to testify students' vocabulary level, which is shown in Table 1. It is can be seen in table 1 that there is no significant difference between the vocabulary levels of the experimental class (EC) and the control class (CC) (t=1.137, p=.257>0.05).

Table 1. Results of Independent samples t-test of the pre-test.

Class	N	Mean	Std. Deviation	t	Sig. (2-tailed)
EC	100	30.22	2.18	1.137	.257
CC	100	29.85	29.85		

Additionally, a pos-test is launched after the experiment to vadidate the experiment effect, the result of which is also analyzed by the independent samples t- test. The table 2 demonstrates that the mean score of the experimental class (M=39.42) is much higher than that of the control class (M=35.02). And there is a significant difference between the mean scores of the control class and the experimental class (t=--7.891, p=0.000). The result clearly suggests that in the vocabulary test students in the experimental class surpass students in the control class after the experiment, which can be ascribed to the vocabulary instruction based on the prototype category theory. That is to say, the instruction experiment with the application of the prototype category theory is effective in improving students' vocabulary level.

Table 2. Results of Independent samples t-test of the post-test.

Class	N	Mean	Std. Deviation	t	Sig. (2-tailed)
EC	100	35.02	3.68	-7.891	.000
CC	100	39.42	4.18		

Analysis of Post-experiment Questionnaire. Fig. 2 refers to the results of the post-experiment questionnaire. After the experiment, more than 70% students harbor the idea that they can apply the association strategy to their vocabulary learning, and their metaphorical awareness has been enhanced. Additionally, 80 % of them arouse more interest in English vocabulary learning and 85% students are supportive of the experiment based on the prototype category theory.
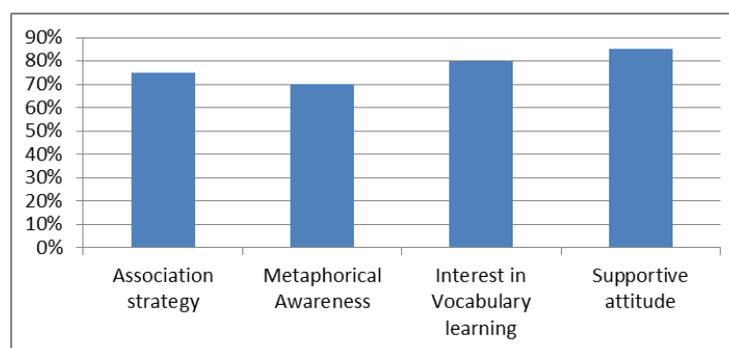

Figure 2. Post-experiment Questionnaire.

Conclusion

As one of crucial theory of cognitive linguistics, the prototype category theory exerts an important influence and provides a new perspective for English vocabulary acquisition. Based on the finding in this paper, it is concluded that college English vocabulary teaching for non-English majors based on the prototype category theory is proved to be effective and significant in facilitating English vocabulary acquisition, arousing students' interest in vocabulary learning and cultivating and enhancing their metaphorical awareness by association strategy. Nonetheless, it is noted that this study has some limitation including the limited sampling with only 200 subjects, the short experiment period restricted to only 16 weeks. Besides, the vocabulary teaching methods with application of the prototypical knowledge needs to be improved by more innovative teachers in the future research.

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