

Research and Practice on Compilation Strategies of English Learning Dictionaries from the Perspective of Cognitive Linguistics

Zeng Ya^{1*}, Xiao Haiyan¹, Zuo Chuanguo²

¹School of General Education, Hunan University of Information Technology, Changsha, Hunan, 410001, China

²School of Foreign Language, Nanhua University, Hengyang, Hunan, 421001, China

*Corresponding Author

Keywords: Cognitive linguistics, English dictionary, Compilation strategy

Abstract: Cognitive linguistics studies the relationship between language and cognition. In the process of compiling dictionaries for English as a second language learners, the research results of cognitive linguistics have not been fully valued and applied. Based on the basic theory of cognitive linguistics, this paper takes learners as the center, fully considers the cognitive rules and cognitive characteristics of learners, and compiles dictionaries by constructing the internal connection of vocabulary and exploring the cognitive motivation of semantic development. Through comparative tests, it is shown that English learner's dictionaries that fully consider learners' cognitive characteristics can better promote learners' long-term vocabulary memory efficiency.

1. Introduction

Since the birth of the first English learner's dictionary in 1935, great progress has been made in compiling English learner's dictionaries from manual to computer aided. Especially after the 1940's, major publishing houses have been constantly updating and publishing Cambridge Advanced Learner's Dictionary, Oxford Advanced Learner's Dictionary, Longman Contemporary English Learner's Dictionary, Collins Advanced Learner's Dictionary and Macmillan Advanced English Learner's Dictionary. These five dictionaries have been widely used in international English study with their outstanding characteristics. On this basis, with the increasing influence of English in the world, other types of English learning dictionaries are also emerging, which helps English learners to improve their English to a large extent. However, most of these dictionaries are based on the traditional linguistic theory, mainly from the semantic, grammatical, explanatory or pragmatic three levels to summarize and comment on word meaning discrimination, and pay less attention to the cognitive rules and characteristics of learners themselves. Therefore, based on the basic theory of cognitive linguistics, with learners as the center, dictionary compilation can provide cognitive path and strategy for second language learners' vocabulary construction through the internal connection, semantic development and cognitive motivation of vocabulary, so as to improve the efficiency and depth of learners' vocabulary knowledge acquisition.

2. Diffusion Activation Model of Vocabulary Organization

Collins and Quillian (2000) proposed diffusion activation model. The model assumes that there are independent but interrelated words and their conceptual networks, but concepts are organized through semantic relationships. Diffusion activation is an important feature of this model. In this model, the semantic concept is expressed as "node", and the connection between nodes and the network formed by the connection are emphasized. Nodes can activate each other. Once one node is activated, the stimulus will be transmitted to other connected concept nodes. Nodes form a complex network through interconnection. Connectionism holds that at birth, the brain tends to seek and establish the relationship between things. It can obtain information from various channels and store it in a neural network composed of a large number of nodes like neurons. However, vocabulary

information is distributed in the network composed of nodes. With the increase of language input, the strength of network connection is strengthened accordingly, and the relationship between language form and meaning is established (Peng Jianwu, 2002). Therefore, we can use and graphically activate the diffusion model to guide learners to discover and establish the internal interrelationship between words or words semantics, so as to expand students' vocabulary and strengthen their comprehensive and in-depth understanding of words.

3. English Vocabulary Organization Strategies from a Cognitive Perspective

In the compilation of English learning dictionaries, vocabulary organization strategies directly determine learners' learning strategies and usage. Dictionary compilation from the perspective of cognitive linguistics needs to reorganize vocabulary according to the concepts and word formation characteristics of different types of vocabulary.

(1) Category and categorization

Cognitive linguistics holds that when people observe the different objective world, they find the similarity between things, which is used as the basis to divide and classify all things and endow them with linguistic symbols. This classification process is categorization. The result based on the interaction of subjective and objective factors is category. The vertical level of category has pyramid-shaped levels. The top of the tower is highly generalized and the things at the bottom of the tower are refined. The things at the middle level are of appropriate concreteness and the largest number of members are easier to perceive, learn and master. This level category is called the basic level category. Basic level categories develop upward or downward to form upper category or lower category. The vertical application of category in language is shown as basic category words, upper category words and lower category words. The prototype effect is embodied at the category level.

① Organization centered on basic level category words

In the cognitive process, the category of basic level “is the most direct and basic level for people to recognize the world and is a powerful tool for people to classify the world's things” (Ullmann, 1962). The entries in the dictionary have no specific directive function. They refer to category features, not specific features of a certain thing. This requires that the definition of the dictionary not only has a certain generality, but also can accurately mark the distinguishing features of the word purpose, so as to minimize the ambiguity and uncertainty of the meaning. Therefore, we should try our best to interpret the basic category words. The generic feature marks not only reflect the similarity, but also the gradualness, which can help learners achieve the maximum cognitive economy. For example, the definitions of ape, gibbon, gorilla, chimpanzee and other words:

Ape: a large animal like a monkey, with no tail.

Gibbon: a small ape (=an animal like a large monkey without a tail) with long arms, that lives in SE Asia.

Gorilla: a very large powerful African ape(= an animal like a large monkey without a tail) covered with black or brown hair.

Chimpanzee:a small intelligent African ape (=an animal like a large monkey without a tail).

In the interpretation of ape, the primate word is not used, but the basic category word monkey is used and the difference is pointed out: without tail. In the interpretation of the last three words, ape is used to mark their generic, and then geographical and physical characteristics are given.

② Organization centered on category prototype

Polysemy is a common phenomenon in all languages. Among lexicographers, historical sequence, practical frequency and logical sequence are three traditional ways to deal with the arrangement of polysemy. Prototype category theory holds that a polysemous word is a category with central meaning and marginal meaning. There are one or several central senses in each sense of polysemy, and the central senses include other senses connected with them through family similarity. The dictionary uses this arrangement to enable users to see the internal relationship between various senses. For example, ramble is treated as the meaning arrangement of verbs:

Ramble: a. stroll about ■ (path, stream, etc) meanders ■ (plants) spread

b. talking, chatting; informal essay ■ research without a definite object in view ■ (words, writing) rambling and messy

Ramble establishes two archetypal meanings, each of which is followed by several non archetypal meanings and each of which has two secondary meanings. The secondary meanings are listed after the prototype meanings, and each secondary meaning is preceded by a striking black square. In this way, the scattered and disorganized meanings are systematically summarized and arranged, and seemingly unrelated meanings are classified into one category for arrangement, which can effectively promote learners' memory and understanding.

(2) Image schema

Image schema refers to a dynamic organization pattern that arises and appears repeatedly in the process of interaction between people and the objective world. It originates from the mapping of human concrete experience into abstract concepts. Image schema is used to construct known knowledge, helps to understand and recognize more abstract concepts, can explain complicated semantic phenomena, and is of great significance to dictionary compilation (Wang Yin, 2007). Johnson summarized the most important and representative PATH, LINK, CYCLE, SCALE, CENTER-PERIPHERY and other 27 basic schemas (Johnson, 1987).

Take bank-related words for example. The most basic meaning of bank: ① shore; ② embankment; ③ Banks. Its word-building ability is strong: adding the suffix “er” constitutes “banker”; add the root “rupt” and “RUPT” to indicate “bankruptcy”. The organization of bank related words can be done by means of CONTAINER schema. The basic meaning of bank is regarded as a container and the content is money. For the understanding of the various terms of the bank, the CONTAINER schema of the bank can be further extended as shown in Figure 1.

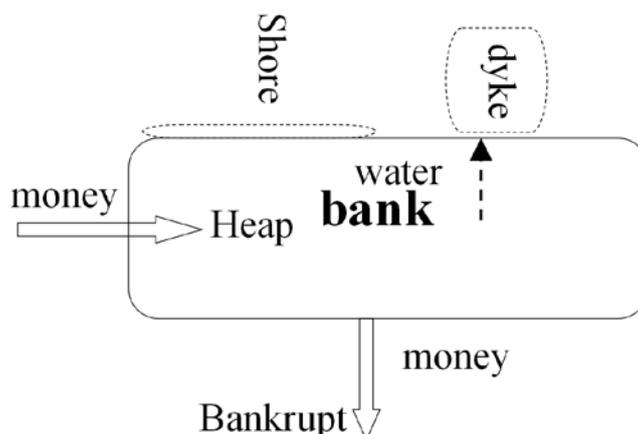


Fig.1 Container Schema of Bank

(3) Frame

Fillmore (1982) put forward “Frame Semantics”, believing that only by putting things into their background or frame can we understand them. Under the framework of frame semantics theory, each word represents an empirical category, and an important component of word meaning research is to reveal what motivations each language community has when creating the empirical category represented by the word, and to include these reasons when describing the word's meaning (Petrucci, 1996). Therefore, when compiling dictionaries, the words are classified and analyzed according to the framework. Such as understanding the meaning of attack, defend, fight, retry, conquer, defeat, win, lose power, territory and other words in the network or background of WAR frame, each word can indicate or activate other concepts of the same frame, which will not only effectively improve learners' learning efficiency, but also help students understand a specific concept (word) in the frame.

(4) Conceptual metaphor

Lakoff & Johnson (1980) pointed out that metaphor is a universal way of human cognition. Metaphor uses the similarity between different things to project what people know to another abstract or unknown thing, and explains or understands another thing in the most economical way.

That is, projecting the source domain to the target domain to form cognitive projection. Taking the word “head” as an example, the basic meaning is “the top part of your body that has your face at the front and is supported by your neck”. Based on similarity, other meaning is derived through metaphor mechanism: at the head of the industry, the head of a river, head a department, head the storm. There is an internal connection between the meanings of “head” in different expressions.

4. Dictionary Application

Based on the above-mentioned strategies, “CET-4 vocabulary” (hereinafter referred to as “vocabulary”) has been formed. “Vocabulary” takes three-level frames as its basic organizational form. By regrouping and sorting words through categories, image schemas and conceptual metaphors, 1023 words from CET-4 are included. In order to verify the effectiveness of the cognitive theory compilation strategy of the English learning dictionary, the comparative application experiment of “vocabulary” which takes the students of Hunan University of Information Technology as subjects was conducted. SPSS20.0 was used for the t-test of the differences between classes.

(1) Experiment design

Two parallel classes was selected, one of which was asked to use “vocabulary” as reference book, the other was required to choose vocabulary learning reference books, but not specific ones. The experiment was carried out in two stages. The first stage was the learning stage, which required the students to complete the specified 1000-word memory task within one month. The second stage was the test stage. Students' short-term and long-term memory effects were tested through two tests respectively. The two tests were conducted respectively in the first week and the third week after the first stage. The subjects were not informed to take the tests until the day before. The content of each test was randomly selected 100 words, which appeared in the form of “choose to fill in the blank”. If one of them was selected, one score would be given, with a full score of 100.

(2) Vocabulary level of subjects before experiment

Before the experiment, the subjects' vocabulary level was tested. 100 CET-4 words were randomly provided to the subjects. The subjects scored the words according to their familiarity with them. The highest point for one word was 5 point (very familiar), the second was 4 (familiar), then 3 (difficult to determine), and 2 (unfamiliar), 1 (very unfamiliar).

Table 1 Group Statistics of Vocabulary Familiarity

Class	Number of people	Mean value	Standard deviation	Mean standard error
Experimental class	30	2.520	0.403	0.072
Control class	30	2.509	0.463	0.084

Table 2 the Independent Sample t-Test for the Difference between Classes before the Experiment

	Homogeneity test of variance		Mean t test						
	F	P	t	df	P (bilateral)	Average deviation	Mean square error	95% confidence interval	
								Lower limit	Upper limit
Variance equality	0.286	0.595	0.104	59	0.918	0.011	0.111	-0.211	0.234
Uneven variance			0.104	57.339	0.918	0.011	0.111	-0.211	0.234

The test results show that the average proficiency of the experimental class is 2.520 and that of the control class is 2.509. There is no significant difference in vocabulary familiarity between the two classes at the level of 0.05. Before the experiment, there is no significant difference in vocabulary level between the experimental class and the control class (see Table 1 and Table 2 for details).

(3) Test results

① First test (immediate test) results

An independent sample t-test between classes was performed on the significance of the difference in the first test results. The average accuracy rate of the experimental class is 0.813, slightly higher than that of the control class 0.801, with an average difference of 0.012, $P > 0.05$, and the difference is not significant (see Table 3 and Table 4 for details).

Table 3 Accuracy Rate Statistics of 1st Test

Class	Number of people	Mean value	Standard deviation	Mean standard error
Experimental class	30	0.813	0.118	0.021
Control class	30	0.801	0.185	0.034

Table 4 the Independent Sample t-Test for the Accuracy Difference between Classes of 1st Test

	Homogeneity test of variance		Mean t test						
	F	P	t	df	P (Unilateral)	Average deviation	Mean square error	95% confidence interval	
								Lower limit	Upper limit
Variance equality	6.139	0.016	1.318	59	0.096	0.012	0.040	-0.027	0.132
Uneven variance			1.308	49.018	0.098	0.012	0.040	-0.028	0.133

② Second test (delay test) results

The difference between the second test results and the significance of the independent sample t-test between the classes. The average accuracy rate of the experimental class is 0.756, which is higher than that of the control class 0.668, $P < 0.05$, the difference is significant (see Table 5 and Table 6 for details).

Table 5 Accuracy Rate Statistics of 2nd Test

Class	Number of people	Mean value	Standard deviation	Mean standard error
Experimental class	35	0.756	0.118	0.021
Control class	35	0.668	0.185	0.034

Table 6 the Independent Sample t-Test for the Accuracy Difference between Classes of 2nd Test

	Homogeneity test of variance		Mean t test						
	F	P	t	df	P (Unilateral)	Average deviation	Mean square error	95% confidence interval	
								Lower limit	Upper limit
Variance equality	0.602	0.441	2.479	59	0.008	0.088	0.035	0.017	0.159
Uneven variance			2.462	49.211	0.009	0.088	0.036	0.016	0.159

③ Comparative analysis of experimental class

Paired sample t-test was performed on the significance of the difference in accuracy between the two tests in the experimental class. From the immediate test to the delayed test, the accuracy rate in the experimental class decreases by 0.057, $P < 0.01$, and the difference is significant (see Table 7 for details).

Table 7 Paired Sample T-Test for the Accuracy of 1st Test and 2nd Test of Experimental Class

Paired differences					t	df	P (Unilateral)
Average deviation	Standard deviation	Mean square error	Mean 95% confidence interval				
			Lower limit	Upper limit			
-0.057	0.163	0.029	-0.157	-0.037	-3.293	30	0.0013

④ Comparative analysis in control class

Paired sample t-test was performed for the difference in accuracy of the control class between the two tests. From the immediate test to the delayed test, the accuracy rate of the control class decreases by 0.133, $P < 0.01$, and the difference is significant (see Table 8 for details).

Table 8 Paired Sample T-Test for the Accuracy of 1st Test and 2nd Test of the Control Class

Paired differences					t	df	P (Unilateral)
Average deviation	Standard deviation	Mean square error	95% confidence interval				
			Lower limit	Upper limit			
-0.133	0.272	0.050	-0.163	0.041	-1.230	29	0.0002

⑤ Empirical conclusion

There is no obvious difference between the experimental class and the control class in the first test. In the second test, the accuracy of the two classes decreases significantly compared with the first test, but the accuracy of the experimental class was significantly higher than that of the control class, and the accuracy of the experimental class decreases significantly lower than that of the control class. “Vocabulary”, which compiled by cognitive linguistic strategies, can effectively improve learners' long-term memory efficiency in vocabulary learning.

5. Conclusion

Human language is vocabulary-based. The rise and development of cognitive linguistics provides important theoretical and methodological support for the compilation of English learning dictionaries. Taking “learner centered” as principle, dictionaries based on theories of cognitive linguistics can effectively improve learners' vocabulary memory efficiency, especially in the long-term memory effect of vocabulary.

Acknowledgment

Research project of teaching reform in Colleges and universities of Hunan Province: Research on Compilation Methods and Strategies of English Vocabulary Books from the Perspective of Cognitive Linguistics-Taking CET4 as an Example (No.618)

Scientific research project of Hunan University of Information Technology: Research on the Reconstruction of English Vocabulary from the Perspective of Categorization-Taking CET4 Vocabulary for Example (No.XXY018YB12)

References

- [1] David, W. Carroll. Psychology of Language [M]. Beijing: Foreign Language Teaching and Research Press, 2000.
- [2] Fillmore, J. Towards a descriptive framework for spatial deixis [A]. In R.J. Jarvella and W. Klein (eds.). Speech, Place, and Action [C]. New York: Wiley, 1982.
- [3] Lakoff G, Johnson M. Metaphors We Live By [M]. Chicago: University of Chicago Press, 1980.
- [4] Mark Johnson. The Body in the Mind: The Bodily Basis of Meaning, Imagination and Reason [M].Chicago&London: University of Chicago Press, 1987.
- [5] Petruck, M. Frame semantics [A]. In J-O. Ostman, J. Blommaet, C. B ulcaen (eds.). Handbook of Pragmatics[C]. Amsterdam/Philadelphia: Benjamins, 1996.
- [6] Ullmann, S. Semantics. An Introduction to the Science of Meaning [M].Oxford: Basil Blackwell, 1962.
- [7] Peng Jianwu. Application of Unicom Theory in English Vocabulary Teaching [J]. Foreign Languages, 2002 (4).
- [8] Wang Yin. Cognitive Linguistics [M]. Shanghai: Shanghai Foreign Language Education Press, 2007.