Cognitive System of Chinese Modal Verbs from the Perspective of Cognitive Science

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Abstract. The combination of cognitive science and linguistics has been a matter for nearly a decade or two, which results in the birth of a new marginal subject--cognitive linguistics, indicating a new development trend in language research. Modal verbs are highly grammatical, framed verbs that have relatively prominent cognitive features in language. Over the past two decades, Chinese modal verbs have received considerable attention from many different perspectives. Studies thrived, focusing on its formal aspects, such as the semantic features, modality, primarily syntactic features. By contrast, the delineation for its cognitive system is rarely seen. From the perspective of cognitive science, this research to some extend presents the cognitive process the psychological representation of modal verbs in conceptualizers’ mind.

Keywords: Cognition, Conceptualize, Conceptualizer

1. Introduction
In the 1950s, a “cognitive revolution” broke out in Europe and the United States. A new science, cognitive science, was born in the revolution. Cognitive science attempts to describe the processing of information in the brain with representational computing. It is a science that studies the process of information processing from perception to thinking, including sensory input to the solution of complex problems, intelligent activities from individual humans to human society, and the nature of human intelligence and artificial intelligence.

The cognitive study of language began in the 1970s with Chomsky's transformational grammar. The theory believes that people have a natural ability to learn language, and advocates studying the ability of language generation by studying human mind. Cognitive linguistics is based on the way humans perceive the world and conceptualize the world. It studies the relationship between human's general cognitive mechanism and language learning. Cognitive linguistics believes that language not only reflects the results of human understanding of the real world, but also is a tool to analyze human cognitive activities. Human language ability is part of general cognitive ability. Human language acquisition and other cognitive activities go through the same process and have the same rules. Therefore, the study of the law of language acquisition should start from the basic cognitive abilities of human beings, and use the cognitive experience obtained by humans in other cognitive fields to explain language phenomena.
Tally McCormick Miller [11] stressed that there is a causal link between vocabulary items language and the language users’ cognitive processes contributing to perception. Modal verbs are highly grammatical, framed verbs that have a relatively prominent cognitive features in the language. Over the past two decades, Chinese modal verbs have received considerable attention from many different perspectives. Studies focusing on its formal aspects thrived, such as the semantic features, modality, primarily syntactic features. By contrast, the delineation for its cognitive system research is rarely seen. From the perspective of cognitive science, the cognitive process and the psychological representation of modal verbs in conceptualizers’ mind can be well presented.

2. Literature Review of Cognitive Study on Model Verbs
Since the 1980s, various scholars have studied the characteristics of English modal verbs from the perspective of human cognition and association [8, 10, 12].

Linguist Perkins [9] pointed out that among all modal expressions, such as modal auxiliary verbs, semi-auxiliary verbs, adjectives, modal nouns, modal verbs and tenses, modal verbs are the most prominent modal expressions. Langacker, one of the two pillars of the cognitive linguistic study, studied English modal verbs from a cognitive perspective [5]. He proposed to describe the cognitive process and the psychological representation of language in conceptualizers’ mind as comprehensively as possible. His research focuses on the analysis of meaning at the cognitive conceptualization level. He pointed out that language meaning is equivalent to conceptualization, that language is conceptualized by the conceptualizers in the cognitive process when used by human [6]. Langacker advocates that English modal verbs should be studied in certain groundings because English modal verbs are related to the background and attitude of the speaker. He examined English modal verbs from the perspectives of cognitive grounding, dynamic evolution model and subjectivity.

In addition to English modal verbs, Achard [1, 2] began cognitive studies on French modal verbs as early as 1998. Bert Cornillie [3] studied the subjective cognition and interpretation of modal verbs in Spanish based on Langacker's cognitive theory. Tanja Mortelmans [7] further deepened the cognitive research of German modal verbs based on Langacker's research on subjective and grounding of German modal verbs.

Comparatively speaking, the cognitive study of modal verbs in modern Chinese is rather weak. This research attempts to deeply explore, from the perspective of cognitive theories, the cognitive system of Chinese typical modal verbs.

3. Cognitive System of Chinese Modal Verbs

3.1 Force-dynamics of Chinese Modal Verbs in cognition
Force-dynamics is related to the concept of motion energy in our lives. Life experience tells us that some entities have internal energy, while others only receive power from external entities. The concept of force dynamics is derived from the oppositional forces between forces and counterforces. The phenomenon of force is omnipresent in the physical world. For example, the gravitational force we feel when we push upwards, and the reverse wind force we feel when riding a bicycle. The modal verbs also highlight the force dynamics, not only expressing physical forces, but also expressing the interaction between psychic and abstract forces in the social field. On social occasions, when an authoritative person tells a relatively disadvantaged person what to do, we can feel the force dynamics. For example, a teacher may ask a lazy student, "You must start working for a change now." The modal verb “must” indicates the force and the power from the speaker to the listener. The speaker urged the listener to make a change. The social pressure and the instruction the listener received forced him to perform an action. The concept of force dynamics enables a unique interpretation of modal verbs. Chinese modal verbs demonstrate the similar force-dynamics in cognition. For example, in the sentence: Wǒ huì bǎohù nǐ (I will protect you).

The Figure 1 exhibits the conceptual complex expressed by modal verb “huì”. The three key roles of dynamic force—Agonist (AG), Antagonist (AN) and Performer (PR) are all presented in the
utterance. Agonist of the modal verb “hui” is the subject, the speaker in the sentence. The speaker is the origin of deontic force. The Antagonist (AN) is also the speaker, who impose the deontic force on himself. The force presses the speaker to conduct his commitment based on the social deontic rules, therefore the Performer (PR) of potential activity is the same to the Antagonist (AN). The social deontic rules are not presented in the utterance, which is embedded by the conceptualizer from the ground. Compelled by the force, the antagonist turns into the performer of certain activity, whose skills or ability could make the potential activity (PA) fulfilled.

Reality Space   Assessment Space   Attitude Space

Figure 1. Force Dynamic model of “hui”

Figure 2. Psychological Space of “hui”

3.2 Psychological space of Chinese Modal Verbs in cognition
In term of psychological space, modal verbs are spatial constructs in cognition.

For example, modal verb “hui” constructs three psychological space in example sentence “Wǒ hui bāohù nǐ (I will protect you)”. It involves the interaction of three psychological spaces (as shown in Figure 2): the real space, the assessment space and the attitude space. The reality space is the grounding space of the speech events, such as the grounding in the example includes the environmental situation when the speaker makes a promise and the social rules the society respects, which guides the speaker's behaviours on the stage. The assessment space refers to the conceptualization of the speaker to the reality groundings. By assessment, the speaker makes his possible decision, whether abides by the social rules or not. The last one is the attitude space which refers to the speaker's attitude toward speech acts after assessment.

In the example sentence, the speaker uses the modal verb “hui” to perform strong instruction on himself and guide himself to abide by the obligatory rules. The fusion of reality space, assessment space and attitude space leads the speaker to make a promise to the listener to perform certain obligations. There is a high probability that the obligation will be implemented.

3.3 Idealised Cognitive Model of Chinese Modal Verbs
Based on the concept of evolutionary momentum, in order to semantically explain the tense and modality of English modal verbs, Langacker has established the Idealized Cognitive Model or ICM of modal verbs, as shown in Figure 3.
This model is also called Dynamic Evolutionary Model (DEM) [4]. The world develops along the time axis according to a specific pattern. Things that conform to the structure of the world may occur, while things that do not conform to the structure of the world may never appear. The current reality structure determines the development trend of future reality. The trend is conceptualized by the conceptualizers as the form of force, namely the dynamic evolutionary force.

In the above sentence “Wǒ huì bǎohù nǐ (I will protect you)”, the addition of modal verb “huì” changed the speech act performed in the sentence “Wǒ bǎohù nǐ (I protect you)”, the tense of which is projected in the current reality. By adding modal verb “huì”, the tense has been projected from the current reality area into the unrealistic area along a possible path on the time axis. The motion process of “protect” is projected to the future by modal verb “huì”. Modal verb “huì” allows conceptualisers to participate in conceptual cognition, transforming the tense from the reality in “Wǒ bǎohù nǐ (I protect you)” into the potential reality in “Wǒ huì bǎohù nǐ (I will protect you)”.

4. Conclusion

The combination of cognitive science and linguistics has been a matter for nearly a decade or two, which results in the birth of a new marginal subject--cognitive linguistics, indicating a new development trend in language research. Cognitive linguistics offers a new and challenging perspective on traditional linguistic theories. Different nationalities have different languages and cultures. The difference seems to be great, but we cannot ignore that we share the same objective world and cognitive mechanism. Therefore, there are inevitably many things in common between different languages. Human cognition is similar, which provides a theoretical basis for us to find commonality between languages. Chinese modal verbs as analyzed hereby share the similar cognitive system with the English modal verbs. Cognitive interpretation of Chinese modal verbs shows that cognitive conceptualization not only provides the content for language, but also the form. Further research on more Chinese modal verbs is highly recommend in order to testify the cognitive system proposed in this research and provide more cognitive features of Chinese modal verbs.

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