An Event-related Potentials on the Euphemism Construal Mechanism in Literary Expression

Siming Zhou*, Hong Wan

ABSTRACT
The purpose of this paper is to clarify whether there is any electrophysiological evidence that supports psychological reality. Here we introduce ERP technology to verify the "connotation and denotation correlation heritage model" for Chinese semantic rhetoric construal mechanism from the perspectives of Chinese antiphase, metonymy, euphemism, pun, and exaggeration, etc. It is proved with the results that there is a "psychological reality for the probability feature extraction" in the process of these Chinese rhetoric construal. In the average literal sense, the response to the probe word spends significant shorter time than that to unrelated sentence. While for probe words in the euphemistic text, there is no significant difference in the grand average response time conditions.

Key Words: Literacy, Euphemism, ERP Technology

Introduction
We learn from the definition: First, euphemism as a kind of linguistic phenomenon is an important means for people to communicate with each other in certain occasions. People usually manage to avoid words that may irritate both parties or spoil their relationship, but use a form of euphemism express ideas and exchange information instead. Second, euphemism as a social culture phenomenon has infiltrated into all fields of our daily life, reflecting a widespread social phenomena or people's psychology, for example, given dodge, taboo, and etiquette, etc. (Pilgramm et al., 2010). The euphemism phraseology described here is not exactly identical to that in rhetoric because it seems to be more a semantic means as a way people use to express their thoughts. Euphemism is not so much a kind of means as a purpose of rhetoric. It floods in the languages in many forms, such as metaphor, metonymy, pun, antiphase, and character-dividing, etc., for the purpose of "euphemism" (Pilgramm et al., 2010). Scholars have also found many rhetorical phenomena that involve euphemism expression, so that in a specific context, the speaker adopts appropriate euphemisms to express linguistic politeness and decency (Coulson et al., 2002). The listener deduces what the speaker wants to express from shared information based on the cooperative principle, thus achieving a real effect as two parties desire (Croft et al., 2004). Euphemism is just a proper way to convey this ideal communication since it can use more implicative languages to express a variety of acidulous, unspeakable words (Glenberg et al., 1999). This kind of euphemistic words are the results from people's choice for linguistic text in a certain context, so that various rhetorical devices form by deliberately deviating from the convention, or conversational implications generate by violating the cooperative principle. This enriches the language expression means, achieves unique rhetorical meaning, and produces unique
linguistic effects. Here comes the simple analysis on the important rhetorical meaning and pragmatic values of euphemisms in speech communication based on the rhetorical devices of euphemistic terms and its violations of the cooperative principle (Glenberg et al., 2002).

The euphemism phenomenon is very prevalent and has found a wide range of applications. Since the sixteenth century, many scholars at home and abroad have made extensive studies on euphemisms from the perspectives of definitions, historical and culture backgrounds, social psychology, classification, composition forms, pragmatics, cognition, and contrasts between English and Chinese. The previous results are fruitful and have great reference value. Euphemism as a common Rhetorical means, originated from "word fetishism" in the diachronic dimension. Since then, civilization has emerged in the early days of human history (Halliday et al., 2004). Euphemism is widely used from the synchronic dimension. In daily life, it is a pleasant or hurtless substitute for those words that may offend or imply unpleasant things. The euphemism expression, as a cross-cultural phenomenon, is referred in many linguistic applications.

Euphemism has won the favor of scholars at home and abroad. Some linguists simply focus on four key aspects: 1) traditional linguistic learning, focusing on verbal learning, definition, history, evolution, and formation (Lai et al., 2009); 2) sociolinguistic study, it analyzes its cultural implications and social functions, especially the influence of religions on the euphemism generation and application, including race, relationship, customs, and geography; 3) pragmatic study including pragmatic functions, contextual dependence, and communication principles; 4) the construction process, occurrence mechanism and comprehension for explanatory meaning of cognition study. For the euphemism mechanism in Chinese literature, whether the abstraction of possible features in the process of the Chinese euphemisms is confirmed by electrophysiological data. According to study objectives, the modern academic circle questions the following cases: Is there any electrophysiological evidence that supports psychological reality? How to deduce the possible features of the Chinese euphemism construal? On this basis, this paper will answer for the above questions based on the results from ERP experiment.

Methods

Experimental preparation

This study uses data-driven analysis to conduct ERP experiments in attempt to explore the construal mechanism for euphemism in Chinese literary and demonstrate the genetic models associated with annotation symbols. In this study, the subjects are 24 master graduate students, who belong to English-speaking Chinese. Thirty sets of sentences are used as experimental materials, each of which includes three sentences as euphemistic, literal and irrelevant sentences, and two probe words. The experimental procedure comes here as follows: 1) give a context sentence, and then a critical sentence, and randomize both. 2) give two probe words, and the subjects are required to read the sentences and carefully judge whether they are true or false. 3) give a declarative sentence, the subject needs to determine what this sentence means. The declarative sentence is consistent with the context and the critical sentence as appeared. Before it. Then we collect behavioral data, ERP data and EEG data for analysis, design experimental materials and processes and program with e-prime 2.0. Behavioral data and ERP data are acquired and neuoscan4.5 SynAmps2. 4) repeat the measurement of ANOVAs and the paired sample T-test is performed by SPSS 16.0.

Study

After the requisite preparations, the subjects are required to sit in front of the laboratory computer in a calm and relaxed state. Additionally, they are not allowed to frequently move about during the experiment, avoiding frequent blinking as far as possible, keeping their bodies and heads in a stable state. They should devote themselves to the experimental tasks in order to avoid useless EEGs caused by unnecessary thinking. After the above requirements are fully conveyed to the subjects, formal experiment is started. After a fixed point "+" appears in the center of the screen, the subject is asked to focus on the point, and move with the point "+". At this time, a contextual euphemistic sentence is randomly given under this state. Then the subjects need to carefully read the sentence to make an interaction, After that, the sentence is changed into two answers. Now the subjects are required to determine whether the answer is true or not; whether the answer is the same as what the underlined words mean. If the answer is true, the subjects press the "F" button; otherwise press the "J" button.
In the new experiment, 1) a fixed sign "+" appears on the screen after 500ms, followed by the 500ms screen blank period. Once again, a context sentence reappears, and then disappears after 3500 ms, subsequently followed by a blank screen for 500 ms. A key sentence appears and holds for 2000ms. The screen is then blank until a 500ms later. Then the two answers are only displayed for 500ms. 2) the subjects need to select the answer in the blank period. Repeat the above procedures to press the "F" button or the "J" button. The difference is that they can select the question mark if they are not sure. Similarly, for the key sentence, it is necessary for them to determine whether the probe word has the same meaning as the underlined words are, if yes, press the "F" key; if no, press the "J" key. In the end, the declarative sentence is maintained continuously.

Fig. 1 shows the flow chart of this experiment.

As shown in Fig. 1, each set of material consists of a context sentence, three critical sentences, two probe words, and one declarative sentence; each context sentence, every two probe words, and each declarative sentence appear with the rhetoric, literally irrelevant sentences together, see Table 1 for details of panel.

The way the material is presented is shown above. Then the test will be conducted twice for each one.

![Flow chart of the experiment](image)

**Figure 1.** The procedure of a trial in the experiment

**Table 1.** Details of the panel

<table>
<thead>
<tr>
<th>Prime1: Context sentences</th>
<th>Prime2: Context sentences</th>
<th>Ptimulus1: Probe word</th>
<th>Ptimulus2: Declarative sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xiao pan is rich and young. Great never did the housework</td>
<td>Her family has invited two aunts.</td>
<td>Maid</td>
<td>Xiao pan does not have to do housework from childhood.</td>
</tr>
<tr>
<td>Xiao pan is rich and young. Great never did the housework</td>
<td>Her family has invited two nannies.</td>
<td>Maid</td>
<td>Xiao pan does not have to do housework from childhood.</td>
</tr>
<tr>
<td>Xiao pan is rich and young. Great never did the housework</td>
<td>Her family invited two spectators.</td>
<td>Maid</td>
<td>Xiao pan does not have to do housework from childhood.</td>
</tr>
</tbody>
</table>

**Table 2.** Results of behavioral data of detecting words in three conditions: metaphorical sentences, straight sentences and irrelevant sentences.

<table>
<thead>
<tr>
<th>category</th>
<th>Number of subjects</th>
<th>Mean of reaction</th>
<th>Correct rate of detection words</th>
<th>Declarative sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euphemism</td>
<td>24</td>
<td>782.33 ±115.92</td>
<td>99.80 ±0.573</td>
<td>81.20 ±3.665</td>
</tr>
<tr>
<td>Straight sentence</td>
<td>24</td>
<td>882.9±180.65</td>
<td>99.53 ±0.841</td>
<td>81.99 ±3.851</td>
</tr>
<tr>
<td>Irrelevant sentence</td>
<td>24</td>
<td>957.3±320.73</td>
<td>100 ±0.000</td>
<td>80.88 ±4.884</td>
</tr>
</tbody>
</table>
Results and discussion

Behavioral data results

26 subjects involve in the experiment. The results from two of them are removed due to too many artifacts and. In the end, behavioral data of 24 subjects are collected and analyzed with SPSS19. 0. We obtain the results shown in Table 2.

As can be seen from Table 2, it is higher correctness when judging on whether the declarative sentence is true or not in the forms of the literal sentence, the euphemism sentence and the irrelevant sentence, which shows that the subjects are serious in the experiment and understood the meanings of the sentences. The durations of their responses to the true and false judgments of the probe words under the three types of sentence conditions are: the euphemism sentence is 782. 33ms, the literal sentence is 882.96ms and the irrelevant sentence is 957.38ms. Obviously, subjects have a fastest response to the probe words under euphemistic conditions.

ERPs data results

This experiment uses Neuroscan 4.5 to perform off-line analysis on the collected ERP data of 15 electrodes (FPZ, FP1, FP2, FZ, FCZ, F3, F4, CZ, C3, C4, CPZ, PZ, P3, P4, POZ). As shown in Fig. 2 and 3, there are EEGs on some electrodes when probe words are judged true or false. Due to the fact that there is not EEG on the parietal region since it has no any disparity in the true and false judgment types for the probe words in the three sentence conditions. Only the EEGs of 9 electrodes are presented. The EEG data uses a 3×3×3 repetitive measurement and variance analysis (RMANOVA), namely three conditions (euphemism, literal and irrelevant sentences), brain regions (frontal, central, parietal regions) and hemisphere (left, middle, right). At last, we choose 310-560ms time window to analyze EEG data.

Conclusion and outlook

The maximum average response time to the probe words in literal sense is the shortest, only 906.14ms; while in the euphemistic sentence, it reaches 915.69ms; in the condition of irrelevant sentences, it hits upon 1052.53ms, the longest time. The grand average response time to the probe words in the euphemistic sentence is significantly lower than that of the irrelevant sentence. In the average literal sense, the response time to the probe words is significantly shorter than that in the unrelated sentences. However, for probe words under the euphemistic text, there is no significant difference in the total average response time conditions.

References


