



The priming effect of translation equivalents across languages for concrete and abstract words



Baoguo Chen ^{a,*}, Lijuan Liang ^a, Peng Cui ^a, Susan Dunlap ^b

^a School of Psychology, Beijing Normal University, Beijing 100875, China

^b Children's Learning Institute, University of TX Health Science Center at Houston, USA

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ABSTRACT

The present study used a masked priming paradigm and two language tasks (lexical decision, semantic categorical judgment) to investigate whether concrete and abstract words share the same degree of conceptual representation across languages for bilinguals. The results showed that the priming effect of translation equivalents did not differ for concrete and abstract words in the lexical decision task, in both prime-target directions (in Experiment 1). The same results were also found in the semantic categorical judgment task in either prime-target direction (in Experiment 2). Our results do not provide support for the representation difference hypothesis of concrete and abstract words of Distributed Representation Model (De Groot, 1992a, 1992b; Van Hell & De Groot, 1998), which assumes that concrete words share more semantic components in the conceptual representations across languages, compared with abstract words. Rather, our findings suggest that both concrete and abstract words have the same degree of overlap in conceptual representations across a bilingual's two languages.

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1. Introduction

The concreteness effect refers to the processing advantage for concrete words over abstract words. Some researchers have observed concreteness effect in many language tasks including translation. For example, De Groot (1992a) found that concrete words were responded much more quickly than abstract words in a translation task. De Groot, Dannenburg, and Vanhell (1994) found that response times were affected by concreteness in both forward (from L1 to L2) and backward (from L2 to L1) translation. Further studies (De Groot & Poot, 1997; Van Hell & De Groot, 1998) showed that concrete words have more word-association links between L1 and L2, which ensures that translation equivalents can be activated much more quickly.

Since the concreteness effect found in translation task involves the representation of translation equivalents across languages for different types of words, theoretical explanations have been made for this phenomenon. For example, De Groot and colleagues (De Groot, 1992a, 1992b; Van Hell & De Groot, 1998) proposed the Distributed Representation Model (DRM), which assumes that for bilinguals the conceptual representations for words in either language, consisting of conceptual nodes or semantic features, are distributive. Translation equivalents have both shared and separate meaning components. However, the conceptual nodes shared by the translation equivalents are different

for concrete and abstract words. Concrete words usually have similar conceptual representations across languages, while those for abstract words are quite different. Semantic activation in abstract words relies more on context. Therefore, concrete words share most or all components across languages and abstract words share a smaller proportion of their components. For example, the concrete word “father” shares all conceptual nodes with its translation equivalent across any two languages, whereas the abstract word “idea” shares only some conceptual nodes with its translation equivalent. According to the DRM, the time needed for translation and the priming effect of translation equivalents depend on the proportion of conceptual nodes shared by the L1 and the associating L2 words. The more conceptual nodes shared, the easier translation will be.

However, other researches have not supported the assumption that concrete words share more conceptual nodes across languages than abstract words. For instance, the advantage for concrete words vanishes when concrete and abstract words are matched in context availability (Van Hell & De Groot, 1998), which means that abstract words do not necessarily share fewer components across languages than concrete words.

Recently, Francis and Goldmann (2011) compared the degree of conceptual overlap between L1 and L2 for concrete and abstract words, using repetition priming methodology. Spanish–English bilinguals were asked to make concrete–abstract decisions on English and Spanish nouns in the encoding phase, which had two blocks, one in English and one in Spanish. Each block had 100 experimental trials.

* Corresponding author. Tel.: +86 10 5880 4071.
E-mail address: Chenbg@bnu.edu.cn (B. Chen).

The test phase also had two blocks, one in English and one in Spanish, each consisting of 50 items previously presented in English, 50 items previously presented in Spanish, and 50 new items. The task was to decide whether the words were concrete or abstract in meaning. Significant between-language priming was elicited for both concrete and abstract nouns, and these effects were of equivalent size, suggesting that translation equivalents of concrete nouns do not share more semantic components than those of abstract nouns.

On the whole, agreement has not been reached yet on whether the degree of overlap in conceptual representations of translation equivalents differs for concrete and abstract words. So, the present study focused on the concreteness of words, and explored the above question. Specifically, the main purpose of the present study was to investigate whether concrete and abstract words shared the same degree of conceptual representation across languages.

One method used to determine the degree of shared representation is through cross-language masked translation priming paradigm, in which words of one language are used to prime their translation equivalents of the other language with forward and/or backward mask and participants are asked to perform a lexical decision or semantic categorical judgment task. The advantage of using this paradigm is to guarantee more automatic word recognition processing since the participant is unaware of the prime and its relationship to the target. Therefore, masked translation priming avoids strategic influences. Using cross-language masked translation priming paradigm, many previous studies (Basnight-Brown & Altarriba, 2007; De Groot & Nas, 1991; Duyck & Warlop, 2009; Finkbeiner, Forster, Nicol, & Nakamura, 2004; Gollan, Forster, & Frost, 1997; Jiang, 1999; Jiang & Forster, 2001; Kim & Davis, 2003; Voga & Grainger, 2007) have observed priming effects of translation equivalents when the prime is in the participants' first language (L1) and the target is in their second language (L2). However, smaller priming effects – or even no priming effects – were found in the direction of L2–L1.

This cross-language translation priming asymmetry has been found across various language pairs using a lexical decision task. For example, Gollan et al. (1997) investigated the priming effect of translation equivalents across languages in Hebrew–English bilinguals, and found a priming effect between non-cognate words in the direction of L1–L2, but not in L2–L1. Jiang (1999) also observed a priming effect of translation equivalents in Chinese–English bilinguals in the direction of L1–L2, but not in the L2–L1 direction. Moreover, a cross-language translation priming asymmetry was also observed in Japanese–English, Korean–English, and Greek–French bilinguals (Finkbeiner et al., 2004; Kim & Davis, 2003; Voga & Grainger, 2007).

According to DRM, for unbalanced bilinguals (fluency in L2 is much weaker than fluency in L1), the semantic representation is richer for L1 words than for L2 words. Word translation time and the priming effect of translation equivalents depend on the proportion of conceptual nodes shared by the L1 word and the L2 word. More conceptual nodes will be activated by L1 words than by L2 words, thus the priming effect in the L1–L2 direction is larger than that in the L2–L1 direction. As for the semantic representation of concrete and abstract words, it assumes that there is more overlap in the semantic representations of translation equivalents for concrete words than for abstract words. More conceptual nodes are shared by the concrete word pairs than that by the abstract pairs. Hereafter, this hypothesis will be called the representation difference hypothesis of concrete and abstract words of DRM in the present study. According to this hypothesis, the priming effect of translation equivalents should be larger for concrete words than for abstract words.

Even though cross-language masked translation priming is a good way to explore the degree of shared representation between L1 and L2 representation, until now, only Schoonbaert, Duyck, Brysbaert, and Hartsuiker's (2009) study has used a masked priming paradigm to compare priming effect differences between concrete and abstract words and did not find a significant concreteness effect in the lexical decision task. Although they didn't get a significant concreteness effect,

they do acknowledge the concreteness pattern in the data and argue that it is theoretically consistent with their revised version of the DRM. However, it should be noted that Schoonbaert and colleagues' study focused on the quantitative or qualitative difference between L1 and L2 representation instead of the representation difference between concrete and abstract words. Besides, masked translation priming paradigm has not been used to explore priming effect differences between concrete and abstract words in a semantic categorical judgment task.

Based on the above analysis, we reckon that the question whether both concrete and abstract words have the same degree of overlap in conceptual representations across languages still needs further investigation. Therefore, the present study aimed to further explore this issue using a masked priming paradigm and two different language tasks and test the representation difference hypothesis of concrete and abstract words of DRM.

Two experiments were conducted. Experiment 1 focused on the priming effect in a lexical decision task in both L1–L2 and L2–L1 priming direction. Experiment 2 focused on the priming effect in a semantic categorical judgment task in both priming direction. According to the representation difference hypothesis of concrete and abstract words of DRM, the priming effect of translation equivalents should be larger for concrete words than for abstract words, since the conceptual representation overlap of translation equivalents is greater for concrete words than for abstract words. On the contrary, if concrete and abstract words do not differ in the priming effect, they should be similar in the degree of conceptual overlap of translation equivalents and argue against the representation difference hypothesis of DRM.

Finally, we should point out that the present study was not concerned with the theoretical argument of whether the cross-language translation priming asymmetry is a qualitative one (priming exists from L1 to L2, but not from L2 to L1) or a quantitative one (priming is stronger from L1 to L2 than from L2 to L1) (Schoonbaert et al., 2009). The focus was on the issue of whether concrete and abstract words have the same degree of overlap in conceptual representations across languages.

2. Experiment 1

Experiment 1 focused on the priming effect of translation equivalents for concrete and abstract words in a lexical decision task.

2.1. Participants

Participants were 40 Chinese–English bilingual college students (12 male), with a mean age of 23 years old (age range was 18–30 years), recruited from Beijing Normal University. Their average age of acquisition of English was 10.5 years old.

All of the participants passed the College English Test Band 4 (CET-4), which is a test designed by the Ministry of Education of China and used in Chinese universities to evaluate the English listening, reading, writing, and comprehensive ability of non-English majors. Their average score on the Oxford Placement Test was 39.2 ($SD = 4.37$). This test comprises 25 multiple choice questions and a cloze test, and the maximum score is 50. Furthermore, based on a six-point scale assessment (1 for “quite poor”, 6 for “highly proficient”), their self-reported ratings for listening, speaking, reading, and writing were 3.57 ($SD = 0.86$), 3.43 ($SD = 0.83$), 2.98 ($SD = 0.98$), and 3.38 ($SD = 1.13$) respectively. Roughly speaking, the participants were late, unbalanced Chinese–English bilinguals with intermediate L2 proficiency. All students were paid for their participation in the experiments.

2.2. Design

We used a 2 (prime type: translation, unrelated) \times 2 (concreteness: concrete, abstract) \times 2 (prime direction: L1–L2, L2–L1) within-participants design.

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