Proceedings of the 2nd International Conference on Social Psychology and Humanity Studies
DOI: 10.54254/2753-7048/51/20240955

The L2 Proficiency Effect on Mentalizing Abilities by Tibetan-Chinese-English Trilinguals

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Abstract: This study investigates the mentalizing performances of Tibetan-Chinese-English trilinguals with different L2 proficiency, using the "Reading the Mind in the Eyes Test" accuracy as a measurement index. The results indicated that trilinguals proficient in both Tibetan and Chinese outperformed those proficient in Tibetan and relatively proficient in Chinese in mentalizing abilities. A survey on language background revealed a positive correlation between L2 proficiency and L2 usage frequency. For Tibetan-Chinese-English trilinguals, Chinese proficiency and usage frequency may have significant effects on their development of mentalizing abilities and involvement in social interaction.

***Keywords*:** Mentalizing Abilities, Tibetan-Chinese-English Trilinguals, L2 Proficiency, Usage Frequency

1. Introduction

In social interaction, mentalizing helps individuals infer thoughts, feelings, beliefs, and goals of another person. Mentalizing is also referred to as "theory of mind", "mind reading", and "social intelligence", and overlaps with the term "empathy" [1]. It is a dynamic and flexible form of social cognition that aids in the understanding of others' intentions and actions, allowing people to better navigate social situations and empathize with and predict the behavior of others [2]. There is a growing literature demonstrating that bilinguals exhibit greater mentalizing capacities compared to monolinguals across the lifespan [3] and greater L2 experience or proficiency can enhance bilinguals' mentalizing performance [4]. However, one research shows adult multilinguals and bilinguals have different performances on the Reading-the-Mind-in-the-Eyes Test (RMET), the most widely used measure of mentalizing abilities [2], which highlights the need to differentiate multilinguals from bilinguals in research on multilingualism and cognition. Therefore, this study aims to explore whether L2 proficiency could also affect mentalizing abilities for adult trilinguals.

2. Literature Review

2.1. Bilingualism and Mentalizing Abilities in Adults

Empirical studies have shown that adult bilinguals exhibited greater mentalizing abilities compared to monolinguals [5], owing to bilinguals' enhanced executive functions, greater metalinguistic

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awareness [6], and strengthened social-pragmatic flexibility [7]. However, bilinguals also vary in meaningful and consequential ways within group and greater bilingual experience may promote pragmatic awareness and attention to social information, two core components of mentalizing [4]. For instance, some research has revealed that low L2 fluency related to greater difficulty in making "complex inferences" (i.e., pragmatic inferences) during text reading [8], whereas higher L2 proficiency enhanced irony comprehension [9]. Verbal irony is a common form of implicature that depends on successful mentalizing [10]. Furthermore, diverse sociolinguistic environments could also enhance mentalizing, even for monolinguals [7].

2.2. Multilingualism and Mentalizing Abilities in Adults

The cognitive processes of humans are significantly reliant on their linguistic abilities, yet far less is known about whether the mind is shaped based on number of languages used, and what potential impact multilingualism might have on social cognition [2]. Some scholars argued that individuals fluent in two or more languages possessed bilingual cognitive advantages [9]. However, one research found that adult monolinguals and multilinguals did not differ much in their mentalizing abilities on the RMET while bilinguals performed the worst, underscoring the necessity to differentiate between multilinguals and bilinguals in research on language and cognition [2]. But the impact of language proficiency on multilinguals' mentalizing abilities remains unexplored. Scholars have noted that higher levels of multilingualism were associated with higher levels of cultural empathy, thus greater ability to emphasize the feelings, thoughts, and behaviors of individuals from a different cultural background [11].

2.3. Research Objective

If bilingual experience can promote mentalizing abilities, can greater language experiences also enhance mentalizing performance for multilinguals? Given the above, this study focuses on the mentalizing differences within the multilingual group, targeted at Tibetan-Chinese-English trilinguals to examine the L2 proficiency effect on their mentalizing abilities.

3. Research Methods

3.1. Participants

A total of 100 Tibetan-Chinese-English trilinguals were recruited in this study and they were all first-year university students in Northwestern China. All participants were adults, with an average age of 19.46 years (SD = 1.20), and 74% of them were female. Prior to the experiment, the participants completed background information questionnaires adopted from previous research [12]. Results indicated that the average age of starting learning Tibetan, Chinese, and English was 1, 7.4 and 10.7 years old. Their language proficiency was self-reported on a ten-point scale (1 = lowest proficiency, 10 = highest proficiency). Their average Tibetan, Chinese, and English proficiency was 8.5, 7.5 and 4.0. The current use of languages showed that participants reported 48.2% average use of Tibetan, 51.5% for Chinese and 9.2% for English on campus; 89.3% for Tibetan, 23.6% for Chinese, and 2.1% for English at home.

Participants were divided into two groups according to their relative proficiency in L2: those proficient in L2 (L2 higher-level group) and those relatively proficient in L2 (L2 lower-level group), with 50 individuals in each group comprising 13 males and 37 females. Results showed average proficiency of 8.4 for Tibetan, 7.9 for Chinese, and 4.0 for English among L2 higher-level group. Analysis of variance showed no significant differences between Tibetan and Chinese proficiency ($F = 0.653$, $p = 0.071$), but significant differences were found between Tibetan and English ($F = 2.312$,

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p = 0.000) and between Chinese and English (F = 0.470, p = 0.000). For L2 lower-level group, their average Tibetan, Chinese and English proficiency was 8.7, 7.1 and 3.9. Analysis of variance showed significant differences between Tibetan and Chinese (F = 1.684, p = 0.000), Tibetan and English (F = 4.927, p = 0.000), and Chinese and English (F = 0.742, p = 0.000). Comparing the two groups, Chinese proficiency of L2 higher-level group was significantly higher than that of L2 lower-level group, while there were no significant differences in Tibetan (F = 0.350, p = 0.308) or English (F = 0.073, p = 0.952) proficiency.

3.2. Materials and Procedure

The most widely used measure of mentalizing ability in adults, the Reading-the-Mind-in-the-Eyes Test, was employed in this study [1], which involved recognizing emotions from facial cues [2]. As shown in Figure 1, participants were required to recognize mental states based on a grayscale image of their eye-region (e.g., ashamed, nervous) and choose which of four possible adjectives best describes what the person was thinking or feeling. The RMET was scored as the total number of items answered correctly, out of a maximum of 36. The English version of the RMET has been translated into many languages, and the Chinese version employed in this experiment was derived from the Autism Research Center by University of Cambridge, translated and compiled by Chinese People's Liberation Army General Hospital, available for download at https://docs.autismresearchcentre.com/tests/EyesTest_Chinese.zip.

Figure 1: Chinese Version of the RMET.

Note: The four words denote ashamed, nervous, suspicious, and indecisive.

The experiment was conducted in a paper-and-pencil format. Participants gave informed consent and completed the background information questionnaire and the RMET independently in a quiet environment, without time limitation. Before the experiment, they were informed that a personalized report of results would be sent to them via their email, if they provided their email address. It was thought that this would motivate participants [13].

4. Results

Analyses were conducted in SPSS 17.0 and RStudio (version 4.2.3).

The average RMET accuracy was 23 of 36 items correct (52%; M = 23.04, SD = 3.02), ranging from 13 to 29. Consistent with previous findings, having more years of experience speaking a foreign language was associated with higher RMET scores (F=3.961; p=0.049). Results for RMET scores between the two groups were presented in Table 1.

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Table 1: Results for RMET Scores between the Two Groups

Group	N	M	SD	Min	Max	p
L2 higher-level group	50	23.82	3.38	17	29	0.018
L2 lower-level group	50	22.26	3.10	13	29	

Levene's Test of Equality of Error Variances speculated the equal variance between the scores of the two groups ($p = 0.122$). Independent samples t-test results showed that L2 higher-level group exhibit higher mentalizing accuracy than L2 lower-level group ($F = 2.437$, $p = 0.018$).

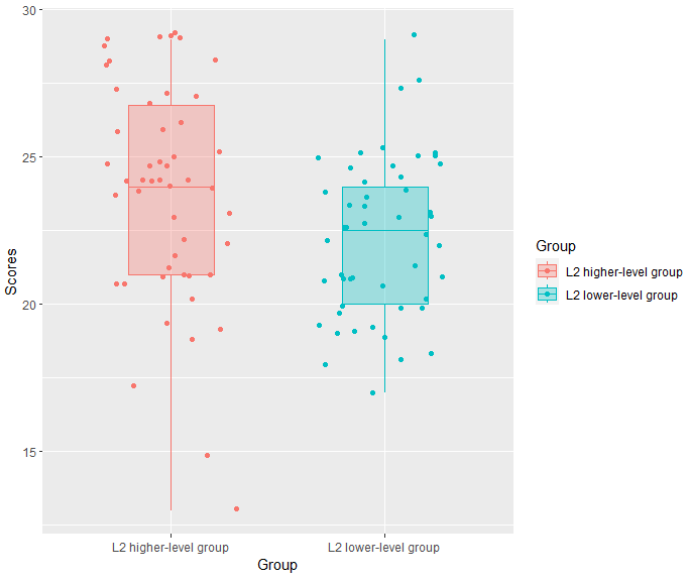

Figure 2: L2 Proficiency and Mentalizing Abilities

According to the background information questionnaire, participants' Chinese proficiency was positively correlated with the use percentage of Chinese on campus ($r = 0.231$, $p = 0.021$) and at home ($r = 0.258$, $p = 0.009$). In other words, highly proficient L2 users are also frequent L2 users. According to the results of Levene's Test of Equality of Error Variances, average usage frequency on campus of the two groups supported the assumption of equal variance ($p = 0.679$). Independent sample t-test results showed that L2 higher-level group used Chinese significantly more frequently on campus ($M = 54.78\%$) compared to L2 lower-level group ($M = 44.98\%$; $F = 0.049$, $p = 0.040$). Similarly, Levene's Test of Equality of Error Variances did not speculate the equal variance between the scores of the two groups ($p = 0.001$), but after logarithmic transformation, it supported the assumption of equal variance ($p = 0.616$). Independent sample t-test results revealed that L2 higher-level group used Chinese more frequently at home ($M = 20.42\%$) compared to L2 lower-level group ($M = 10.46\%$; $F = 0.253$, $p = 0.010$)

5. Discussion

Participants in this study were all Tibetan first-year college students from the same cultural background in Northwestern China, all of whom were rigorously selected and admitted to the

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university. The RMET consisted of 36 photographs of the eye region of actors and actresses from different countries.

Results showed that higher L2 proficiency was associated with higher mentalizing accuracy, consistent with previous findings suggesting that advanced knowledge of more languages and frequent use of more languages were linked to higher levels of cultural empathy [11]. Items include 'Tries to understand other people's behavior' and 'Pays attention to the emotions of others'. Their research indicated that multilingual individuals who used different languages regularly were less likely to have rigid prejudiced attitudes towards individuals from different cultural backgrounds and towards their cultural norms and values. They were also more likely to actively approach social situations and to build social networks quite easily. Hence, L2 proficient individuals were more capable of transcending cultural boundaries in recognizing emotions in the RMET.

It has been pointed out that having more opportunities to engage in novel social situations through the regular practicing of multiple languages, or greater language diversity, may expand one's understanding of the world and in turn their mentalizing abilities [9]. Early Exposure to a multilingual environment promotes effective communication [7]. This study also found that trilinguals who learned Chinese at an earlier age scored higher on RMET. Moreover, even passive involvement in greater language diversity could boost mentalizing performance. For instance, monolinguals growing up in a multilingual environment had better performance in perspective-taking tasks than those from a monolingual environment. The importance of a diverse language environment was highlighted in all these studies. There were no significant differences between the two groups in the frequency of L3 use neither on campus ($F = 0.101$, $p = 0.967$) nor at home ($F = 0.054$, $p = 0.599$). But highly proficient L2 users speak L2 relatively frequently both on campus and at home, whether actively or passively involved in L2 communication situations. They used foreign languages frequently to communicate with a more diverse group of people. In social interactions, they were well aware that people could come from different cultural backgrounds, speak different languages, thus having different ways of thinking [7], which led to strengthened social-pragmatic flexibility [4]. The social-pragmatic flexibility account is also aligned with social psychological research displaying that identification of self-other differences is a critical component of successful mentalizing. Speakers who experience greater language diversity may also experience other forms of diversity in their daily lives (e.g., racial, gender, class) [14]. Encoding these environmental differences may require high language diversity readers to exercise greater mentalizing. Future research could further explore the potential social mechanisms between sociolinguistic diversity and mentalizing.

Additionally, common measures of mentalizing abilities by previous studies, such as the empathy quotient [15], false belief tasks [16] were presented in the form of texts or verbal narratives, requiring participants to pay attention to subtle grammatical differences or narrative contexts. So certain level of language proficiency would be required. Existing research indicated that other, potentially social, or contextual, information (e.g., "paralinguistic cues") might compensate for low language proficiency during inference making of complex texts in the L2 [17]. The RMET used in this study, a typical emotion recognition paradigm, relied only on a series of photographs of the eye region, i.e., subtle non-verbal cues, to infer others' mental states, which reduced the impact of linguistic information on mentalizing to some extent.

6. Conclusion

This study targeted at Tibetan-Chinese-English trilinguals to explore the effect of L2 proficiency on mentalizing abilities. The results indicated that individuals proficient in L2 outperformed those relatively proficient in L2. Meanwhile, language background information revealed a significant positive correlation between L2 proficiency and L2 usage frequency both on campus and at home, suggesting that frequent L2 users exhibited greater mentalizing abilities than those who used L2 less

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frequently. For Tibetan-Chinese-English trilinguals, improving Chinese proficiency and frequency of use could have a positive impact on their development in mentalizing abilities, interpersonal relationships, and social interactions.

Acknowledgements

This research is funded by China's National Foundation for Social Science (Item No. 23BYY142) and Gansu Provincial Department of Education: Excellent Graduate "Innovation Star" Project 2023CXZX-032.

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