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Study of The Resolution of English Relative Clause Attachment Ambiguities by Trilingual Learners

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Abstract: The study of the relative clause (RC) attachment is important in revealing the internal psychological processes of processing ambiguous sentences. It is worth exploring whether the existing attachment hypotheses apply to second and third-language learners. This study used an offline sentence acceptance test method to conduct a relative clause attachment ambiguity bias experiment on 35 Chinese students whose second language is English and whose third language is Thai. Research has shown that the subjects do not exhibit a significant attachment bias when processing ambiguous sentences related to English and Thai relative clauses with the NP1 of NP2-RC structure, but exhibited significant proximity bias when processing ambiguous sentences with the NP1 of NP2-RC structure.

Keywords: Third language learners; Relative clause attachment; Ambiguity resolution

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1. Introduction

Research on the ambiguity resolution imposed by English relative clauses (RC) has become a hot topic in psycholinguistics and second language acquisition, which is important for the theoretical construction of the mother tongue and the acquisition of a second language. The study of the processing of RC is also an important perspective in sentence processing. The study of sentence processing containing ambiguity imposed by RC can help explore the differences in processing mechanisms between native and second language sentences, such as:

(1) The man shouted at [the tutor] of [the friend] who was wearing a white skirt.

The example sentence (1) contains a noun phrase with the structure of NP1 of NP2 (the tutor of the friend), and the relative clause "who was wearing a white skirt," which can be attached to both the first noun phrase, "the tutor" (NP1), and the second noun phrase, "the friend" (NP2). In the study of first language, English and Thai exhibit different attachment biases. According to Ye *et al*., English RC is attached to the second antecedent, showing a clear tendency towards NP2 attachment [1]. Wang *et al*.

found that Thai shows a clear NP1 attachment bias [2], as shown in example sentence (2).

(2) “The young girl admired [the driver] of [the actor] who was talking to an old woman.” (เด็กผู้หญิงชื่นชอบคนขับรถของนักแสดงที่พูดคุยกับหญิงชรา)

Although Thai and English RC structures are post-modifiers, there are different attachment biases, that is, Thai RC tends to be attached to “the driver” (NP1) rather than “the actor” (NP2). However, English has an opposite RC structure to Chinese but exhibits the same attachment bias. According to Shen *et al*., 2023, Chinese RC prefer NP2 attachment [3]. Meanwhile, second language (L2) English learners with different mother tongues also exhibit different attachment bias results. When the word “of” in the NP1 of NP2 phrase is replaced by “with,” L2 English learners exhibit the same NP2 attachment bias. In this study, there was no correspondence between NP1 with NP2 structures in Thai. However, Thai L2 English learners prefer NP2 attachment. Currently, there is little research on the RC attachment bias among trilingual learners, especially those who speak Thai as their third language. Hence, this study focuses on two questions. First, how do students who are native Chinese, have English as a second language English, and Thai as the third language process Thai ambiguous RC? Second, what kind of RC attachment bias do these students have towards English? This article aims to explore whether multilingual learners use the same processing strategies when processing ambiguous RC, or whether the processing of ambiguous sentences in three languages affects each other.

2. Ambiguous clause attachment strategies

In psycholinguistics and second language acquisition research, there are different attachment biases in the processing of ambiguous RC in first and second languages. Scholars use both offline and online methods to test the process of learners’ RC attachment to summarize different attachment strategies.

2.1. The Recency

Frazier argued that sentence parsers often attached new information to the current phrase being processed, known as the Late Closure principle [6]. Later, Gibson *et al*. proposed the Recency, which was a variant of the Late Closure principle [4]. The parser attaches RC to the nearest NP2. This processing strategy may be related to the limitation of the brain’s short-term memory. The Recency was supported by research data on subjects of different mother tongues, such as English and Turkish [5].

2.2. The Predicate Proximity Principle

Gibson *et al*. pointed out that the Predicate Proximity Principle, which required sentence constituents, was attached closely to the head of a predicate [6]. The predicate serves as the core of a sentence, and the subject or object determines the degree of closeness between the attributive and the predicate. A farther distance will activate the predicate to enable remote connections. In configurational languages, such as English, the predicate is worded directly before its object, with a relatively short distance and weak predicate activation. Hence, the nearest NP2 attachment tends to be the preferred choice. In languages such as Spanish, predicates can be non-adjacent to their objects and must be strongly activated, making NP1 the preferred choice as it is the node closest to the predicate.

2.3. The construal hypothesis

The Construal Hypothesis proposed by Frazier and Clifton proposed different processing strategies for the primary and nonprimary [6]. Modifiers and RC as nonprimary are related to the current scope of the discourse.

It is not possible to assign a theta role for a genitive case, so the most recent theta role assignment word would be the predicate. So, in the phrase "the tutor of the friend," the entire NP is within the scope of the current discourse. Assuming that the NPs contain the headword NP1 (the tutor) and the modifier NP2 (the friend), the referential determines which NP to attach RC to. Gilboy *et al*. pointed out that the central word of a phrase was referential, meaning that the discourse subject already existed in the discourse [7]. The referential property of the headword can enable the parser to connect RC to NP1. The language rules of Spanish, German, Dutch, French, and Greek determine that NP1 is the discourse subject. The RC should be attached to the discourse subject, namely NP1. Hence, English RC should prefer NP1 attachment, but this is inconsistent with the Recency. It may contribute to two genitive forms. The NP1 form of NP2 can avoid ambiguity. NP1 of NP2 form implies RC associated with NP2. However, it should be noted that if the word "of" is replaced by "with," NP2 can be obtained through the new scope of discourse "with," and the parser will attach RC to NP2. The claim was supported by data from Gilboy *et al*. on native Spanish and English learners who are native to Greek and German [7].

3. Cross-linguistic ambiguous related clause attachment preferences

Many scholars have researched L2 ambiguous RC. The results of online and offline research indicated that L2 learners exhibited three different biases. Firstly, second language learners are influenced by the native language NP1 attachment strategy. For example, the experimental results of Spanish English bilinguals showed that when Spanish dominates, the native language NP1 attachment strategy was transferred to L2 English learners. In addition, the data of different L2 learners also provide data support for the transfer of mother tongue NP1 attachment strategies, such as Filipino bilinguals and low-proficiency English learners whose native language is Persian [8,9].

Secondly, L2 learners adopt an NP2 attachment bias. Dussias investigated the attachment bias of late Spanish English bilinguals using offline and online experiments [13]. The results indicated that the subjects tend to apply Recency, which does not support the claim that native language processing strategies are transferred. The same results have also been validated in Persian English learners with high working memory abilities, as well as highly proficient Persian native English learners [10].

Thirdly, L2 learners did not show a significant NP attachment bias. High-proficiency English learners whose native language was Greek and German in the online experiment did not show a significant attachment bias. However, in N1-with-N2-RC ambiguous RC, both L2 groups tend to proximity, and this result also does not support the transfer of native language processing strategies and the Recency. Similar experimental results also existed among learners of both German and Spanish L2 learners of Greek, as well as research on Greek learners whose native languages are Spanish, German, and Russian. When the preposition is replaced with "with," each group tends to be closely related. Given the above results, the native language's NP1 attachment bias strategy plays a certain role, but sometimes the L2 NP2 attachment strategy can also have an impact, whereby learners may not use either of these two strategies. This indicates that the issue of whether L2 learners use first or second-language strategies has not yet been resolved.

There is no unified attachment bias based on current research data for the third language. An experiment was carried out with Russian trilingual learners whose mother tongue is Russian, L2 is French and L3 is English. Russian English learners were influenced by native English speakers in processing RC and students were more inclined to attach RC to NP2. When parsing French sentences, the NP1 attachment was more prominent. Therefore, the results were not consistent with the transfer from the mother tongue or processing

strategies for L2 [11]. However, in the study of Mongolian trilingual learners, both online and offline test results showed that Mongolian trilingual learners had the same NP2 attachment bias, while there was no significant difference in processing the word "with." It can be inferred that the transfer of processing strategies had a significant effect on the ambiguity resolution for Mongolian trilingual learners [12].

4. Experimental design

In this study, the researcher conducted two offline experiments. Experiment 1 examined the subject's attachment bias in Thai NP1-of-NP2-RC. Experiment 2 examined the subject's attachment bias in English NP1 of/with NP2-RC. The 35 participants in both experiments were third-year students majoring in Thai language at a university in Guangxi, with their mother tongue being Chinese, second language being English, and third language being Thai. All 35 participants studied English for more than 10 years and studied Thai for 3 years. The experimental method was offline acceptance testing. The test included English and Thai questionnaires with different contents. To avoid students becoming aware of the purpose of testing purpose and affecting the test results, the Thai questionnaire included 10 experimental sentences and 23 fillers. The English questionnaire included 10 experimental sentences with NP1 of NP2-RC structure, 10 experimental sentences with NP1 with NP2-RC structure, and 35 fillers. To achieve the best test results and reflect the true sentence processing of the subjects, basic vocabulary words were used and the subjects were required to respond with their first reaction. Time constraints were also used to reduce the possibility of interference caused by repeated thinking and unsureness.

5. Results

A total of 35 test questionnaires were distributed and collected, all of which are valid data and can be used for the next data analysis. A t-test was used to analyze the bias of participants in Thai NP1 of NP2-RC and English NP1 of/with NP2-RC, respectively. Research data showed that there was no significant difference in the attachment bias of Thai ($t = 1.501$, $P > 0.05$). However, it can be seen from the mean values of attachment NP1 (5.46 ± 2.55) and NP2 (4.54 ± 2.55) that participants were slightly inclined to attachment NP1. In the English NP1-of-NP2-RC structure, the mean values of NP1 and NP2 attachment bias of the subjects were 5.09 and 4.91, respectively, and there was no significant difference ($t = 0.285$, $P > 0.05$). However, when dealing with NP1 with NP2-RC, the subjects showed a significant NP2 attachment bias ($t = -2.917$, $P < 0.05$).

6. Discussion

In Experiment 1, learners of Chinese as their mother tongue, English as their second language, and Thai as their third language did not show a significant attachment bias in Thai. This was inconsistent with the NP2 or NP1 bias mentioned earlier, including the NP2 bias in monolingual Chinese, the NP2 bias in monolingual English, and the NP1 bias in Thai. It indicates that the subjects were not affected by the transfer of native language NP2 bias strategy or the influence of second language NP2 strategy, and the transfer of third language NP1 attachment bias was not significant. It can be seen that third-language learners may use different sentence-processing strategies compared to native and second-language learners. Due to the need to manipulate three different language systems simultaneously, participants are not as sensitive to the requirements of configurational language working memory, hence they are less inclined to associate the sentence components to be processed with the processing. Nonetheless, the attributes of configurational language do not highlight the

advantage of the Recency over the Predicate Proximity principle. The use of the Construal hypothesis strategies reflected in native Thai did not show significant differences among third-language Thai learners. Meanwhile, due to the short learning time for the trilingual Thai language, the advantages of Thai processing strategies were not highlighted but cross-language processing strategies may influence each other and achieve some balance.

In Experiment 2, there was no significant difference in L2 English among the participants. The research results indicated that Recency in both first and second languages does not demonstrate an advantageous position in processing ambiguous RC in English. This was inconsistent with the research results of Shen and Chen [3, 12]. The reason may be influenced by the NP1 attachment bias of the third language Thai. On the other hand, when the subjects processed the NP1 with NP2-RC ambiguous RC, the indicative nature of the Construal hypothesis determined that "with" assigned the theta role to NP2. There was no significant difference in the biased processing of NP1-of-NP2-RC ambiguous RC between L2 English and third language Thai in both experiments, indicating that a mother tongue, second language, or third language strategy did exhibit a prominent effect. The subjects may be influenced by cross-linguistic processing strategies, or there may be some unique processing strategy in the process of multilingual acquisition. However, when processing the preposition "with," it was consistent with the research results of many scholars, where participants chose the same processing strategy by attaching the RC to NP2**.**

7. Conclusion

The research findings raised questions about how the Recency, Predicate Proximity Principle, and Construal Hypotheses derived from first-language and second-language studies can be applied by multilingual learners in processing ambiguous RC. At the same time, questions about whether the transfer of native language NP1 attachment strategy and the influence of second language NP2 attachment strategy apply to the resolution of ambiguous RC in third language learners were raised. Multilingual learners may not simply utilize processing strategies of a particular language but are influenced by cross-language processing strategies. Further research is needed to confirm whether multilingual learners are dominated by a dominant language strategy. This study was limited to offline experiments for the resolution of cross-linguistic ambiguous RC. Further verification is needed to determine whether the online experiment supports this result.

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Disclosure statement

The authors declare no conflict of interest.

References

[1] Cheng Y, Rothman J, Cunnings I, 2021, Parsing preferences and individual differences in nonnative sentence processing: Evidence from eye movements [J]. Applied Psycholinguistics, 42(1): 129–151.

[2] Wang J, Singhapreecha P, 2022, High Attachment in Thai Learners' Processing of English Relative Clauses. LEARN Journal, 15(2): 263–299.

[3] Shen G, Scheepers C, Yao B, n.d., "Cross-linguistic Priming of Relative Clause Attachments in Mandarin-English

Bilinguals – the Effects of Branching Direction and Second Language Proficiency." PsyArXiv, viewed 9 November, 2023.

[4] Gibson E, Pearlmutter N, Canseco-Gonzalez E, et al., 1996, Recency Preferences in The Human Sentence Processing Mechanism. Cognition, 59(1): 23–59.

[5] Akal T, 2021, Recency Preference in Ambiguous Relative Clause Attachment in Turkish. Journal of Language and Linguistic Studies, 17(1): 139–159.

[6] Frazier L, Clifton C, 1996, Construal, MIT Press, United States.

[7] Gilboy E, Sopena J, Clifton C, et al., 1995, Argument Structure and Association Preferences in Spanish and English Complex NPs. Cognition, 54(2): 131–167.

[8] Jennifer R, Zhang J, 2022, A Study on the NP Attachment Preference of Tagalog-Dominant and Chinese-Dominant Bilinguals. Journal of English and Applied Linguistics, 1(1): 114–112.

[9] Karimi M, Samadi E, Babaii E, 2021, Relative Clause Attachment Ambiguity Resolution in L1-Persian Learners of L2 English: The Effects of Semantic Priming and Proficiency. Journal of Modern Research in English Language Studies, 8(1): 153–185.

[10] Marefat H, Farzizadeh B, 2018, Relative Clause Ambiguity Resolution in L1 and L2: Are Processing Strategies Transferred. Applied Linguistics, 21(1): 125–161.

[11] Sokolova M, Slabakova RA, 2022, Different Type of RC Attachment Resolution: Comparing Bilingual and Trilingual Processing. Generative SLA in the Age of Minimalism, 2022: 287–314.

[12] Chen S, 2018, A Study on The Ambiguity Resolution of English Relative Clauses by Mongolian Trilingual Learners, dissertation, Inner Mongolia Normal University.

[13] Dussias PE, 2003, Syntactic Ambiguity Resolution in L2 Learners: Some Effects of Bilinguality on L1 and L2 Processing Strategies. Studies in Second Language Acquisition, 25(4): 529–557.