

Exploring the Influence of Syntactic Structures on English Syntactic Priming

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Abstract: English syntactic structures are essential components in the process of learning English as a second language (ESL) and play a critical role in the acquisition process. Based on previous research, this paper discusses the impact of syntactic structures on English L2 syntactic priming among Chinese learners from three perspectives: research paradigms, priming structures, and the factors influencing priming effects. The findings indicate that, given syntactic structure interchangeability, different syntactic structures exhibit varying degrees of priming effects. Key factors such as L2 proficiency, syntactic usage preferences, and language structure—including both structural differences within English and similarities between the learner's native language and English—significantly affect the extent of these priming effects. These insights not only contribute to further research on English L2 syntactic priming but also provide practical guidance for ESL teaching, highlighting the importance of understanding these dynamics to improve language acquisition and instructional strategies. It also enables English as a second language learners to fully understand the mechanisms of syntactic priming effects, providing them with scientific learning methods, thereby allowing them to learn English more efficiently.

Keywords: syntactic priming, syntactic structures, English as a second language, Chinese learners, impact factors.

1. Introduction

Syntactic priming refers to the tendency of individuals to use syntactic structures that have been repeated before during language production [1]. It plays an important role in English second language learning. When teachers understand the mechanisms of syntactic priming, it is helpful to improve the traditional teaching mode and formulate an easier scheme to facilitate students' English production, and thereby enhance the teaching efficiency and course process. For students, syntactic priming is beneficial to reduce anxiety, increase learning efficiency and promote their English proficiency.

Current research on syntactic priming in English as a second language (ESL) in China mainly focuses on these influencing factors: syntactic representation [2], working memory [3], vocabulary enhancement effect [4]. Among these, as a crucial part of English study material, syntactic structures are affected by many factors in students' selection and production. The role of syntactic structure warrants attention. However, existing studies haven't discussed enough the influence of different syntactic structures in the ESL priming process and the factors that affect structure selection.

Therefore, it's necessary to explore how it influences ESL syntactic priming from the perspective of syntactic structure. By focusing on students' syntactic structure priming, teachers can guide students to select and produce target structures that are grammatically and semantically correct through reasonable and effective repetitive practice. This approach helps students overcome cognitive obstacles in learning English, increases their interest and confidence in learning, and ultimately aims to improve their ESL acquisition levels.

In this study, China National Knowledge Infrastructure was used to search for keywords such as "English structural priming", "English syntactic representation", "English second language priming", "English second language syntactic structure". After removing repetition through manual screening, 17 articles were retained according to their relevance and significance as the basis for discussion in this review.

2. Research Methods

The collected studies mainly use methods such as picture description paradigm, sentence completion paradigm, confederate-scripting paradigm and post-reading continuation task, for experimental research. The following sections will discuss these methods in detail.

2.1. Picture Description Paradigm

The picture description paradigm was first introduced by Bock [1]. It involves a priming exercise where participants are presented with priming sentences containing target structures. During the experiment, participants read and judge whether the sentences they encounter are the same as those from the priming exercise. Subsequently, participants are shown new pictures, each accompanied by an English verb underneath, and they are required to describe the events depicted using the given verbs. The occurrence of syntactic priming effects is determined by examining the consistency between the syntactic structures of the produced target sentences and the priming sentences. If the syntactic structures are identical, syntactic priming is considered to have occurred.

In the studies reviewed in this paper, nine papers employed the picture description paradigm. For example, Yang [4] used Double Object Sentences (DO) and Prepositional Object Sentences (PO) as priming structures to see if the DO/PO structures produced by participants were consistent with the priming structures, thereby determining if priming effects occurred. When using this method, it is important to insert filler sentences between the production of priming sentences and the target sentences to help participants disregard the syntactic structures they were previously exposed to and to conceal the true purpose of the experiment, thus reducing interference with the experimental data. Additionally, the interval time between changing pictures should be controlled to ensure that participants produce target sentences as their immediate reaction. This method effectively examines syntactic priming effects in individuals' English oral production and provides insights into their preferences for the two interchangeable structures.

2.2. Sentence Completion Paradigm

The sentence completion paradigm involves participants completing sentences provided by the experimenter based on their initial reaction. In the studies reviewed, five papers employed the sentence completion paradigm. Dai [5] used this method, where participants first completed priming sentences with a specific structure, followed by target sentences that could be completed using two syntactic structures. The syntactic priming effect was analyzed by the proportion of target structures used. In addition to priming sentences, the experimental materials also included conditional sentences and distractor fragments. Conditional sentences could be completed using the target syntactic structure or other structures, while distractor fragments were used to obscure the true purpose of the

experiment. This method is often used to study syntactic priming effects in written production and can effectively examine how different syntactic structures influence syntactic priming effects.

2.3. Confederate-Scripting Paradigm

The confederate-scripting paradigm, proposed by Branigan [6], is an experimental method where the experimenter and the participant alternately complete picture description tasks. The syntactic priming effect is determined by the consistency of the syntactic structures used in their sentences. In the studies reviewed in this paper, two papers employed this paradigm. Xia [7] used English embedded special questions as experimental materials. The experimenter first described a picture, and the participant repeated the sentence and selected a picture that matched the sentence content. Subsequently, the participant completed a sentence based on a newly provided picture, and the experimenter then described and matched the picture. This method is often used to study syntactic priming effects in communicative conversations. If both parties use consistent syntactic structures, it indicates the presence of syntactic priming effects. During communication, participants focus more on the meaning conveyed by the other's sentences and less on syntactic structure consistency, thus concealing the true purpose of the experiment and ensuring that the sentences produced by the participants are the result of their first reactions.

2.4. Post-Reading Continuation Task

The post-reading continuation task involves participants first reading an English story that contains target syntactic structures, with its ending removed. Participants then continue writing the subsequent development of the story. In the studies reviewed in this paper, two papers employed the post-reading continuation task. Wang [8] grouped participants based on their English proficiency. Two groups continued stories containing the target syntactic structures, while the other two groups continued versions without the target syntactic structures. The experimenter determined whether syntactic priming effects occurred by counting the number of target syntactic structures in the completed stories. This paradigm is used to explore syntactic priming at the discourse level in English. Compared to the previous three methods, the post-reading continuation task provides participants with more creative freedom, resulting in more imaginative content. However, this also presents challenges: participants might use other syntactic structures in their continuations, potentially affecting the priming effect. Therefore, it is recommended that, while maintaining coherence and semantic fluency, the experimenter pre-adjust the syntactic structures in the story to align with the target structures, thereby increasing the likelihood of participants using the target syntactic structures in their continuations.

3. Classification and Characteristics of Syntactic Structures

The syntactic structures selected for priming often follow the principle of syntactic interchangeability, frequently involving DO sentences, PO sentences, active and passive sentences, transitive and intransitive sentences, adverbial clauses, and embedded special interrogative sentences. The following sections will discuss each of these in detail.

3.1. DO and PO Sentences

DO and PO are syntactic structures that can be converted into each other without changing the sentence's meaning. DO emphasizes the act of transferring or giving, while PO focuses on the recipient of the action. However, there are differences in how learners choose and use these structures. Jia [9] used Chinese DO and PO sentences as prime sentences, employing a sentence completion paradigm to investigate the cross-linguistic syntactic priming effect by examining the output

proportion of English DO and PO sentences produced by participants. The results showed that both Chinese DO and PO sentences could successfully prime the English DO/PO structure. In intra-English priming, Sun [10] found that when PO was used as the prime sentence, the number of primed sentences was significantly higher than the number of unprimed sentences, showing a significant priming effect. However, when DO was used as the prime sentence, the number of primed sentences was lower than the number of unprimed sentences, indicating no priming effect. This suggests that differences in the frequency of syntactic structures influence the variation in priming effects among second language (L2) learners.

3.2. Active and Passive Sentences

Active and passive sentences are also syntactic structures that can be interchanged. Active sentences are characterized by their directness and clarity in expression, while passive sentences emphasize the action or result, making the description of events more formal and objective. Yan [11] used English active and passive sentences as prime sentences and employed a picture description paradigm to investigate syntactic priming effects within English. The results showed that, regardless of whether the prime sentence was active or passive, participants produced more active sentences than passive ones, indicating a preference for active structures. On the other hand, Chen [12] found that when the prime sentence was active, participants produced more active sentences than passive ones, and when the prime sentence was passive, participants produced more passive sentences than active ones. The difference in these results is attributed to the varying proficiency levels of participants in their second language, which will be discussed in detail in Section 4.

3.3. Transitive and Intransitive Sentences

Transitive and intransitive sentences are common structures in English learning. Transitive sentences clearly indicate the recipient of the action, whereas intransitive sentences can express the meaning fully without requiring an object. Zhao [13] used transitive and intransitive structures as prime sentences, dividing participants into high-proficiency and low-proficiency groups, and employed a sentence completion paradigm to investigate syntactic priming effects within English. The results indicated that low-proficiency participants consistently tended to produce intransitive structures and were not influenced by the priming effect. In contrast, high-proficiency participants demonstrated priming effects under different structural conditions. This suggests that the L2 proficiency of participants influences syntactic priming, consistent with studies on active and passive sentences.

3.4. Adverbial Clauses

Compared to the previous three syntactic structures, adverbial clauses have been less frequently studied in past research. The position of adverbial clauses is not fixed; placing them before or after the main clause does not affect the meaning of the sentence, consistent with the interchangeability principle used in priming structures. Wang [8] used preposed and postposed adverbial clauses in English as prime sentences, employing a post-reading continuation task to investigate priming within English. The results indicated that when the reading materials did not contain adverbial clauses, participants produced more preposed adverbial clauses, reflecting their natural usage tendency. However, when the reading materials contained preposed or postposed adverbial clauses as primes, participants tended to produce the corresponding primed structures, demonstrating that syntactic usage preferences influence the priming effect.

3.5. Embedded Special Interrogative Sentences

Embedded special interrogative sentences are relatively complex structures in English syntax. Second language learners often make mistakes with the word order in these clauses, confusing the subject and predicate; even native English speakers tend to make similar errors [14]. Therefore, acquiring this structure is quite challenging. Xia [7] used embedded special interrogative sentences in a sentence completion paradigm to study whether syntactic priming can promote the production of complex syntactic structures in English. The results showed that after the priming experiment, participants produced more target sentences with correct word order in embedded special interrogative sentences, indicating the facilitative effect of syntactic priming.

4. Influencing Factors

There are many factors that affect syntactic priming in second language learners. Below, we will focus on the impact of language proficiency, participant preferences, and language structure.

4.1. Language Proficiency

The degree of syntactic priming can vary depending on the language proficiency of second language learners. Experimental comparisons have shown that when using both active and passive sentence structures for priming, Yan [11] found that the priming effect of passive sentences was not significant among vocational college students, who were categorized as low-level English learners. On the other hand, Chen [12] observed a significant priming effect for passive sentences among university students majoring in English, both freshmen and seniors, who were high-level second language learners. This suggests that, compared to high-level learners, low-level learners have less stable syntactic representations and less exposure to low-frequency target syntactic structures, making it more challenging to achieve priming. This trend is also reflected in studies of transitive and intransitive structures [13]. However, Wang [15] found that the low-level group was more prone to syntactic priming compared to the high-level group. The discrepancy in research findings may be due to Wang's use of cross-linguistic priming, where Chinese was used to prime L2 English. Low-level learners often rely on their native language when producing sentences, as their abstract syntactic representations in the second language are not yet well established, resulting in a stronger L1-L2 cross-linguistic priming effect. In contrast, the high-level group, with more mature second language syntactic representations, is less dependent on their native language, leading to a weaker priming effect. Therefore, the influence of second language proficiency on priming effects should be considered separately under different conditions of intra-linguistic and cross-linguistic priming.

4.2. Participant Usage Preference

Syntactic usage preference refers to the phenomenon where, under conditions where two syntactic structures are interchangeable, an individual tends to favor one structure over the other in language expression. Diessel [16,17] found that native English speakers are more inclined to use postposed adverbial clauses in English. However, Wang [8] discovered that in the absence of target structure priming, Chinese participants tend to use preposed adverbial clauses in English. Since Chinese primarily uses preposed adverbial clause structures, Chinese native speakers learning English as a second language are influenced by their mother tongue when producing sentences, making them more likely to produce preposed adverbial clauses in English, which differs from the usage habits of native English speakers. Syntactic priming can also influence the syntactic usage preferences of second language learners. Wang [8] found that when postposed adverbial clauses in English were used as priming sentences, participants produced more postposed adverbial clauses. This indicates that

syntactic usage preference is not rigid and can be influenced by priming. Syntactic structure priming can alter the syntactic usage preferences of second language learners.

4.3. The Influence of Language Structural Factors

4.3.1. Intra-Language Structural Differences

In English-language priming experiments, previous research has shown that frequency differences between interchangeable priming structures can affect the syntactic priming effect. Bock [18] found that native English speakers use the DO construction much more frequently than the PO construction. Sun [10] discovered that Chinese English learners exhibited better priming effects with the PO structure than with the DO structure, indicating an inverse frequency effect, where low-frequency structures are more easily primed. This may be because low-frequency structures attract greater attention from learners, leading to more careful processing during priming. This suggests that the frequency of syntactic structures significantly impacts the production of DO and PO constructions in English. However, Dai [5] found that participants produced more DO than PO constructions during the priming phase. The reason for this difference is that Dai [5] used only DO constructions as the priming structure and increased the frequency of the priming structure during the experiment to reduce the influence of the inverse frequency effect on the results. This demonstrates that the frequency of intra-language structures significantly affects syntactic priming, and this influence can be adjusted by altering the frequency of the priming structure.

4.3.2. Inter-Language Structural Differences

In addition to the influence of intra-language structural differences, previous studies have also pointed out that structural differences between the mother tongue and the second language significantly affect the syntactic priming effect. Chen [12] found in Chinese-English cross-linguistic priming experiments that compared to active sentences, there was almost no priming effect for passive sentences. This is because the usage frequency of passive sentences differs greatly between Chinese and English. Passive sentences are widely used in formal contexts such as news reports and academic writing in English, with a much higher frequency than in Chinese. As a result, Chinese English learners, influenced by their native language, are less sensitive to passive sentences, less proficient in using them, and slower in acquiring this structure.

In the case of DO and PO structure priming, there is also a frequency difference between English and Chinese. In Chinese, the PO structure is a high-frequency and simple structure, while the DO structure is a low-frequency and complex structure, which is the opposite of the frequency patterns in English. Lin [19] used English DO and PO constructions as priming sentences and examined the cross-linguistic syntactic priming effect between L2 English and L1 Chinese. The results showed that the priming effect of the high-frequency DO in English was not significant, while the priming effect of the low-frequency PO was significant. This again reflects the influence of the high-frequency PO structure in Chinese on the use of English structures.

5. Conclusion

This study focuses on Chinese learners of English as a second language (L2) and examines the impact of syntactic structures on English L2 syntactic priming from three perspectives: research methods, the classification and characteristics of primed syntactic structures, and factors influencing syntactic priming effects. The results reveal that: 1) when syntactic structures are interchangeable, different structures exhibit varying degrees of priming effects; 2) factors such as L2 proficiency, syntactic usage preferences, and structural similarity can influence these effects. Through analysis, this study

identifies limitations in previous research: most studies on English syntactic priming have focused on double object (DO) and prepositional object (PO) constructions, as well as active and passive sentences, while other English syntactic structures remain underexplored. Moreover, limited research has been conducted on cross-linguistic priming between Chinese and English, and the specific impact of the native language on second language priming remains to be quantitatively assessed.

Future research could broaden the range of English syntactic structures studied and quantify the impact of structural similarity in cross-linguistic priming between Chinese and English. This would make the research more objective, comprehensive, and representative.

This study also provides practical insights for teaching English as an L2 in China. For listening and speaking, teachers could use the picture description paradigm to enhance students' oral expression skills. Additionally, the confederate script paradigm could be adopted to form study groups with students of different proficiency levels, improving listening comprehension and oral skills through communicative conversations. This approach would increase classroom engagement and promote interaction and enjoyment in English learning. In terms of writing, teachers could utilize sentence completion paradigms and post-reading writing tasks to assess students' mastery of English syntactic structures and their ability to apply them in writing. This would also foster creativity and innovation, ultimately enhancing students' overall English proficiency.

References

- [1] Bock, J. (1986). *Syntactic persistence in language production*. *Cognitive Psychology*, (18), 355-387.
- [2] Yang, K. & Wang, M & Wei, H. (2020). *The development trajectory of unbalanced bilinguals' L2 syntactic representations: Evidence from structural priming*. *Foreign Language Teaching and Research*, (06), 906-918+960-961.
- [3] Wei, R. & Jin, S. (2020). *The Effect of Working Memory in L2 Syntactic Priming*. *Foreign Languages Research*, (02), 63-69.
- [4] Huang, J. & Yang, Z. & Hong, D. & Liu, X. & Wang, S. (2022). *Different mechanisms for head and non-head words in the lexical boost effect on syntactic priming*. *Acta Psychologica Sinica*, (11), 1354-1365.
- [5] Dai, S. & Cheng J. (2021). *A Study on the Cumulative Effects of Structural Priming in the Written Output of Intermediate-Level L2 Learners in China*. *Journal of Xi'an International Studies University*, (02), 66-71.
- [6] Branigan, H. & M. J. Pickering & A. A. Cleland. (2000). *Syntactic co-ordination in dialogue*. *Cognition*, 75(2), B13-B25.
- [7] Xia, S. & Wang, P. (2017). *Syntactic Priming and L2 Complex Structure Learning*. *Modern Foreign Languages*, (01), 69-79+146.
- [8] Wang, Q. & Zhou, W. (2023). *The Impact of Usage Preference on Structural Priming in L2 Coherent Discourse: A Case Study of Word Order in English Adverbial Clauses*. *Foreign Language World*, (06), 64-71.
- [9] Jia, W. (2016). *A Comparative Analysis of Syntactic Representations in Chinese-English Bilinguals: An Experimental Study Based on English-to-Chinese and Chinese-to-English Syntactic Priming*. *Journal of Mudanjiang University*, (10), 89-91+94.
- [10] Sun, B. & Zhou, P. & Cai, X. & Liao, R. (2014). *On Structural Priming in Chinese Students' Oral Sentence Production*. *Journal of Xi'an International Studies University*, (01), 45-48+56.
- [11] Yan, C. (2021). *Syntactic Priming of Second Language on Low-Proficiency Foreign Learners*. *Journal of Hubei Open Vocational College*, (11), 156-158.
- [12] Chen, N. & Fan, L. (2015). *Syntactic Priming in Chinese Learners of English and Its Implications for English Teaching: A Study Based on Active and Passive Sentences*. *Forestry Education in China*, (01), 53-58.
- [13] Zhao, C. (2014). *The category effects on L2 syntactic representation: Evidence from structure priming*. *Foreign Language Teaching and Research*, (02), 235-245+320.
- [14] Pozzan, L. (2011). *Asking questions in learner English: First and second language acquisition of main and embedded interrogative structures (Doctoral dissertation)*. The City University of New York.
- [15] Wang, M. (2021). *A Study on the Syntactic Representations of Chinese-English Bilinguals: Evidence from Dative Syntactic Priming*. *Overseas English*, (09), 254-255.
- [16] Diessel H. (2005). *Competing motivations for the ordering of main and adverbial claus*. *Linguistics*, 43(3), 449-470.
- [17] Diessel H. (2008). *Iconicity of sequence: A corpus-based analysis of the positioning of temporal adverbial clauses in English*. *Cognitive Linguistics*, 19(3), 465-490.

- [18] Bock, J. K. & Z. M. Griffin. (2000). *The persistence of structural priming: Transient activation or implicit learning?* *Journal of Experimental Psychology: General*, (129), 177-192.
- [19] Lin, P. (2016). *A Study on Multi-Construction English-Chinese Syntactic Priming*. *Teaching of Forestry Region*, (06), 57-61.