Crosslinguistic influence on Chinese-English postgraduate students' written production of adverbial clauses in different language environments

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To all the love and support along the way.

To my supervisor, my friends, and my family.

To everything I've been through in Oxford.

Abstract

The interplay between a bilingual learner's first language (L1) and second language (L2), referred to as crosslinguistic influence (CLI), has received considerable attention in second language acquisition (SLA) research. Contrary to how most previous CLI studies have treated this phenomenon, this study emphasizes on the bidirectional nature of CLI: it can occur from the L1 to the L2 (i.e., forward transfer) or from the L2 to the L1 (i.e., reverse transfer). Since forward transfer has been extensively investigated, more research into the under-investigated reverse direction is needed as L1 has also been evidenced to be subject to influence from the L2. This study aimed to explore the underlying mechanisms that contribute to CLI in both directions, with a focus on three major contributing factors: language environment, syntactic priming, and L2 proficiency level. Although language environment has been widely recognized as an effective source of language input (e.g., Seliger, 2010), most of pertinent studies targeted immigrants that have stayed in an L2 environment for several years. Little attention has been given to L2 learners who have experienced an L2-immersive context for a shorter period of time. Additionally, few CLI studies have rigorously measured learners' L2 proficiency level, which also has an important modulating effect on CLI. This study thus addressed these two issues with Chinese-English postgraduate students studying in both L1- and L2-immersive language environments and proper L2 proficiency tests. As syntax serves as a significant aspect in investigating CLI, this study targeted the written production of adverbial clauses to showcase the interactions between the two languages. An adverbial clause comprised of a subject and a verb that is dependent on and serves to modify the main clause, which is placed differently in Chinese and English and thus, constitutes a proper structure for CLI exploration. Specifically, adverbial clauses are most commonly placed at the initial position and rarely after a main clause, whereas the placement of adverbial clause is more flexible in English. To achieve a successful elicitation of this particular syntactic structure, syntactic priming (i.e., a tacit tendency of interlocutors to use similar structures as the ones they encountered in preceding discourse) should also be taken advantage of. As another source of language input, syntactic priming's effect on CLI was also explored.

Hence, the main research objectives of this study are: 1) to examine the influence of language learning environment (i.e., China or English-speaking country, such as the U.K. or the U.S.) on Chinese postgraduate students' written production of adverbial clauses in either L1 Chinese or L2 English; 2) to investigate whether L2 English proficiency also has an effect on the production of adverbial clauses; and 3) to understand the impact of syntactic priming on effective elicitation of the targeted adverbial clauses and whether it affects CLI. This study adopted a quantitative design to answer these questions. 80 Chinese postgraduate students (who were L2 English learners) were recruited, with 40 of them learning in a Chinese-dominant environment and the other 40 in an English-dominant environment. They first completed a set of English proficiency tests, including both vocabulary and grammar questions, and then were given a writing task for which they were randomly allocated to four different routes: a) syntactic priming in English and writing task in English; b) syntactic priming in Chinese and writing task in Chinese; c) no syntactic priming and writing task in English; d) no syntactic priming and writing task in Chinese. The writing task was followed by a questionnaire aiming to obtain information on participants' L1 and L2 use on a daily basis.

The results indicated that living in the L2 environment contributed significantly to reverse transfer, such that the participants used more English-featured adverbial clauses. Syntactic priming was found to interact with learners' L1 experience to strengthen their existing knowledge, with both the English- and Chinese-dominant groups producing more Chinese-featured patterns under priming in Chinese. While for the English-dominant group, syntactic priming provided in English was able to strengthen the reverse transfer effect coupled with the influence of the L2-immersive environment. However, L2 proficiency level seemed to have a positive correlation with forward transfer, as the more proficient L2 speakers produced more Chinese-featured sentences. The findings together verified the bidirectional, dynamic, and complex nature of CLI, and provided insights for language teaching in terms of the importance of language exposure and the awareness of the correspondences between learners' L1 and L2.

List of Abbreviations

AC-initial:	Adverbial-clause-initial
AC-final:	Adverbial-clause final
ANOVA:	Analysis of Variance
CLI:	Crosslinguistic influence
CUREC:	Central University Research Ethics Committee
EMI:	English as a medium of instruction
LexTALE:	Lexical Test for Advanced Learners of English
L1:	First language
L2:	Second language
SLA:	Second language acquisition

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1. Introduction

One of the key issues in the field of second language acquisition (SLA) is how the two languages possessed by a bilingual learner influence each other, which is widely addressed as crosslinguistic influence (CLI). Literature to date has provided ample evidence that learners' first language (L1) and second language (L2) interact with each other constantly across different linguistic aspects (e.g., phonology: Goldrick et al., 2014; grammar: Hartsuiker et al., 2004; lexis: Malt et al., 2015). However, most research focused merely on the forward direction (i.e., from the L1 to the L2) and limited attention has been paid to the influence exerted from the L2 to the L1. Yet, the acquisition of an L2, undoubtedly results in some changes in the learners' own L1. For example, some learners adopted more L2-featured linguistic representations in their L1, even though this structure was not commonly used in their L1 (e.g., Brown and Gullberg, 2012; Su, 2001; Šućur, 2019). These changes in learners' L1 is particularly associated with the language environment that learners are immersed in (Seliger, 2010), which provides different amounts of exposure to the L1 and the L2 and thus, contributes to CLI on the two languages to a varied extent. Among the language environment studies, a growing number of researchers targeted children or immigrants who relocated to a different, normally an L2-speaking, country for a prolonged period. For example, Nicoladis (2011) looked into how immigrant children's "immature" L1 system was restructured by living among L2-dominant communities. However, the idea that a "matured" L1 system in adulthood is stable has been extensively challenged (e.g., Cook, 1991; Gürel, 2008; Pavlenko, 2000), suggesting that such restructuring is not confined to children. More perspectives are also needed to explore CLI as a dynamic bidirectional phenomenon with an adult population that has been largely ignored: Chinese students who pursue higher education in an English-speaking country.

Compared to the immigrant subjects targeted in other studies, the Chinese students studying abroad may have been exposed to the L2-immersive environment for a relatively shorter period. Yet as Allgäuer-Hackl and Jessner (2019) highlighted, CLI is a dynamic and complex phenomenon shaped by a variety of factors, such as in cognitive, contextual, and linguistic. It is therefore of significance to also add more perspectives to CLI effects with a population of

comparatively less L2-exposure. Moreover, the two languages these learners possess, L1 Chinese and L2 English, are drastically different in multiple aspects, which also offers an interesting ground for exploring how the two divergent languages influence each other. Another reason for choosing this population is its sufficiently large size: the number of Chinese students who choose to pursue higher education abroad has outnumbered that of other international students for the past decade and this figure has still been constantly increasing (Li et al., 2021).

In addition to the exposure brought by an immersive environment, syntactic priming has been recently raised as a source of CLI effects (see Jackson, 2017 for a detailed review). Syntactic priming represents the inclination to repeat a linguistic structure that a learner has had previous encounters with (Bock, 1986), which has been widely justified as an effective tool for eliciting target structure production from adult bilingual speakers (Hartsuiker and Bernolet, 2015). In addition to being a useful elicitation technique, Serratrice (2016) also proposed that syntactic priming serves as a form of language input to facilitate language production and CLI. Although an increasing number of studies have dedicated to examining the effect of within-language syntactic priming (i.e., using the same language to conduct priming and target tasks) on CLI, few have considered its possible interaction with other variables, such as language environment, which also serves as a source of language input.

Another potential factor of CLI that deserves more attention is learners' L2 proficiency level. Several studies have reported that learners' perception and production of L1- and L2-featured structures vary according to different L2 proficiency levels (e.g., Gonzàlez Alonso, 2012; Kasparian and Steinhauer, 2017). For example, Su (2001) found that learners who were more proficient in L2 English tended to rely more on L2-based cues than those less proficient counterparts to make judgements about a sentence's grammatical correctness, even though these cues were not commonly used in their L1 Chinese. Jarvis and Pavlenko (2008) also observed that L2-proficient learners were more likely to produce a higher number of L2-featured instances despite the sharp contrasts between their L1 and L2. However, most CLI studies have merely focused on one proficiency level or relied on a rough estimation of learners' L2 proficiency, such as self-report in Balcom (2003), which may not be able to accurately reflect learners' actual L2 proficiency level.

Hence, it is necessary to investigate this fluid and complex phenomenon of CLI with the consideration of the aforementioned three potential moderators. As a significant aspect in which CLI takes place, syntax was one of the first linguistic areas that kickstarted CLI research (Paradis and Genesee, 1996). Therefore, this study will look into effects of CLI on a particular syntactic structure—adverbial clause, which has been relatively under-researched compared to other features, such as pronouns (e.g., Angelis, 2018; Foursha-Stevenson et al., 2023). This particular structure also provides the benefit of being used differently in Chinese and English: adverbial clauses are mostly placed before the main clause in Chinese while that for English is more flexible and both before and after the main clause are frequently used. To encourage participants' production of adverbial clauses, this study will thus take advantage of the effectiveness of syntactic priming as a target-structure elicitation method (Branigan and Messenger, 2016), while further analyzing whether the syntactic transfer between learners' L1 and L2 can be attributed to language environment, syntactic priming, and L2 proficiency level, if there is any.

Furthermore, unlike the majority of CLI studies that targeted oral comprehension or production (e.g., Cheung et al., 2010; Elvin and Escudero, 2019; Melby-Lervåg and Lervåg, 2011), this study centred on the written format that has been paid less attention to. Despite the loss of phonological evidence, written data proffers a tangible record of learners' language use with a higher degree of stability and measurability, which can be easily archived, re-examined, and reproduced (Russak and Zaretsky, 2021). As Kormos (2023) observed, writing involves cognitive activities at a more complex level that draws on existing knowledge and skills and therefore, serves to better reflects how the target languages interact within a bilingual individual. Hence, learners' written production provides a solid and relatively novel environment for exploring CLI effects.

To conclude, the purpose of this paper is multifold. First, it aims to understand the effect of language environment on Chinese postgraduate students' L1 (Chinese) and L2 (English), and the influence that they exert on one another. Second, it aims to investigate how different English proficiency levels play a role in the bidirectional transfer of syntactic forms. Moreover, different treatments will be given to participants in both groups, with some experiencing a syntactic

priming task before completing the writing task in the same language and some without the priming procedure. Another purpose of this paper is therefore, to further investigate whether the receipt of targeted language input, in the form of syntactic priming, is able to exert any influence on CLI expressions. With the exploration of the relationships between CLI and these three factors, this study is also an attempt to provide pedagogical insights for L2 teachers teaching in different language contexts to be aware of learners' possible language performance and design more effective methods and materials corresponding to learners' different proficiency levels and learning contexts.

To address these issues, this paper will conduct a thorough and systematic analysis grounded in both theoretical and empirical evidence: in the literature review chapter, it will present a comprehensive overview of prior research on CLI, with a particular focus on its bidirectionality feature displayed from a syntactic aspect and its interaction with L2 proficiency level, before introducing the differences between Chinese and English in adverbial clause placement; based on the reviewed literature, primary research questions and corresponding predictions will be put forward; the methodology chapter will then describe procedures and methods employed to gain information of the target learners' L2 proficiency and written production of adverbial clauses; the final chapters will include a detailed quantitative analysis of the results and a discussion of the possible causes behind these findings, aiming to enable an elaborate understanding of CLI taking place in Chinese postgraduate students and its pertinent contributing factors and highlight the pedagogical, theoretical, and research implications emerging from this study.

2. Literature review

In this chapter, a comprehensive introduction of the previous literature on CLI in the field of SLA will be provided. It will first demonstrate how CLI was investigated in the past decades and emphasize on the bidirectional nature of this phenomenon, with a brief discussion of the several terms that were often used synonymously in different studies to avoid terminological confusion. Pivoting on CLI's bidirectionality feature, the reason for a shift from a L1-to-L2-direction-focused investigation to also incorporating the reverse direction (i.e., from the L2 to the L1) and a critical review of the relevant studies investigating both directions in the syntactic domain will be presented. A close-up examination of the syntactic aspect of CLI will then be offered, in which the role of L2 proficiency level and syntactic priming in CLI effects will also be looked into. It is then followed by a detailed comparison of the use of adverbial clauses in Chinese and English, with a focus on four major types: temporal, conditional, concessive, and causal.

2.1 History and features of CLI

Before presenting studies pertinent to CLI, it is of significance to understand the theoretical and empirical grounds that current CLI research was built upon since its emergence. The period where CLI first became a widely recognized factor that plays a role in language acquisition could be traced back to the late 1800s (e.g., Müller, 2013; Whitney, 1881). Around the mid-1970s, CLI formed part of numerous contrastive studies (e.g., Dagut and Laufer, 1985; Lado, 1957; Kleinmann, 1977), which believed that the errors that occurred in the L2 could be attributed to the differences between the L1 and L2. Thus, in these studies, CLI was commonly referred to as "interference". For example, Weinreich's (1968) seminal work examined different types of interference, including lexical borrowing, syntactic transfer, and phonological substitution; he also proposed both deductive (i.e., based on general principles) and inductive inferences (i.e., based on empirical observations) to identify this variable through specific methods such as contrastive analysis and error analysis; he then discussed using the frequency, distribution, and structural characteristics of interference to quantify this phenomena and argued that it might interact with other aspects of bilingualism, such as the intensity of contact with the languages and the structural similarities and differences between the two languages.

In addition to “interference”, the terms “transfer”, “avoidance”, and “borrowing” have been used to refer to CLI (Sharwood Smith and Kellerman, 1986). However, it should be noted that CLI essentially distinguishes itself from these terms. While CLI represents a bidirectional effect (i.e., both from the L1 to the L2 and from the L2 to the L1), the other terms are in effect implying a restricted one-way influence from the L1 to the L2. For instance, the widely accepted definition of “transfer” proposed by Gass and Selinker (1992) covers only the forward direction, restraining the influence from an individual’s native or other languages to later acquisition of second or additional languages. Although some scholars, such as Brown (2000), Chen (2006), and Šućur (2019), regarded “transfer” as an inclusive term of both directions’ influence, most research so far denied this bi-directionality feature by adding “forward” or “reverse (backward)” before “transfer” to specify the direction of influence. Moreover, although the distinction between positive transfer (i.e., leading to correct usage) and negative transfer (i.e., leading to errors) has been proposed to show that the influence from the L1 is not necessarily unfavorable, “interference” and “avoidance” provide a negative connotation of the L1 in SLA research. The term “borrowing” displays a more neutral tone. Yet, this term oversimplifies the process as it does not take into account newly formed structures that emerge in a bilingual’s speech, which may not belong to either language that the bilingual is acquiring. Hence, CLI is considered to be the most appropriate term to describe the dynamic, complicated, and spontaneous interactions between the L1 and L2 that incorporates the possible effects these other terms intend to manifest. Additionally, it should be noted that, in this paper, L1 and L2 are used to refer to the first and second languages acquired by the user from a chronological perspective, regardless of the status, level of proficiency of the language, or the context of acquisition.

Contrary to the negative connotations suggested, more scholars have come to realize that CLI is a natural characteristic of the SLA process (Bergman and Engström, 2023). Indeed, research from the late 20th century onwards has placed more emphasis on CLI as a vital cognitive process in its own right that can shed light on the architecture of the bilingual brain, instead of a mere unwanted effect of bilingual acquisition. Investigations started to interact with the causes (e.g., Cenoz, 2001; Ringbom, 1978), effects (e.g., Jarvis, 2000; Selinker, 1969), and constraints (e.g., Kellerman, 1978) of CLI, with a few studies also touching upon the directionality issue (e.g.,

Kecskes and Papp, 2000). For example, Pavlenko and Jarvis (2002) argued that the traditional approach to CLI of viewing it as a unidirectional phenomenon should be refined and explicitly pointed out that it can work both ways. These investigations have thus given rise to the development of theories aimed to define CLI more clearly, including the Interlanguage Hypothesis (Selinker, 1969), the Competition Model (Bates and MacWhinney, 1982), and the Dynamic Systems Theory (De Bot et al., 2007), and explain how it is related to different linguistic processes, such as syntax, lexis, and phonology. Since this study is not built on these aforementioned theories, the specific contents will not be elaborated. However, these theories have contributed to depict the important characteristics of CLI - a dynamic and ever-changing process that interacts with several critical variables such as surrounding language environment, input, and L2 proficiency, which is critical to this study, despite the fact that they emphasize on different aspects of language learning.

In addition to these linguistic theories, several neurolinguistic accounts have also been proposed to further elucidate the dynamic nature of the language learning process taking place in human brains (e.g., Hulstijn et al., 2014; Joanisse and McClelland, 2015). Although some sociolinguistic researchers denied the existence of different languages and claimed that there is merely one unitary system in learner's mind (e.g., Otheguy et al., 2015), more empirical cognitive evidence has argued in favor of the idea that, cognitively, languages exist as separate entities and interact with each other, as exemplified by Green and Abutalebi (2008) and Bhatt and Bolonyai (2015) with learners suffering from aphasia. This is supported by Cook's (1991, 1992, 1997) Multicompetence Framework, which suggests that the knowledge of more than one language for a speaker is not equivalent to the sum of that of monolingual speakers of the same languages. Likewise, Grosjean (1982, 1992) suggested that the linguistic system of bilingual speakers are interactive rather than rigidly separate from each other. These multicompetence arguments are attempts to theorize the dynamic interactions between two languages for a speaker, and account for the differences between bilinguals' and monolinguals' performance, which thus allows an extensive examination of CLI on an empirical ground.

In summary, the existing research has demonstrated that CLI is a complicated phenomenon worth investigating and a number of variables, such as language environment and L2

proficiency, are involved to modulate the presence and magnitude of CLI effects. However, further research is necessary to improve on several remaining issues, for example, the aforementioned inconsistencies in the terms used to address CLI across studies may lead to incomparability of results across studies as they were in fact speaking to different phenomena.

2.2 Bidirectionality of CLI

As discussed in the previous section, research on CLI in the forward direction has a long tradition and a large body of literature has identified L1-dependent changes in learners' L2 across various linguistic aspects (e.g., lexical: Helms-Park and Dronjic, 2016; Ortega and Celaya, 2019; lexical and syntactic: Hopp et al., 2019; grammatical: Brown and Iwasaki, 2013; phonological and orthograpgical: Sun-Alperin and Wang, 2009). As Selinker (1969) pointed out, the L1 exerts an exceptional influence in the process of SLA as it either hinders the learning of the L2 or lends support to it. This is supported by Koda's (2008) transfer facilitation model, which suggests that L2 input serves to activate the well-established L1 competencies and thus, enables the transfer exclusively from the L1 to the L2. Yang et al. (2017) also highlighted that forward CLI represents a meaningful utilization of the linguistic knowledge of the L1 in the SLA process. However, it is worth noting that as a bidirectional phenomenon, CLI might also take place in the reverse direction (Laufer, 2003), which showcases the dynamic interplay of the two languages in an L2 learner's mind.

Despite the believed reciprocity of the L1 and L2 interactions, CLI from the L2 to the L1 has been much less investigated. It is only in the last four decades that researchers have taken interest in CLI taking place in a reverse direction. Although this phenomenon has been extensively explored as language attrition (i.e., L2-induced change or structural grammar reformation in the L1; Pavlenko, 2000). However, a negative connotation also exists for the term "attrition". As the L1 should not be seen as the culprit for speakers' challenges to achieve native-like performance in the L2, changes to the L1 brought by the L2 do not necessarily represent a diminished L1 competence (Littlewood, 2004). Instead, as SharwoodSmith (1983b: 226) commented, L2 learners may develop "an enriched set of resources by combining the best of both systems", which should not be easily concluded as a loss in their L1. The traditional approach to CLI researching merely the forward direction is also challenged by the Multicompetence Framework

(Cook, 1991), which views the traditional views on a speaker's L1 competence as stable and rigid once matured (e.g., MacWhinney, 1997), to be problematic. Indeed, studies that examine L1 performance and processing have demonstrated that L1 competence is also dynamic, fluid, and was subject to L2 influence and the broader social context (e.g., Pavlenko, 2000; Schmid, 2002). In other words, with a frequent contact with an L2 in the surrounding environment, L1 speakers may develop a range of different L1 linguistic representations that are shaped by L2 across multiple aspects, such as in phonology and vocabulary. This is also in consistent with what Gürel (2008) concluded, that a change in L1 grammatical features attributable to L2 has been gradually regarded as a natural consequence of bilingualism.

2.3 The role of language environment in CLI

A major contributing factor in affect CLI is learners' exposure to different language environments. In particular, reverse transfer is mostly associated with an L2-dominant environment where limited exposure to learners' L1 is available (Seliger, 2010; Sharwood Smith and Van Buren, 1991). This is widely supported by a number of researchers, such as Argyri and Sorace (2007), who believed that the quantity of input in either language serves to affect the presence and magnitude of CLI effects. Therefore, current trends such as globalization and transnational migrations that involve such shift to an L2 environment are presumably the main driving forces that draw attention to the changes happening to learners' L1. Through a study conducted in Utrecht, Sharwood Smith (1983a) discovered that native English speakers' English changed in terms of cognitive control during their stay in the Netherlands, despite English being a frequently-used language there. Similarly, De Bot et al. (1991) found a decrease in Dutch immigrants' L1 proficiency when they lived in France, including a significant decrease in the frequency of using Dutch, a diminished grammatical complexity and vocabulary size, and a French-influenced Dutch pronunciation. However, the researchers based these conclusions on these immigrants' self-reports through in-person interviews rather than comparisons of their performance changes, which is thus subjective and incomparable with other studies.

The findings of a changed L1 also emerge in different language pairs, including L1 Chinese and L2 English. Through two writing tasks in Chinese and English respectively, Carson and Kuehn (1992) reported that 48 Chinese university students studying in intensive English learning

programs in the U.S. had experienced a loss of L1 Chinese writing abilities while their L2 writing proficiency increased. More recent studies have turned to examine more specific linguistic areas. Despite the participants' immersion in a homogenous L1 community, Šućur (2019) found an increase in L1 Serbian speakers' use of L2 English-featured syntactic and semantic elements in their L1 argumentative essays with the enhancement of L2 proficiency, which includes predicate decomposition, meta-discourse markers, and passives, displaying a shift to more L2-inclined manner of writing. Although the judgement of level of L2 proficiency was arbitrary to some extent as it was simply based on the school year these speakers were in, for example, year three students was believed to be more proficient L2 users than year two students, Šućur's (2019) discoveries did verify that learners' L1 are susceptible to changes even with limited exposure to their L2. Similar findings on reverse transfer also occurred in other linguistic aspects, such as speech production (e.g., Chang, 2012) and collocation use (e.g., Laufer, 2003).

Furthermore, a growing number of researchers have attempted to explore CLI in both directions. For example, Pavlenko and Jarvis (2002) examined 22 Russian-English adult speakers' CLI in grammatical, lexical, and semantic aspects through oral recall production tasks of four movie clips in both languages. The authors compared and analyzed narrative instances and found various bidirectional CLI effects, such as participants using both passive forms (i.e., which are more common in English) and active forms (i.e., which are more common in Russian) to express emotional states, as well as several loan translations from both English and Russian. They also discovered some instances of unidirectional transfer, for example, in lexical selection, participants used English words in Russian narratives but no Russian words were involved when it comes to narrating in English; while syntactically speaking, merely transfer from the L1 to the L2 was found, with these participants structuring their sentences in English with a Russian word order.

Focusing on adult Spanish speakers learning English as an L2, Hohenstein et al. (2006) also found CLI on both lexical usage and grammatical constructions in 24 participants' oral description of different motions (e.g., floating and climbing) occurred in 24 videos clips in the two languages. Despite the relatively limited sample size, the researchers reported bidirectional transfer in verb selection (e.g., path or manner verbs), but unidirectional transfer (i.e., from the

L1 to the L2) regarding modifier use (e.g., on all fours). For example, participants were found to prefer using "floating" in English when describing a motion event that would be lexicalized with a path verb in Spanish, such as "crossing afloat"; while for the description in Spanish, path verbs were more frequently used when those events in English would often be coupled with manner verbs, such as "floating across". The authors believed that different results appeared in lexical and syntactic aspects may be attributed to different reasons: for the unidirectional transfer in syntactic modifier use, it may be the effect of living in an L1-only environment for a prolonged period of time outran that of limited L2 contact as stated in Bates and MacWhinney's (1982) Competition Model; while transfer happening at the reverse direction was assumed to be brought by the dominance of L2 environment and culture and individual differences, such as age of L2 acquisition. The finding of the importance of language environment is also consistent with what Brown and Gullberg (2012) discovered in a similar motion description task study with 56 Japanese-English speakers residing in L1- and L2-immersive environments respectively.

Additionally, Gürel and Yilmaz (2013) compared two groups of L1 Turkish speakers living in two different L2 environments (i.e., English in North America and Dutch in Netherlands) and a monolingual Turkish control group through their judgement of L1 syntactic structures among. As English and Dutch share similar binding principals in null and overt subject pronoun placement (i.e., only allow overt pronouns, such as "she" and "we", in the subject position), the authors predicted that the two L2s, English and Dutch, should have a similar impact on speakers' L1, Turkish, under the condition that the L1 and the L2 have analogous forms. A written interpretation task containing 48 sentences, with 24 containing null subject pronouns and another 24 overt embedded subject pronouns, was assigned to all three groups. The speakers were asked to decide the possible antecedent for each embedded subject pronoun. The inferential data indicated that the prediction was partially correct: only when encountering syntactic rules that are corresponding in the L1 and the L2, reverse transfer would take place; yet for linguistic forms that diverge between the L1 and the L2, the reconstruction of L1 might not be sufficient to support a direct effect from the L2. Although the selected speakers differed in age (range = 16-72), educational level (from secondary school to university), and age of arrival (range = 0-33) in their current environment to a large extent, the rigorous use of control and experimental groups and the solid design enabled the results to persuasively showcase the influence of the two L2s on

the L1 and highlighted that language environment plays a significant role in causing such CLI effects.

While the studies presented above suggest that the environments participants were in modulated the effects of CLI that they experience, it should be emphasized that the results from participants who lived in an L1 environment (e.g., Hohenstein et al., 2006), are different from those obtained by participants who lived in an L2 environment (e.g., Pavlenko and Jarvis, 2002). Yet, in comparing residents in both L1- and L2-immersive environments, Brown and Gullberg (2012) and Gürel and Yilmaz (2013) also came to different conclusions. The divergence in these findings may be attributable to these studies' varied individual factors, such as participant age and educational level as mentioned above. Another reason may be that none of these aforementioned studies were specific about how their subjects' L2 proficiency was estimated or simply relied on self-reports, despite the fact that L2 proficiency may serve as an important moderator in CLI (Chen, 1992; Mägiste, 1984; Jarvis and Pavlenko, 2008).

2.4 CLI effects on syntactic constructions

CLI affects various linguistic aspects, among which the most commonly affected areas are phonology, syntax, lexis, and semantics (Jarvis and Pavlenko, 2008). Some researchers have thus delved into CLI in a rather inclusive manner. Moattarian (2013), for example, investigated CLI between Persian and English by asking two groups of 35 Persian speakers to complete both Persian-to-English and English-to-Persian translation tasks. The targeted transfer structures were not restricted, meaning that all aspects of transfer were included, such as lexically, semantically, and morphologically. Both forward and reverse transfer instances were found across all targeted aspects, however, L2-based features in L1 translation overwhelmingly outnumbered the L1-based ones in L2 translation. Although the content and requirements of the translation tasks were not disclosed, which impedes the replicability of this study, the author presented that more L2-to-L1 transfer instances than L1-to-L2 instances were only found in syntactic constructions. This is also in line with Pavlenko and Jarvis (2002) finding with Russian learners of L2 English that CLI was more pronounced in the reverse direction in the syntactic domain. As Paradis and Genesee (1996) observed, syntax served as one of the linguistic aspects that kickstarted research on CLI. Recent decades have witnessed an increase in the evidence reported on syntactic transfer,

encompassing phenomena from simple word order to more systemic constraints differing across languages, and both receptive and productive modalities.

Among the burgeoning studies, various types of tasks have been designed and used to investigate CLI effects on syntactic changes. For instance, the grammaticality judgement task (i.e., a task asking participants to make judgements about the grammatical correctness of the presented sentences) has been widely used to investigate L2-to-L1 CLI effects (e.g., Gass and Selinker, 1992; White, 1987). In a case study conducted by Jarvis (2003), the target Finnish-English bilingual living in the US was observed to reject some L1 Finnish sentences that were grammatically correct for Finnish but did not conform to the L2 English word order constraints, which were stricter. Likewise, Balcom (2003) noted a significantly higher number of middle-verb constructions (e.g., "cut" in "cut himself") being considered ungrammatical by French-English bilingual speakers studying in a Francophone university, which was believed to result from the influence of the more conservative structures of the L2 English. These findings suggest that CLI is likely to take place, regardless of whether the L2 is more restrained or flexible than the L1. However, it should be noted that these studies did not take into account other possible factors, for example, what L2 proficiency level were these participants at (Jarvis and Pavlenko, 2008).

A great deal of research has examined syntactic transfer through another type of task - comprehension and sentence interpretation tasks (e.g., Devescovi and D'Amico, 2004; Hopp, 2016; Koda, 1993; Siu and Ho, 2015;), with the majority of them motivated by the Competition Model proposed by Bates and MacWhinney (1982). This model argued that language learning is essentially a competition between different linguistic cues and structures in the L1 and L2, emphasizing on the importance of language input frequency and context in SLA. These studies built upon the Competition Model took advantage of how different languages prioritize different surface cues (e.g., word order, inflectional morphology, and semantics) and how speakers make use of these cues to reflect CLI in sentence interpretation. For example, Su (2001) compared the performance of two groups of speakers at different L2 proficiency levels, one group of Chinese native speakers with English as their L2 and the other group of L1 English and L2 Chinese speakers, in deciding the agent in a series of sentences, in which word order (i.e., the major cue

for English) and noun animacy (i.e., the major cue for Chinese) were the target cues. Su (2001) discovered that participants at different proficiency levels employed different strategies to process sentences at both forward and backward directions. More specifically, both groups of participants used L1 strategies to process L2 sentences while they also applied L2 strategies to their L1 in making the decisions about the agents of the sentences. Also, participants with higher L2 proficiency showed less reliance on the L1-based cues and relied more on the L2-based cues. However, Su's (2001) estimation of the participants' English proficiency levels was simply based on the length of years these participants have learnt English, which may not accurately reflect how proficient these participants truly were. Despite this rough estimation, other studies also came to similar results using participants with a variety of L1s and L2s (e.g., Italian-English: Gass, 1987; Japanese-English: Harrington, 1987; Sasaki, 1994; English-French/Spanish/German: Sparks et al., 2009).

Another method of investigating syntactic that has also been widely documented is language production task. Among multiple types of productive tasks, the task of adverbial clause placement may represent the most direct way of displaying CLI effects (Jarvis and Pavlenko, 2008). This task invites participants to create complex sentences with adverbial clauses included and the place participants chose to put the adverbial clause, for example, at the initial position or the final position. Several pertinent studies, such as those conducted by Selinker (1969), Alonso-Ovalle et al. (2002), and Chen (2007) have evidenced that CLI plays an important role in learners' adverbial placement behavior. For instance, Chen (2007) employed a sentence-combining task and a picture description task to examine CLI effects displayed by learners at different L2 proficiency levels. The participants included a baseline group of 35 Chinese native speakers, an experimental group of 30 English-Chinese learners, and a control group of 30 Korean-Chinese learners, with the latter two groups divided into three proficiency levels respectively. Since Korean and Chinese tend to follow a similar adverbial clause placement pattern, which contradicts English, Chen's (2007) study revealed that the English native speakers produced significantly more English-patterned adverbial clauses in both tasks than the Korean and Chinese groups, which was believed to be a transfer effect from the L1. On an additional note, the authors observed that this CLI effect could be more often discovered in the less structured production task and diminished with an increase in L2 proficiency.

Despite a few studies (e.g., Larsson et al., 2020) arguing against CLI effects in adverbial placement, this finding supported Su's (2001) observation that L2 proficiency can be an important mediating factor for CLI effects. It is also in line with what Kasparian and Steinhauer (2017) discovered from their Catalan and Spanish learners: the more proficient a learner is in their L2, the higher possibility that they will consider a grammatical sentence in their L1 ungrammatical. Nevertheless, it should be noted that Chen (2007) only focused on the forward direction. However, the findings also hold for the reverse direction of transfer. For example, Jarvis and Pavlenko (2008) researched the relationship between L2 proficiency and reverse transfer and found that the more proficient L2 learners were, the more L2-featured instances they would produce in their L1 speaking. Hence, it is of significance to take L2 proficiency into consideration when examining CLI with a reliable reporting measure.

In addition to the methods discussed above, syntactic priming (i.e., a tendency to repeat the structures recently encountered in an intentioned input; Bock, 1986), has often been used as an effective auxiliary tool to encourage the production of target structures for adult bilingual speakers (Hartsuiker and Bernolet, 2015). It is widely believed that syntactic priming takes the shape of implicit learning (i.e., unconscious acquisition of abstract knowledge over a period of time; Branigan and Messenger, 2016; Chang et al., 2006) and within-language priming could facilitate L2 production even for less proficient L2 learners (e.g., McDonough and Fulga, 2015). For example, in a priming study conducted on L1 Dutch learners of L2 English, Bernolet et al. (2013) tested these learners on both within-language and crosslinguistic priming on target and non-target structures and found a stronger priming effect in boosting within-language target structure production than in that in the cross-language priming condition. Moreover, a number of studies have also shown that the effect of syntactic priming is subject to its magnitude (e.g., Pickering and Branigan, 1998; Yokokawa and Hamada, 2019), although some scholars argued that this is not always the case. Peynircioğlu (1990) suggested that there seemed to be a limit on the amount of priming given to affect participants' production while Ostergaard (1998) also found that the relationship between the effect and magnitude of syntactic priming varied when primed structures differed in the level of difficulty.

Several researchers (e.g., Pickering and Branigan, 1999; Serratrice, 2016, 2022) have further proposed that syntactic priming serves as one of the mechanisms that underlies CLI in L2 production. Nonetheless, little research attention has been paid on how syntactic priming tasks, which offer a small amount of exposure to the L2, can contribute to CLI and interact with other variables that are known to mediate CLI, such as language environment and linguistic proficiency. This is of particular importance for structures that are not easy to elicit (e.g., adverbial clause), which cannot be achieved with grammaticality judgement task or language production task alone. Additionally, these aforementioned studies were restricted to Romance languages, the effect on languages in other branches, such as from the Sino-Tibetan language family, should also be included to provide a more comprehensive picture. Therefore, this study will aim to place two learner groups of L1 Chinese and L2 English, living in different language environments (i.e., L1- and L2-immersive environments), under the same testing conditions and control potential variables such as learners' age, onset age of L2 learning, and educational level, to allow investigation of the targeted factors.

2.5 Adverbial clause placement: differences between Chinese and English

The present study targets adverbial clause production in L1 Chinese, L2 English learners' writing. Adverbial clauses are a type of subordinate clause, that is, a grammatical unit with a subject and verb which is dependent on the existence of a main clause to form a meaningfully-complete sentence. As exemplified in Example 1 below, an adverbial clause serves as a modifier of a verb phrase or a sentence (Thompson et al., 2007) and the removal of an AC should not affect the grammaticality of the main clause (Pérez Quintero, 2002). Moreover, Ford (1993) introduced two requirements that needed to be fulfilled to form an adverbial clause: the clause must be introduced by an adverbial conjunction, and it cannot be functioning as a subject or object of the verb of the main clause.

Example 1

She studied hard because she wanted to pass the exam.

她 学习 很 努力，因为 她 想 通过 考试。

ta xuexi hen nuli，yinwei ta xiang tongguo kaoshi。

As can be seen from Example 1, the adverbial clause “because she wanted to pass the exam” provides the reason for the action taken in the main clause “she studied hard”. This sentence also satisfies the requirements mentioned above: 1) the main clause still stands as a grammatically correct sentence even without the adverbial clause; and 2) “because” serves as the adverbial conjunction that introduces a causal relationship and the adverbial clause becomes meaningfully-deficient without the main clause.

In addition to being easy to identify, another reason for choosing this sentence type as the focus of the present study is that it is used differently in Chinese and English writing. As Kirkpatrick (1993) reported, Chinese speakers are inclined to use a topic-comment pattern, with the subordinate clause preceding the main clause. In other words, in Chinese, it is more common to place the main argument after the supporting argument. This subordinate-to-main clause pattern has been well documented as the most natural and frequently used in numerous research (e.g., Chao, 1968; Wang, 1984; Wong, 2013), although the reversed sentence pattern also exists (Osgood, 1980). The written corpus analyses of Mandarin Chinese conducted by Wang (1995, 2002) suggested that adverbial clauses tended to occur more significantly before the main clauses. This is consistent with what Paul (2015) found from multiple Chinese complex sentences, including adverbial clauses, from a semantic perspective. Therefore, Chinese complex sentences normally follow an adverbial-clause-initial (AC-initial) pattern, as exemplified by Example 2 below:

Example 2

小 的 时候， 我 经常 用 气球 来 寄信。

xiao de shihhou，wo jingchang yong qiqiu lai jixin。

I used to mail my letters via balloons when I was a kid.

In addition to the temporal conjunction “deshihou (when)”, there also exist a number of commonly used conjunctions in Chinese to link the main and the subordinate adverbial clauses, such as yinwei… (“because…”) and suiran… (“even though”), as showcased in Table 1 below.

Nonetheless, English utterances display a more flexible manner in subordinate clause placement (Young, 1983). Unlike Chinese, both placement sequences of main and subordinate clauses are common in English, differing to serve different communicative purposes. It should be noted that a growing number of researchers, such as Quirk et al. (1989) and Wang and Li (2016), have argued that the preferred structure for complex sentences in English is adverbial-clause-final (AC-final; e.g., Prideaux and Hogan, 1993). Example 3 demonstrates a sample complex sentence placing adverbial clause at the final position:

Example 3

I cried even though my dad accompanied me to see the dentist.

我 害怕 得 大叫，即使 爸爸 陪 我 一起 去 看 的 牙医。

Wo haipa de dajiao，jishi baba pei wo yiqi qu kan de yayi。

Because of the different patterns of adverbial clause placement in the two languages, it is reasonable to expect CLI to take place between Chinese and English in terms of adverbial clause sentence production.

This research focuses on four main types of adverbial clauses (i.e., temporal, conditional, concessive, and causal), which are not only the most commonly used in both Chinese and English, but also the most frequently investigated in previous corpus studies. These four types of adverbial clauses are normally employed to perform different communicative functions: temporal adverbial clauses are for conveying temporal sequences; conditional adverbial clauses are used to state a hypothesis or condition, which can be either factual or counterfactual (see Bhatt and Pancheva, 2006 for a more detailed discussion); concessive adverbial clauses are employed to introduce contrasts while causal adverbial clauses are used to provide causes and explanations. As shown in Table 1, an adverbial clause is often linked to the main clause through conjunctions such as “ruguo (if)” and “zhiyao (as long as)”.

Table 1. The four targeted adverbial clause types and the possible conjunction examples in both Chinese and English

Adverbial clause type	Chinese conjunctions	Corresponding English conjunctions
Temporal	当 dang…… 每当 meidang… ……之前/以前 …zhiqian/yiqian ……之后/以后…zhihou/yihou 自从 zicong… 一……就 yi…jiu… 随着 suizhe	“when” “whenever” “before” “after” “since” “once” “as soon as”
Conditional	如果/假如 ruguo/jiaru… 只有 zhiyou… 除非 chufei… 要是/倘若 yaoshi/tangruo… 只要 zhiyao…	“if” “only if” “unless” “in case that” “as long as”
Concessive	虽然/但是suiran…, danshi… 即使/纵使/即便/就算/尽管jishi/zongshi/jibian/jiusuan/jinguan… 不管/不论 buguan/bulun…	“although” “even though/even if” “despite/regardless/no matter”
Causal	因为/由于……所以 yinwei/youyu…suoyi… 从而/以至于 conger/yizhiyu…	“because…so” “as a result”

To summarize, CLI serves as a major topic in SLA as it concerns the critical issue of how the L1 and the L2 interact, however, there is still relatively scarce research that looks into how the L2 influences the L1 and the critical contributing factor of language environment. Among the limited number of studies that investigated L2's influence on L1, their study subjects were mostly confined to children (e.g., Nicoladis, 2011) or immigrants (e.g., Gürel and Yilmaz, 2013), whereas adult learners, such as students who are pursuing a higher degree in an L2-speaking country, have been largely overlooked. Focusing on this population could allow the examination of how CLI changes as a result of a relatively short-term L2-immersive experience and across different language contexts. Moreover, as a significant investigating area in CLI, most studies researching syntactic structures failed to rigorously control for learners' individual variances, such as L2 proficiency levels, which makes it difficult to understand whether CLI is subject to developmental changes. Furthermore, the contribution of syntactic priming as a source of language input should also be considered to enable a clearer understanding of the complexities of CLI. Hence, to address these issues, this study will investigate both directions of CLI (i.e., from L1 Chinese to L2 English and from L2 English to L1 Chinese) through the written production of adverbial clauses from Chinese postgraduates studying in two different language learning contexts (i.e., L1- and L2-dominant contexts), with a standardized test of their English proficiency level and different syntactic priming conditions given.

3. Research questions (RQ)

1) Does the Chinese-immersive environment group (will be labelled as "Chinese group" for the convenience of reading) differ from the English-immersive environment group (will be labelled as "English group" for the same reason) in terms of:
    - the number of AC-final sentences produced;
    - the number of AC-initial sentences produced?
2) Do the groups receiving syntactic priming produce more adverbial clauses than the groups that did not?
    i) Does syntactic priming have a different effect on the Chinese and the English groups in terms of:
        - the number of AC-final sentences produced;
        - the number of AC-initial sentences produced?
    ii) Does the language of syntactic priming have a different effect on the Chinese and the English groups in terms of:
        - the number of AC-final sentences produced;
        - the number of AC-initial sentences produced?
3) For Chinese L2 learners of English, does English proficiency level affect:
    - the number of AC-final sentences produced;
    - the number of AC-initial sentences produced?
    i) If so, for which language environment group does English proficiency level display a stronger relationship with the production of a higher number of the:
        - AC-final sentences;
        - AC-initial sentences?

Based on the reviewed literature, it was predicted that: 1) language environment will exert a significant influence on CLI performance, exhibited in the manner that the English group will produce more English-featured (i.e., AC-final) sentences and fewer Chinese-featured (i.e., AC-initial) sentences than the Chinese group due to a limited amount of L1 exposure but also a much higher input of the L2; 2) syntactic priming will contribute to a larger number of adverbial clause production, yet the contribution to the placement of adverbial clauses will vary in terms of language group and priming language, with Chinese group receiving Chinese syntactic priming

producing more AC-initial sentences while the English group receiving English syntactic priming producing more AC-final sentences; however, the effect of syntactic priming in a different language may not be able to outdo that brought by the language environment; and 3) L2 English proficiency levels will modulate the CLI effects in a way that the more proficient English learners will produce a higher number of AC-final sentences; as the English group was expected to possess a higher English proficiency than the Chinese group due to their capability of studying in an L2-immersive environment, the English group are likely to rely more on the English-based sentence pattern and thus, produce more AC-final sentences that are common in English.

4. Methodology

This chapter will introduce the methods used to address the aforementioned research questions. It will first present the overall design of the whole experiment, before providing details about the participants' characteristics, instruments, and procedures.

4.1 Design

This study adopts a quantitative design with three independent variables (language environment, L2 English proficiency level, and syntactic priming condition) and one dependent variable (written production of adverbial clauses). Although the fundamental methodological paradigm for investigating CLI is to compare monolinguals with speakers who speak both the same L1 and have the knowledge of an L2 (e.g., Cook, 2003), this may only be feasible for studies on young children. With the prevalence of the multilingualism, coming into contact with one or more languages is almost inevitable: thus, adult monolinguals are difficult, if not impossible, to find (Šućur, 2019). Moreover, comparing bilinguals with bilinguals allow the investigation of the effects of both CLI and bilingualism, which cannot be achieved by comparison with monolinguals. Thus, two groups of participants were recruited from two different language environments and randomly assigned to different experimental conditions within their group. As Pickering and Ferreira (2008) suggested, syntactic priming is an ideal source for eliciting target syntactic structures, therefore, two subgroups within each language environment received syntactic priming of adverbial clauses in either language respectively while the other two groups were sent directly to the writing task, which is the target adverbial clause production task of this study. The participants' L2 proficiency level was assessed through two tests, a vocabulary test and a grammaticality judgement test. More information concerning participants' L2 learning experience and environment was collected through a questionnaire.

4.2 Participants

Through a combination of posting recruitment messages on social media platforms and snowballing, a total of 111 participants were recruited to participate in this study. However, due to some participants' incomplete submission or the occasional malfunctioning of experiment

website, 80 participants were eventually chosen. 40 of them (27 females and 13 males; mean age = 22.9, range = 22-25) are undertaking a postgraduate program in an English-speaking country, including the UK, the US, and Australia. This group will thus be referred to as the "English" group hereafter. The English group participants' average length of stay in the English-speaking country was 15.1 months; only 10 participants had spent more than 2 years in the location. The other 40 participants (23 females and 17 males; mean age = 22.9, range = 21-24) were studying in China and have never studied in an English-speaking country, who will thus be labeled as the "Chinese" group. All participants are Chinese native speakers with English as their L2; the different labels denote the language that participants are mostly in contact with, which means that English was the most frequently used language for the English group while the Chinese group was mostly immersed in a Chinese-speaking environment. All participants started learning English at a similar age (M = 7.588, SD = 2.218), as was required by the Chinese educational system. However, the English proficiency level of these participants varies. As shown in Table 2, the English group achieved a slightly higher total score on average (M = 68.45, SD = 8.155) in terms of the total score of the vocabulary and grammar tests than the Chinese group (M = 67.68, SD = 7.488), although the performance of the English group's participants were more spread out from the mean. Based on the respective scores of the vocabulary and the grammar tests, however, the Chinese group (M = 44.68, SD = 6.821) better than the English group (M = 29.45, SD = 9.422) concerning vocabulary while the opposite results occurred for grammar. The differences between the English and the Chinese groups in terms of the vocabulary and grammar tests were also significant ($p_{vocab} < .001$, $p_{gramm} < .001$), yet that for add-up scores of both tests was non-significant ($p = .303$). In other words, the two groups differed in vocabulary and grammar knowledge, but were at a similar overall English proficiency level.

Table 2. L2 English proficiency scores of the Chinese and the English groups

Language learning environment	Vocabulary test	Grammar test	Total (vocab + gramm)	Range of total
Chinese (N = 40)	M = 44.68 SD = 6.821	M = 23 SD = 3.297	M= 67.675 SD = 7.488	47-85

English (N = 40)	M = 29.45 SD = 9.422	M = 25.92 SD = 3.467	M = 68.450 SD = 8.155	56-92

Note: Total here represents the add-up score of the vocabulary and grammar tasks

4.3 Instruments

The instruments employed for all participants comprised of a vocabulary test, a grammaticality judgement test, and a demographic questionnaire. The main experiment involved a writing task that two sub-groups (one within the English group and the other within the Chinese group) received syntactic priming in either English or Chinese. All task instructions were written in Chinese, except for the groups assigned to syntactic priming with English sentences. Participants were asked not to seek any help from additional resources, such as a dictionary or the internet. Moreover, it was specified for all parts of the experiment that punctuation and manner of spelling (e.g., American or British) should not be concerned and for the grammaticality judgement test, tense was not a part of the assessment. The whole procedure was piloted with four Chinese postgraduate students, two studying in China and two studying in the U.K., to ensure the arrangements were proper and reasonable. Details of each instrument used will be presented below.

4.3.1 LexTALE vocabulary test

This study administered the LexTALE (Lexical Test for Advanced Learners of English; Lemhöfer and Broersma, 2012) to measure participants' L2 vocabulary knowledge. The reason for choosing the English version of this test was that it has high reliability and validity, which have been attested in a number of studies (e.g., Diependaele et al., 2013; Tatsuya et al., 2020), and extended to many other languages, such as Spanish (e.g., Izura et al., 2014), French (e.g., Brysbaert, 2013), and Portuguese (e.g., Zhou and Li, 2021). The LexTALE is a yes-or-no test consisting of 60 stimuli, among which 40 are existing words and 20 are made-up words. The real words were selected from Meara's (1996) unpublished 10K vocabulary size test under the idea that including real words that span various frequency tiers can assess learners' vocabulary knowledge. The non-words were introduced to reduce response bias. During the LexTALE, the

participants are asked to decide whether the presented stimulus is a real word or not. The whole test takes approximately three to five minutes to finish, which can reduce the participants' workload. The convenience and accessibility of LexTALE further support its use as an appropriate measure of L2 vocabulary knowledge.

4.3.2 Grammaticality judgement test

To holistically assess the participants' L2 proficiency, a grammaticality judgement test was used alongside the LexTALE. The test was adapted from the grammar section of the Oxford Placement Test, which is a standardized test and has been widely used in multiple studies to assess general language proficiency (e.g., Morell Moll, 1999; Rahimy and Shams, 2012; Sadeghi, 2013; Talakoob and Koosha, 2017). Taking the participants' limited time and concentration into consideration, the listening section of the Oxford Placement Test was removed, and 36 sentences of the grammar section were selected. Among the 36 sentences, 18 were grammatically correct while the other half were grammatically incorrect (see Appendix 9.1). The credibility of the correctness of the sentences was confirmed by a native English speaker from the U.S. This test was also presented in a binary-choice form that required participants to choose whether the sentence is perceived correct in grammar or not. Like the LexTALE test, it also takes approximately three to five minutes to finish. The total scores of the vocabulary test and the grammaticality judgement test constitute an approximate measure of the participants' L2 English proficiency level, with each participant receiving a score out of the full score of 99 points.

4.3.3 Syntactic priming task

The syntactic priming task consisted of 16 pictures, each of which was paired with a relevant sentence (see Appendix 9.2). Two groups of participants were asked to determine whether the sentence matched the picture by either choosing "match" or "no match". The pictures were extracted from a classic German comic, "Vater und Sohn (meaning 'Father and Son')". The selected stories concern father-son daily life scenes and are vivid and easy to understand. The paired sentences corresponded to the four target types of adverbial clauses (i.e., temporal, conditional, concessive, and causal). The two groups that were allocated to the syntactic priming

condition were given either 16 Chinese sentences or 16 English sentences with the same pictures following the same order. For each group of adverbial clauses in English, there were two sentences that placed the main clause at sentence-initial position and two that placed the main clause at sentence-final position, which follows the flexible English-featured manner of adverbial clause usage. For the clauses in Chinese, all sentences were presented in a subordinate-to-main clause pattern as most commonly seen in Chinese texts. Six of these sentences, including one sentence from each clause type group and another two randomly selected from the four clause groups, were created to describe something opposite to what the picture showed to ensure that participants were unable to recognize the aim of this task. For example, it can be seen from Figure 1 that the father and the son looked upset sitting by the river and the father was picturing themselves on a boat, but the sentence claimed that they were "having so much fun" without a boat, which is an apparent "no-match" sentence-picture pair.

Figure 1. A concessive adverbial clause example of a "no match" syntactic priming sentence

Sentence: My dad and I are having so much fun, although we don't have a boat.
即使 没有 船， 我 和 爸爸 玩得 还是 很开心。
jishi meiyou chuan，wo he baba wande haishi henkaixin。

The matched pairs, on the other hand, were believed to allow participants to make the "match" decision easily. As exemplified by Figure 2, the bald father deliberately cut the photo in this way because he wanted to appear with hair.

Figure 2. A causal adverbial clause example of a "match" syntactic priming sentence

Sentence: My dad cut our photo because he didn't want to appear bald.

因为 爸爸 不想 看上去 秃顶，所以 他 把 我们 的 合照 剪掉了。

yinwei baba buxiang kanshangqu tuding, suoyi ta ba women de hezhao jiandiaole。

4.3.4 Picture description task

The writing task aimed to elicit participants' production of adverbial clauses by asking them to describe a short comic story consisting of a series of pictures, as shown below in Figure 3 and Figure 4. The two comic stories were also chosen from "Vater und Sohn" to enhance the consistency between tasks for participants who were in the syntactic priming condition. The richness of content and the ease of understanding that the comic strips afforded were also considered to ensure that participants are able to comprehend the story and have enough information to write about. The Chinese version (Figure 3) was a nine-picture story concerning the father and the son's purchase and usage of their new instruments while the English version (Figure 4) included eight pictures that depicted how the father and the son traded a pet dog with a stranger. Same as in the syntactic priming task, participants were also randomly assigned to different writing tasks with instructions that required them to write in either Chinese or English. A time limit of nine minutes was set to ensure that participants will finish the writing task efficiently and avoid potential distraction.

Figure 3. Comic strips of the Chinese writing task

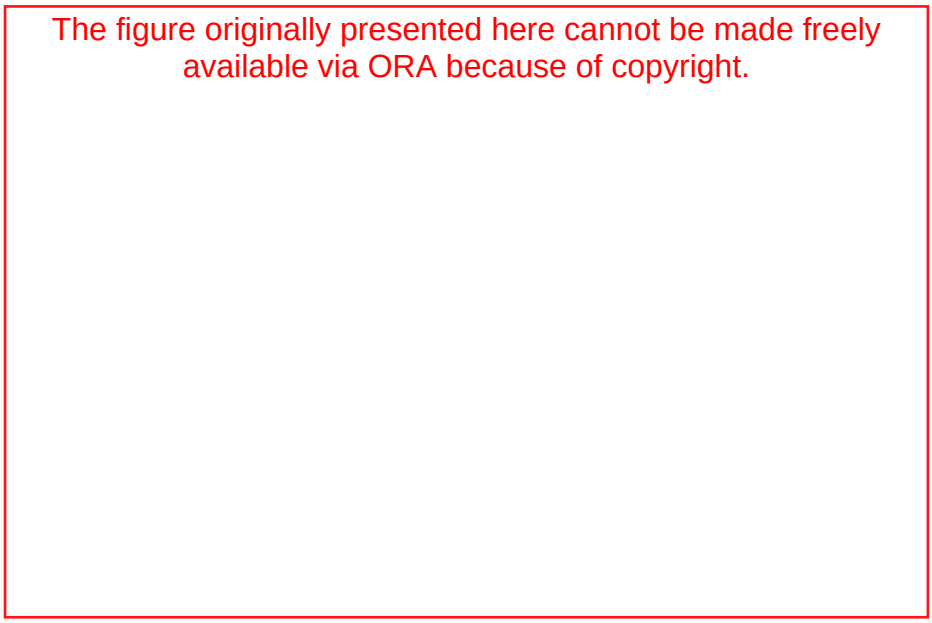
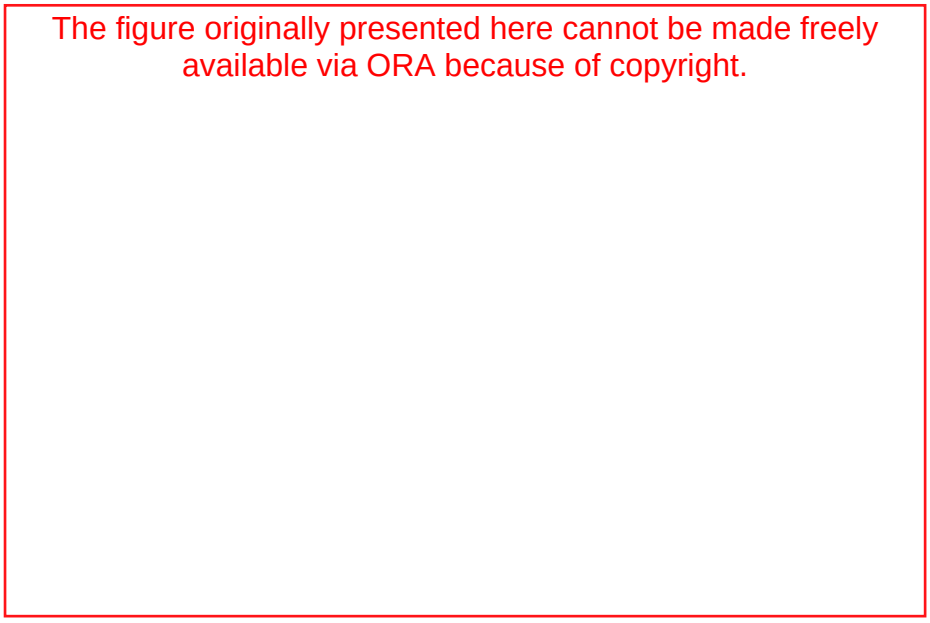


Figure 4. Comic strips of the English writing task



4.3.5 Language use experience questionnaire

To gain a better understanding of participants' language use experience, a questionnaire consisting of 7 major questions was administered (see Appendix 9.3). As shown in the questions included the participants' age, gender, onset age of L2 English learning, the length of stay in the English-speaking country if applicable, and the time of daily language use specifically referring to three aspects: daily communication, school or work, and daily leisure. Table 3 below shows the two groups of participants' demographic information and daily language use.

Table 3. Demographic information and daily language use of the two groups of participants

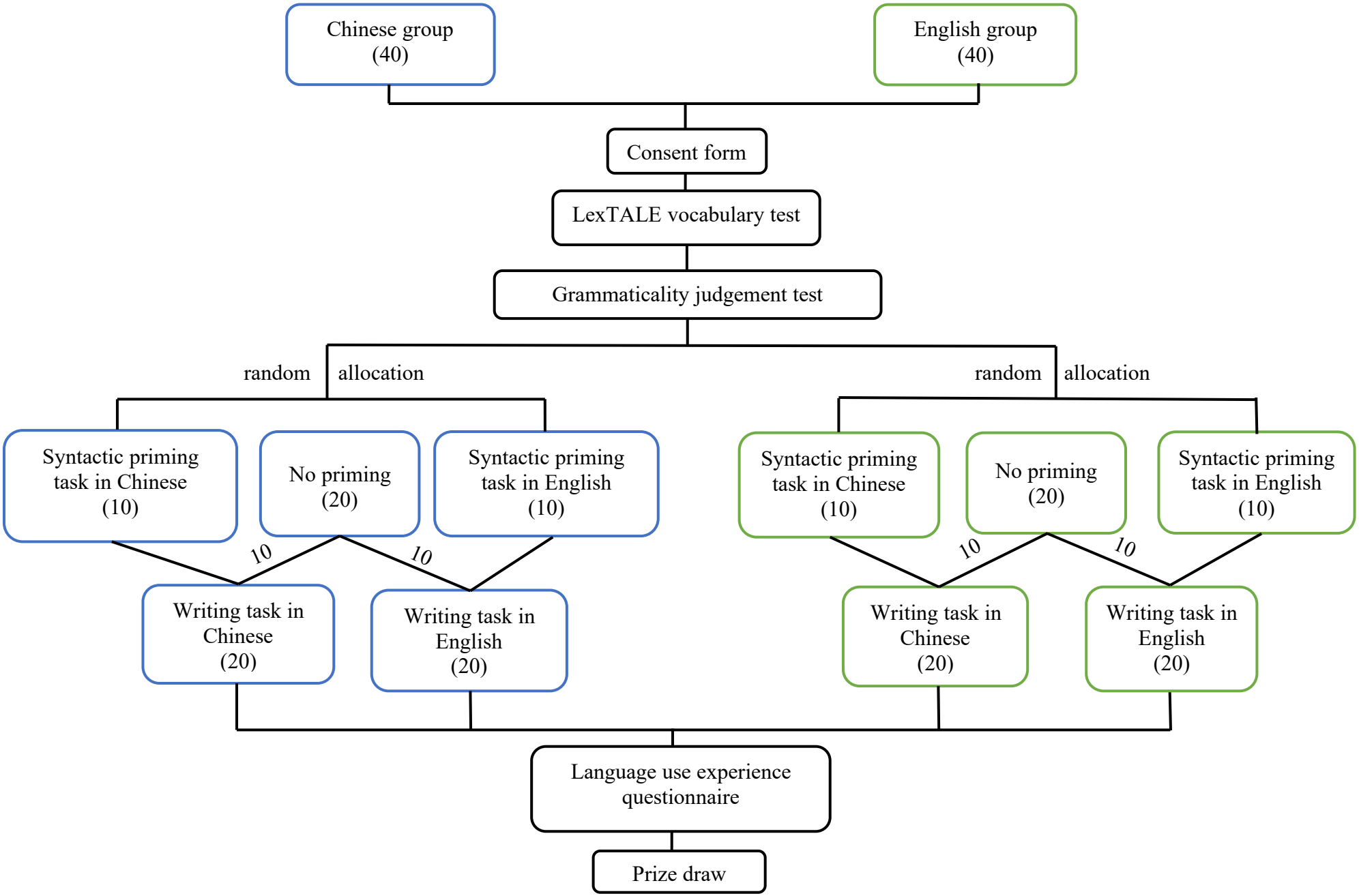
Language learning environment	Chinese group	English group	Total
age	M = 22.9 years SD = 0.818	M = 22.9 years SD = 0.848	M = 22.9 years SD = 0.833
gender composition	27 females, 13 males	23 females, 17 males	50 females, 30 males
onset age of L2 learning	M = 7.975 years SD = 1.904	M = 7.2 years SD = 2.431	M = 7.588 years SD = 2.218
length of stay in an L2-country	/	M = 15.1 months SD = 14.281	M = 15.1 months SD = 14.281
usage time of Chinese for daily communication	M = 8.4 hours SD = 4.716	M = 4.313 hours SD = 3.491	M = 6.356 hours SD = 4.625
usage time of English for daily communication	M = 0.266 hours SD = 0.608	M = 1.453 hours SD = 1.078	M = 0.860 hours SD = 1.057
usage time of Chinese for daily school or work	M = 5.175 hours SD = 3.263	M = 1.4 hours SD = 1.078	M = 3.314 hours SD = 3.060
usage time of English for daily school or work	M = 1.113 hours SD = 1.385	M = 2.738 hours SD = 1.573	M = 1.924 hours SD = 1.690
usage time of Chinese for daily leisure	M = 5.825 hours SD = 5.224	M = 2.769 hours SD = 3.039	M = 4.288 hours SD = 4.542
usage time of English for daily	M = 0.675 hours	M = 1.713 hours	M = 1.194 hours

leisure	SD = 0.952	SD = 1.250	SD = 1.226

4.4 Procedures

This study received ethical approval (Reference number: C1B-24HT-Educ-004, see Appendix 9.6 for the official approval email). After gaining consent from each participant, they were provided with a series of tasks as shown in Chart 1. The LexTALE vocabulary test and the grammaticality judgement test were given to both the Chinese and the English groups. After this, the participants in both groups were randomly assigned to three different routes: 10 participants from the Chinese group and 10 participants from the English group received a syntactic priming task in Chinese; another 10 participants from the Chinese group and 10 participants from the English group received the syntactic priming task in English; and 20 participants from the Chinese group and 20 participants from the English group were directly sent to the writing task. The groups undertaking the syntactic priming task were given instructions in the writing task after priming to write in the same language they were primed in, while the groups that did not receive syntactic priming were then randomly allocated in equal numbers to the writing task in Chinese and English (i.e., 10 participants each). The writing task was followed by a questionnaire aiming to gain information about the participants' L2 English learning time and daily usage of different languages. By the end of this experiment, participants were invited to take part in a prize draw as an appreciation of their participation.

Chart 1. Experiment procedures in a flow chart



5. Analysis

Before presenting the analysis of each research question, it is important to demonstrate the descriptive picture of the data. 80 participants were equally split into two groups based on their language environment (i.e., 40 based in China and 40 based in an English-speaking country). Within each language group, an equal number of 20 participants were randomly allocated to the syntactic priming condition, while the remaining 20 participants did not receive any priming. All participants were asked to complete a questionnaire concerning their language learning experience and two English proficiency tests: the LexTALE, used to assess their vocabulary knowledge, and a grammaticality judgement task, used to assess their grammar knowledge.

Table 4 shows the number, means, standard deviations of adverbial-clause-initial (AC-initial) and adverbial-clause-final (AC-final) sentences each group produced. Only the targeted four types of adverbial clauses (i.e., temporal, conditional, concessive, and causal) were included in the quantitative analysis, although other types of adverbial clauses also occasionally occurred, such as comparison ("*The father looks as sad as his son.*"). In Table 4, it can be seen that within the Chinese group, the subgroup undergoing the syntactic priming condition (M = 2.35, SD = 0.93) produced more AC-initial sentences on average than the subgroup without any priming (M = 1.85, SD= 1.57), but fewer AC-final sentences (M_{SP+} = 0.10, SD_{SP+} = 0.31; M_{SP-} = 0.20, SD_{SP-} = 0.52). For the English group, similar results were observed for AC-initial sentences, while AC-final sentence result turned out to be the opposite, with the subgroup that received syntactic priming producing more AC-final sentences than the group that did not receive priming (M = 0.55, SD = 0.83 vs M = 0.25, SD = 0.44). To summarize, the groups being primed generated a higher number of AC-initial sentences. The English groups produced both more AC-initial and AC-final sentences than the Chinese groups on average, though their higher level of dispersion indicated that there was greater variation in their scores.

Table 4. Descriptive statistics concerning adverbial clause production of each group based on different language learning environments and syntactic priming conditions

Language environment	Syntactic priming condition	Sentence pattern	Minimum	Maximum	Mean	Standard deviation
Chinese-dominant (N = 40)	SP+ (n = 20)	AC-initial	1	4	2.35	0.93
		AC-final	0	1	0.10	0.31
	SP- (n = 20)	AC-initial	0	5	1.85	1.57
		AC-final	0	2	0.20	0.52
English-dominant (N = 40)	SP+ (n = 20)	AC-initial	0	9	3.25	2.02
		AC-final	0	3	0.55	0.83
	SP- (n = 20)	AC-initial	0	5	2.30	1.66
		AC-final	0	1	0.25	0.44

Note 1: For the neatness and readability of the table, "SP+" and "SP-" were used to refer to the condition of receiving syntactic priming and not receiving syntactic priming respectively.
Note 2: Minimum and maximum here refers to the minimum number of AC-initial sentences and the maximum number of AC-initial sentences produced respectively.

5.1 RQ1: influence of different language environments on CLI

To explore the differences between the Chinese and the English groups in terms of AC-final and AC-initial sentences produced, an independent samples t-test was originally chosen to compare means between the two groups. However, given that the data did not fully meet the assumption of normality that is required to conduct a parametric test (see Appendix 9.4.1), two Mann-Whitney U tests were performed instead. The results indicated that the English group produced significantly more AC-final sentences than the Chinese group: U ($N_{\text{Chinese}} = N_{\text{English}} = 40$) = 959.0, z = -2.11, p = .035. However, the two groups did not differ in terms of the production of AC-initial sentences, U ($N_{\text{Chinese}} = N_{\text{English}} = 40$) = 643.0, z = -1.54, p = .123.

5.2 RQ2: influence of syntactic priming on adverbial clause production

To investigate the effect of syntactic priming on eliciting adverbial clauses, an independent samples t-test was conducted. The results indicated that there was a significant difference in the number of sentences containing an adverbial clause produced between the groups that were being primed (M = 3.125, SD = 1.682) and the groups that were did not go through syntactic priming (M = 2.275, SD = 1.754): $t(78) = 2.212$, $p = .015$. This difference represented a medium-size effect ($d = .495$). Follow-up independent samples t-tests were carried out to confirm which type of clauses (i.e., AC-initial or AC-final) contributed to this significant difference. It was found that syntactic priming exerted a significant influence on the production of AC-initial clauses ($t(78) = 2.009$, $p = .048$), although the Cohen's d indicated a small effect size ($d = .449$). There was no significant effect in the case of AC-final clauses ($t(78) = 0.778$, $p = .439$). In summary, syntactic priming increased the production of AC-initial sentences while no seeming effect was found for AC-final sentences' production.

5.3 RQ2.1: influence of syntactic priming on CLI between the two groups

To investigate whether syntactic priming has an effect on the written production of the number of AC-final and AC-initial sentences between the two language learning groups, an analysis of variance (ANOVA) was intended but, as the normality assumption of the ANOVA was not fully met (see Appendix 9.4.2), its non-parametric equivalent, Kruskal-Wallis H test, was performed. The results showed that there was no significant difference in the number of AC-final sentences produced across different language environments and syntactic priming conditions, $H(3) = 6.202$, $p = .102$, with a mean rank number of 35.35 for the Chinese primed group, 37.70 for the Chinese non-primed group, 47.83 for the English primed group, and 41.13 for the English non-primed group. Regarding AC-initial sentence production, the results also indicated a non-significant effect, $H(3) = 6.252$, $p = .100$, with a mean rank number of 40.80 for the Chinese primed group, 32.35 for the Chinese non-priming group, 50.14 for the English primed group, and 38.73 for the English non-priming group. This suggests that, having being primed or not did not make any significant difference in terms of the production of AC-initial and AC-final clauses within each language environment.

5.4 RQ2.2: influence of different syntactic priming languages on CLI

Two Kruskal-Wallis H tests (see Appendix 9.4.3 for normality test results) were carried out to explore whether the language of syntactic priming (i.e., Chinese or English) had an effect on the number of AC-final and AC-initial sentences for the two groups (i.e., China-based or U.K./U.S.-based). For AC-final sentences, the results indicated that different languages of syntactic priming contributed to a significant difference in the number of AC-final sentences produced by the Chinese and the English groups. A post-hoc Dunn's pairwise analysis showed that: 1) there was a significant difference between the Chinese subgroup that received syntactic priming in Chinese and the English subgroup that received syntactic priming in English, $p = .047$; 2) there was also a significant difference between the Chinese subgroup that received English syntactic priming and the English subgroup that received English syntactic priming, $p = .047$; and 3) that there was no significant difference among other subgroups. With regard to AC-initial sentence production, there was no significant difference across groups, $p = .134$. In other words, for participants studying in a Chinese-dominant environment, receiving syntactic priming in Chinese led to fewer instances of AC-final sentences (i.e., oppose to common Chinese adverbial clause usage), whereas receiving syntactic priming in English did not seem to affect the pattern of adverbial clause sentences produced. For participants studying in an English-dominant environment, syntactic priming in English contributed to a higher number of AC-final sentences and syntactic priming in Chinese did not result in any significant difference.

5.5 RQ3: relationship between L2 English proficiency level and CLI

A Pearson's r correlation test was conducted to explore the relationship between Chinese participants' L2 English proficiency level (i.e., the combined score of the vocabulary and grammar tests) and their production of AC-final and AC-initial sentences. The results suggested that there was no significant relationship between L2 English proficiency and the number of AC-final sentences produced, $r = .155$, $p = .170$. Nevertheless, there was a weak, positive correlation between English proficiency level and the number of AC-initial sentences produced, which was statistically significant ($r = .261$, $p = .020$). That is to say, it is more likely for the more L2-proficient participants to produce more AC-initial sentences, which is the common adverbial

placement pattern in Chinese. Four additional correlation tests were then performed to see whether vocabulary or grammar test score alone has any influence on AC-initial sentence production. The results showed that neither of the two tests were found to have a significant relationship with the number of AC-initial sentences produced (r_{vocab} = -.181, p_{vocab} = .108; r_{gramm} = .155, p_{gramm} = .171), whereas a weak, positive correlation was found between participants' knowledge of L2 grammar and AC-final sentence production (r_{gramm} = .286, p_{gramm} = .010), though not for vocabulary knowledge (r_{vocab} = .009, p_{vocab} = .936).

5.6 RQ3.1: differences between the two language groups concerning L2 English proficiency

To further understand how English proficiency level was correlated with the number of AC-initial sentences produced across the two language environment groups, another Pearson's r correlation test was carried out. The results indicated a weak, positive correlation was found for the English group (r = .290, p = .070), yet no significant relationship was found for the Chinese group (r = .209, p = .195). Additionally, in terms of the relationship between AC-final sentence production and grammar knowledge, the result also displayed a non-significant relationship for the Chinese group (r = -.031, p = .850) while a weak, positive correlation for the English group (r = .367, p = .020).

6. Discussion

6.1 Overview of the findings

This research centered on the roles that language learning environment, syntactic priming condition, and L2 proficiency level play in affecting Chinese-English postgraduate students' written production of adverbial clauses, and CLI patterns therein. Written picture description tasks in both Chinese and English were adopted to examine the existence and magnitude of CLI through adverbial clause placement. The difference between Chinese and English common adverbial clause placement is that Chinese tends to follow an AC-initial pattern, with AC-final sentences being scarce, while English is tolerant of both AC-initial and AC-final sentences. If these Chinese participants only produced AC-initial sentences in Chinese or English, then there would be no indication of CLI from English. Correspondingly, if any AC-final sentences were produced in Chinese or English, it could be concluded that CLI from English played a role. Moreover, the higher number of AC-final sentences produced, the stronger the effect would be argued to be.

In general, CLI in both the forward (i.e., from the L1 to the L2) and reverse directions (i.e., from the L2 to the L1) were discovered in the study. The production of AC-final sentences was found to interact with the three target factors to different degrees, with the language environment giving rise to the strongest effects. Interactions among different variables were also found, such as between syntactic priming and participants' L1 knowledge. These findings serve to justify not only the fluid and complex nature of CLI, but also the flexibility of the L1 system. Much like their L2, the participants' L1 seem to also experience constant changes, which serves as counterevidence to what MacWhinney (1997) claimed about a matured L1 system that is stabilized and static. The findings of this study suggest that the changes to the L1 system are not confined to the early stages of acquisition (e.g., bilingual children) or long periods of immersion in the L2 environment (e.g., immigrants). It can be concluded that languages are dynamic and constantly evolving and for bilingual learners, the interplay between the L1 and the L2 is subject to a variety of complexities that are also interrelated.

6.2 Answer to RQ1: language environment and CLI

RQ1 aimed to explore the effect of environments dominated by two different languages (i.e., L1 Chinese and L2 English) on CLI in both directions: from the L1 to the L2 and from the L2 to the L1. Previous literature did not come to a unanimous conclusion on the effect of language environment, but there is a host of evidence suggesting that a large amount of exposure to a language can contribute to a stronger CLI effect and vice versa (e.g., Keijzer, 2007; Seliger and Vago, 2010). An extreme example of a language exposure effect is Baladzhaeva and Laufer's (2018) study, which showed that an immersive contact with a new language can contribute to syntactic changes in speakers' L1, even when they arrived to the L2 context without any knowledge of the target language. In the present study, it was therefore predicted that CLI will take place in both directions; while participants residing in different language learning environments will display a different production of AC-included sentences, with the English group displaying a stronger reverse transfer effect (i.e., from the L2 to the L1), and the Chinese group displaying a stronger forward transfer effect (i.e., from the L1 to the L2). The statistical results showed that the expectations were partially met: the English group produced significantly more AC-final sentences, which is a sentence pattern more acceptable in English; regarding AC-initial sentences, both groups performed similarly, indicating that no difference was found between the two groups in CLI in the forward direction, regardless of the amount of contact with the L1.

The findings are in support of the claim that being in an L2-immersive environment with limited L1 contact can lead to a change in syntactic reformulation in a learner's L1. For example, they are reminiscent of what Chen's (2006) study revealed about Chinese postgraduate students studying in the US. It is also in line with what Baus et al. (2013) found among native German speakers attending an exchange program in Spain in terms of vocabulary retrieval, what Linck et al. (2009) reported by carrying out L1 comprehension and production tasks between two groups of native English speakers learning L2 Spanish in both their L1 and L2 environments, and what Malt et al. (2015) discovered with Chinese-English bilinguals in lexical network. It also adds a new perspective as one of the few investigations into late L2 immersion learners, suggesting that

even a relatively limited amount of exposure in an L2 environment, such as six months, is capable of causing changes in learners' L1 syntactic system.

It should be noted that the reverse transfer effects found in this study also contradict some studies (e.g., Gürel, 2002; Porte, 2003) that did not discover any CLI in the reverse direction even among speakers who lived in an L2-speaking country for many years. The reasons for the different results between these studies and the one at hand might be due to the fact that the participants had started to learn the L2 at different ages. For example, in Gürel's (2002) case, the age of onset was post-puberty, whereas in the present study, all the participants started their L2 learning at a much younger age of six or seven. Following the same logic, White et al. (2013) proposed for how age of onset affects the forward transfer: the earlier L2 starters are likely to have more L2 experience to develop a more refined L2 linguistic system than the late learners, which will thus contribute to a severer competition between the L1 and L2 linguistic representations and a higher possibility to enable reverse transfer. Other possible reasons could be the different target features. For instance, Porte's (2003) considered the number of code-switching examples as evidence of transfer. Although some researchers, such as De Bot (1992) and Poplack (1990), did support the particular pertinence between code-switching and CLI, yet whether replacing one phrase in the L1 to the L2 is not necessarily sufficient to argue that CLI is taking place. While in this study, adverbial placement, a syntactic structure that has been previously investigated (e.g., Su, 2001) was targeted and may thus be a more appropriate structure for exploring CLI effects.

Moreover, the findings of the present study suggest that living in the L1 environment did not contribute to a stronger forward transfer effect, which is consistent with Tsimpli et al.'s (2004) discoveries on Italian and Greek speakers' L2 syntactic performance studying in their L1 environments respectively, yet is in contrary to Brown and Gullberg's (2012) comparisons of Japanese-English speakers residing in Japan and Japanese monolinguals in terms of clause constructions. The little difference between their adverbial placement and that of the Chinese group may be attributable to the relatively short period these learners in the English group stayed in their L2 environment (0.5-4.5 years) and the constant use of L1 (1-10 hours per day) with their friends either from the surrounding environment or online, which might not satisfy the contextual

conditions of "a prolonged period of L2 immersion" and "limited L1 use" (Kasparian and Steinhauer, 2017: 1) to cause a change in their L2. Additionally, in Tsimpli et al. (2004), all the included learners' L2 proficiency had reached a near-native level.

Concerning language environment, the findings of this study provide some intriguing insights into CLI. A relatively higher amount of contact with the L2 enabled Chinese learners of L2 English to expand their syntactic preferences; however, a relatively lower amount of contact with the L1 did not reduce the CLI on the L2 to any discernible extent. These findings support the dynamic nature of languages per se and the phenomenon of CLI. Nevertheless, it should also be highlighted that, for the non-priming groups, a few participants did not compose any adverbial clauses or complex sentences. This may bias the result as it is feasible that their production was affected by CLI but their performance in the writing task did not allow discovery of it. As Yang et al. (2017) suggested, language environment is a significant yet complicated moderator in CLI. Different language environments are associated with differences in terms of language exposure, but also vary in terms of a range of features, such as regional language policy, culture, and individual educational level, which should be taken into consideration.

6.3 Answer to RQ2 and its sub-questions: syntactic priming and CLI

RQ2 set out to explore the effects of syntactic priming on eliciting adverbial clause production and causing a difference in participants' different placement behavior. As this study also employed syntactic priming in both Chinese and English, the influence of priming language was also investigated. Based on previous literature, the following results were expected: the groups receiving syntactic priming will produce more adverbial clauses and exhibit a greater CLI effect than the groups that did not; and within-language syntactic priming will strengthen the effects of CLI from the primed language to the other, which means that in this study, syntactic priming in Chinese will contribute to a stronger forward transfer effect (i.e., produce more AC-initial sentences) while that in English will enhance CLI in the reverse direction (i.e., produce more AC-final sentences). Yet since barely any research to date has delved into the interaction between priming language and the dominant language of the surrounding environment, no further evidence-supported hypothesis could be made. The findings showed that, for the first part of the question, the implementation of syntactic priming did effectively elicit more written

adverbial clause production, which suggests that priming implicitly affects target language structure use, however, whether this language use change indicates a certain level of implicit learning happening as Dell and Chang (2014) believed needs further examination, such as adding pre- and post-tests on learners' adverbial clause knowledge. Moreover, the follow-up t-test's results indicated that primed participants displayed a higher tendency to place the adverbial clause at the initial position (i.e., a more common pattern in Chinese) but not the other way round.

The findings for the second part of the question (i.e., RQ2.1 and RQ2.2) further elaborated on the influence of syntactic priming on CLI patterns, including both syntactic priming's interaction with other variables, such as language environment, and the language of the priming per se. When the effect of syntactic priming was analyzed separately within the two language environments, it was found that, neither in the Chinese group nor in the English group did syntactic priming stimulate the production of adverbial clauses in any position. This seems to stand in contrast to the former finding that syntactic priming benefited a higher production of Chinese-like AC-initial structures. Yet in fact, it indicated that syntactic priming alone was unable to promote CLI in either direction but it had a facilitative interaction effect coupled with these participants' L1 syntactic knowledge.

This interaction effect can be seen more clearly if reviewed together with the number of each type of adverbial clause sentences produced: the English-primed group living in an English-immersive environment produced both the most English-patterned adverbial clause sentences and the most Chinese-patterned adverbial clause sentences. In other words, syntactic priming seemingly failed to counteract or bolster the CLI effects brought by immersive language contacts in either direction in this study. However, it is worth noting that the number of participants (i.e., 10) included in each subgroup was relatively limited, which may thus render it unable to display the effects of syntactic priming in a noticeable manner. This priming, nevertheless, was able to strengthen the L1-experience-induced CLI effects in the same direction, leading to a higher number of Chinese-like adverbial clause production. These findings are in favor of Hartsuiker and Bernolet's (2015) and Gerwien and Flecken's (2015) observations that the production of L2-inclined syntactic structures was modulated by L1 experience. They also offered a new

perspective by investigating the interaction between syntactic priming and other variables, including CLI, which again, highlights the fact that participants in this study were exposed to both short-term (i.e., syntactic priming) and long-term (i.e., immersion in either the L1 or L2 environment) language input.

As for the investigation into the language of syntactic priming, the result showed that the English group receiving priming in English wrote more in line with the English manner compared to the Chinese group receiving priming in Chinese. This implies that the interaction effect between syntactic priming and language environment was able to overcome what participants have established concerning adverbial clause placement in their L1 system. This finding may also serve to provoke more thoughts for within-language priming studies which aimed to verify the effectiveness of within-language priming, such as in Jackson and Ruf (2016) and Kaschak et al. (2014), that whether such effectiveness was caused by priming alone or coupled with some other factors. Moreover, under the same English syntactic priming condition, the English group still used more English-based syntactic structures than the Chinese group, which underlines the strong influence brought by the language environment.

Overall, these results seem to be in more support of the implicit learning accounts proposed by Chang et al. (2006), suggesting that it is likely the long-term implicit learning effect rather than an immediate activation of the unfamiliar knowledge that renders syntactic priming effective in target structure production. As the Chinese participants in China have presumably undergone more implicit learning of the Chinese-patterned adverbial clause structure, receiving syntactic priming in English for a short period of time may be unable to compete with those more entrenched forms. The same logic applies to those studying in an English-speaking country: staying in an L2 environment was able to provide more L2 input and, thus, a longer period of implicit learning that could outdo the effect of being primed in Chinese. Another possible reason for the fact that syntactic priming did not increase the magnitude of CLI effects may be that the amount of target input that the participants received was insufficient, as the overall amount of time to complete the whole experiment had to be controlled. As Yokokawa and Hamada (2019) suggested, it is likely that with a larger amount of syntactic priming, the effects may become

stronger and therefore, overcome those resulted by language immersion and direct CLI to the opposite direction intended by syntactic priming.

6.4 Answer to RQ3 and its sub-questions: L2 English proficiency level and CLI

The relationship between CLI effects and L2 proficiency was explored to address RQ3. It was expected that the English group would perform better in the proficiency tests since they had to study in an English as a medium of instruction (EMI) university for at least a year. The descriptive and inferential statistics, nevertheless, argued against this expectation: in terms of the two respective proficiency test results, the Chinese group outperformed the English group in vocabulary but was comparably less grammatically-equipped; while for the overall score, the groups were at a similar L2 proficiency level, with the English group achieving a slightly higher mean score than the Chinese group. This may serve as an implication for teachers in EMI institutions, suggesting that they should not hold the view that international students who come to study in an immersive environment are or will become highly proficient in English.

As multiple studies have pointed out the modulating effect of L2 proficiency (e.g., Jarvis and Pavlenko, 2008; Su, 2001) on CLI performance, the predictions were that Chinese participants' L2 English proficiency would be positively correlated with the reverse transfer effect (i.e., from the L2 to the L1), but negatively associated with a forward transfer effect (i.e., from the L1 to the L2). However, contrary to what were predicted, the results indicated no correlation between participants' L2 English proficiency and reverse transfer. With regard to the forward transfer effect, a weak and positive correlation was found. In other words, the more proficient a participant was in English, the less likely they were to produce adverbial clauses in an English-patterned manner. When the two proficiency constituents were considered separately, it was also found that for the English group, the better the participants were at grammar, the more AC-final (i.e., English-featured pattern) they would produce.

This finding between the overall L2 proficiency and forward transfer effect remarkably contradicts most previous findings in the literature and few of which have looked into the relationship between CLI and linguistic aspects (e.g., vocabulary and grammar) separately in terms of L2 proficiency. Nevertheless, these results are partially in support of Chen (2006), who

found that, for Chinese learners in the U.S., a U-shaped curve relationship existed between forward transfer and L2 proficiency – but only in intermediate learners. That is to say, just like in this study, the increase of English proficiency also occurred with a stronger forward transfer effect in Chen's (2006) research for those above-average intermediate L2 learners. This is also in consistent with the results of the follow-up correlation test, which indicated that this weak and positive relationship only held for the English group, which was slightly more proficient in L2 English and produced more Chinese-featured adverbial placements, while there was no correlation found for the Chinese group.

Although Chen (2006) did not proffer any explanation, what might possibly account for this positive correlation is that participants in an L2 environment may not have been as distant from their L1 as expected, which can be seen from the time these participants spent on daily communication (M = 4.313 hours, SD = 3.491), school or work (M = 1.4 hours, SD = 1.078), and leisure (M = 2.769 hours, SD = 3.039) using Chinese. As they were immersed in an L2 environment, there was presumably a stronger desire to use their L1 and thus, to generate a large proportion of Chinese-featured sentences, although not to an excessive extent as Levinston (1971) has observed. This finding may also correspond to Cummins' (1991) Interdependence Theory concerning how L1 and L2 proficiency are interrelated. The higher L2 proficiency level may also contribute to a higher L1 proficiency, which thus enables a greater production of L1-featured sentences, although the L1 proficiency was not tested in this study. Concerning a lack of a correlation between proficiency and reverse transfer, some scholars, such as De Bot and Clyne (1989), have proposed that there is a critical threshold of L2 proficiency level: before reaching this threshold, the learners' L1 is susceptible to their L2; yet after this threshold, learners develop immunity from such reverse transfer. Thus, in this study, the participants' English proficiency level might have arguably surpassed that threshold and the participants were immune from such effects. Another possibility is that even for those participants who achieved a relatively high score in the vocabulary and grammar tests, their L2 proficiency was still too limited for any L2 knowledge to be transferred to the L1. Additionally, some participants have reported on using a third or fourth language in daily communication, such as Japanese, which follows a similar pattern as how Chinese places adverbial clause (Yokomori, 2008). Given that the participants'

proficiency level in their third or fourth language is unknown, there might also be CLI from this language that outdo the influence brought by the L2.

Furthermore, a few other issues that might result in such "unusual" CLI effects should also be considered. For example, the format of the experiment may have constituted a limitation, as some participants might not have taken the writing task seriously and produced rather simple, short sentences that did not allow the exploration of transfer effects. Such a situation is likely to be improved when some more authoritative parties are involved, for example, participants may put into more effort in writing if this task was incorporated in an official school assignment. In addition, other individual variables may have also contributed to this CLI effect, such as age of onset and metalinguistic awareness (i.e., the conscious knowledge of the target language and other previously acquired languages; Köpke, 2007; Schmid, 2013). As exemplified in this case, some learners might possess a higher level of metalinguistic awareness, which means they understand the syntactic similarities and differences between Chinese and English in terms of adverbial clause placement. As the level of metalinguistic awareness was found to positively correlate with L2 proficiency (Renou, 2001), these participants with a higher L2 proficiency may thus be able to control their language use more consciously and at more ease than those less proficient counterparts and consciously made the choice to adopt a Chinese-like manner in the writing task.

7. Conclusion

Adopting a quantitative perspective, this study expanded the current CLI literature in the field of SLA as it represented one of the few investigations that explored this phenomenon in both forward and reverse directions through Chinese postgraduate students in different dominant language environments, while examining three widely discussed factors: language environment, syntactic priming, and L2 proficiency level. Via an online experiment comprising of two L2 English proficiency tests, a syntactic priming task, a written picture description task, and a survey concerning L1 and L2 usage, it unraveled the bidirectional CLI effects exhibited in Chinese postgraduate students' written production of adverbial clauses. Both directions of CLI effects were detected, but the investigations into the three focal factors yielded rather different results. Being in different language environments appeared to have caused changes to these learners' L1 and L2, and a major influence from the L2 to the L1 was found, especially for participants in the English-immersive environment. The picture was further complicated by the incorporation of syntactic priming. It was not only confirmed that priming could effectively elicit target syntactic structures, but also influence CLI effects through interactions with other variables. Specifically, coupled with learners' L1 knowledge, syntactic priming was able to strengthen forward transfer (i.e., from the L1 to the L2) effects and more reverse transfer (.e., from the L2 to the L1) effects were discovered when priming was provided in English, interacting with the language input from the L2-immersive environment in the same direction for the English group. With regard to L2 proficiency level, more forward transfer instances were associated with a higher English proficiency; while for those who studied in an L2 environment, the more grammatically-competent they were, the more likely they were to perform in an English-featured manner.

7.1 Implications

The implications drawn from this research comprise two aspects: theoretical and pedagogical. From a theoretical perspective, these results emphasize a dynamic view of the two languages that a bilingual speaker is learning and suggest that CLI is a complex phenomenon that involves multiple variables that interrelate in various complex ways. Despite immersing in an L2

environment from a rather late age (i.e., no earlier than 18 years old in this study), which corresponds to what Malt et al. (2015: 86) described as late immersion learners possessing a "well-entrenched L1", the results have shown that these learners' L1 was not immune to L2 influence. This is an interesting finding, given that the two languages, Chinese and English, differ to a great extent. Moreover, although most of these participants in the English group spent a relatively limited time in the immersive L2 context (i.e., approximately 14 months on average), the amount of increase in L2 exposure they experienced turned out to be an adequate source of L2 input to cause changes in these participants' L1. This finding extends the research scope of CLI effects from merely focusing on bilinguals at a younger age or having relocated to an L2 environment for a longer period (e.g., 4-5 years) to adult learners experiencing a relatively limited L2 immersion. Furthermore, the correlation found between participants' grammatical knowledge and CLI also sheds light on research exploring the modulating effect of L2 proficiency level through specifying the linguistic elements included in "L2 proficiency", which should also be further investigated with more samples and more standardized tests.

Pedagogically speaking, the role that the language environment and syntactic priming played in affecting CLI effects underlines the importance of exposure to the target language for SLA. For teachers who either teach an L2 or teach through an L2, when a learner's L1 contains structures contrasting those in their L2, it may be difficult for them to learn the target structures. To ease the learning process, a significant amount of exposure to the target structures should be provided to help the learners adjust to a more L2-based manner of writing. The exposure could include repeated occurrences of target structures during the class and in teaching materials. Such exposure should be achieved through a combination of explicit and implicit instruction as Ellis (2009) proposed, by engaging learners in a learning environment that is both implicitly rich in the target structures and explicitly explained with the rules to develop metalinguistic awareness. This is especially the case for teachers teaching in an L2 as an additional language context. As previous L1 knowledge will presumably strengthen the effect of forward transfer, the teachers should point out the differences and similarities of the target structures to the learners explicitly while paying attention to signs of CLI that appear in learners' written work. Since, in this study, L2 proficiency displayed a positive correlation to forward transfer, it is argued that this teaching process should be implemented across all proficiency levels.

7.2 Limitations

There are several limitations emerging in the present study that need to be improved in future research. First, a total of 80 participants, including 40 of them from the Chinese-dominant environment and another 40 from the English-dominant environment, were recruited for this study. Among each language group, only 10 participants were assigned to each of the four syntactic priming conditions. Although the number of 10 participants for each condition satisfied the minimal requirement proposed by DeMaris (1992) for effective statistical inference, future work with more participants and more written production data will benefit a more robust and more detailed analysis.

In addition to relatively small sample size, during the process of data cleansing, it was found that the number of adverbial clauses produced by each participant was actually rather limited, which thus rendered it difficult to examine the CLI representations more closely. Given that studies investigating different syntactic features seemed to reach contrastive conclusions, it is reasonable to assume that CLI tends to occur more commonly in some syntactic structures than others. As suggested by Halliday and Matthiessen (2014), clause sequences also vary in terms of communicative function, context, and topic to a large extent. More data is thus needed to obtain a more detailed analysis on whether there is any relationship between the type of adverbial clause and CLI.

Moreover, due to time and resource constraints, this study was unable to ensure that participants treat the experiment tasks and tests seriously. Thus, an incorporation of authoritative third party is preferred, for example, enabling the experiment to be a part of the school assignment or test may be of help. Such constraints also renders it difficult to attend to other individual variables that are also significant to CLI, such as participants' length of stay in an L2 environment, awareness of CLI, motivation, and knowledge of languages other than Chinese and English as well as their potential contact with the other languages. The syntactic priming task was also limited to 16 sentences to ensure the total time to finish the experiment will not exceed 40 minutes, which might be an inadequate amount of exposure for the participants to absorb the target structures. Hence, future research looking into more individual variables and provide

syntactic priming sufficient in both length and content will add more insightful results to the current CLI study.

8. References

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9. Appendices

9.1 Grammaticality judgement task

1. The house is bigger, but more expensive.
2. I have been to Germany last year.
3. The film was directed by Quentin Tarantino.
4. I don't like getting up early.
5. Could you tell me where the record shop is?
6. If I have more time, I would do more exercise.
7. It was the first time I have eaten anything so spicy.
8. By next week I will have finished all my exams, hooray!
9. That smells good! What are you cooking?
10. I'm busy on Monday, so I couldn't come.
11. She hardly ever work as hard as she should.
12. Where has she been?
13. She's wearing a long beautiful black dress.
14. How long have she been waiting there?
15. I wouldn't say that to her if I were you.
16. Put the bag on the table and pass me a bar of chocolate, please.
17. Winters here could be really cold sometimes, so make sure you bring warm clothes.
18. Do you think it's will rain tomorrow?
19. I wish she hadn't been so rude to people when we go out.
20. Take a sandwich with you if you get hungry later.
21. I'll send it to you as soon as I got the money.
22. She's from the States but she speaks great German.
23. I wish I knew when can I get the result.
24. She used to have short hair, but now it's grown long.
25. That wasn't a good idea, you should have thought about it more carefully.
26. I've already called her four times yesterday.
27. I'd love to have lived in the 19th century.
28. She drives quite slowly, but her mom drives really fast.

29. Having spent time abroad when I was a student, I found it easier to get used to live in another country.
30. If she had arrived one minute later, she would have missed the train.
31. How did this get broke?
32. But they mustn't be away—I saw them this morning!
33. She lives in a house near the beach.
34. Which film will we watch tonight?
35. I don't know where she is. I suppose she have got stuck in traffic.
36. She was looking to buy her a house for her family.

9.2 Syntactic priming task

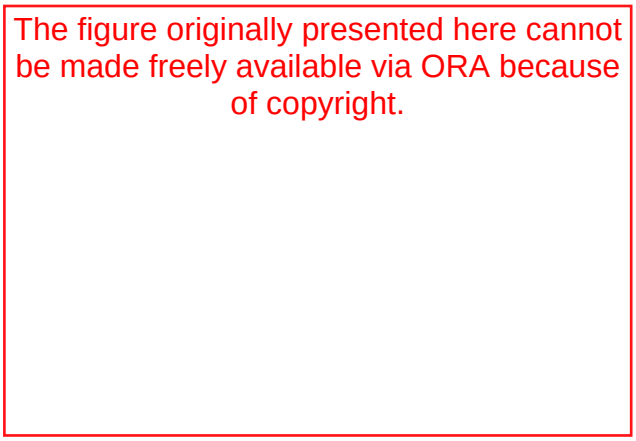
* Chinese and English versions contained the same pictures in the same order

(1) 

Chinese: 天气好的时候，我和爸爸会一起去钓鱼。

English: My dad and I will go fishing when the weather is good.

A. 图文匹配 (match) B. 图文不匹配 (no match)

(2) 

Chinese: 因为这部电影太好看了，我和爸爸看得如痴如醉。

English: My dad accidentally poured the tea into his hat, as the book we were reading was so intriguing.

A. 图文匹配 (match) B. 图文不匹配 (no match)

(3)

Chinese: 爸爸和我约定好，除非紧急情况发生，否则不能动存钱罐里的钱。

English: Dad and I agreed that unless an emergency happens, we can’t use the money from the piggy bank.

A. 图文匹配 (match)　B. 图文不匹配 (no match)

(4)

Chinese: 虽然我和爸爸没有船，我们还是感到非常开心。

English: My dad and I are having so much fun, although we don’t have a boat.

A. 图文匹配 (match)　B. 图文不匹配 (no match)

(5) 

Chinese: 因为晚饭做好了，所以爸爸提早回来了。

English: Although dinner is ready, my dad still hasn’t come home.

A. 图文匹配 (match)　B. 图文不匹配 (no match)

(6) 

Chinese: 因为我踢球时不小心把玻璃弄碎了，爸爸和我大吵了一架。

English: Because I broke the window when playing soccer, dad and I had a big fight.

A. 图文匹配 (match)　B. 图文不匹配 (no match)

(7) 

Chinese: 在我小的时候，我经常用气球来寄信。

English: I used to mail my letters using balloons when I was a kid.

A. 图文匹配 (match)　B. 图文不匹配 (no match)

(8) 

Chinese: 因为爸爸陪我一起去看牙医，我一点都不害怕了。

English: I cried at the dentist even though my dad accompanied me.

A. 图文匹配 (match)　B. 图文不匹配 (no match)

(9)

Chinese: 当我开始看书架上的书时，爸爸看起来很吃惊。

English: When I started picking up books from the shelf, dad looked surprised.

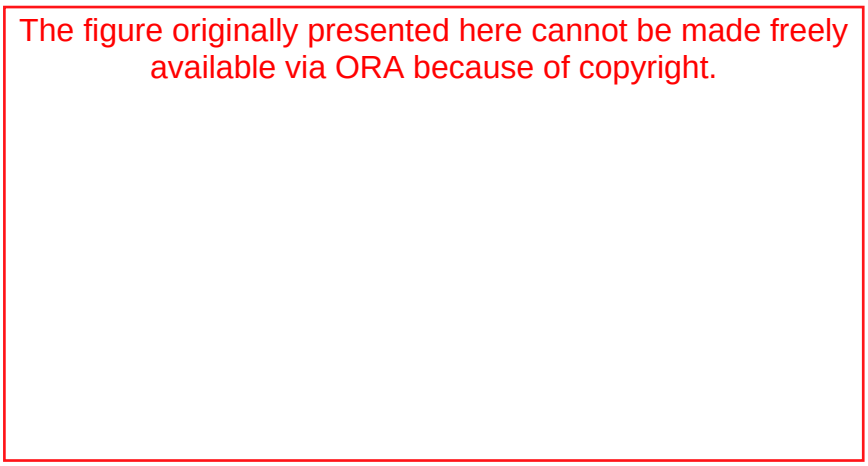
A. 图文匹配 (match)　B. 图文不匹配 (no match)

(10)

Chinese: 不管爸爸承不承认，他确实需要一副新眼镜了。

English: My dad needs a new pair of glasses whether he admits it or not.

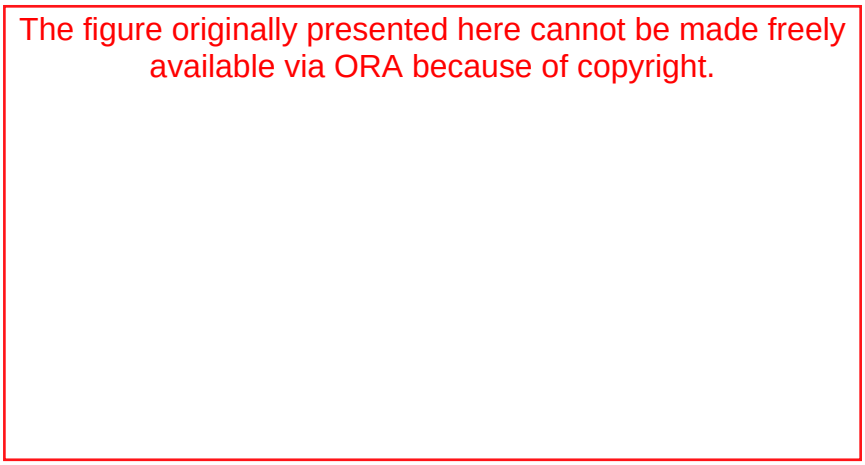
A. 图文匹配 (match)　B. 图文不匹配 (no match)

(11) 

Chinese: 因为爸爸的衣服被我的朋友们弄破了，爸爸刚刚大发雷霆。

English: Although my friends were polite after tearing up my dad's clothes, my dad was still mad at them.

A. 图文匹配 (match)　B. 图文不匹配 (no match)

(12) 

Chinese: 如果爸爸能坚持锻炼，我也要加入他。

English: Even though my dad works out every day, I'm not joining him.

A. 图文匹配 (match)　B. 图文不匹配 (no match)

(13)

Chinese: 即使爸爸是尽全力，那个箱子还是纹丝不动。

English: The box has not been moved a bit, even though my dad pulled it as hard as he could.

A. 图文匹配 (match)　B. 图文不匹配 (no match)

(14)

Chinese: 今天早上醒来的时候，我发现我居然不在房间里。

English: When I woke up this morning, I was surprised to find that I was not in my room.

A. 图文匹配 (match)　B. 图文不匹配 (no match)

(15)

Chinese: 因为爸爸不想看上去秃顶，所以他把我们的合照剪掉了。

English: My dad cut our photo because he didn’t want to appear bold.

A. 图文匹配 (match)　B. 图文不匹配 (no match)

(16)

Chinese: 因为我觉得有胡子很酷，所以我给自己画上了一撮。

English: I drew myself a beard because I think it looks cool.

A. 图文匹配 (match)　B. 图文不匹配 (no match)

9.3 Language experience questionnaire

1. 你的性别是？

(What is your gender?)

A. Female B. Male C. Non-binary

2. 你的年龄是？

(What is your age?)

3. 你从几岁开始学习英语？

(Since what age have you started learning English?)

4. 你是否在以英语为通用语言的国家居住过？

(Have you ever lived in an English-speaking country)

A. Yes B. No

5. 如果你在Q4选了“是”，请具体说明你所在的国家和居住的时长。比如，“英国 半年”。

(If you chose “yes” in question 4, please specify the country(s) you’ve lived in and the length of stay in that country. For example, U.K., 6 months.)

6. 在读研期间，你日常交流会用什么语言？（可多选）

(During your postgraduate studies, what language(s) will you use for daily communication?) (multiple selections are allowed)

A. English B. Mandarin C. Others

7. 在日常交流中，你每天使用英语的时间大约是多久？

(During your daily communication, how long will you spend on using English?)

8. 在日常交流中，你每天使用普通话的时间大约是多久？

(During your daily communication, how long will you spend on using Mandarin?)

9.
如果你在Q7有选其他语言：在日常交流中，你会使用其他什么语言？使用时间大约是多久？（没有就跳过）
(If you have chosen “Others” in question 7: During your daily communication, what other language(s) will you use and how long will you spend on using that language?)

10. 在读研期间，你上课/兼职会用什么语言？
(During your postgraduate studies, what language(s) will you use for school/work?) (multiple selections are allowed)
A. English B. Mandarin C. Others

11. 在上课/兼职过程中，你每天使用英语的时间大约是多久？
(During your school/work period, how long will you spend on using English?)

12. 在上课/兼职过程中，你每天使用普通话的时间大约是多久？
(During your school/work period, how long will you spend on using Mandarin?)

13.
如果你在Q10有选其他语言：在上课/兼职过程中，你会使用其他什么语言？使用时间大约是多久？（没有就跳过）
(If you have chosen “Others” in question 10: During your school/work period, what other language(s) will you use and how long will you spend on using that language?)

14. 在读研期间，你日常娱乐所使用的语言是？比如看电影、看展览等。
(During your postgraduate studies, what language(s) will you use for recreations? For example, watching a movie or going to an exhibition) (multiple selections are allowed)
A. English B. Mandarin C. Others

15. 在日常娱乐时，你每天使用英语的时间大约是多久？
(During your recreation time, how long will you spend on using English?)

16. 在日常娱乐时，你每天使用普通话的时间大约是多久？
(During your recreation time, how long will you spend on using Mandarin?)

17.
如果你在Q14有选其他语言：在日常娱乐时，你会使用其他什么语言？使用时间大约是多久？（没有就跳过）
(If you have chosen “Others” in question 14: During your recreation time, what other language(s) will you use and how long will you spend on using that language?

9.4 Normality test results

9.4.1 RQ1 (language environment and CLI)

AC-initial sentence production:

Language environment	Shapiro-Wilk sig.	Kolmogorov-Smirnov sig.	Skewness	Kurtosis
Chinese (N=40)	.027	.016	.102	-.595
English (N=40)	.014	.012	.872	1.574

AC-final sentence production:

Language environment	Shapiro-Wilk sig.	Kolmogorov-Smirnov sig.	Skewness	Kurtosis
Chinese (N=40)	<.001	<.001	3.013	9.225
English (N=40)	<.001	<.001	1.987	4.739

9.4.2 RQ2.1 (syntactic priming condition and CLI)

AC-initial sentence production:

	Shapiro-Wilk sig.	Kolmogorov-Smirnov sig.	Skewness	Kurtosis

CN, SP+	.023	.025	.055	-.734
CN, SP-	.056	.180	.458	-.811
EN, SP+	.108	.200	1.105	2.265
EN, SP-	.095	.124	.314	-.933

Note : “CN” and “EN” represent Chinese and English group respectively while “SP+” and “SP-” represent receiving syntactic priming and not receiving syntactic priming

AC-final sentence production:

	Shapiro-Wilk sig.	Kolmogorov-Smirnov sig.	Skewness	Kurtosis
CN, SP+	<.001	<.001	2.888	7.037
CN, SP-	<.001	<.001	2.745	7.401
EN, SP+	<.001	<.001	1.695	2.960
EN, SP-	<.001	<.001	1.251	-.497

9.4.3 RQ2.2 (syntactic priming language and CLI)

AC-initial sentence production:

	Shapiro-Wilk sig.	Kolmogorov-Smirnov sig.	Skewness	Kurtosis
CN, SP in CN	.015	.035	.434	-.283
CN, SP in EN	.074	.148	.712	-.450
EN, SP in CN	.723	.200	.773	1.305
EN, SP in EN	.466	.200	.334	-.852

AC-final sentence production:

	Shapiro-Wilk sig.	Kolmogorov-Smirnov sig.	Skewness	Kurtosis
CN, SP in CN	<.001	<.001	3.162	10.000
CN, SP in EN	<.001	<.001	3.162	10.000
EN, SP in CN	<.001	<.001	1.779	1.406
EN, SP in EN	<.001	.054	1.085	.914

9.5 Participant information sheet

Department of Education

University e-mail:
Reference number: C1B-24HT-Educ-004

[Crosslinguistic influence on Chinese-English postgraduate students' written production of adverbial clauses in different linguistic contexts]

General Information

We appreciate your interest in participating in this online task. You have been invited to participate as you are a Chinese native speaker with English as an L2, aged 18-40 years old, and are currently taking part in a postgraduate program either in China or an English-speaking country. Please read through this information before agreeing to participate (if you wish to) by ticking the 'yes' box below. You may ask any questions before deciding to take part by contacting the researcher (details below).

The aim of this research is to understand how Chinese learners' first language (L1) and second language (L2) influence each other in the course of writing production, and how the learning context mediates cross-linguistic influence.

The Principal Researcher is , who is attached to the Department of Education at the University of Oxford. This research is being completed under the supervision of .

If you agree to take part in this study, you will need to complete three tasks. The first task is a two-part test measuring your English proficiency in terms of both vocabulary and grammar. For the second task, you will be asked to describe a given picture with 100 to 150 words using the designated language. The third task involves a questionnaire concerning your demographic background and daily language usage. All three tasks should take about 30 to 40 minutes. No background knowledge or preparations are required. Your results will be anonymized and will only be used by the researcher for the analytical purpose of her dissertation research project. No third party will be given access to your data.

Do I have to take part?

No. Please note that participation is voluntary. If you do decide to take part, you may withdraw at any point for any reason before submitting your answers by pressing the 'Exit' button/ closing the browser. If you wish to withdraw at any point during the session, please inform the researcher.

How will my data be used?

The data we will be collecting are your age, gender, and the location where your postgraduate studies take place, which will be completely anonymous and will remain confidential. No identifiable data will be collected except for your email address for the prize draw, which is entirely based on your choice. Your IP address will not be stored[1]. The data you provide will be stored in a folder in the researcher's University of Oxford Nexus365 OneDrive account. Except for the email address that will

be deleted immediately after the prize is drawn, other research data will be stored for 3 years after publication or public release of the work of the research.

Who will have access to my data[2]?

The University of Oxford is the data controller with respect to your personal data and, as such, will determine how your personal data is used in the research. The University will process your personal data for the purpose of the research outlined above. Research is a task that we perform in the public interest. Further information about your rights with respect to your personal data is available from https://compliance.admin.ox.ac.uk/individual-rights. The results will be written up for a Master's degree and may form part of other academic publications/presentations.

Who has reviewed this research?

The application was reviewed and approved by my supervisor on behalf of the Departmental of Education's Research Ethics Committee.

Who do I contact if I have a concern or I wish to complain?

If you have a concern about any aspect of this research, please speak to
( ) or their supervisor
( ), and we will do our best to answer your query. We will acknowledge your concern within 10 working days and give you an indication of how it will be dealt with. If you remain unhappy or wish to make a formal complaint, please contact the Research Ethics Committee at the Department of Education, University of Oxford who will seek to resolve the matter as soon as possible:

Education Departmental Research Ethics Committee (DREC), email:
student.curec@education.ox.ac.uk

Please note that you may only participate in this survey if you are 18 years of age or over.

☐ I certify that I am 18 years of age or over

If you have read the information above and agree to participate with the understanding that the data (including any personal data) you submit will be processed accordingly, please tick the box below to start.

☐ Yes, I agree to take part

9.6 CUREC 1B approval email

CUREC 1B - Crosslinguistic influence on Chinese-English postgraduate students‘ written production of adverbial clauses in different linguistic contexts

Student CUREC <student.curec@education.ox.ac.uk>

Sunday 2024/3/3 2:43

To: < >

Cc: < >;Student CUREC <student.curec@education.ox.ac.uk>

Dear ,

I am writing to acknowledge receipt of your CUREC 1B application entitled ‘*Crosslinguistic influence on Chinese-English postgraduate students‘ written production of adverbial clauses in different linguistic contexts'*. The application was reviewed and approved by , your supervisor. No further approval from the Education DREC is required for applications reviewed under the CUREC 1B process. As such, the project will not receive a formal letter of ethical approval from the SSH IDREC.

The ethics reference for your application is C1B-24HT-Educ-004. Please add this reference to your CUREC 1B form and include it on documents for the research participants such as the participant information sheet.

Please note that this is contingent on the research project adhering to the criteria set out in the CUREC 1B guidance. Please ensure, therefore, that you comply with the conditions of this process and, should anything change in the course of the project, you should discuss this with your supervisor to determine whether this requires further review and approval by the Education DREC.

Please see below a couple of additional small comments, which I would appreciate if you could take into account before starting any work. Please send us any revised documents, for our records, if applicable:

- please be aware that it might be easier/better practice to include on Gorilla a link to an MS Form for the purpose of collecting the participant's email address for the prize draw. This way, you’re not collecting personal data via Gorilla (which you shouldn’t) and also you keep the research data separate from the contact details, which will make it easier to delete it as soon as you won't need it anymore.
- the guidance notes from the footer of the participant information sheet are for you rather than your participants, so I would remove them from there

Please don't hesitate to get in touch if you have any questions.

All the best for your research – we hope it goes well.

Irina

Irina Lepadatu

Research Manager

Department of Education, University of Oxford

15 Norham Gardens, Oxford, OX2 6PY

Research SharePoint site

LinkedIn | X | YouTube