Research on Spatial Concept Transfer - the Order of Adverbial Clauses of Time from Chinese English Learners at Different Educational Levels

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Abstract:

The research on spatial concept transfer as a cognitive paradigm of language transfer aims to explain the factors that learners may encounter in second language acquisition (SLA) and promote the development of SLA. This research uses a corpus-based approach to reveal the features of English learners' distribution of inflectional order in When, While, and Once-led adverbial clauses of time at different levels of education and to validate the theoretical framework of spatial concept transfer.

Keywords: Second Language Acquisition; Spatial Concept Transfer; Ground and Figure; Corpus Linguistics

1. Introduction

As far as we know, possessing human language is associated with a specific type of thought organization, not simply a higher degree of intelligence. A basic hypothesis is proposed that from a cognitive perspective, the concept of space is categorized into physical space, thought space, and language space, all of which reflect and influence each other. Specifically, under the influence of multiple cognitive factors, different language features in Chinese and English lead to different thought tendencies, which have different degrees of influence on SLA. Based on this, the research aims to verify the theoretical framework of spatial concept transfer through corpus empirical research. In this way, it helps to explore the deep cognitive factors that lead to language transfer, promoting the development of language transfer theory and even the theory of SLA to a higher level.

2. Theoretical background

The study of conceptual transfer emerged in the 1990s, and its paradigm has been divided into two main types:

Firstly, Jarvis (Pavlenko) focuses on the influence of thought on language and has always viewed conceptual transfer as a special case of cross-linguistic influence that occurs when learners use language. From partial to comprehensive, he has been improving the connotation of conceptual transfer, i.e., from concept to covering both conceptual and conceptualization; from psychological to linguistic, he has broadened the development of linguistic empirical research about conceptual transfer, i.e., from the use of psychological terminology and research paradigms such as conceptual representations, concepts, and conceptualization, to the use of linguistic terminology and research paradigms such as conceptual meanings. In general, Jarvis's research on conceptual transfer can be divided into three stages:

(1) The beginning stage, in which Jarvis considers conceptual transfer as a cross-linguistic influence related to concepts or conceptual representations (Jarvis, 1998, p.186; Jarvis, 2000a, p.19)

(2) The developmental stage, in which Jarvis (Pavlenko) hypothesizes that conceptual transfer involves cross-linguistic influences on concepts or patterns of conceptualization, i.e., certain instances of CLI [crosslinguistic-influence] in a person's use of one language are influenced by conceptual categories and conceptualizations acquired through another language (Jarvis,2007, p.53; Jarvis & Pavlenko, 2008, p.115; Jarvis, 2013, p.115)

(3) The maturation stage, in which Jarvis (Bylund) underlines that conceptual transfer involves conceptual meaning, namely expressing and understanding a cross-linguistic influence that has to do with the ways humans represent experience in their minds (Bylund & Athanasopoulos, 2014; Jarvis, 2016, p.608).

Secondly, Odlin, a major scholar, pays attention to the influence of language on thoughts and argues that conceptual transfer refers to the situation involving bilingualism in linguistic relativity and that conceptual transfer is a subset of meaning transfer. The key question is whether the focal patterns of a given language ever reflect different cognitive patterns. If such patterns involve

L1 influences, they can be called conceptual transfer. Since focus constructions interact with attention and memory, perhaps recall and memory sometimes reflect language-specific factors. (Odlin, 2005, p.3; Odlin, 2008; Odlin, 2022, p.98). In brief, starting with linguistic relativity, or Whorf's reference to the binding power,' Odlin argues that conceptual transfer reflects a particular kind of linguistic influence on thought and is a special case of linguistic relativity.

3. Theoretical framework

3.1 Spatial concept transfer

Based on concept transfer in Chapter 2, this research builds a theoretical framework of spatial concept transfer concerning the multidimensional dynamic theoretical framework of language transfer proposed by Jinting Cai and Jia Li (2016b) and spatial conceptual transfer (Xijiang Li, 2017, p.41), as shown in Figure 1.

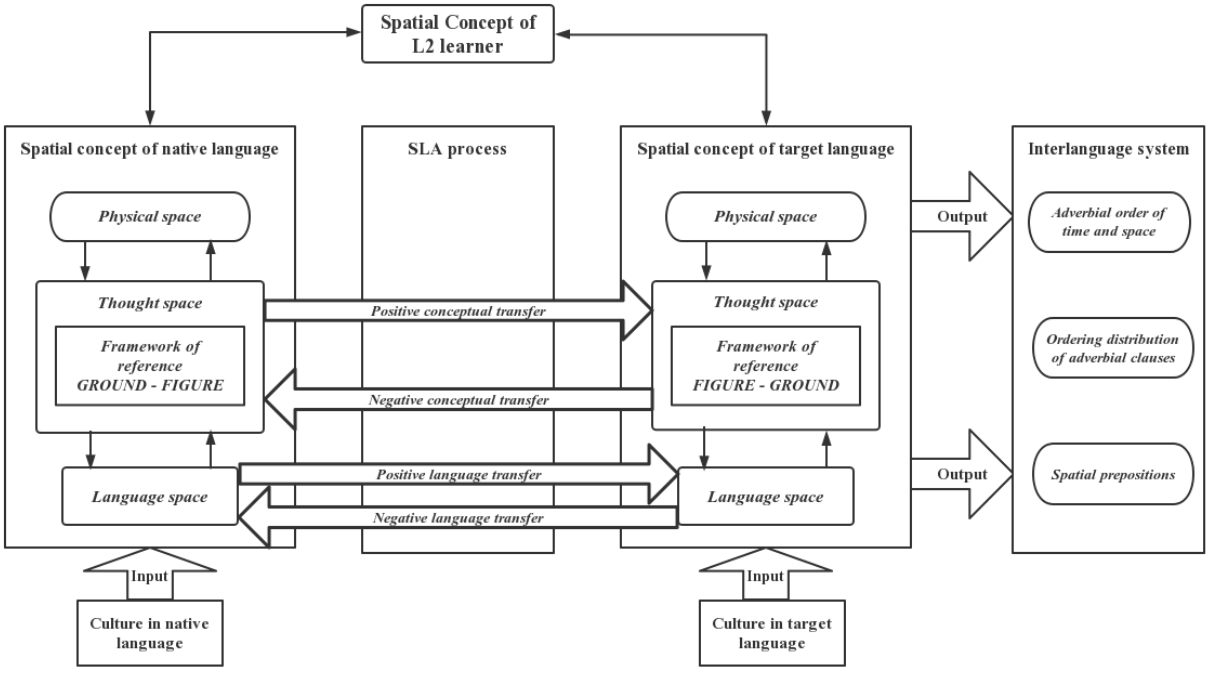

Figure 1. Theoretical frame work for spatial concept transfer.

3.2 Spatial concept-- physical space, thought space, and language space

From the cognitive linguistics view, the space concept can be divided into "physical space" (or physical world), "thought space," and "language space." Physical space is the foundation of thought and language space; thought space is the connection between physical and language space, and language space is the mapping of thought space to physical space. Physical space, one of the most basic philosophical categories, refers to the spatial concept of the orientation system of the objective world that people form based on contact with the surrounding environment and physical experience.

Inspired by Gestalt psychology, we consider the principle of figure-ground (Gro Skottun & Åshild Krüger, 2022, p.11) as one of the basic representations of thought space. On this premise, the thought system of the spatial relationship between the focus and the ground is known as "the frame of reference." Talmy was the first scholar to use it to analyze semantic prominence of language space or order in sentences. He posits the existence in language of two fundamental cognitive functions, that of the Figure, performed by the concept that needs anchoring, and that of the Ground, performed by the concept that does the anchoring (Talmy, 2001, p.311). Figure and ground may represent two entities that are spatially related to each other in a motion or orientation event and are characterized by nouns and prepositional phrases in simple sentences; on the other hand, they can also be two events that are related to each other in a temporal, causal, or other type of scenario and are characterized by main and subordinate clauses in complex sentences. Therefore, we can understand the relationship between the events and thus identify the positions between the main and subordinate clauses in the complex sentence.

3.3 Syntactic Properties in Chinese and

English

Figure-ground is based on the prominence of thought space, and language space (or word order) corresponds to the thought space in the spatial concept, so the figure-ground principle has a high explanatory power for the rules of linear arrangement of the complex sentence. English tends to come to the point of first cause and then effect, while the Chinese language is generally concerned with gradual progression, first effect and then cause. Therefore, their frames of reference are not identical, which reflects the difference in the thought space: English speakers tend to favor the "figure-ground," and Chinese speakers are used to the "ground figure."

There are a series of relationships (time, cause, etc.) between the focal and background events, and this type of complex sentence embodies cross-related events. Previous English corpus research has shown that in terms of temporal adverbial clauses, English subordinate clauses can be placed anteriorly and posteriorly in the main clause, but posteriority is the dominant order (Biber et al., 1999; Diessel, 2005). In Figure 2 (Talmy, 2001, p.352), "an S1 represents the Figure event, the Ground event by an S_2, and subordinating conjunction is here labeled Scj". Therefore, the ScjP node, as a connection, dominates a subordinating conjunctional phrase, which is a subordinate or adverbial clause to connect the main clause.

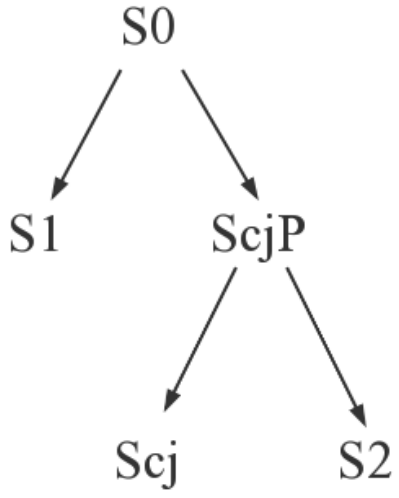

Figure 2.

"Across languages, adverbial clauses may precede or follow the main clause, or they may occur on either side" (Katja Hetterle, 2015, p.121). The complex sentence in Chinese consists of a subordinate clause and a main clause, with the subordinate clause serving as a foil (ground event=S2) and the main clause being the central part of the expression (focus event=S1), the semantic prominence.

For a long time, Chinese researchers have believed that the common structure of Chinese complex sentences is the opposite of that of English, i.e., the subordinate clause comes first, and the main clause comes second. Thus, the subordinate clause is generally placed before the main clause as the dominant word order. (Chunhong Shi, 2011, p.201; Bin Zhang, 2010, p.989; Yuehua Liu,Wenyu Pan, & Wei Gu, 2019, p.908; Borong Huang & Xudong Liao, 2017, p.136). To reflect the logical relations in a complex Chinese sentence, connected words (conjunctions and adverbs) play an important role, and there are two ways of using connected words: in pairs and individually. When used in pairs, each main and subordinate clause is preceded by an associated word; if only one connected word is used, it is generally used before the subordinate clause. In adverbial clauses of time, the subordinate clause expresses a time, and the main clause represents something that happened or occurred at that time. The sentences generally follow the principle of single use of adverbs, basically without conjunctions, which can be used in the second clause with the adverb " 就 ," " 还 ," " 才 ," etc.

(1) 母亲等了一个晚上 (S_2), 他还没回家 (S_1)

He hasn't come home(S_1) after his mother waited all night(S_2)

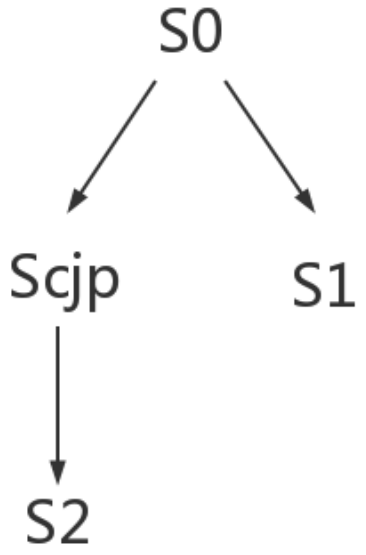

Figure 3.

4. Methodology

First of all, we have to set up a precondition that both Chinese and English take the most common unmarked complex sentence as the target because "the unmarked order is for the Ground constituent to follow the assertional constituent" (Talmy, 2001, p.356). Beyond that, the research collected two groups of complex

sentences that indicate the same time both in the subordinate clause and in the main clause, such as when and while-led adverbial clauses of time, and also selected Once-led adverbial clauses of time which involve time order likeness (clause before and main after) and complex semantic factors.

4.1 Research questions

Based on the previous theory of conceptual transfer and the comparative study of Chinese-English thought space and language space, the following are some of the specific research questions:

(1) Taking the written language of native speakers as a reference corpus, what are the features of the order of adverbial clauses of time by Chinese learners?

(2) With the higher educational levels, how are these features affected by differences in spatial thought between English and Chinese in SLA?

4.2 Corpus-based approach

Both native and learner corpora, which are "corpora made up of the production of second or foreign language learners in the target language" (Jablonkai & Csomay, 2022, p.281), provide a large amount of authentic and reliable linguistic data (interlanguage) for the study of conceptual transfer, and "have constituted valuable data sources for this body of SLA research" (Lu, 2023, p.1). This research uses the method of Contrastive Interlanguage Analysis (CIA), "the method capture linguistic patterns that allow researchers to better distinguish the linguistic systems of learner language from those of native language as well as those of different learner language varieties" (Paula Marie Winke, & Tineke Brunfaut, 2020, p.106-107), and to better understand the influence of the native language space on the 2L learner's thought space. The learner corpus used in this research is the Chinese Learner English Corpus (CLEC), which was created by Shichun Gui and Huizhong Yang in 2003, and it involves English learners at different levels - high school, CET4, CET6, and English majors. Besides, the comparative corpus is NESSIE v2, a large corpus of English essays by native British and American speakers created by Xu Jiajin in 2013. Some texts collected in the corpus are English compositions written by native speakers by Chinese CET and TEM essay topics, which is much more comparable with the learner corpus.

5. Result and Discussion

As Tables 1-12 show, the usage of adverbial clauses of time has been presented. Data were analyzed by using the Chi-square test

Table 1

Subject	Name	Language user (All)					Tot	Test method	X^2	P
		Native	Hi-School 2LL	CET-4 2LL	CET-6 2LL	En-Major 2LL				
When-position-1	after	129	37	50	66	91	373	Pearson Chi-square testing	113.764	0.000***
	before	71	163	150	134	109	627			
Sum		200	200	200	200	200	1000			

Comments: ***、**、* represent the significance level of 1%, 5% and 10% respectively

Table 2

Analysis item	Phi	Crammer's V	Coefficient of contingency	lambda
When-position-1	0.337	0.337	0.32	0.155

Table 3

Subject	Name	Language user (All)					Tot	Test method	X²	P
		Native	Hi-School 2LL	CET-4 2LL	CET-6 2LL	En-Major 2LL				
While-position-1	after	43	8	16	15	39	121	Pearson Chi-square testing	27.163	0.000***
	before	8	13	24	14	16	75			
Sum		51	21	40	29	55	196			

Comments: ***、**、* represent the significance level of 1%, 5% and 10% respectively

Table 4

Analysis item	Phi	Crammer's V	Coefficient of contingency	lambda
While-position-1	0.372	0.372	0.349	0.173

Table 5

Subject	Name	Language user (All)					Tot	Test method	X²	P
		Native	Hi-School 2LL	CET-4 2LL	CET-6 2LL	En-Major 2LL				
Once-position-1	after	23	6	24	48	45	146	Pearson Chi-square testing	4.005	0.405
	before	6	0	2	5	5	18			
Sum		29	6	26	53	50	164			

Comments: ***、**、* represent the significance level of 1%, 5% and 10% respectively

Table 6

Analysis item	Phi	Crammer's V	Coefficient of contingency	lambda
Once-position-1	0.156	0.156	0.154	0.000

From the overall distribution, we set the variable X: Language user (All); variable Y: When-position-1, While-position-1, Once-position-1. As shown in Table 1, 3, 6, the Pearson Chi-square test analysis shows that the X^2 is 113.764, 27.163, 4.005, and the significance P is 0.000*** (P<0.05), 0.000*** (P<0.05), and 0.405(P>0.05) respectively. On the one hand, the first two present significant levels and reject the null hypothesis, so there is a significant difference for Language user (All) and When-position-1, Language user (All), and While-position-1. On the other hand, Language user (All) and Once-position-1 do not show a significant level and accept the null hypothesis, so there is no significant difference.

Firstly, On the premise of significant difference between X

and Y, we next quantify the difference in conjunction with analyzing the effect indicator, which reflects the degree of correlation between the variables (Language user (All) and When-position-1; Language user (All) and While-position-1). As shown in Tables 2 and 4(When-position-1; While-position-1), the coefficient of contingency is 0.32 and 0.349 (<1, variable X is moderately correlated with variable Y and has strong independence); lambda is 0.155 and 0.173 (<0.5, variable X is moderately predictive of variable Y); Cramer's V is 0.337 and 0.372 respectively. Therefore, Language user (All) and When-position-1 and Language user (All) and While-position-1 all have strong degrees of differences.

Secondly, as shown in Table 6 (Once-position-1), the coefficient of contingency is 0.154; lambda is 0.000 (The independent variable predicts the dependent variable poorly); Cramer's V(Phi) is 0.156. In this way, Language user (All) and Once-position-1 are weak degrees of differences. There is a big difference between Chinese learners and native speakers in the order of when and while-led adverbial clauses of time, while there is little difference in the order of once-led clauses.

When and while-led adverbial clauses of time generally refer to events that occur simultaneously as the events in the main clause, so theoretically, the clauses can be either preceded or postponed. However, due to the influence of spatial thought, native speakers of English tend to put such clauses in the back position (spatial language). However, these data show that when it comes to when and while-led adverbial clauses of time, Chinese learners' English shows an obvious tendency to clause antecedent, although it is not wrong at the grammatical level. This indicates that the learners still get accustomed to thought space from their mother tongue, explaining the background information of the event before reporting the main information of the event, which has led to the emergence of a significant negative transfer of spatial concepts and hinders SLA. On the flip side, the Once-led clauses have shown a positive transfer. These clauses mark the start of the event, which is placed before the main clause, and Once is a kind of conjunction in which prepositioning is the dominant order. At this point, the spatial thought coincides with the time order likeness, which results in positive conceptual transfer and facilitates SLA.

After all, "the typological distance between the L1 and the L2 may determine the likelihood of transfer to a large extent" (Schoonen & van Vuuren, 2022, p. 99). There is often a negative transfer of spatial concepts in the order of adverbial clauses of time during SLA. However, positive spatial concept transfer can also occur under certain conditions, such as time order likeness coinciding with spatial thought. This verifies the theoretical framework of spatial concept transfer.

Table 7

Subject	Name	Language user (N-Hi)		Tot	Test method	X^2	P
		Native	Hi-School 2LL				
When-position-2	after	129	37	166	Pearson Chi-square testing	87.159	0.000***
	before	71	163	234			
Sum		200	200	400			
Subject	Name	Language user (N-CET4)		Tot	Test method	X^2	P
		Native	CET-4 2LL				
When-position-3	after	129	50	179	Pearson Chi-square testing	63.106	0.000***
	before	71	150	221			
Sum		200	200	400			
Subject	Name	Language user (N-CET6)		Tot	Test method	X^2	P
		Native	CET-6 2LL				
When-position-4	after	129	66	195	Pearson Chi-square testing	39.715	0.000***
	before	71	134	205			
Sum		200	200	400			
Subject	Name	Language user (N-En)		Tot	Test method	X^2	P
		Native	En-Major 2LL				
When-position-5	after	129	91	220	Pearson Chi-square testing	14.586	0.000***
	before	71	109	180			
合计		200	200	400			

Comments：***、**、* represent the significance level of 1%, 5% and 10% respectively

Table 8

Analysis item	Phi	Crammer's V	Coefficient of contingency	lambda
When-position-2	0.467	0.467	0.423	0.349
When-position-3	0.397	0.397	0.369	0.324
When-position-4	0.315	0.315	0.301	0.297
When-position-5	0.191	0.191	0.188	0.1

Table 9

Subject	Name	Language user (N-Hi)		Tot	Test method	X^2	P
		Native	Hi-School 2LL				
While-position-2	after	43	8	51			
	before	8	13	21	Pearson Chi-square testing	15.38	0.000***
Sum		51	21	72			

Subject	Name	Language user (N-CET4)		Tot	Test method	X^2	P
		Native	CET-4 2LL				
While-position-3	after	43	16	59			
	before	8	24	32	Pearson Chi-square testing	19.308	0.000***
Sum		51	40	91			

Subject	Name	Language user (N-CET6)		Tot	Test method	X^2	P
		Native	CET-6 2LL				
While-position-4	after	43	15	58			
	before	8	14	22	Pearson Chi-square testing	9.848	0.002***
Sum		51	29	80			

Subject	Name	Language user (N-En)		Tot	Test method	X^2	P
		Native	En-Major 2LL				
While-position-5	after	43	39	82			
	before	8	16	24	Pearson Chi-square testing	2.715	0.099*
合计		51	55	106			

Comments：***、**、* represent the significance level of 1%, 5% and 10% respectively

Table 10

Analysis item	Phi	Crammer's V	Coefficient of contingency	lambda
While-position-2	0.462	0.462	0.42	0.238
While-position-3	0.461	0.461	0.418	0.25
While-position-4	0.351	0.351	0.331	0.000
While-position-5	0.16	0.16	0.158	0.000

Table 11

Subject	Name	Language user (N-Hi)		Tot	Test method	X^2	P
		Native	Hi-School 2LL				
Once-position-2	after	23	6	29			
	before	6	0	6	Pearson Chi-square testing	1.498	0.221
Sum		29	6	35			
Subject	Name	Language user (N-CET4)		Tot	Test method	X^2	P
		Native	CET-4 2LL				
Once-position-3	after	23	24	47			
	before	6	2	8	Pearson Chi-square testing	1.863	0.172
Sum		29	26	55			
Subject	Name	Language user (N-CET6)		Tot	Test method	X^2	P
		Native	CET-6 2LL				
Once-position-4	after	23	48	71			
	before	6	5	11	Pearson Chi-square testing	2.044	0.153
Sum		29	53	82			
Subject	Name	Language user (N-En)		Tot	Test method	X^2	P
		Native	En-Major 2LL				
Once-position-5	after	23	45	68			
	before	6	5	11	Pearson Chi-square testing	1.75	0.186
合计		29	50	79			

Comments：***、**、* represent the significance level of 1%, 5% and 10% respectively

Table 12

Analysis item	Phi	Crammer's V	Coefficient of contingency	lambda
Once-position-2	0.207	0.207	0.203	0.000
Once-position-3	0.184	0.184	0.181	0.000
Once-position-4	0.158	0.158	0.156	0.000
Once-position-5	0.149	0.149	0.147	0.000

From further categorization, we set four pairs of variables X: Language user (Native-High school); (Native-CET4); (Native-CET6); (Native-English major); and three groups of data, each of which involves four pairs of variables Y When-position-2 -3 -4 -5, While-position-2 -3 -4 -5, Once-position-2 -3 -4 -5.

As shown in Table 7, the Pearson Chi-square test analysis shows that X^2 (When-position-2 -3 -4 -5) is 87.159(P<0.05), 63.106(P<0.05), 39.715(P<0.05), 14.586(P<0.05). All four pairs of data are significantly different and reject the null hypothesis. Therefore, we next quantify the difference in conjunction with analyzing the effect indicator. As shown in Table 8, the coefficients of contingency for four pairs are 0.423, 0.369, 0.301, 0.188 (general correlation and stronger independence in order); their lambdas are 0.349, 0.324, 0.297, 0.1 (The independent variable predicts the dependent variable to some degree and decrease in order); Phi and Cramer's V were 0.467, 0.397,0.315, and 0.191. This indicates that except for When-position-5 and Language user (N-En), which had a weak degree of difference, all the other three pairs showed a moderate degree of difference, with progressively decreasing differences.

As shown in Table 9, X^2 (While-position-2 -3 -4 -5) is 15.38(P<0.05), 19.308(P<0.05), 9.848(P<0.05), 2.715(P>0.05). Except for the Language user (N-En) and While-position-5, which have no significant differences, the other three data pairs are significantly different and reject the null hypothesis. Therefore, we next quantify the difference in conjunction with analyzing the effect indicator. As shown in Table 10, the coefficients of contingency for four pairs are 0.42, 0.418, 0.331, 0.158 (general correlation and stronger independence in order); their lambdas are 0.238, 0.25, 0.000, 0.000 (The independent variable predicts the dependent variable to some degree and sharply decrease in order); Phi and Cramer's V were 0.462, 0.461, 0.352, 0.16. This suggests that, except for While-position-5 and Language user (N-En), which had a weak degree of difference, all the other three pairs showed a moderate degree of difference, with progressively decreasing differences.

As shown in Table 11, X^2 (Once-position-2 -3 -4 -5) is 1.498(P>0.05), 1.863(P>0.05), 2.044(P>0.05), 1.75(P>0.05). All four data pairs have no significant difference and accept the null hypothesis. Then, we next quantify the difference by analyzing the effect indicator. As shown in Table 12, the coefficients of contingency for four pairs are 0.203, 0.181, 0.156, 0.147(stronger independence between two variables); their lambdas are 0.000, 0.000, 0.000, 0.000 (The independent variable predicts the dependent variable poorly); Phi and Cramer's V were 0.207, 0.184, 0.158, 0.149. So, all four pairs of variables had a weak degree of difference.

Firstly, the first two sets of data show that, with higher educational levels, the difference between the interlanguage order of When & While and the native's order gradually decreases, and the negative transfer of spatial concepts can be improved. Especially for English majors, whose ability to bilingual space thought has been developed, their language acquisition is less affected by the negative transfer of spatial concepts, which can be attributed to daily exposure to the language and cultural inputs. Nonetheless, it is undeniable that the influence of thought space from the mother tongue has existed for a long time, even for the English professional group.

Secondly, when we talk about Once-led adverbial clauses of time, the spatial thought and time order likeness work in the same direction, resulting in the influence of native language conceptual transfer being masked to a certain extent. As the above data shows, the usage of Once is, to some extent, not affected by variable X (Language user), which constitutes a similar language space both in English and in Chinese, resulting in a positive transfer of spatial concepts, which facilitates SLA.

In conclusion, spatial concept transfer is a long-standing, dynamic, and complicated cognitive process. On the one hand, spatial concept transfer from the thought space of the mother tongue is the main, but not the only factor affecting the distribution of 2L temporal pronominal order. From the internal perspective, time order likeness or other semantic factors will influence SLA to a certain extent; from the external perspective, language exposure and cultural input will also impact SLA. On the other hand, both positive and negative spatial concept transfer may exist in SLA, and even under a suitable educational system, negative transfer might be transformed into positive transfer to a certain degree. This further verifies the theoretical framework of the spatial concept transfer.

6. Conclusion

The features in the adverbial clauses of time validate the theoretical framework of spatial concept transfer in SLA and reveal the complex relationship between the thought and language spaces. We should guide the learners from the spatial thought in 2L teaching and remind them of the spatial thought that Chinese language sequences follow so that the learners can gradually change the conceptualization mode of their mother tongue and develop reasonable spatial language representations as soon as possible, to acquire a more authentic English.

Footnotes

[1] The Chi-square variables are X and Y, respectively. Firstly, the Chi-square test was made to see whether it showed significance ($P<0.05$), and if it did, the percentage of difference was described specifically, respectively, and then the differences were analyzed quantitatively based on the effect indicators.

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