

Reflections on the Grammatical Category of *before*, *after* and *since* Introducing Non-finite *-ing* Clauses: A Corpus Approach

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Abstract

English language learners may be confused in identifying the grammatical category of such conjunctive expressions as *before*, *after* and *since* introducing non-finite *-ing* clauses. In this article, we will conduct a corpus-based investigation of hypotactic conjunctions and conjunctive prepositions following the principle of unidirectional transfer in grammatical metaphor proposed by He and Yang (2014) within the framework of Systemic Functional Linguistics. The research concludes that hypotactic conjunctions tend to transfer to zero conjunctions and *before*, *after* and *since* introducing non-finite *-ing* clauses should be included into the grammatical category of conjunctive prepositions.

Keywords: *before*, *after* and *since*, grammatical category, unidirectional transfer, hypotactic conjunction, conjunctive preposition

1. Introduction

Learners of English as a foreign language would have been being confused by the structures of the following four sentences or the grammatical category of the conjunctive expressions introducing *-ing* elements in (1).

(1) a. *When leaving* your cabin, head for activities in the lounges. (COHA_1992_MAG)

b. *Before leaving* New Zealand, you visit Jackson and Walsh's home on Karaka Bay. (COHA_2001_MAG)

c. *After leaving* Seattle, the plane had landed in Los Angeles. (COHA_2005_FIC)

d. *Since leaving* the Prosecuting Attorney's Office, Arthur had played defense lawyer infrequently. (COHA_2003_FIC)

All the sentences contain a non-finite element *leaving* introduced by a conjunctive expression. However, grammarians (e.g. Quirk et al., 1985; Huddleston & Pullum, 2002) include the conjunctive expression *when* in (1a) into the grammatical category of hypotactic conjunctions, while *before*, *after* and *since* into prepositions. The only explanation may be that *leaving* in (1a) is a present participle and those in (1b-c), gerunds. A problem arises from this cause-and-effect reasoning: Does the grammatical category of the *-ing* expression determine that of the conjunctive expression or vice versa?

Generally, in any a grammatical construction it is the head element that determines its satellite elements. For example, the head of a nominal group is the noun and the head of a prepositional phrase is the preposition. In other words, in a prepositional phrase, it is the preposition that determines the grammatical category of the element that follows. A preposition needs a nominal group to function as its complement. A gerund is no longer a verbal group; it belongs to the category of nominal groups. In this sense, a gerund can be used as the complement of both verbs (e.g. *I enjoy reading after class*) and prepositions (e.g. *I am interested in reading after class*). According to this analysis, it is the conjunctive expressions that determine the grammatical category of *leaving* following them in (1b-c).

The question is, since the grammatical category of *before*, *after* and *since* determines that of the following element, then why *when* in (1a) is considered as a conjunction while the other three in (1b-c), prepositions? To answer this question we will conduct a corpus-based study on the grammatical category of *before*, *after* and *since* from the perspective of unidirectional transfer in grammatical metaphor within the framework of Systemic Functional Linguistics developed by Halliday (1985, 1994) and Halliday and Matthiessen (2004, 2014). For this

purpose, we will briefly introduce the principle of unidirectionality in Section 2 and present the research method in Section 3. The diachronic distribution of conjunctive prepositions and that of zero conjunctions will be investigated in Sections 4 and 5 respectively. Section 6 identifies the grammatical category of the conjunctive expressions *before*, *after* and *since*.

2. An Overview of Unidirectionality

In their study of subjectification of language, both Traugott (1982, 1989) and Langacker (1990) propose that subjectification is a unidirectional process. “Meaning change is essentially a unidirectional process of subjectification which typically proceeds along the following pathway: propositional (> textual) > expressive” (Traugott, 1982, p. 256). The evolution of any grammatical marks is unidirectional but “not in the reverse direction” (Fanego, 2010, p. 201). Based on this notion, He and Yang (2014) propose the conception of unidirectional transfer in grammatical metaphor. In their thinking, any meaning is originally realized as a congruent language form, and the congruent form can be transferred to various metaphorical forms but a metaphorical form cannot be transferred back to its original congruent form. For example:

(2) a. She is satisfied with him because he has arrived on time.

b. His arrival on time resulted in her satisfaction.

The two clauses *She is satisfied with him* and *he has arrived on time* in (2a) are rank-shifted to the two nominal groups *his arrival* and *her satisfaction* in (2b), and the conjunctions *because* is correspondingly transferred to the verbal group *result in*. In this process, the clause complex in (2a) is transferred to a simple clause in (2b) and so (2b) is the grammatical metaphor of (2a). Double functionality is the criterion of identifying grammatical metaphor (He, 2013; He & Yang, 2014). The three transferred elements in (2b) are all of double functionality: *his arrival* and *her satisfaction* function as participants in the simple clause and they each construe a figure at the same time. Similarly, the verbal group *resulted in* functions as the process in the simple clause and the relator binding the two figures. Although we can say that (2b) can be decoupled to (2a), we cannot say that (2a) is the grammatical metaphor of (2b). This is because none of the elements in (2a) is of double functionality.

According to the principle of unidirectionality of transfer in grammatical metaphor and the criterion of double functionality for identifying grammatical metaphor, He *et al.* (2015) identify five types of textual grammatical metaphor from the perspective of relator, i.e., zero conjunctive adverbial groups, conjunctionalization of conjunctive adverbial groups, prepositionalization of conjunctions, verbalization of conjunctions and nominalization of conjunctive verbal groups. See examples (3) to (5):

(3) a. No doubt she would be. *However*, she isn't my daughter. (COHA_2006_FIC)

b. No doubt she would be. She isn't my daughter

c. No doubt she would be, *but* she isn't my daughter

(4) a. *When* I arrived, the church was safe and sound. (COHA_2007_FIC)

b. *On* my arrival, the church was safe and sound.

(5) a. *Because* she didn't know the rules she died. (Halliday & Matthiessen, 2014, p. 673)

b. Her ignorance of the rules *caused* her to die.

c. *The cause* of her death was her ignorance of the rules.

The (a) sentences in examples (3) to (5) are congruent realizations, and the (b) and (c) sentences are metaphorical realizations. In (3), The transcaterization from (3a) to (3b) is a unidirectional transfer from conjunctive adverbial group *however* to zero conjunctive expression, and that from (3a) to (3c), a unidirectional transfer from conjunctive adverbial group to paratactic conjunction. The relator is realized congruently by the hypotactic conjunction *when* in (4a) and metaphorically by the conjunctive preposition *on* in (4b). The hypotactic conjunction *because* in (5a) is verbalized to the verbal group of reason *caused* in (5b), which is further nominalized to *the cause* in (5c). Verbalizations and nominalizations are logical metaphor and experiential metaphor respectively in the domain of ideational metafunction and at the same time they function as the relator of the two rank-shifted figures in the domain of textual metafunction.

It should be noted that all the five types of textual metaphor abide by the principle of unidirectional transfer in grammatical metaphor. From the diachronic perspective, the frequency of congruent forms is decreasing compared with the relative increase of the frequency of metaphorical forms. In this sense, if *before*, *after* and *since* are prepositions when they introduce non-finite *-ing* secondary causes, they tend to increase in number compared with the relative decrease of hypotactic conjunctions.

3. Methodology

3.1 Corpora

In this research we will use the Corpus of Historical American English (COHA). We choose this corpus because it not only has a large vocabulary (406 million words) but also is the largest structured corpus of historical English covering a span of time from 1810 to 2009. This allows “for research on a wide range of phenomena that are difficult or impossible to study with the small first-generation historical corpora of English” (Davies, 2014, p. 401). As for the research of the grammatical category of *before*, *after* and *since*, this corpus helps in examining the change of frequency during the 200 years of language evolution. In addition, COHA is available online (<http://corpus.byu.edu/coha/>) and it provides convenient search tools which are helpful to count up the occurrences of *before*, *after* and *since* and other conjunctive expressions as well.

3.2 Data Collection

We write search queries or regular expressions according to the query syntaxes to retrieve constructions consisting of a hypotactic conjunction or a conjunctive preposition and an *-ing* form directly following a punctuation mark by inputting the following regular expression.

RE 1. [y*] [cs*][i*] [v?g*]

To guarantee the validity and availability of the collected data and for the convenience of analysis, we will only retrieve the occurrences of several typical conjunctive expressions as examples. To achieve data effectiveness, we will further restrict the search queries and only retrieve constructions directly following the punctuation marks comma or period.

Using this regular expression, we retrieved 158278 instances from the corpus, including 22114 hypotactic conjunctions and 136164 conjunctive prepositions. See Table 1 and Figure 1:

Table 1. Distributions of hypotactic conjunctions and conjunctive prepositions introducing *-ing* clauses with *before*, *after* and *since* as conjunctive prepositions

	Crude Frequency			Per 100 Million Words		
	Conjunction	Preposition	Total	Conjunction	Preposition	Total
1810s	107	741	848	9059	62733	71792
1820s	670	6090	6760	9672	87915	97587
1830s	1488	10971	12459	10803	79647	90450
1840s	1628	10037	11665	10144	62542	72686
1850s	1782	10640	12422	10819	64596	75415
1860s	1446	8659	10105	8479	50771	59250
1870s	1359	8400	9759	7321	45253	52574
1880s	1266	7640	8906	6232	37606	43838
1890s	1223	6971	8194	5937	33838	39775
1900s	1117	6786	7903	5055	30709	35764
1910s	1085	6505	7590	4780	28656	33436
1920s	1011	6990	8001	3941	27247	31188
1930s	916	6228	7144	3723	25314	29037
1940s	839	5697	6536	3446	23398	26844
1950s	783	5792	6575	3190	23598	26788
1960s	937	5513	6450	3908	22993	26901
1970s	988	5469	6457	4149	22964	27113
1980s	962	5077	6039	3800	20055	23855
1990s	1219	5893	7112	4363	21090	25453
2000s	1288	6065	7353	4356	20512	24868
Total	22114	136164	158278	123177	791437	914614

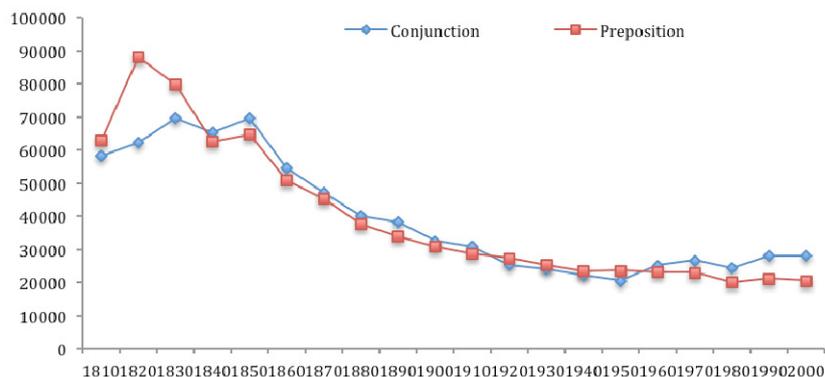


Figure 1. Distributions of hypotactic conjunctions and conjunctive prepositions introducing *-ing* clauses with *before*, *after* and *since* as conjunctive prepositions (standard frequency)

Table 1 and Figure 1 show that the diachronic distributions of both hypotactic conjunctions and conjunctive prepositions introducing non-finite *-ing* clauses are decreasing at nearly the same speed ($p = 0.000$; $R = 0.948$). This trend is not in agreement with the principle of unidirectional transfer in grammatical metaphor since conjunctive prepositions are textual metaphor of hypotactic conjunctions.

4. Distribution Trend of Conjunctive Prepositions

Following the principle of unidirectional transfer in grammatical metaphor, conjunctive prepositions should be increasing compared with the relative decrease of hypotactic conjunctions. The reason for the disagreement to the hypothesized distribution pattern may be that *before*, *after* and *since* can be used as either conjunctions or prepositions. According to Quirk *et al.* (1985), when introducing finite clauses, *before*, *after* and *since* are all hypotactic conjunctions, but when introducing non-finite *-ing* clauses, they are prepositions. The corpus also tagged these words introducing non-finite *-ing* clauses as prepositions. For example, using regular expression $[y^*][cs^*][v?g^*]$ we can retrieve sentences in (6), and using regular expression $[y^*][i^*][v?g^*]$ we can retrieve sentences in (7) and (8):

- (6) a. *If using* gas grill, heat one side to high, the other to low. (COHA_2007_MAG)
 b. *When looking* across the data, several interesting points emerged. (COHA_2004_NF)
 c. I lost weight and became my usual skinny self, *although wearing* black turtleneck sweaters and white lipstick. (COHA_2000_FIC)
- (7) a. *After reading* this article, I know that I am not alone in this fight. (COHA_2006_NEWS)
 b. *Before leaving*, he sized himself up in his bedroom mirror. (COHA_2007_FIC)
 c. *Since arriving* in the heat of the Keys, he had followed that regimen. (COHA_2000_FIC)
- (8) a. *In doing* so, he encountered the inner darkness. (COHA_2002_FIC)
 b. *Without saying* another word, he got up and left with my story in his hands. (COHA_2008_FIC)
 c. *Upon reaching* the saddle of Dormer Pass, we dismount and let the horses graze. (COHA_2003_MAG)

All the conjunctive expressions in (6) can only be used as hypotactic conjunctions, and all those in (8) can only be used as prepositions. Those conjunctive expressions in (7), however, can be used as either hypotactic conjunctions or prepositions. This is because all the non-finite clauses in (6) and (7) have their finite equivalents, but those in (8) do not have. Seen from this perspective, there is not structural difference between those non-finite clauses in (6) and (7), and the non-finite *-ing* elements following *before*, *after* and *since* in (7) could be considered as present participles. On the other hand, all the conjunctive expressions in (7) and (8) can introduce a nominal group as their complement, forming a prepositional phrase. Seen from this perspective, *before*, *after* and *since* in (7) could be considered as prepositions, and the non-finite *-ing* elements following them are gerunds. For example, besides those in (7), we can have sentences in (9):

- (9) a. *After lunch*, the class has to find their own worms in the mud outside (COHA_2006_FIC)
 b. *Before the war*, he had been professor of orthopedic surgery at St. Louise's Hospital in Munich. (COHA_2000_FIC)

c. *Since the accident*, nostalgic people give me the jitters. (COHA_2000_FIC)

According to this explanation, we can hypothesize that the reason why conjunctive prepositions are not increasing with the relative decrease of hypotactic conjunctions is that the three words *before*, *after* and *since* are coded as prepositions and their relative decrease in frequency has exerted influence on the relative decreasing speed of hypotactic conjunctions. In other words, if we categorize the three conjunctive expressions into hypotactic conjunctions, the decreasing trend of hypotactic conjunctions will speeding up compared with the relative increase of conjunctive prepositions. See Table 2 and Figure 2:

Table 2. Distributions of hypotactic conjunctions and conjunctive prepositions introducing *-ing* clauses with *before*, *after* and *since* as hypotactic conjunctions

	Crude Frequency			Per 100 Million Words		
	Conjunction	Preposition	Total	Conjunction	Preposition	Total
1810s	169	679	848	14308	57484	71792
1820s	1549	5211	6760	22361	75226	97587
1830s	3338	9121	12459	24234	66216	90450
1840s	3445	8220	11665	21466	51220	72686
1850s	3829	8593	12422	23246	52169	75415
1860s	3204	6901	10105	18787	40463	59250
1870s	3345	6414	9759	18020	34554	52574
1880s	2981	5925	8906	14674	29164	43838
1890s	2865	5329	8194	13908	25867	39775
1900s	2762	5141	7903	12499	23265	35764
1910s	2662	4928	7590	11727	21709	33436
1920s	2699	5302	8001	10521	20667	31188
1930s	2357	4787	7144	9580	19457	29037
1940s	2158	4378	6536	8863	17981	26844
1950s	2146	4429	6575	8743	18045	26788
1960s	2296	4154	6450	9576	17325	26901
1970s	2456	4001	6457	10313	16800	27113
1980s	2361	3678	6039	9326	14529	23855
1990s	2901	4211	7112	10383	15070	25453
2000s	3297	4056	7353	11151	13717	24868
Total	52820	105458	158278	283686	630928	914614

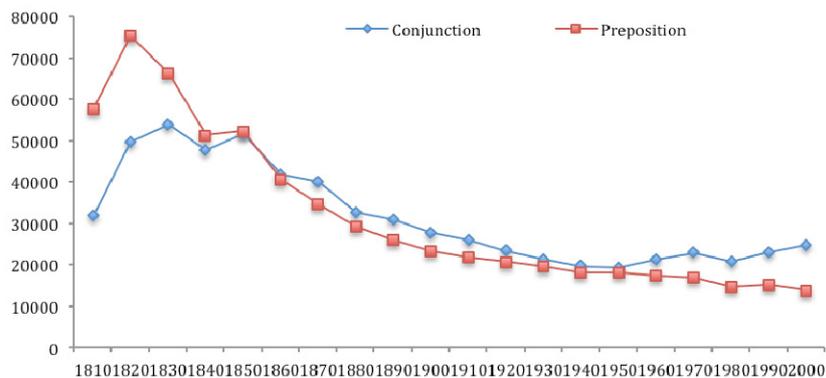


Figure 2. Distributions of hypotactic conjunctions and conjunctive prepositions introducing *-ing* clauses with *before*, *after* and *since* as hypotactic conjunctions (standard frequency)

Table 2 and Figure 2 show that after including *before*, *after* and *since* into the category of hypotactic conjunctions there appears only slight difference between the distribution trends of the two types of conjunctive expressions. Instead of decreasing faster, the decrease of hypotactic conjunctions is a bit slower than that shown in Figure 1. This is opposite to our hypothesis that the frequency of hypotactic conjunctions is decreasing compared with the relative increase of conjunctive prepositions.

We have two possible reasons for this result. One is that hypotactic conjunctions introducing non-finite *-ing* clauses have the potential to transfer to zero conjunctive expressions and conjunctive prepositions as well. The other is that conjunctive prepositions are not at all textual metaphor of hypotactic conjunctions. These two hypotheses will be investigated and discussed in sections 5 and 6 respectively.

5. Distribution Trend of Zero Conjunctions

As for the zero conjunctions, we will only retrieve the *-ing* clauses directly following a period. To compare, we will retrieve constructions consisting of a hypotactic conjunction and an *-ing* element directly following a period as hypotactic conjunctions. For the validity of data and convenience of analysis, we still include *before*, *after* and *since* into the category of hypotactic conjunctions. We retrieved from COHA 165052 non-finite *-ing* clauses, including 18279 introduced by hypotactic conjunctions and 146773, by zero conjunctive expressions. See Table 3 and Figure 3:

Table 3. Distributions of hypotactic conjunctions and zero conjunctions introducing *-ing* clauses

	Crude Frequency			Per 100 Million Words		
	Conjunction	Zero	Total	Conjunction	Zero	Total
1810s	30	178	208	2540	15069	17609
1820s	414	1247	1661	5976	18002	23978
1830s	731	3515	4246	5307	25518	30825
1840s	828	4502	5330	5160	28053	33213
1850s	945	4948	5893	5737	30039	35776
1860s	764	4995	5759	4480	29288	33768
1870s	953	6884	7837	5134	37086	42220
1880s	824	5932	6756	4056	29199	33255
1890s	845	5612	6457	4102	27242	31344
1900s	905	6191	7096	4096	28017	32113
1910s	895	6786	7681	3943	29893	33836
1920s	993	8960	9953	3871	34927	38798
1930s	912	9209	10121	3707	37431	41138
1940s	859	8592	9451	3528	35288	38816
1950s	891	9192	10083	3630	37450	41080
1960s	1032	9900	10932	4304	41289	45593
1970s	1150	10267	11417	4829	43111	47940
1980s	1126	11016	12142	4448	43514	47962
1990s	1464	12630	14094	5240	45202	50442
2000s	1718	16217	17935	5810	54848	60658
Total	18279	146773	165052	89898	670466	760364

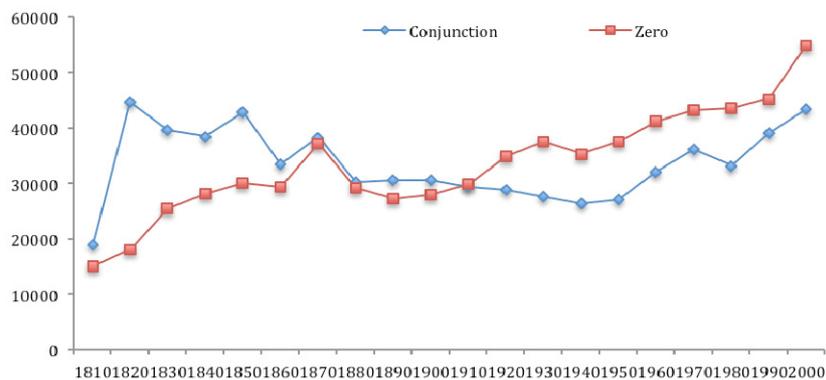


Figure 3. Distributions of hypotactic conjunctions and zero conjunctions introducing *-ing* clauses (standard frequency)

It can be seen from Table 3 and Figure 3 that hypotactic conjunctions do not show an obvious trend of increase or decrease, and zero conjunctive expressions show a trend of gradual increase and begin to exceed hypotactic conjunctions since 1910s. This means compared with the fluctuating distribution of hypotactic conjunctions, zero conjunctive expressions show a general trend of increase.

6. Grammatical Category of *before*, *after* and *since*

According to the above corpus-based investigation, hypotactic conjunctions have two potentials of transfer. One is to transfer to conjunctive prepositions and the other, to zero conjunctive expressions. The result shows that although the diachronic distribution of hypotactic conjunctions is not negatively correlated to that of zero conjunctive expressions, the latter is obviously increasing compared with the relative decrease of the former. Conjunctive prepositions, however, shows a nearly opposite trend. That is to say, hypotactic conjunctions will not transfer to conjunctive prepositions.

Since conjunctive prepositions are not directly transferred to from hypotactic conjunctions, what grammatical category should the conjunctive expressions *before*, *after* and *since* included into? In this section, we will analyze this trend of distribution and further identify the grammatical category of *before*, *after* and *since*.

We can propose the following two opposite hypotheses. One is that if *before*, *after* and *since* are considered as conjunctive prepositions, according to the above analysis on Figures 1 and 2, conjunctive prepositions should be decreasing compared with hypotactic conjunctions. The other is that if *before*, *after* and *since* are considered as hypotactic conjunctions, according to the analysis on Figure 3, the hypotactic conjunctions *when*, *although* and *if* tend to be transferred to zero conjunctive expressions, with the meaning of relator not being changed, but *before*, *after* and *since* have no corresponding zero equivalents because without these conjunctive expressions the meaning of relator will disappear. For example:

(10) a. *When speaking of oneself*, the only language available is the language of the present self. (COHA_2007_NF)

b. *If gagging causes her to regurgitate food*, the doctor should also check for reflux. (COHA_2009_MAG)

c. *Although citing health dangers*, the panel said that risks were not significant enough to keep the implants off the market. (COHA_2003_MAG)

(11) a. *After studying it*, he threw it down and shook his head. (COHA_2000_FIC)

b. *Since arriving at Atherton University*, her dreams had become increasingly bizarre. (COHA_2004_FIC)

c. *Before going to the opera in the evening*, visitors can swim or sail. (COHA_2000_MAG)

In the example sentences in (10), the hypotactic conjunctions can all be transferred to zero conjunctive expressions, with the logico-semantic relations still being there. In (11), however, the logico-semantic relations will disappear if the conjunctive expressions are omitted. Relator is out of rank scale (Yang, 2007), and the conjunctions realizing relator are not the constituents of clauses. Conjunctive prepositions realizing relator also function as minor processes in prepositional phrases. In a prepositional phrase the preposition is the Head. In this sense, a conjunctive preposition realizing relator cannot be omitted. None of the conjunctive expressions in (11) can be omitted, and thereby they should be included in the category of conjunctive prepositions.

To testify this reasoning, we will compare the diachronic distribution of *before*, *after* and *since* and that of the three typical hypotactic conjunctions, *when*, *although* and *if* introducing non-finite *-ing* clauses. For the validity of data, we will only retrieve constructions consisting of one of these six words and an *-ing* element directly following a period. Using relevant regular expressions, we retrieved 15193 non-finite *-ing* clauses introduced by these six conjunctive expressions, including 1673 introduced by *when*, *although* and *if* and 13520, by *before*, *after* and *since*. See Table 4 and Figure 4:

Table 4. Distributions of conjunctive expressions *although*, *if*, *when* and *before*, *after* and *since* introducing *-ing* clauses

	Crude Frequency			Per 100 Million Words		
	Conjunction	Preposition	Total	Conjunction	Preposition	Total
1810s	2	23	25	169	1947	2116
1820s	16	340	356	231	4908	5139
1830s	32	586	618	232	4254	4486
1840s	44	661	705	274	4119	4393
1850s	62	731	793	376	4438	4814
1860s	44	579	623	258	3395	3653
1870s	59	718	777	318	3868	4186
1880s	51	619	670	251	3047	3298
1890s	43	634	677	209	3078	3287
1900s	77	673	750	348	3046	3394
1910s	72	669	741	317	2947	3264
1920s	89	729	818	347	2842	3189
1930s	99	670	769	402	2723	3125
1940s	71	626	697	292	2571	2863
1950s	86	647	733	350	2636	2986
1960s	107	731	838	446	3049	3495
1970s	107	830	937	449	3485	3934
1980s	116	825	941	458	3259	3717
1990s	232	1014	1246	830	3629	4459
2000s	264	1215	1479	893	4109	5002
Total	1673	13520	15193	7450	67350	74800

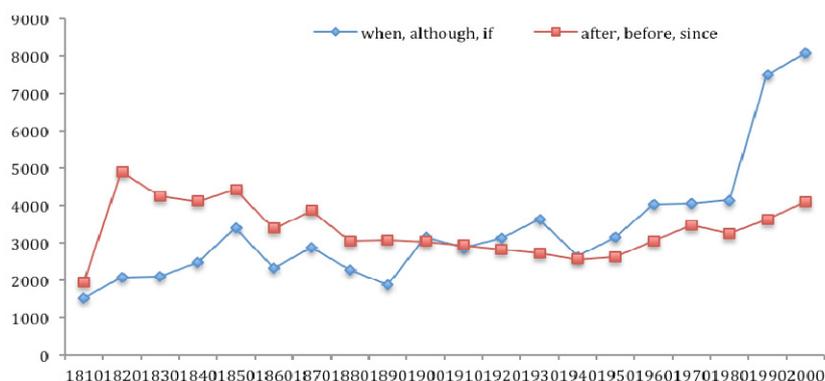


Figure 4. Distributions of conjunctive expressions *although*, *if*, *when* and *before*, *after*, *since* introducing *-ing* clauses (standard frequency)

It can be seen from Table 4 that the proportion of *when*, *although* and *if* to that of *before*, *after* and *since* is 11:89,

which is obviously skew. This means that compared with conjunctive prepositions *before*, *after* and *since*, hypotactic conjunctions *when*, *although* and *if* do not tend to introduce non-finite *-ing* clauses.

Figure 4 shows that after being converted into standard frequencies of per 100 million words, the diachronic distribution of *when*, *although* and *if* experiences a trend of change from slow increase to rapid increase and this increase abides by the Piotrowski law ($R = 0.671$), while that of *before*, *after* and *since* is basically leveling off, showing no obvious increase or decrease. Relative to *when*, *although* and *if*, *before*, *after* and *since* keep a trend of decrease. Bivariate correlation test shows that the distributions of the two groups of conjunctive expressions are not significantly correlated at either 0.05 or 0.01 level ($p = 0.397 > 0.05$), indicating that the increase of *when*, *although* and *if* is not compensated by the decrease of *before*, *after* and *since*. This effectively verifies our first hypothesis, i.e., *before*, *after* and *since* should still be included into the category of conjunctive prepositions.

7. Conclusion

In this article, we investigated the diachronic distributions of hypotactic conjunctions and conjunctive prepositions from the perspective of unidirectional transfer in grammatical metaphor within the framework of Systemic Functional Linguistics. The corpus-based research shows that hypotactic conjunctions do not tend to transfer to conjunctive prepositions. There are two reasons. One is that hypotactic conjunctions tend to transfer to zero conjunctions. The other reason is that hypotactic conjunctions will not directly transfer to conjunctive prepositions. They are induced by the gerundalization of verbal groups, and hence are second order metaphorization. The research concludes that *before*, *after* and *since* are categorized into conjunctive prepositions when introducing non-finite *-ing* elements.

This research is of importance in English grammar teaching and is useful for the English learners, especially those learning English as a foreign language, for a better understanding of English grammar.

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