

# 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 |

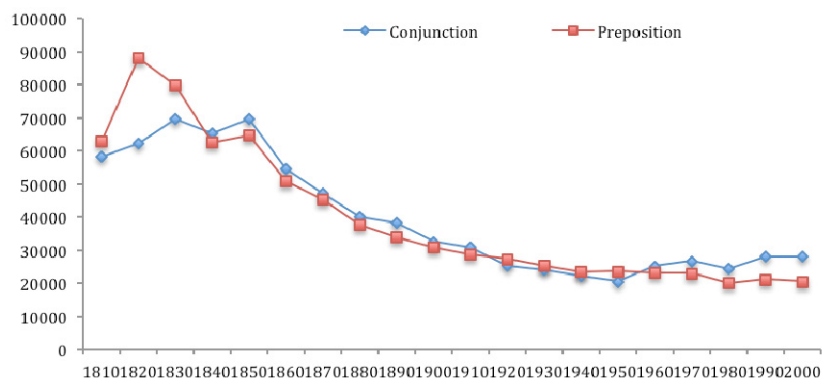


Figure 1. Distributions of hypotactic conjunctions and conjunctive prepositions introducing *-ing* clauses with *before*, *after* and *since* as conjunctive prepositions (standard frequency)

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 |

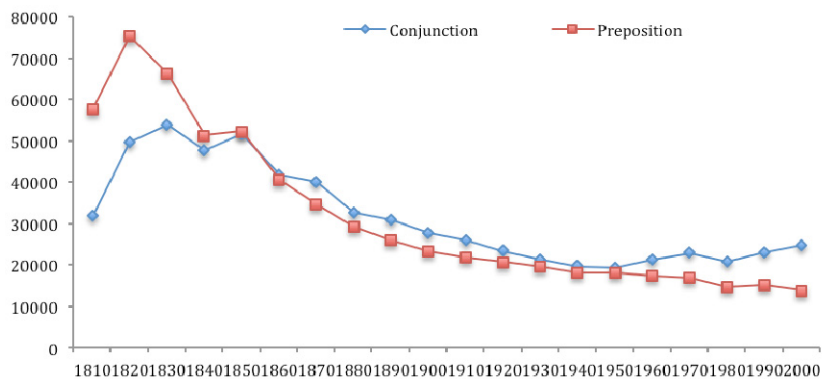


Figure 2. Distributions of hypotactic conjunctions and conjunctive prepositions introducing *-ing* clauses with *before*, *after* and *since* as hypotactic conjunctions (standard frequency)

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 |

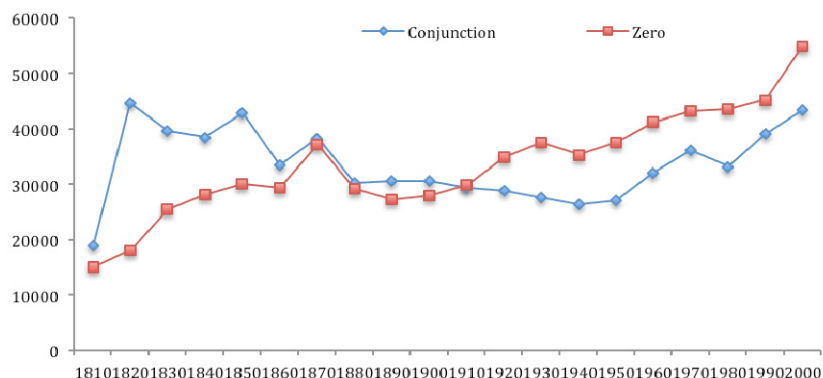


Figure 3. Distributions of hypotactic conjunctions and zero conjunctions introducing *-ing* clauses (standard frequency)

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 |

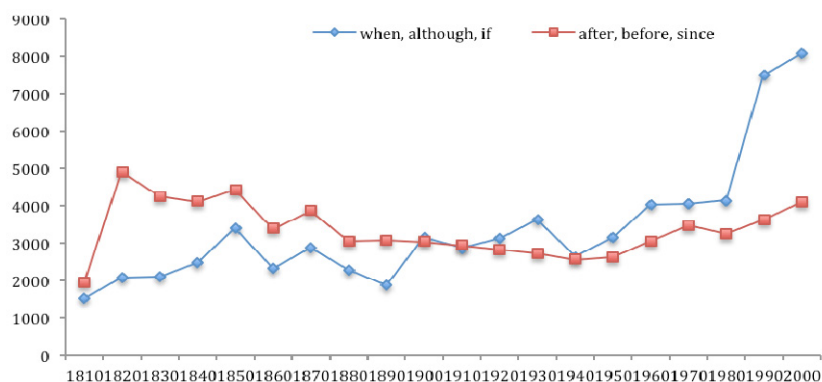


Figure 4. Distributions of conjunctive expressions *although*, *if*, *when* and *before*, *after*, *since* introducing *-ing* clauses (standard frequency)

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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