

# Investigation on the uses of temporal subordinators by NS and NNS in academic spoken English

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## Abstract

This study was prepared to investigate the semantic functions of four common temporal subordinators : “after”, “before”, “when” and “whenever” in the Michigan Corpus of Academic Spoken English (MICASE). The purpose of this paper was to examine: (1) the semantic functions of these four subordinators in academic spoken registers (2) the different semantic distributions by comparing the performance of American English native speakers (NS) and non-native speakers (NNS). In the first part, the frequency of each subordinator will be presented and subsequently the semantic functions of each will be investigated. In the second part, the emphasis will be put on the different semantic distribution of NS and NNS.

In this study, we found out that the similar semantic functions of these four temporal subordinators displayed and NS and NNS showed different patterns on the semantic functions of “after”, “before” and “whenever” clauses while they are the same on the semantic senses of “when” clauses. The result derived from MICASE are hoped to provide explicit pedagogical implications for second language teaching and learning.

## 1. Introduction

In 1987, Graeme conducted a corpus analysis on the linguistic devices used to express temporal frequency in academic written English. Among his findings, the most frequent type was subordinators which contain six items. Those words are: *when*, *after*, *before*, *until*, *as* and *whenever*. This study was prepared to investigate the semantic functions of four common temporal subordinators among these six items. They are “after”, “before”, “when” and “whenever”.

By comparing how native and non-native speakers use “before” and “after” differently, we hope our study can provide insights into the acquisition of “before” and “after”. Quirk et al. (1985) proposed various functions of the two subordinators. We examined whether, when they are used in a temporal manner, the two subordinators display the distribution of semantic functions described by Quirk et al. The distinction between native and non-native usage was also one of our concern.

The semantic usage of time sequence is not limited to the two words “before” and “after”. Literature records that the “when” subordinator not only displays temporality but in many cases show the semantic usage of “before” and “after”. Kennedy (1998) classified “when” into eight different senses. Two of them are synonymous with “before” and “after”. He has also investigated three corpora (LLC, LOB and Wellington) for the proportions of the eight senses of “when”. Our result of proportions would be compared with his. We further examined that under situations when “when” are used as “before” and “after”, whether they show different semantic functions as usual “before” and “after” do, and whether NS and NNS display different patterns. Finally, the difference between NS and NNS regarding the

employment of semantic functions of 'whenever' was investigated.

The organization of this paper is as follows: section 2 presents literature concerning our study. Section 3 discusses the methods we employ in conducting our study and the materials we use. Results and remarks are given in section 4.

## **2. Literature review**

The traditional grammar defines the structure of a clause as a subject with its predicate. Clauses subsume many subtypes for different functions. One of those is the adverbial clause which serves to describe a cause, location or condition etc., and it can be omitted without affecting the host clause (Greenbaum et al., 1996). Therefore, the adverbial clauses frequently appear to be subordinate clauses which are dependent on the main clauses. A clause which fulfills a grammatical function inside another clause is called a subordinate clause. Subordinate clauses have specific structural features that distinguish them from main clauses and serve a range of grammatical functions. Their relationship with the main clause should be connected by the subordinators. According to Quirk et al. (1985), a subordinator is a conjunction connecting main clause and subordinate clause. Namely, the subordinating conjunctions relate the adverbial clause to other clauses.

Among the adverbial clauses, the most common use is to denote the time sequences of some related events. Those are so-called "temporal adverbial clauses" defined by Quirk et al. (1985) as an adverbial clause of time which relates the time of the situation denoted in its clause to the time of the situation denoted in the matrix clause. Thompson and Longacre (1985) further classified time adverbials into time adverbs, time adverbial phrases and time adverbial clauses, but in this present paper, we focused mainly on adverbial clauses.

Joo (2002) also give a simple interpretation that adverbial of time is a sentence combined with a temporal subordinator. Those temporal clauses indicating temporal sequence are introduced by different subordinators which denote different semantic meanings. Because our present study focuses mainly on "after", "before", "when" and "whenever", we will review some literature on the four subordinators in the following sections respectively.

### **2.1 Semantic functions of "after" & "before"**

The uses of "after" and "before" are ubiquitous in English, but their sensitivities of semantic and syntactic functions to the contexts are less noticed. As a result, we intended to investigate their distinctive components. Several researchers have provided some useful classification of the semantic functions of "after" and "before". Harper & Charniak tried to give the semantic functions of the two temporal connectives in terms of event sequences. They commented that "before" means the anchor event of the main clause ends before the beginning of the main event of the subordinate clause. On the contrary, "after" implies the main event of the main clause begins after the end of the anchor event of the subordinate clause. In a similar point of view, Thompson et al (1985: 182) pointed out that "before-clauses are different from when and after clauses in that it is always the case that the event named in the before-clauses has not happened yet by the time of the event named in the main clause." And "the event named in the before clauses is always incomplete with regard to the main clause event".

In addition, there are some peripheral meanings which may be performed by the two subordinators. Hudson (1998) identified that semantics of “after” may be combined with a causal meaning and sometimes “*after*” can introduce a concessive meaning. However, besides the core meanings to indicate that the situation in the matrix clause occurred after or before to the situation in the subordinate clause, Quirk et al. (1985) gave a more comprehensive analysis on the semantic differences of ‘*after*’ and ‘*before*’. They singled out several categories as below:

- (1) the sequential meaning of “*after*” and “*before*” may induce an implication of *cause and effect* respectively.
- (2) Before-clause may imply *purpose and result*.
- (3) Nonfactual before-clauses may imply *preference*.
- (4) the situation in the matrix clause may prevent that in the before-clause from taking place.
- (5) when the matrix clause is imperative, the sentence with a before-clause may imply a *condition relationship*

## 2.2 Semantic functions of “when”

Kennedy (1998) noted that “when” marks sequence and is synonymous with temporal subordinator “after” and “before”, as in [1] and [2] respectively.

[1] When you finished, you went away.

[2] She had only been in her room a few minutes when there was a knock.

According to Graeme (1971) and Renaat (1996), two point events referred to in a “when” clause and its main clause may be paraphrased as ‘just before, during or just after’ and two point events convey a sense of causality. Put it more precisely, in some cases, “when” clauses not only express sequentiality but also convey causal implication, as shown in [3]: the “when” clause leads to the causal interpretation that the riots stopped because of the police’s intervenue.

[3] The riots stopped when the police intervened.

In addition to temporal sequentiality, “when” is also synonymous with “whenever” if “when” marks indefinite or timeless frequency or iteration, as in [4]. (Kennedy and Quirk et. al)

[4] He used to throw his children bananas to eat when they were hungry.

## 2.3 Semantic functions of “whenever”

Quirk (1985) defined semantic uses of temporal subordinator “whenever”, as in the following: (1) “whenever” is primary used to introduce a frequency adverbial, denoting the situation is repeated. (2) “whenever” may induce an implication of cause. (3) “whenever” may combine time and condition.

To sum up, we can conclude the semantic functions of “after”, “before”, “when” and “whenever” based on native speakers’ intuition, on which the traditional linguistic research heavily relies. However, the performance of the spontaneous speech, which was collected as a corpus, may not necessarily reflect what those classifications assumed completely. Furthermore, the deviation may appear to be even more marked for non-native speakers. Therefore, we will explore the aforementioned four subordinators by means of an empirical corpus analysis.

### 3. Methods and materials

#### 3.1 Data resources

The data for our linguistic analysis is drawn from MICASE, *The Michigan Corpus of Academic Spoken English* (Simpson et al. 2000). Since MICASE consists of the database of native and nonnative English speakers, we take the liberty of using the database of MICASE to investigate the different uses of temporal subordinate clauses between American English native speakers (NS) and nonnative English speakers (NNS). For our data, we have used a subset of MICASE.

#### 3.2 Identification

We used Wordsmith computational software to analyze the four temporal subordinators. Firstly, we searched the corpus for "after" "before" "when" and "whenever" in specified contexts (left and right 5 words of key words). The concordance results we obtained were 800 and 959 entries for "after" and "before" clauses in the database of NS respectively, 57 and 58 entries for "after" and "before" clauses in NNS' database respectively, 3520 and 196 entries for "when" clauses in NS' and NNS' database respectively, and 76 and 5 entries for "whenever" clauses in NS' and NNS' database respectively. Since the entries for "when" clauses of NS were too many, we only extracted 1000 from 3520 entries for our analysis. After the concordance results in specific contexts were displayed, we classified their semantic meanings in a manual manner that we identified their whole transcriptions because the semantic meanings of "after" "before" "when" and "whenever"-clauses were not fully identifiable only by viewing their concordance results. The semantic meanings of these four kinds of temporal clauses were obtained more accurately by means of having access to their discourse contexts.

##### 3.2.1 Identification of "after" and "before"

Our identification of the semantic meanings was based on Quirk's semantic functions of "after" and "before" clauses. However, on the basis of Quirk's definitions (1985) there were some gray areas between the different semantic functions of "after" and "before" clauses, especially in differentiating the *cause-effect* and *purpose-result*. Some entries regarded as difficult differentiating their semantic functions were put aside. For the sake of readers' conveniences, Quirk's definitions of semantic meanings were illustrated again, and the examples were drawn from MICASE to characterize the semantic meanings of their own.

(1) "after" and "before" indicate *time sequence*

[1] S1: or for Jeff the program director, who who they're they\_ again i mean they they they jumped to this concern *before* i did. [ADV285SG135]

(2) the sequential meaning of "after" and "before" may induce an implication of *cause* and *effect* respectively. "Before" clause in [2] is the effect because the event referred to in the main clause provides the cause for the situation in the "before" clause.

[2] S3: no it's not being we don't, yeah. we don't believe it's coming from the mitochondria because the calcium occurs *before* the gradient changes occur so we monitor the, gradient changes at the mitochondria with D-I-O-C-six or with J-C-one, [COL200MX133]

Another "after" clause also describes the *cause and effect* implication.

[3] S3: this could be an encounter between an m- a T-cell and an antigen, that could help fight off infection. *after* the infection is over and the antigen goes away [COL200MX133]

“After”-clause indicates the cause of T-cell’s disappearance or that of transforming to memory to help the immune system.

(3) “After” and “Before”-clause may imply *purpose and result*

Another semantic function of before clauses is to indicate *purpose and result* with the example in MICASE, as shown in [4].

[4] S2: well you might wanna meet her *before* you blow her off. [ADV700JU047]

The speaker S2 suggested that S5 had better meet her advisor so that she does not annoy her advisor. Example [5] illustrates the “after”-clause which has a *purpose-result* implication:

[5] S1: She is so dazed *after* she looks at the clock. [SGR385SU057]

(4) Nonfactual before-clauses may imply *preference, or implausibility*.

We did not find any entry denoting *preference or implausibility* on the basis of Quirk’s definition.

### 3.2.2 Identification of “when”

The other focus of this paper was to analyze the semantic uses of “when” clauses functioning as temporal sequence “after” and “before”. Firstly, we identified “when” clauses functioning as “after” and “before”. Then, we subcategorized the semantic uses of “when” clauses functioning as “after” and “before” on the basis of Quirk’s semantic functions of “after” and “before” clauses: *cause-effect, purpose-result* and *temporality*. Some examples were extracted from MICASE to make this subcategorization clear.

(1) “When” clauses are synonymous with temporal subsequence, “after”.

[1] S1: *when* you're finished with your vocab quiz, would you, turn to the required readings... [LES215MU056]

(2) “When” clauses denote the combination of *temporal subsequence* and *cause-effect*, “after”.

[2] S3: the way that you usually do that... is you add an inducer. an inducer is a molecule that can bind the repressor, and *when* it binds the repressor it changes the conformation state... [LES175SU079]

(3) “When” clauses imply the combination of *temporal subsequence* and *purpose-result*, “after”.

[3] S5: *When* I finally combined all three facets, I got a big fat zero..[LES335JG065]

(4) “When” clauses are synonymous with temporal prior-ness, “before”.

[4] S6: cuz people didn't know about the the reversal until this morning *when* they opened up the New York Times and saw the poll in there and the, story about the reversal.[ LES220SU140]

### 3.2.3 Identification of “whenever”

As for the other temporal subordinator “ whenever”, the semantic uses of it are divided into three semantic functions: repetitiveness, condition and cause (Quirk, 1985), as shown in the following.

(1) “whenever” clauses imply *repetitiveness*

[1]S5: *whenever* you talk about those turtle populations i always think about the uh, study that...[LES425JG077]

(2) “whenever” clauses imply *condition*.

[2]S2: no but we get Shannon we get to use his swimming pool *whenever* we want. we're gonna have a, chemistry reunion at his at his pool.[LAB200JU018]

(3) “whenever” clauses denote *cause*.

[3]S1: but instead, the law was design- to protect, m- minority voters *whenever* they confront more difficulties than whites, in trying to cast their ballots [STP095SU139]

#### 4. Results and Discussion

##### 4.1 After vs. Before

**Table 4.1 The distribution of temporality in “after” and “before” clauses**

	After		Before	
	NS (800)	NNS (58)	NS (959)	NNS (57)
<b>1. Temporal</b>	27.75% (222)	31% (18)	35.25% (338)	40.35% (23)
<b>2. Non-temporal</b>	72.25% (578)	69% (40)	64.75% (621)	59.65% (34)

Table 4.1 shows that for native speakers, among 959 “before” tokens, 338 were used as a temporal subordinator. Both finite and non-finite clauses were counted as temporal clauses. The remaining 621 tokens were used in a non-temporal manner. They were either used as adverbs or prepositions. The percentage of “after” used as a temporal subordinator was lower than that of “before”. This was so because that in our data more “after”s than “before”s were used as adverbs and prepositions. For non-native speaker data, they showed the same pattern as that of native speakers. The percentage of “before” used as a temporal subordinator was higher than that of “after”.

**Table 4.2 The semantic distributions of “after” and “before”**

SEMANTIC FUNCTIONS	After		Before	
	NS (222)	NNS (18)	NS (338)	NNS (23)
<b>1. Cause &amp; Effect</b>	22% (49)	38.9% (7)	3.55% (12)	4.3% (1)
<b>2. Purpose &amp; Result</b>	4.1% (9)	0% (0)	8.6% (29)	0% (0)
<b>3. Preference &amp; Implausibility</b>	0% (0)	0% (0)	0% (0)	0% (0)
<b>4. Conditional</b>	1.8% (4)	0% (0)	0.29% (1)	0% (0)

Table 4.2 indicates that, for NS, among 338 tokens when “before” was used as a temporal subordinator, there were 12 tokens when “before” clauses and their main clauses also bore a relation of cause and effect, 29 tokens a relation of purpose-result, and 1 token a conditional relation. For the relation of preference-implausibility, the number was zero. NS employed “before” clauses to represent different semantic meanings except “preference and implausibility”. When the tokens were converted into percentage, the rates were 3.55%, 8.6%, 0% and 0.29% respectively. For the subordinator “after”, the number of tokens were 49, 9, 0 and 4 in the four separate semantic functions. When converted into percentage, the rates were 22%, 4.1%, 0% and 1.8%. When the distributions of semantic functions of “after” and “before” were compared together, there did not show much a difference. Only that the distribution of “before” was more concentrated on the relation of purpose-result, and the distribution of “after” was more concentrated on the relation of cause-effect. Nevertheless, we noticed that in our data there were many cases when the “before” clauses and their main clauses showed a conditional relation which can not be counted under our categorizing framework. Our way of categorizing was adopted from Quirk et al.(1985). Under their framework, a “before” clause must be in an imperative mood to be counted under the conditional category. But there were many “before” clauses which showed a conditional relation with their main clauses but were not in an imperative mood. The “before” clause in a sentence like “We need to hang out here before the whole thing starts. [TOU999JU030] “ has a conditional relation with its main clause but is not in an imperative mood. In Quirk et al.(1985), they did not mention this kind of sentences. Their classification was not detailed enough.

In the non-native data, there was cause-effect usage in both “before” and “after” clauses. There were two possible reasons. One was that those NNS had already learned to express cause-effect relation in temporal clauses. The other explanation was that besides showing time sequence, temporal relationship is strongly related to cause-effect. Thus it is not possible to separate the two.

#### 4.2. When

**Table 4.3 Comparison with other corpora ( LLC, LOB and Wellington corpora are quoted from Kennedy 1998)**

Sense of when	MICASE (spoken academic American English)		LLC (spoken British English)		LOB (written British English)		Wellington (written New Zealand English)	
	Tokens	%	Tokens	%	Tokens	%	Tokens	%
<b>After</b>	<b>140</b>	<b>14</b>	<b>257</b>	<b>20.3</b>	<b>763</b>	<b>30.1</b>	<b>113</b>	<b>29.4</b>
<b>Before</b>	<b>31</b>	<b>3.1</b>	<b>53</b>	<b>4.2</b>	<b>146</b>	<b>5.8</b>	<b>27</b>	<b>7.0</b>

Kennedy (1998) compared three corpora, one spoken and two written. The results showed that the proportions of tokens in which “when” is used synonymously as “before” and “after” were higher in the two written corpora than the spoken one. Our results were 14% and 3.1% for “after” and “before”, lower than 20.3% and 4.2% for “after” and “before” from LLC. Our results and Kennedy’s results together seem to suggest that the proportions of cases of “when” used as “after” and “before” are higher in

written corpora than oral ones. However, Kennedy (1998:151) cautions us that “The greater proportion of when as a synonym for after in the LOB and Wellington corpora may, of course, be a reflection of the reporting-narrative nature of particular genre in the corpora rather than necessarily reflecting the written medium as such.” Whether the discrepancy resulted from written-spoken difference or genre difference obliges further studies.

#### 4.4 The frequencies & percentages of “when” for NS:

	Total		Cause & Effect		Purpose & Result		Temporality	
	Fre.	Per.%	Fre.	Per.%	Fre.	Per.%	Fre.	Per.%
<b>After</b>	140	14	50	5	10	1	80	8
<b>Before</b>	31	3.1	0	0	0	0	31	3.1
<b>whenever</b>	74	7.4	*	*	*	*	74	7.4
<b>Subtotal</b>	245	24.5	50	5	10	1	185	18.5
<b>Total</b>	1000							

#### 4.5 The frequencies & percentages of “when” for NNS:

	Total		Cause & Effect		Purpose & Result		Temporality	
	Fre.	Per.%	Fre.	Per.%	Fre.	Per.%	Fre.	Per.%
<b>After</b>	22	11	6	3	1	0.5	15	8
<b>Before</b>	3	2	0	0	0	0	3	2
<b>whenever</b>	16	8	*	*	*	*	16	8
<b>Subtotal</b>	41	21	6	3	1	0.5	34	17
<b>Total</b>	198							

Observing from Table 4.4 and 4.5, we found NS and NNS displayed a similar pattern in using “when” as “after” or “before”. The most pervasive use of “when” by both NS and NNS was the sense of “after” in the percentages of 14 and 11 respectively. To give a close scrutiny on the basis of the semantic categories provided by Quirk et al., we also examined the distribution in the uses of “after” and “before”. With respect to “after”, NS employed 5% denoting “cause and effect” and only 1% indicating “purpose and result”, likewise, NNS made use of 3% and 0.5% in the same semantic meanings. On the aspect of “before”, no case was found to substantiate the two semantic categories mentioned above, whatever the status of native-ness of the speakers. However, 8% of “after” and approximately 3% within “before” was found to express temporality. This may account for the fact that most English speakers, NS or NNS, do not get accustomed to using “when” to substitute “after” or “before” in their peripheral meanings. That is, they generally tended to produce time sequences through the primary meaning of “after” and “before”, i.e. temporality, in the form of “when”. This confirms what Kennedy (1998) suggested, “after” and “before” are used to mark ‘prior-ness’ and ‘subsequence’, while “when” is commonly used to mean

“simultaneity”.

Also, the proportion of occurrence of “whenever” was almost equivalent in NS (7.4%) and NNS (8%), which demonstrated another consistent dimension of “when” in this spoken corpus. Although there seemed to be no differential effect on the performance of “when” by NS and NNS, however, what of note was the relative proportion of “cause and effect” and “purpose and result”. The tokens of the NS ( 6%) were about two times than the NNS ( 3.5%), implying that NS may have more sensitivities to the subtle distinctions of the semantic subcategories thereof.

### 4.3. Whenever

**Table 4.6 Distribution of the senses of whenever of NS &NNS**

Senses of whenever	NS		NNS	
	Tokens	%	Tokens	%
<b>Repetitiveness</b>	<b>47</b>	<b>61.8</b>	<b>5</b>	<b>100</b>
<b>Causality</b>	<b>2</b>	<b>2.6</b>	<b>0</b>	<b>0</b>
<b>Condition</b>	<b>27</b>	<b>35.6</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>76</b>	<b>100</b>	<b>5</b>	<b>100</b>

“Repetitiveness” accounts for 61.8% of the tokens of “whenever”. This indicates that NS primarily use “whenever” to indicate repetitiveness. In contrast to the most prototypical meaning “repetitiveness”, “whenever” clauses are seldom used to convey causality by NS. Compared to that of NS, NNS’s usage of “whenever” clauses seems limited to situations denoting repetitiveness.

### 5. Conclusion

This present paper has attempted to investigate the different uses of temporal subordinators by NS and NNS via the bulk of the data generated from an academic speech corpus. The consequences obtained unraveled some questions in relation to second language acquisition, and shed new light on language teaching and learning. To summarize, several crucial findings were reported as follows:

First, with regard to “temporality”, there was a similar pattern of both NS and NNS. The “non-temporal” uses were sparser since all the subordinators under examination are inherent to express time sequence. Particularly, “after” was more preferred than “before” when “temporality” were involved. Moreover, speakers were found to be prone to use “after” and “before” instead of “when”, which has the same semantic functions. Secondly, when dealing with the minute distinctions of semantic functions, NS and NNS revealed somewhat differences. In general, our findings showed that NS and NNS displayed discrepancy in the use of semantic meanings. NNS had only learned the most prototypical semantic meaning. With respect to the several subordinators investigated, NNS displayed more limited language capacity compared to NS. They employed only the “cause & effect” among the various semantic functions for “before” and “after” and only the “repetitiveness” for “whenever”. However, a limitation should be noted. In comparison to the data of native speakers, that of non-native data is relatively small. Therefore, the statistic of non-native data we obtained should be treated with more caution.

Quirk's semantic classifications of "after" and "before" clauses are too restricted. His classification of "before" clauses as conditional appears to be confined to imperative; however, there are some cases which are in the form of imperativeness and lack imperative voices, but the main clauses and the "before" clauses indeed bear conditional relations. Moreover, Quirk's definition of "preference and implausibility" is not clear enough, and it appears to only apply to "before" clauses which denote metaphorical relationship between main clauses and "before" clauses.

In addition, some directions could be followed from our study. Firstly, future studies could compare different discourse modes in academic spoken English between English native speakers and non-native speakers. Furthermore, further studies could be done on comparison of written and spoken academic English of native speakers with that of non-native English speakers.

Although limitations exist in our study, it is hoped that this study could make a contribution to language pedagogy and offer some insight for future researches. The disparity of competence between NS and NNS highlights the importance that language teachers should provide authentic materials to help language learners aware of other semantic functions of subordinators.

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