Investigating the English ADJECTIVE *OF* Construction in Academic Writing

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Abstract

This study investigates the English [ADJ *of*] construction in academic writing. The target construction represents a subclass of the predicative adjectives (*The children are **happy**.*) in English. While the predicative adjectives have long been recognized to function either as a subject complement (e.g., *The children are **happy.***) or object complement (e.g., *He made the children **happy**.*), typically found in copular constructions, these adjectives with a complement such as a prepositional phrase (*incapable of*…, *suggestive of*…, etc.) are less discussed in the literature. The purpose of this study is therefore to examine this group of adjectives to see what particular roles they play in academic writing. A cross-disciplinary investigation was carried out to identify possible variations among disciplines. The corpus results showed that cross-disciplinary variations are only found in the extent of predicative adjective premodification and description of mental state, both of which are far more common in the humanities and social sciences than natural sciences and medicine. The uniformity across discipline calls for attention to instruction in the field of English for Academic Purposes.

1 Introduction

The English adjectives can be distinguished into attributive and predicative types. While the attributive adjectives occupy the prenominal position (e.g., *a beautiful day*), the predicative adjectives are postverbal (e.g. *This is particularly important.*). Biber, Johansson, Leech, Conrad, and Finegan (1999) compared the distribution patterns of these two types of adjectives across four genres (conversation, fiction, news, and academic prose) and found that the attributive adjectives are highly distributed in the academic genre as compared to the other genres. The predicative adjectives, on the other hand, do not seem to occupy a fair share in academic writing. However, to date, not much discussion has been given to the predicative adjectives in academic writing. Most importantly, their discourse functions remain unelucidated. Quirk, Greenbauum, Leech, Svartvik (1985) explained that the predicative adjectives may function either as a subject complement (1) or object complement (2).

(1) *The children are **happy**.*

(2) *He made the children **happy**.*

(Examples taken from Quirk, 1985: 417)

It is also possible for the predicative adjectives to complement clauses as shown in (3).

(3) I consider what he did *foolish*. (Quirk, 1985: 417)

As illustrated in (3), the predicative adjectives can be found to complement clauses in addition to noun phrases. Biber et al. pointed out that the predicative adjectives characterize their preceding target from a postmodifying position or called postposed (Biber et al., 1999: 519). A group of predicative adjectives that draw our interest in this study are those carrying a complement in the form a succeeding *of*-phrase, as in underlined in (4) and (5).

(4) *Plants and animals that were* ***incapable of acclimatizing to cold*** *would not have survived in the cooling environment of the early Pleistocene*. (G1E-1172) [1]

(5) *The control had no history or symptoms* ***suggestive of pancreatitis***. (HU4-1310)

Example (4) demonstrates a copular construction predicated by the adjective *incapable* which is complemented by an *of*-phrase. In contrast, example (5) does not involve a copular construction but contains a postposed adjective *suggestive* which is also complemented by an *of*-phrase. Biber et al. considered the case in (4) where the predicative adjective complements a copular verb as a subject predicative, whereas the predicative adjective in (5) complements the direct object, which is referred to as an object predicative (p.515). In general, these predicative adjectives are polyvalent (Haugen, 2013) or with more than one argument which is reminiscent of verb valency patterns. Previous work on predicative adjectives in academic writing mainly focused on stance-taking constructions in association with the introductory *it* which can be found in patterns such as [*it* v-link ADJ *that*] (e.g., *it is clear that*) and [*it* v-link ADJ *to*-inf] (e.g., *it is important to*) (Biber, et al., 1999; Hewings & Hewings, 2002; Peacock, 2011; Larsson, 2016). In a cross-disciplinary study, Peacock compared how four science disciplines (biology, chemistry, physics, and environmental science) and four non-science disciplines (business, language and linguistics, law, and public and social administration) differ in terms of how [*it* v-link ADJ *that*] and [*it* v-link ADJ *to*-inf] constructions are used in research articles. The results indicated that these two patterns are more commonly used by non-science fields, particularly by academic writers in law, as compared to the science fields. While these two patterns serve an important evaluative function in academic writing and have drawn much research attention, other patterns associated with predicative adjectives are comparatively less well studied. The evaluative function of [ADJ *of*], the target construction investigated in this work, can be seen in (6) and (7) below.

(6) *The same may be* ***true of*** *its addition to the 1018 entry that the meeting...* (HXX-530)

(7) *I was one of a "lost generation" who remained blissfully* ***ignorant of*** *the major advances in preventative health care.* (EWX-774)

Example (6) illustrates how the predicative adjective functions to take an epistemic stance, and (7) exemplifies an evaluative stance. Example (7) also differs from (6) in terms of the presence of a modifying adverb *blissfully*. The use the adverb seems to change the evaluative adjective to something more positive in tone.

To investigate the roles predicative adjectives might play in academic writing of different disciplines, our research questions are formulated as the following.

(i) What types of predicative adjectives are commonly found in the [ADJ *of*] construction in academic writing and what are their functions?

(ii) What disciplinary variations exist?

To answer these research questions, a corpus-based approach was taken to analyze the adjectives in the [ADJ *of*] construction.

2 Literature Review

In their comprehensive work, Francis, Hunston, and Manning (1998) analyzed the [ADJ *of* n] pattern based on The Bank of English and identified at least 16 categories as shown in Table 1.

Table 1. Francis et al.'s (1998) categorization of adjectives based on the pattern [ADJ *of* n] (pp.451-457)

Category	Description	Example
1. fond & critical	indicate an attitude	*We are* ***proud of*** *our achievements.*
2. afraid	indicate someone is frightened	*Everyone is* ***afraid of*** *him.*
3. tired	indicate the feeling of boredom	*I'm* ***sick of*** *hearing about her book.*
4. desirous	indicate someone's desire	*I was* ***envious of*** *their anonymity.*

[1] This code specifies the position of the concordance line from the British National Corpus.

5. assured	indicate achievement	*Juventus are now **assured of** a place in the quarter-finals of the European Cup.*
6. aware & unaware	indicate existence of something	*I think he's fully **aware of** those dangers.*
7. considerate & careless	indicate someone considers or ignores	*Please respect the environment and be **considerate of** others.*
8. empty	indicate the lack of something	*We're very **short of** money.*
9. full	indicate one has something	*My boots were **full of** water.*
10. certain & uncertain	indicate certainty/uncertainty	*We are **confident of** forming the next government.*
11. indicative	indicate what something is like	*The room is **reminiscent of** a bank vault.*
12. destructive	indicate a harmful effect	*Secrets are **destructive of** relationships.*
13. deserving	indicate one deserves something	*He is **deserving of** sympathy.*
14. kind	indicate a quality	*That was **stupid of** me.*
15. clear	indicate a relation	*The worst-hit areas are **north of** the capital.*
16. others	adjectives with other meanings	***capable of**, **incapable of**, **independent of**, **predicative of**, **unbecoming of**, **true of***

Table 1 presents 16 categories of predicative adjectives in the pattern [ADJ *of*]. It is apparent that a number of the categories involve the expression of human emotion including 'fond', 'critical', 'afraid', 'tired', and 'desirous', while some are epistemic in nature such as 'certain', 'uncertain', and 'indicative'; some are cognitive such as 'aware', 'unaware'; some are evidential such as 'empty', 'full', and 'clear'. The rest categories can be considered as evaluative including 'considerate', 'careless', 'destructive', 'deserving', and 'kind'. While Francis et al.'s work was based on both the spoken and written discourse, further work is necessary if we want to consider disciplinary specificity in academic writing.

Biber et al. (1999) also considered predicative adjectives in their register study. They found that predicative adjectives usually lack a complement in conversation (e.g., *We'll find out what's **wrong**.*) as compared to those found in fiction, news, academic prose, all of which are written genres. Among the four registers, fiction contains the highest proportion of predicative adjectives where descriptive use of a state of mind or emotion is common (e.g., *afraid*, *aware*, *glad*, *happy*). In contrast, the predicative adjectives in academic prose either denote epistemic stance (e.g., *clear*, *true*, *likely*) or allow the writer to commit to an evaluative stance (e.g., *important*, *essential*, *difficult*, *necessary*).

Embarking from previous studies, the purpose of this study is to examine the linguistic context where these predicative adjectives are used by taking into account of their semantic and syntactic features in academic writing.

3 Methodology

The analysis of this is divided into two parts. First, a list of commonly used adjectives was to be compiled based on their frequencies in the corpus. The second part involves a statistical analysis based on the categorization of the semantic and syntactic features of the adjectives.

3.1 Corpus Query

The British National Corpus was used through the BNC*Web* platform to gather the corpus data. Prior to the query search, several subcorpora were created by using the user-defined function of BNC*Web* to select four academic genres including two non-science genres, humanities and social sciences, and two science genres, natural sciences and medicine, as listed in Table 2.

Table 2. Details of subcorpora

Subcorpora	No. of texts	No. of words
Humanities	87	3,358,166
Social Sciences	142	4,785,423
Natural Sciences	43	1,121,666
Medicine	43	1,435,603

A query string (_AJ0 *of*) was used for each subcorpus and after the frequency breakdown function was applied, the results were downloaded in a text file. All the results were then pooled together in a metafile for further analysis. The top 20 most frequent results from each subcorpus were examined and compared. Any mis-placed items were removed from the lists and replaced with another item ranked next in the frequency breakdown lists. For example, *important of* is listed in all four subcorpora within the top 20 ranking. However, upon a closer examination of the concordance lines showed that they did not carry a predicative role. These items were therefore removed. The same procedure was also applied to few mis-tagged items (e.g., *centile of*, *Carboniferous of*).

3.2 Statistical Analysis

After obtaining the query results from the BNC*Web* as described in Section 3.1, the results were randomized and 100 instances of the concordance lines were extracted from each subcorpus and copied onto an Excel file for further analysis. The data were re-grouped into sciences (natural sciences and medicine) and non-sciences (humanities and social sciences) to avoid sparse data for Chi-squared tests. Next, the data were annotated according to their semantic classes, syntactic roles, and presence or absence of adverbial premodification as shown in Table 3. In the process of annotation, about one quarter of the data (49 for non-sciences and 51 for sciences) were excluded. Most of these data either contain a mis-tagged form (e.g., *revealing of*) or were found to be a preposed adjective (e.g., *the most important of*). The remaining 151 and 149 instances were subjected to Pearson's Chi-squared test and graphically visualized by using the vcd package (Meyer, Zeileis, & Hornik, 2017) with the R program.

4 Results

The results section will be divided into two sub-sections. Section 4.1 presents the corpus results which list the frequency distribution of top 20 most commonly used adjectives for each discipline. Section 4.2 presents the results of statistical analyses.

Table 3. Factors considered for predicative adjectives

Factors	Levels	Examples
semantic classes	deviation	*…when Coward seems to be advocating sexual experimentation, he stops far* ***short of*** *specific details.* (ARD-429)
	modality	*The same may be* ***true of*** *its addition to the 1018 entry…* (J2L-1588)
	evaluation	*Lawton (1980) is* ***critical of*** *the "continuum hypothesis"…* (HXY-444)
	description	*The findings were highly* ***suggestive of*** *recent pancreatitis with pseudocyst formation.* (HWS-6392)
	cognition	*The patient was* ***unaware of*** *which order the solutions were infused.* (HU3-6465)
syntactic roles	subject complement	*The printing shop is, in many ways,* ***typical of*** *prison industry.* (CRT-282)
	object complement	*The forest does not offer the grazing* ***typical of*** *animal husbandry…* (J18-1061)
	other	*This is also* ***true of*** *mammals…* (CMH-1373)
premodification	yes	*…this strategy is entirely* ***independent of*** *the air quality management strategy.* (GU5-900)
	no	*…octopuses seem to be* ***capable of*** *very rapid learning.* (AMM-533)

4.1 Corpus Results

To answer the first research question which asks for the most commonly used adjectives in the [ADJ *of*] construction, the BNC*Web* was used to identify possible disciplinary variation. The corpus results are summarized in Table 4.

Table 4. BNC*Web* query results for the four subcorpora in the decreasing order of frequency

Subcorpora	No. of hits	Types	Frequency (instances per million words)
Humanities	2405	408	716.16
Social Sciences	2401	343	501.73
Natural Sciences	525	118	468.05
Medicine	573	91	399.14

Table 4 demonstrates a number of quantitative differences across the four subcorpora. First, there is a tendency for more frequent use of [ADJ *of*] in the non-science disciplines, i.e., humanities and social sciences, as compared to the science disciplines, i.e., medicine and natural sciences.[2] Another variation can also be found within each knowledge field: humanities field outnumbers social sciences and natural sciences field outnumbers medicine.

A closer examination of the [ADJ *of*] construction with the four disciplines was carried out. Table 5 presents the frequency of occurrence for the humanities and social sciences, whereas Table 6 presents the frequency of occurrence for medicine and natural sciences.

Table 5. Frequency distribution of top 20 instances of [ADJ *of*] in the humanities and social sciences

Humanities			Social Sciences		
[ADJ *of*]	Frequency	Percentage	[ADJ *of*]	Frequency	Percentage
aware	210	8.73%	*aware*	335	13.95%
capable	205	8.52%	*capable*	278	11.58%
true	152	6.32%	*true*	138	5.75%
reminiscent	85	3.53%	*typical*	111	4.62%
full	81	3.37%	*irrespective*	96	4.00%
conscious	80	3.33%	*short*	70	2.92%
typical	75	3.12%	*critical*	66	2.75%
incapable	65	2.70%	*independent*	61	2.54%
independent	65	2.70%	*full*	58	2.42%
short	58	2.41%	*guilty*	56	2.33%
irrespective	53	2.20%	*incapable*	48	2.00%
critical	41	1.70%	*free*	42	1.75%
free	39	1.62%	*conscious*	41	1.71%
worthy	39	1.62%	*indicative*	41	1.71%
indicative	34	1.41%	*unaware*	41	1.71%
guilty	32	1.33%	*worthy*	38	1.58%
certain	31	1.29%	*certain*	25	1.04%
devoid	30	1.25%	*wary*	24	1.00%
suspicious	30	1.25%	*reminiscent*	22	0.92%
ignorant	26	1.08%	*suspicious*	20	0.83%

As Table 5 shows, there is a great similarity between the two soft-applied disciplines. First, in both disciplines the top three instances are the same, namely, *aware of* in (6) *capable of* in (7) and *true of* in (8).

(6) *The counsellor must also be **aware of** the words that are being used…* (CE1-66)

(7) *packer (1977) has shown that baboons are **capable of** reciprocal altruism.* (CM2-294)

(8) *This was only slightly less **true of** the industries unconnected with coal and iron.* (CM6-553)

As observed from the corpora, the majority of these predicative adjectives function as the subject complement (shown above), only a handful of instances serve as the object complement as shown in (9) and (10).

(9) *Whatever understanding of societies we gain in future, we do not now have a theory of ideology **capable of** explaining the myriad ways in which individuals perceive their situations…* (CMN-1066)

(10) *The primary purpose of this research is to develop a methodology **capable of** analyzing three complex interrelated issues…*(HJ1-18313)

Both (9) and (10) illustrate the writer's use of *capable of* to postmodify the preceding NP (underlined). While there is a high proportion of overlaps between the [ADJ *of*] instances across the two soft-applied disciplines, one discrepancy found between the two is the ranking order. Otherwise, the two closely related disciplines demonstrate a very high degree of association.

Table 6 juxtaposes the frequency of [ADJ *of*] instances from two hard knowledge disciplines, medicine and natural sciences. A comparison between the two disciplines demonstrates a higher proportion of differences. First, the top three instances are not the same, though both cover up to 30 per cent of the data. A comparison of the hard knowledge fields show some areas of discrepancies which are not found in the two soft-applied disciplines. First, there are several discipline-specific [ADJ *of*] instances including *upstream of*, *downstream of*, *distalmost of,* and *Dalradian of*, all of which can only be found in the natural sciences corpus as shown in two examples, (11) and (12).

(11) *These DH sites are present **upstream of** the Ea gene in a variety of transformed cells at different stages of B cell development…* (K5T-600)

(12) *The DNA region **upstream of** DH site V was present in order to permit the isolation of a single contiguous fragment of DNA…* (K5T-560)

[2] See Hyland (1998, 2000) for references on the distinction between hard and soft disciplines.

Table 6. Frequency distribution of top 20 instances of [ADJ *of*] in the medicine and natural sciences

	Humanities			Social Sciences	
[ADJ *of*]	Frequency	Percentage	[ADJ *of*]	Frequency	Percentage
aware	210	8.73%	*aware*	335	13.95%
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short	58	2.41%	*guilty*	56	2.33%
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guilty	32	1.33%	*worthy*	38	1.58%
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devoid	30	1.25%	*wary*	24	1.00%
suspicious	30	1.25%	*reminiscent*	22	0.92%
ignorant	26	1.08%	*suspicious*	20	0.83%

In (11), *upstream of* is used as a subject complement to describe the relative position of the grammatical subject, *these DH sites*.

If we compare all the four corpora, we would find that medicine appears to be more closely related to the humanities and social sciences rather than with natural sciences. The only exception is *devoid of*. This adjective phrase is only found in the humanities, social sciences and natural sciences but not found in the medicine corpus. Example (12) and (13) illustrate *devoid of* in the humanities and natural sciences, respectively.

(12) *…and he was quite* ***devoid of*** *that propensity for abstraction…* (HY7-591)

(13) *Moreover, the crude preparation obtained was* ***devoid of*** *exonuclease activities…* (FTC-43)

4.2 Statistical Results

Three factors, semantic class, syntactic role, presence or absence of adjective premodification, were considered in this study to inspect if the predicative adjectives are used differentially by academic writers in the non-sciences and sciences. Association plots were used to visualize the differences between the two disciplines for each category based on the values of Pearson residuals. Statistically significant results are represented in shades of blue and red while non-significant results are in gray. First of all, no significant findings were found for syntactic roles. In other words, both disciplines exhibit similar pattern in how predicative adjectives are used in complementation. Regarding the use of premodification before predicative adjectives such as adverbs (e.g., *entirely*, *obviously*, *generally*, *substantially*), the results are presented in Figure 1 by means of an association plot.

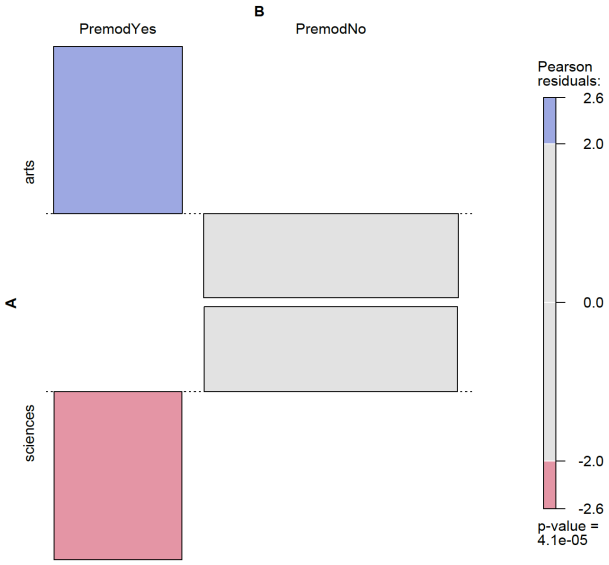

Figure 1. Association plot of predicative adjective premodification in non-sciences and sciences

This plot indicates a significant difference between the two disciplines when we consider the degree of predicative adjectives premodification. The annotated data suggest academic writers in non-sciences tend to premodify the adjectives more than those in sciences. Examples (14) and (15) illustrate the case in non-sciences.

(14) *The presence of this pagan tale in a cathedral is* <u>*strikingly*</u> ***reminiscent of*** *Sigurd's appearance in Christian contexts on sculptures in northern England…* (HXX-1330-non-sciences)

(15) *Semai society, a society which is, in fact,* <u>*virtually*</u> ***free of*** *violence.* (CJ1-430-non-sciences)

Other adverbs used include *partly*, *acutely*, *highly*, *well*, *increasingly*, *very*, *mostly*, *quite*, *fully*, *totally*,

potentially, *particularly*, and *generally*. They appear to connotate the writer's stance in addition to the adjectives.

Figure 2 presents the association plot for semantic classes of predicative adjectives. Only one class, 'cognition', was found to be significantly different. Under this category, there are adjectives like *aware of*, *unaware of*, *fond of*, *wary of*, *undreamed of*, *conscious of*, *unsure of*, *oblivious of*, and *supportive of*. Sentences (16) and (17) exemplify this category.

(16) *…the Tories might prove even more* ***fearful of*** *a popular backlash…* (HY8-1718)

(17) *…although we should be* ***wary of*** *assuming that the sources of the material are relevant to the question…* (CFK-764)

The results indicated that the academic writers in non-sciences seem to have more chance to describe one's mental state than those in sciences.

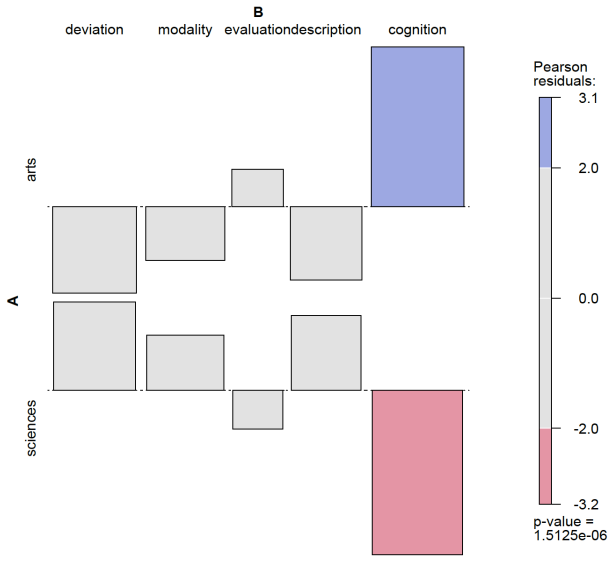

Figure 2. Association plot of semantic classes of predicative adjectives in non-sciences and sciences

In general, the differences between the two disciplines are not overwhelming when considering academic writer's use of predicative adjectives. Only two cross-disciplinary differences were identified: the use of premodification before the predicative adjectives and the use of cognitive predicative adjectives. In both cases, there are higher proportion of use found in the non-sciences than the sciences fields.

5 Conclusion

In this study, we examined the instances of the [ADJ *of*] construction to see how they vary in terms of disciplines. The results showed more areas of common grounds with the top 20 most frequent instances. While the adjective predicates can serve both as the subject complements and object complements, they are much rarer found as object complements. There are two types of subject complements. The first refers to those constructed with a copular construction. The second is postposed directly after the grammatical subject. The latter cases appear to carry more condensed information than the former. Statistical significant differences were found in two categories, both of which are more commonly found in non-sciences than sciences. It was found that there are more premodifiers used preceding the predicative adjectives and more use of the predicative adjectives belong to the semantic class of 'cognition' by academic writers in non-sciences than sciences. Part of the results of this study also conforms to previous research findings demonstrating the use of some predicative adjectives for reporting (e.g., *indicative of*, *suggestive of*, *supportive of*) and for evaluation (e.g., *true of*, *typical of*, *critical of*, *guilty of*, *suspicious of*, *skeptical of*) which are important for research writing.

The current study has only examined three factors, the presence of premodification, syntactic roles, and semantic classes, in association with the predicative adjectives in academic writing. More research is required to determine the influence of other factors including the semantic classes of the *of*-following complement. It would also be interesting to compare the reporting adjective predicates with those equivalent in other parts of speech (e.g., *indicative of* vs. *indicate* vs. *indication*, *suggestive of* vs. *suggest* vs. *suggestion*).

We would like to end this study by pointing to the high degree of uniformity across four disciplines, humanities, social sciences, medicine, and natural sciences when the [ADJ *of*] construction is under scrutiny. This characteristic of [ADJ *of*] is important for teaching L2 academic

novice writers. The results showed that a number of [ADJ *of*] (e.g., *capable of*, *indicative of*) can be used as an object complement to postmodify a preceding NP, while others (e.g. *true of, aware of*) only function as subject complement.

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