Challenging stereotypes about academic writing: Complexity, elaboration, explicitness

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Abstract

The stereotypical view of professional academic writing is that it is grammatically complex, with elaborated structures, and with meaning relations expressed explicitly. In contrast, spoken registers, especially conversation, are believed to have the opposite characteristics. Our goal in the present paper is to challenge these stereotypes, based on results from large-scale corpus investigations. Our findings strongly support the view that academic writing and conversation have dramatically different linguistic characteristics. However, the specific differences are quite surprising. First, we show that academic writing is not structurally 'elaborated' (in the traditional sense of this term). In fact, subordinate clauses – especially finite dependent clauses – are much more common in conversation than academic writing. Instead, academic writing is structurally 'compressed', with phrasal (non-clausal) modifiers embedded in noun phrases. Additionally, we challenge the stereotype that academic writing is explicit in meaning. Rather, we argue that the 'compressed' discourse style of academic writing is much less explicit in meaning than alternative styles employing elaborated structures. These styles are efficient for expert readers, who can quickly extract large amounts of information from relatively short, condensed texts. However, they pose difficulties for novice readers, who must learn to infer unspecified meaning relations among grammatical constituents.
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Keywords: complexity; elaboration; explicitness; academic writing; research articles; textbooks; conversation; noun phrase

1. Introduction

Researchers have claimed for decades that academic writing is more structurally elaborated than speech, shown by longer sentences, longer 't-units' (a main clause plus all associated dependent clauses), and a greater use of subordinate clauses (see, e.g., Brown & Yule, 1983; Chafe, 1982; Kroll, 1977; O'Donnell, 1974). In addition, researchers have claimed that academic writing is more explicit than speech. That is, while speech is dependent on a shared situational context, academic writing is claimed to be 'decontextualized', 'autonomous', or 'explicit', with all assumptions and logical relations being overtly encoded in the text (see, e.g., DeVito, 1966; Johns, 1997; Kay, 1977; Olson, 1977, pp. 58–64). Hughes (1996, pp. 33–34) notes both of these characteristics, writing that spoken grammar employs 'simple and short clauses, with little elaborate embedding', in contrast to written discourse, which employs

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'longer and more complex clauses with embedded phrases and clauses', 'explicit and varied marking of clause relations', 'explicit presentation of ideas', and 'explicit indication of text organization'.[1]

A few early studies present a different perspective, arguing that academic writing is actually more nominal than verbal. For example, Wells (1960) discusses the 'nominal' style of written discourse (contrasted with the 'verbal' style of speech), and Halliday and Martin (1993/1996) focus on the importance of nouns and nominalization in academic written discourse (cf. Fang, Schleppegrell, & Cox, 2006). Other studies have gone further, showing that clausal subordination is typical of the 'verbal' style of speech, while academic writing relies on phrasal modifiers instead of dependent clauses. Multi-dimensional studies of register variation have repeatedly documented this pattern (e.g., Biber, 1988, pp. 104–108; Biber, 1992; Biber, 2006, Chap. 7). More recently, the *Longman Grammar of Spoken and Written English* (Biber, Johansson, Leech, Conrad, & Finegan, 1999) shows that most types of finite dependent clause are considerably more common in speech than in writing.

However, despite these earlier studies, the strong perception that academic writing is 'elaborated' and 'explicit' persists up to the present time. Hyland (2002, p. 50), in a major ESP teacher education textbook, documents the widespread perceptions that academic writing is 'structurally elaborate, complex, abstract and formal', with 'more subordination' and 'more explicit coding of logical relations'. Hyland goes on to describe how there are no clear-cut distinctions between speech and writing, but he does not specifically challenge the characterizations of academic writing as 'structurally elaborate' and 'explicit'.

The stereotypes that academic writing is elaborated and explicit are pervasive among writing teachers and researchers. For example, a simple database search of ERIC identified 114 published research articles where 'writing' and 'elaborate/elaborated/elaboration' appeared together, and 367 articles where 'writing' and 'explicit' occurred together. Although there is not consensus on the specific meanings of the terms 'elaboration' and 'explicitness' in these articles, there is clearly general consensus that these qualities can be attributed to academic writing: both student writing and professional research writing. These views are often mentioned in passing, treated as background information rather than as a claim that requires evidence. Thus consider the following quotes presented in Table 1 [with **emphasis added**].

These characterizations vary in the specific focus of their descriptions (e.g., professional research writing or student academic writing). Further, some of the descriptions are nuanced, identifying particular ways in which academic writing is elaborated and/or explicit. However, they all reflect the dominant and pervasive view that academic writing can be described as both elaborated and explicit. For the teacher of academic writing, it would be nearly impossible to read current writing research and not form the general belief that academic writing is 'elaborated' and 'explicit'.

Our central goal in the present paper is to challenge these stereotypes, based on the results of large-scale corpus investigations. We should be clear at the outset: We are not claiming that there are no clear-cut differences between academic writing and speech. In fact, we show that academic writing is fundamentally different from conversation in its grammatical characteristics.[2]

However, those differences do not conform to the stereotypes of academic writing as structurally elaborated and explicit.

First, we argue that both conversation and professional academic writing are structurally complex – but their complexities are dramatically different. This difference relates primarily to structural elaboration, and here the findings are surprising: in some ways, conversation is more structurally elaborated than academic writing. In contrast, written academic discourse is actually much more 'compressed' than elaborated. In particular, subordinate clauses – especially finite dependent clauses – are much more common in conversation than in academic writing. In contrast, phrasal (non-clausal) modifiers embedded in noun phrases are the major type of structural complexity found in academic writing.

Second, a consideration of the meaning relations among structural elements shows that academic written texts are not explicit at the grammatical level. Rather, the 'compressed' discourse style of academic writing is much less

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[1] To be fair to Hughes, she does additionally note that the 'embedded phrases and clauses' in writing are especially prevalent in noun phrases – a point that is developed in detail in the present paper.

[2] The findings of Biber (1988) have been sometimes misunderstood in this regard. On the one hand, that study shows that there are no absolute lexico-grammatical differences between the spoken and written modes. But this relationship is uni-directional: Any linguistic styles of expression found in speech can be realized in writing (at the lexical and grammatical levels). The converse is not the case. Rather, there are linguistic styles found in writing that do not occur in speech. In particular, the lexico-grammatical discourse styles of academic writing are not found in speech (even formal, informational spoken registers like classroom teaching). The distinctive styles of informational written registers were already recognized in early Multi-Dimensional studies (see, e.g., Biber, 1988, pp. 160–164).

Table 1
Characterizations of academic writing as elaborated and/or explicit.

Elaboration and/or explicitness as a desired characteristic of student academic writing	
Wright (2008)	"Students [writing chemistry lab reports] engage in **elaborated** discourse with a **high degree of specificity** […] Once they have focused on salient data and evidence, **elaborated** forms of discourse arrange information into **more complex and explicit representations** reflective of canonical scientific ideas." (p. 292)
Keen (2004)	"Myhill (1999) identifies **elaboration and use of subordination as features which tend to characterise high quality Grade A writing** […]" (p. 95)
	'The redrafting process facilitates '**progressively more extended clause planning and greater elaboration**.' (p. 96)
Elaboration and/or explicitness as a characteristic of professional academic research writing	
Li and Ge (2009)	"Moreover, the [historical] change to a more **elaborate** presentation of the data-analysis procedures may serve to strengthen the dependability (e.g., consistent, faithful, stable, unbiased.), accuracy (e.g., **clearer, precise**) and aptness (e.g., well-suited, appropriate, suited) of the findings to be reported subsequently in the Results section […]" (p. 98)
Hyland (2008)	"Here then we see the emphasis of the soft knowledge fields on the discursive exploration of possibilities and limiting conditions, identifying and **elaborating** relationships in argument" (p. 11)
	"This reflects the more discursive and evaluative patterns of argument in the soft knowledge fields, where persuasion is more **explicitly** interpretative and less empiricist […] The presentation of research is therefore altogether more discursively **elaborate**, […]" (p. 16)
Hyland (2007)	"I have sought to make two broad claims in this paper: that **elaboration is a complex and important rhetorical function in academic writing**, and that its use varies according to discipline." (p. 284)
Hyland and Tse (2005)	"[…] in academic writing […] **elaborated** structures are generally preferred as they facilitate the readers' understanding of the text." (p. 127)

explicit in meaning than alternative styles that employ elaborated structures. This generalization holds for a wide range of different grammatical devices that are especially common in academic writing (but rare in speech). Further, academic writing has changed dramatically over the past century to prefer these less explicit linguistic features.

The following sections present the results of large-scale corpus analyses that document these patterns of use. Section 2 briefly introduces the corpora used for the analyses. Then, the analyses themselves are discussed in two main sections: Section 3 surveys the use of features associated with structural elaboration versus compression, and Section 4 discusses the lack of explicitness resulting from the use of compression devices in academic writing. Section 5 then briefly surveys historical findings that show how academic writing has changed dramatically over the past 100 years, towards discourse styles that are much less structurally elaborated and much less explicit than in earlier periods. Section 6 discusses functional motivations for these historical changes and implications for teaching academic reading (and writing) at the university level.

2. Corpus and grammatical features used for the analysis

As noted above, we employ corpus-based analysis to describe the typical discourse styles of academic writing. The first step in the analysis was to construct a corpus of academic research articles (c. 3 million words; see Table 2), sampled from four general disciplines: science/medicine, education, social science (psychology), and humanities (history). We collected texts from three 20-year intervals (1965, 1985, 2005). For the purposes of the present study, we consider these as a single group, contrasted with conversation.

We focus mostly on published research articles as the most important sub-register of professional academic writing. However, in Section 3 below, we also present research findings from analyses of other kinds of academic writing taken from the T2K-SWAL Corpus (see Biber, 2006): university textbooks (87 text samples comprising 760,000 words) and course syllabi/assignments (text samples from c. 200 texts comprising 52,000 words).

The conversation subcorpus is taken from the *Longman Spoken and Written Corpus* (see Biber et al., 1999, pp. 24—35). The subcorpus includes 723 text files and c. 4.2 million words of American English conversation. These are conversations collected by participants who agreed to carry tape recorders for a 2-week period. The corpus thus represents one of the largest collections of natural face-to-face conversations available.

The corpora were grammatically annotated ('tagged') using software developed for the *Longman Grammar of Spoken and Written English* (Biber et al., 1999). Then, more specialized computer programs were developed for detailed linguistic analyses of specific types of structural elaboration.

Table 2
Corpus of Research Articles[a].

Year	Academic Discipline	Number of Research Articles	Totals for Subcorpus
1965	Science/Medicine	70	158 articles
	Education	30	c. 923,000 words
	Psychology	28	
	History	30	
1985	Science/Medicine	44	132 articles
	Education	30	c. 810,000 words
	Psychology	28	
	History	30	
2005	Science/Medicine	52	139 articles
	Education	27	c. 1,206,000 words
	Psychology	30	
	History	30	

[a] Research journals sampled for each discipline: Science/Medicine (*Journal of Cell Biology, Biometrics, American Journal of Medicine, Journal of Animal Ecology, Journal of Physiology),* Education (*American Educational Research Journal, Journal of Educational Measurement*), Psychology (*American Journal of Psychology, Developmental Psychology),* History (*Journal of Contemporary History, Journal of the History of Ideas*).

Previous corpus-based studies have documented the different complexities of spoken and written registers. For example, multi-dimensional studies of register variation (e.g., Biber, 1988, 1992, 2006) have shown repeatedly that certain dependent clause types (e.g., *because*-clauses and WH-clauses) are more strongly associated with speech than writing. The *Longman Grammar of Spoken and Written English* (Biber et al., 1999) provides more detailed descriptions of the grammatical features that are common in conversation versus those that are common in academic writing. Building on this previous research, the present study focused on a wide range of grammatical devices associated with structural elaboration and explicitness.

Table 3 lists the types of dependent clauses that we considered for our analysis of structural elaboration. These dependent clauses can serve three major syntactic functions: complement clauses, which usually function as the direct object of a verb; adverbial clauses, which modify the main verb; and post-nominal relative clauses, which modify a head noun.

We also considered grammatical devices that result in a 'compressed' rather than 'elaborated' discourse style, illustrated in Table 4. These are all phrases rather than dependent clauses, used to modify a head noun. Attributive adjectives and pre-modifying nouns occur before the head noun ('pre-modifiers'), while prepositional phrases and appositive noun phrases occur after the head noun ('post-modifiers'). Finally, for the sake of comparison, we include prepositional phrases when they are functioning as adverbials.

Most of these features could be identified accurately using automatic computer programs. However, prepositional phrases required hand coding to determine when the phrase was functioning as a noun modifier or as an adverbial. This analysis was based on a sub-sample of tokens (every 4th occurrence) from a sub-sample of the corpus (41 academic research articles, and 48 conversations). Appositive noun phrases were also coded by hand (to distinguish them from other noun phrases with different syntactic functions). The counts for all linguistic features were converted to a 'normed' rate of occurrence (per 1,000 words) for each text (see Biber, Conrad, & Reppen, 1998, pp. 263–264).

Table 3
Grammatical features associated with structural elaboration.

Grammatical feature	Examples
Finite complement clauses	*I don't know how they do it.*
	I thought that was finished.
Non-finite complement clauses	*I'd like to get one of these notebooks.*
	Do you want to elaborate on that more?
Finite adverbial clauses	*She won't narc on me, because she prides herself on being a gangster.*
	So she can blame someone else if it doesn't work.
Finite relative clauses	*the quantity of waste that falls into this category …*
	There are three sets of conditions under which the crop is raised.
Non-finite relative clauses	*The results shown in Tables IV and V add to the picture…*
	The factors contributing to the natural destruction of microbes…

Table 4
Grammatical features associated with structural compression.

Grammatical feature	Examples
Attributive adjective (adjective as noun pre-modifier)	*a large number, unusual circumstances*
Noun as noun pre-modifier	*surface tension, liquid manure*
Prepositional phrase as noun post-modifier	*Class mean scores were computed by averaging the scores for male and female target students in the class.*
	Experiments have been conducted to determine the effect of salt on the growth and development of paddy.
Appositive noun phrase as noun post-modifier	*In four cohorts (Athens, Keio, Mayo, and Florence), investigators stated that…*
Prepositional phrase as adverbial	*Alright, we'll talk to you in the morning. Is he going to the store?*

3. Structural elaboration and compression in academic writing

The first stereotype to be challenged is the characterization of academic writing as structurally elaborated. Researchers have usually focused on dependent clauses (or subordinate clauses) as the primary measure of structural elaboration. In part, this stereotype reflects our familiarity with classical works of English literature, which tended to be highly elaborated in earlier centuries. For example, consider the following typical sentence from Charles Dickens's *Great Expectations* (1860; cited from Project Gutenberg: www.gutenberg.org):

As I saw him go, picking his way among the nettles, and among the brambles that bound the green mounds, he looked in my young eyes as if he were eluding the hands of the dead people, stretching up cautiously out of their graves, to get a twist upon his ankle and pull him in.

This sentence has a very simple main clause — *he looked in my young eyes* — but it is modified by six dependent clauses: Adverbial clauses:

as I saw him go
picking his way among the nettles, and among the brambles …
as if he were eluding the hands of the dead people
to get a twist upon his ankle and pull him in

Postnominal (relative) clauses

the brambles that bound the green mounds
the hands of the dead people, stretching up cautiously out of their graves

It is almost inconceivable that a speaker would produce a sentence like this in normal face-to-face conversation. However, such structures were commonplace in 19th century novels.

The dependent clauses in the example above are all optional modifications, added on to the core structure of the main clause to elaborate the meaning of main verbs. Similarly, relative clauses are optional, identifying the reference of a head noun or providing elaborating information about that noun. Such structures are clearly structurally 'elaborated'.

Surprisingly, there is also extensive clausal embedding in conversation, but it employs different structural types. In particular, complement clauses (also called 'nominal clauses') are very common, especially *that*-clauses and *WH*-clauses. Complement clauses normally fill a direct object slot, making it possible for a relatively short utterance to have multiple levels of embedding. For example, the following short utterance has two embedded complement clauses:

I just don't know [if that's [what he wants]]

Unlike adverbial clauses and relative clauses, complement clauses are not optional structures; rather, they take the place of a required noun phrase. In conversation, the complement clause usually occurs with a transitive verb (e.g., *think, know,* or *want*): the complement clause substitutes for the noun phrase as the direct object of the verb. As a result, these structures can contain multiple levels of structural embedding, but they do not feel elaborated in the same way that the Dickens sentence does. For example, the following relatively short sentence from conversation has four embedded complement clauses, each occurring as the object of the preceding main verb:

But I don't think [we would want [to have it [sound like [it's coming from us]]]].

Conversational utterances like these are structurally elaborated, but in a very different way from the written prose of 19th century novels.

In contrast to both conversation and 19th century fiction, the typical discourse style of modern-day academic prose employs surprisingly little clausal embedding of any type. If we employ traditional measures, such as the number of embedded dependent clauses, academic prose would not be characterized as elaborated. This is because the structural elaboration of academic writing is realized as phrases without verbs. For example, consider the following sentence from a university sociology textbook:

> *From the system perspective, these stages are marked by the appearance of new systemic mechanisms and corresponding levels of complexity.*

This sentence consists of only a single main clause, with the main verb *are marked*. There are no dependent clauses in this sentence. The sentence is relatively long because there are multiple prepositional phrases:

> *from the system perspective*
> *by the appearance …*
> *of new systemic mechanisms and corresponding levels …*
> *of complexity*

In addition, many of the noun phrases include extra nouns or adjectives as pre-modifiers before the head noun:

> *system perspective*
> *new systemic mechanisms*
> *corresponding levels*

In their main clause syntax, sentences from academic writing tend to be very simple. Thus, consider the following sentence from a psychology research article:

> *This may indeed be **part** [**of** the reason [**for** the statistical link [**between** schizophrenia and membership [**in** the lower socioeconomic classes]]]].*

The clausal syntactic structure of this sentence is extremely simple, with only one main verb phrase:

> X may be Y   (This may be part)

All of the elaboration in this example results from prepositional phrases added on to noun phrases. Thus, unlike both 19th century fiction and modern conversation, academic writing does <u>not</u> often employ dependent clauses for structural elaboration. Rather, we find a more 'compressed' style, employing embedded phrases rather than fuller dependent clauses.

Our corpus investigations show that the patterns illustrated above represent strong general differences between academic writing and conversation. Thus, Figure 1 shows that complement clauses and adverbial clauses are much more frequent in conversation than in academic writing. These differences are strongest for finite clauses (e.g., *that*-clauses and *WH*-clauses functioning as complement clauses; *because*-clauses and *if*-clauses functioning as adverbial clauses). However, the same general pattern holds for non-finite complement clauses (*to*-clauses and *ing*-clauses). In contrast, relative clauses are more frequent in academic writing than in conversation (especially non-finite relative clauses, such as *the concept of society proposed here*). Overall, Figure 1 shows that there are around twice as many dependent clauses in conversation as in academic writing.

Instead of dependent clauses, academic writing relies heavily on phrases to add information. Figure 2 shows that most of these phrases occur embedded in noun phrases. Many of these structures are adjectives modifying a head noun (e.g., *theoretical orientation*) or nouns pre-modifying a head noun (e.g., *system perspective*). But the most striking difference from conversation is for the use of prepositional phrases as noun post-modifiers. Many of these are *of*-phrases (e.g., *the participant perspective of members of a lifeworld*), but other prepositions are also commonly used for this function (e.g., *the methodological differences between the internalist and the externalist viewpoints; a strategic approach to mutual understanding*). Prepositional phrases used as adverbials are also more common in academic writing than in conversation, but the difference is much less strong.
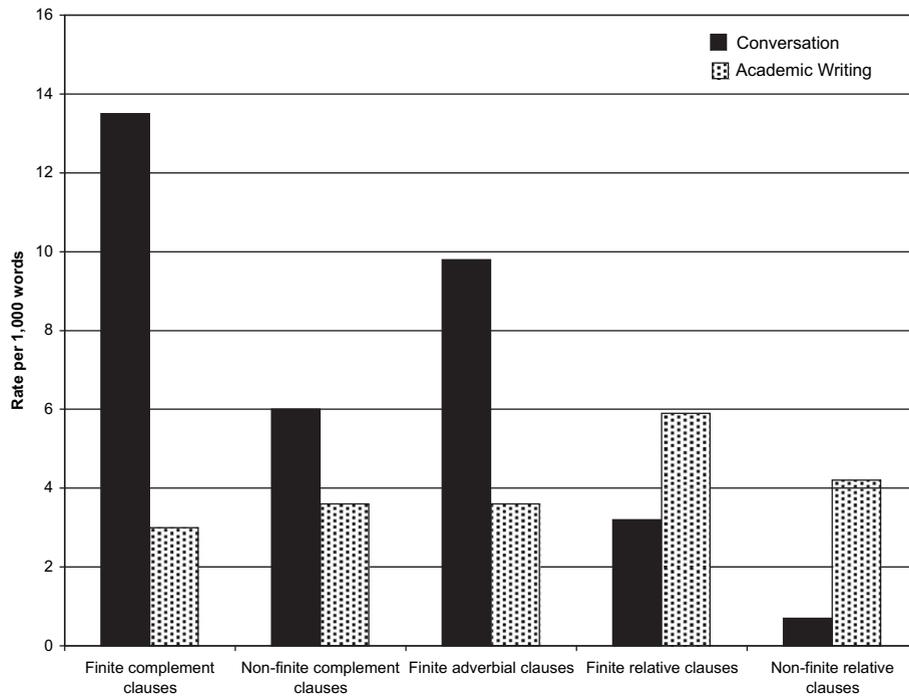
Fig. 1. Common dependent clause types.

In summary, the stereotype that writing is more elaborated than speech is not supported by corpus evidence. In fact, using traditional measures of elaboration – considering the use of dependent clauses – we would conclude that the opposite was the case: that conversation is more elaborated than academic writing. However, that conclusion would also be an over-simplification, because it does not fully capture the characteristics of either conversation or academic writing.
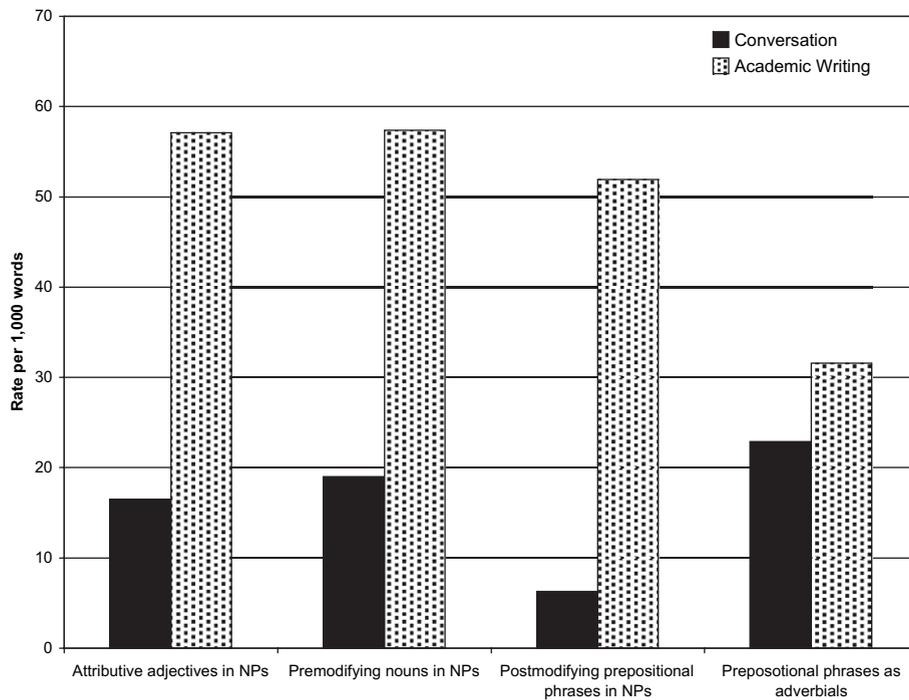
Fig. 2. Common dependent phrase types.

The elaboration of conversation is very restricted in nature. As noted above, most of the dependent clauses in conversation are integrated into the clause structure: complement clauses that normally fill an object slot controlled by a transitive verb. As such, these dependent clauses are not 'elaborating' in the same way that adverbial clauses and relative clauses are. In addition, the structural patterns in conversation are very restricted lexically. For example, although there are over 200 different verbs that can control a *that* complement clause (e.g., *assume, ensure, feel, hear, imply, indicate, propose, realize, suggest*), only three verbs account for c. 70% of all occurrences of this clause type in conversation: *think* (35%), *say* (20%), *know* (13%) (see Biber et al., 1999, pp. 667–670). The lexical restriction is even stronger with *to* complement clauses, where c. 50% of all occurrences are controlled by the verb *want* (see Biber et al., 1999, pp. 710–714). Thus, the overall frequency of dependent clauses in conversation is largely due to a few high frequency lexico-grammatical patterns.

On the other hand, the lack of elaboration in academic writing is in part an artifact of inadequate measures, rather than an accurate characterization of academic writing. That is, elaboration has normally been analyzed by considering the extent to which dependent clauses are used in a text. By that measure, we would conclude that academic writing is actually less elaborated than conversation. However, that measure misses the most important structural characteristic of academic written discourse: the reliance on phrasal rather than clausal elaboration. Most sentences in academic prose are elaborated in the sense that they have optional phrasal modifiers, especially nominal pre-modifiers (adjectives or nouns) and nominal postmodifiers (e.g., prepositional phrases).

These phrasal modifiers are elaborating because they are optional, providing extra information. At the same time, though, these structures are condensed or compressed: the opposite of elaborated. That is, phrasal modifiers are alternatives to fuller, elaborated expressions that use clausal modifiers. So, for example, consider the following roughly equivalent expressions:

Expression from an academic research article, employing phrasal modification	Revised expression employing clausal modifiers
the participant perspective	*the perspective that considers the participant's point of view*
a systems, theoretical orientation	*an orientation which is theoretical and which focuses on the analysis of systems*
corporations within the petroleum industries	*corporations which are part of the industries that process petroleum*
facilities for waste treatment	*facilities that have been developed to treat waste*

This style of discourse is not restricted to professional research writing. In fact, it is typical of all written academic texts that students encounter in a university education, including textbooks, departmental web pages, and even course syllabi. Figure 3 shows that finite complement clauses and adverbial clauses are generally rare in written university texts (contrasted with spoken registers like classroom teaching or office hours). In contrast, prepositional phrases are much more frequent in university written registers than spoken registers (see Figure 4). Consider the following examples from non-research written university registers, noticing especially the general lack of verbs and clauses, coupled with the dense use of nouns (bolded) and phrasal nominal modifiers (underlined):

Textbooks:
This **patterning** of behavior by **households** on other **households** takes **time**. Each new **level** of **system differentiation** opens up **space** for further **increases** in **complexity**, that is, for additional functional **specifications** and a correspondingly more abstract **integration** of the ensuing **subsystems**.

Department web page:
Cultural and Social **Anthropology** deal with the many **aspects** of the social **lives** of **people** around the **world**, including our own **society**: their economic **systems**, legal **practices**, **kinship**, **religions**, medical **practices**, **folklore**, **arts** and political **systems**, as well as the **interrelationship** of these **systems** in environmental **adaptation** and social **change**.

Course syllabus:
The purpose of this course is to assist educators in developing an understanding and appreciation of information technology and a vision of the roles and impacts of these technologies on the curriculum, as well as to
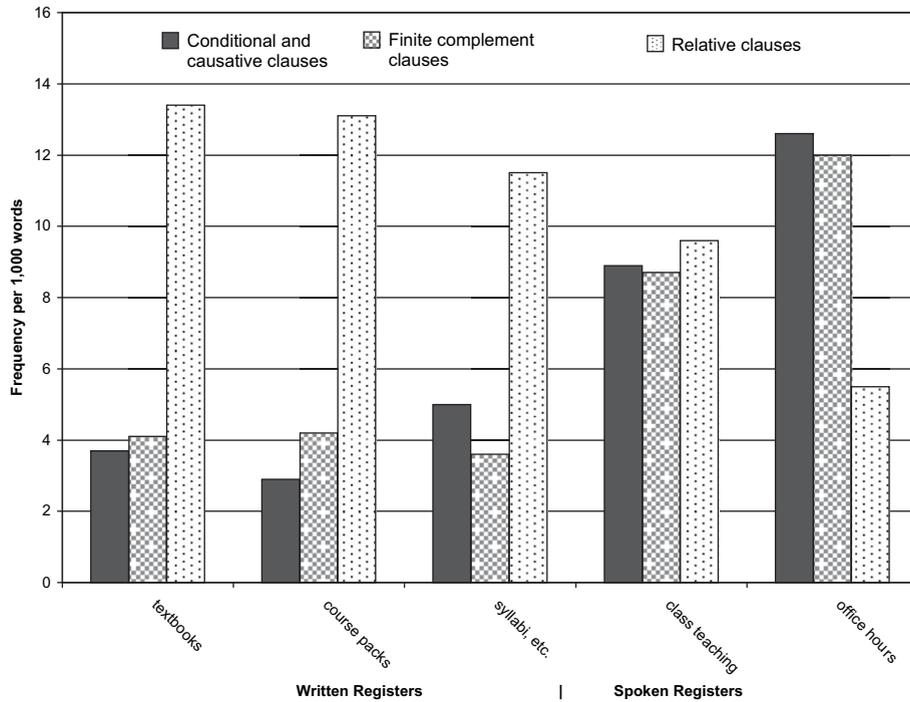
Fig. 3. Finite dependent clause types across university registers [based on Biber, 2006; Figure 4.10].

begin the development of expertise in planning and implementing informed practices which facilitate the creation of a computer using curriculum based on models, theories, and research relevant to effective educational practices.
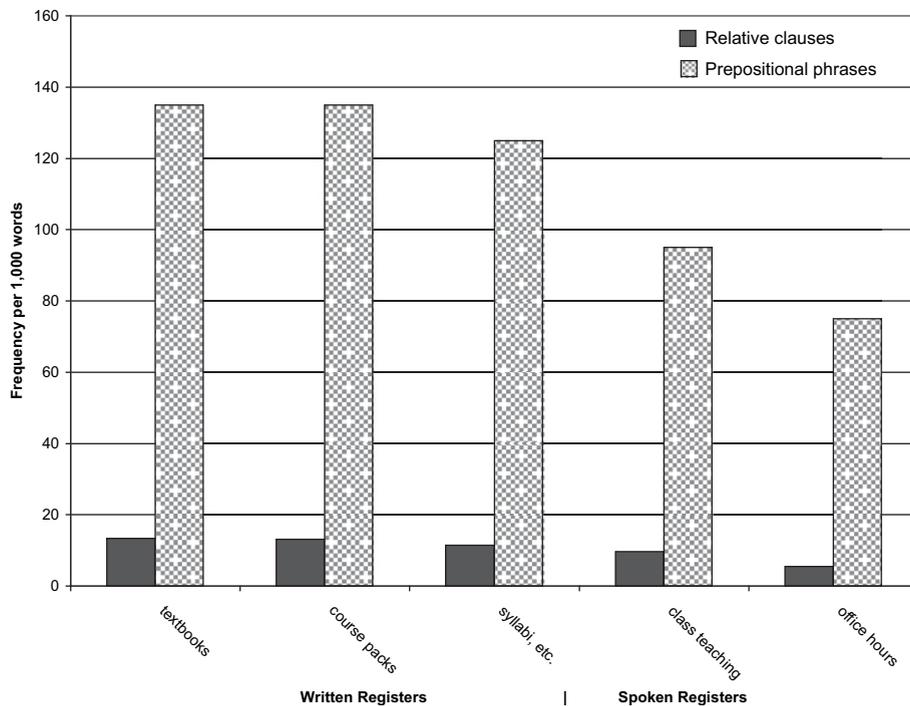

Fig. 4. Relative clauses versus prepositional phrases across university registers [based on Biber, 2006; Figure 4.11].

There are good reasons why compressed, phrasal expressions are preferred over elaborated clausal expressions in academic writing: they are more economical, and they allow for faster, more efficient reading. However, it is often difficult to specify the exact meaning relationship between the head noun and the modifiers. With compressed, phrasal modifiers, those meaning relationships are implicit, while clausal modifiers entail a fuller explicit specification of the meanings. As a result, the compressed discourse style is at odds with a second major stereotype: that academic writing is maximally explicit in meaning.

4. Explicit and implicit meaning in academic writing

The second stereotype to be challenged is the characterization of academic writing as maximally explicit, in contrast to conversation, which relies heavily on implicit meaning. Similar to the stereotypes about elaboration, this stereotype fails to fully capture the discourse patterns of academic writing.

In this case, the generalization that conversation relies on implicit reference is accurate. Conversational participants share the same physical place and time, they often share extensive personal knowledge about each other, and they have the opportunity to interact and thus clarify any misunderstandings. As a result, spoken discourse relies heavily on pronouns, adverbs, and definite noun phrases that refer directly to the situational context (or to the participants themselves). The meaning of these forms is not explicit, because the words have no referential meaning outside of a particular context. Consider the following example (<u>pronouns are underlined</u>; **situated place adverbials in bold**):

Kate: See the pictures of the house?
Pete: No. Where are <u>they</u>?
Kate: <u>They</u>'re over **there on the chair**.
Pete: Oh, ok.
Kate: That envelope **right there** honey **where the camera is. Under that envelope.**
Pete: Where did <u>you</u> go? The camera shop?

Even full noun phrases are often situation-dependent in conversation. Thus, based only on the written transcript, we are not able to identify the specific reference of '*the house,*' '*that envelope,*' '*the camera,*' and '*the camera shop*'. However, these noun phrases all have specific references that were easily understood by the conversational participants because they shared the same physical situation.

Situated reference of this type is virtually non-existent in professional academic writing. The reader almost never shares time and place with the author of academic prose. If the author failed to use explicit referring expressions, readers would not know what the author was talking about. In this respect, academic writing is much more explicit in meaning than conversation.

However, an additional consideration is the meaning relations among grammatical constituents, and in this respect, academic writing is anything but explicit. In fact, it has changed historically to strongly prefer grammatical styles that are dramatically less explicit than in earlier periods.

Nominalizations and passives, which are both common in academic writing, entail reduced explicitness because they omit certain elements (see Halliday, 1979; Halliday & Martin, 1993/1996). Thus compare:

a) *someone manages hazardous waste* >>
b) *hazardous waste is managed* >>
c) *hazardous waste management*

In the passive construction (b), we no longer know who the 'agent' is. In the nominalized construction (c), it is not even explicit that an activity is occurring. Nominalizations are also inexplicit about the time reference of activities. Thus, (a) and (b) are marked for tense and aspect (compare *someone managed hazardous waste* and *hazardous waste has been managed*). However, there is no possibility of expressing tense and aspect in the nominalized version (c); the time reference is implicit and must be inferred by the reader.

The loss of explicit meaning associated with nominalizations and passives has been described in previous studies by Halliday (see, e.g., Halliday, 1979; Halliday & Martin, 1993/1996). However, what has been less noticed is that academic writing prefers a wide array of other structural devices that result in less explicit meanings. Nominalizations and passives are part of this overall pattern, but there are numerous other devices that have similar consequences. In

particular, all of the forms of phrasal (as opposed to clausal) modification described in the preceding section result in a loss of explicitness.

For example, consider the meaning relationship between a head noun and a pre-modifying noun, as in the noun phrase *heart disease*. There is no grammatical clue to help the reader know what the meaning relation is between the two nouns. However, a wide range of meanings is possible, and the use of clausal elaboration can specify the exact meaning relationship; for example:

Head Noun and Pre-Modifying Noun	Statement of Meaning
heart disease	*a disease located in the heart*
alcohol consumption	*the process of consuming alcohol*
computation time	*the time required to compute something*
prison officials	*officials who work in a prison*
union assets	*assets that belong to a union*

As a result of this inexplicitness, the exact same pre-modifier can have a completely different meaning relation to the head noun, as in:

pressure hose	*a hose able to withstand pressure*
pressure ratio	*a ratio that measures pressure*

Further, nouns are often compounded with adjectives, which are in turn used to pre-modify a head noun, resulting in a series of complex implicit meaning relations, as in:

> *aspirin-resistant patients* →
> > *patients who resist aspirin*
> *an ATP-dependent conformational change* →
> > *a change that is conformational and that depends on ATP*

As shown in Figure 2 above, pre-modifying nouns are extremely frequent in academic writing but generally rare in conversation. In this respect, academic writing strongly prefers a structural device that is much less explicit in meaning than alternative expressions.

However, the inexplicit meaning relations are even more pervasive, because all phrasal forms of modification preferred in academic writing can be considered inexplicit in similar ways. The most important of these is prepositional phrases used as nominal modifiers, which are considerably less explicit than alternative clausal modifiers. For example, consider the three prepositional phrases beginning with *for* in the following sentence:

> *Another reason to use Ohio as a surrogate [for the country as a whole] is that the data base [for hazardous waste generation and flow] [for the State] is fairly good.*

In their grammatical form, these three phrases are identical, but they express three different meaning relationships. Clausal modifiers would make those meaning relationships explicit:

> *a surrogate for the country as a whole* →
> > *a surrogate that represents the country as a whole*
> *the data base for hazardous waste generation* →
> > *the data base that documents hazardous waste generation*
> *the data base … for the State* →
> > *the data base that the State uses*

Other meaning interpretations are possible here, at least for the non-expert reader. For example, *the data base for hazardous waste generation* could mean 'the data base used to generate hazardous waste'. Similarly, *hazardous waste generation and flow for the State* could mean 'the hazardous waste that is generated and flows in the State'. The grammatical forms used in this academic sentence provide no clues to the intended meaning. Rather, meaning is implicit and must be inferred by the reader.

Prepositional phrases with other prepositions are similarly inexplicit. For example, consider the wide range of meaning relationships associated with prepositional phrases beginning with *in* and *on*:

> *farms in Malaysia* →
>   *farms that are located in Malaysia*
> *experiments in India* →
>   *experiments that were conducted in India*
> *experiments in agricultural chemistry* →
>   *experiments that focused on the study of agricultural chemistry*
> *a decrease in oil prices* →
>   *oil process decreased*
> *the roots on the surface* →
>   *roots which are on top of the surface*
> *restrictions on underground injection of chemicals* →
>   *rules that restrict the underground injection of chemicals*
> *writers on style* →
>   *writers who discuss style*

In structures like these, the meaning relationships are usually obvious to the expert reader; but there is nothing in the grammatical form of these expressions that makes those relationships explicit. Rather, academic texts have systematically chosen grammatical styles of expression that are less explicit than alternative (more elaborated) grammatical styles.

The loss of meaning associated with these devices is not apparent until we attempt to read technical prose about specialized topics. For example, what are the meaning relations in the following sentence?

> *Interest is now developing in a theoretical approach involving **reflection of** Alfven waves.*

For the non-expert reader, two meanings are possible:

> *… a theoretical approach which involves the way in which Alfven waves reflect something*

or

> *… a theoretical approach which involves the way in which something reflects Alfven waves*

Another structure of this type is appositive noun phrases: two noun phrases that occur in sequence, separated by a comma or parentheses. Traditionally, the two noun phrases are co-referential, and the second one adds descriptive information. Appositive noun phrases are often used in newspaper writing, where the second noun phrase clarifies the identity of a proper noun in the first noun phrase, as in:

> *And so in the middle of <u>Chuseok, the Korean Thanksgiving</u>, Ban was on the phone to his counterparts in Moscow. ''This will be the first time he's ever been his own boss,'' says Peter Beck, the Seoul-based director of the International Crisis Group's Northeast Asia project.*

Similar to nouns pre-modifying a head noun, appositive noun phrases have no explicit grammatical element that specifies the meaning relationship between the two noun phrases. In newspaper writing, this is typically not problematic, because the meaning relationship is usually one of identity; for example, *Chuseok **is** the Korean Thanksgiving*, and *Peter Beck **is** the Seoul-based director*…

However, the use of appositive noun phrases is more complicated in academic writing. Often, an appositive noun phrase can be used to introduce an acronym, or to itemize the members of a group, as in:

> *We present the results of the International Meta-analysis of Mortality Impact of Systemic Sclerosis (IMMISS)*
> *…*
> *In four cohorts (Athens, Keio, Mayo, and Florence), investigators stated that…*

However, in many other cases, the meaning relationship is much more specialized in academic writing. For example, consider the following sentence:

> *Numerous variables were measured, including case status, sex, race, <u>date of enrollment (date of first visit to the cohort with the pertinent diagnosis)</u>, age at first visit, …*

In this case the author is not adding descriptive information about *date of enrollment*. Rather, the authors antici-pated a methodological issue: how was 'enrollment' measured for the purposes of this study? The appositive noun phrase is used to add technical information about the methodology for the study, with a meaning something like:

> *For the purposes of this study, we operationally defined the variable 'date of enrollment' as the date of the first visit to the cohort with the pertinent diagnosis.*

Appositive noun phrases with complex meaning relationships are common in academic writing, especially science research articles. In all of these cases, there are no grammatical markers used to make the meaning relationship explicit. Thus consider the following examples:

> *… depending on whether underlined enrollment (first cohort visit) occurred within 6 months of the first physician diag-nosis of systemic sclerosis (incident case) or whether diagnosis had preceded the first visit by >6 months (prevalent case).*
> *Analyses that included all cases in each center (n = 3311; total follow-up: 19,990 person-years) yielded largely similar results.*
> *Our Girnock analysis (fig. 2a) shows that late autumn and winter (day 240 onwards) was the only period when…*

Similar to the other phrasal devices described above, appositive noun phrases are used to condense extensive information into relatively few words. For example, it would require three separate sentences to rephrase the last example above to make the meaning relations explicit:

> *Our Girnock analysis shows that late autumn and winter was the only period when…*
> +
> *The results of our Girnock analysis are presented in Figure 2a.*
> +
> *For the purposes of our study, we operationally defined 'late autumn and winter' as day 240 onwards.*

All of the grammatical devices discussed above are phrasal modifiers of head nouns, and they are inexplicit in that they omit grammatical markers that could specify the meaning relationship between the head noun and the modifier. However, academic writing also uses other grammatical devices that are inexplicit. Perhaps the most notable of these is the colon. Similar to the other grammatical devices discussed above, the meaning relation signaled by a colon is entirely implicit. In some cases, a colon is used as an alternative to a comma to connect two appositive noun phrases, as in:

> *The articles are written from different perspectives: formalist, feminist, psychological, and Marxist.*

However, the colon is also often used to connect appositive noun phrases at a distance. For example:

> *One possible pathogenetic mechanism can be excluded with certainty in man: a physiological decrease of intestinal lactase activity with advancing age.*

In other cases, two clauses are connected by a colon signaling an implicit appositive meaning relationship (which could be rephrased with the linking adverbial *that is*):

> *This is indicated in Figure 2b by the difference in slopes of the mean correct-response curves: The higher 8-minute recovery curve rises more steeply than the 1-minute curve.*

However, clauses connected by a colon can also have an explanatory or causative relationship. Thus, the following sentence could be paraphrased with a reason clause:

> *If replication of the viral nucleic acid is dependent, there is no need for special enzymes in order to carry it out: the normal cellular enzymes should be sufficient.*
> (Compare: *there is no need … because the normal cellular enzymes should be sufficient*)

In all of these cases, there is no overt grammatical device to specify the meaning relationships. The colon signals only that some meaning relationship exists between the following phrase/clause, and some preceding phrase/clause.

In sum, present-day academic prose relies heavily on a wide array of grammatical devices that are compressed rather than elaborated structures, with the result that they are not explicit in expressing the meaning relations among

grammatical elements. As the following section shows, this style of discourse is a recent innovation, developing primarily in the 20th century.

5. Historical change towards increasingly less elaborated and less explicit discourse styles

Interestingly, academic research writing has not always been unelaborated and implicit in the expression of meaning relations. In fact, this is a recent innovation. Corpus-based studies, which allow us to track these historical changes, have shown that the shift to the compressed, inexplicit style of discourse described above is largely a 20th century phenomenon (see Atkinson 1992, 1999; Biber & Clark, 2002; Biber & Conrad, 2009; Biber & Finegan, 2001, Chap. 6).

Figures 5 and 6 document some of these historical changes, based on analysis of science/medical texts in the ARCHER Corpus and astronomy texts in the A Coruña Corpus. Figure 5 shows that nouns as pre-modifiers were generally rare in academic writing through the 18th and 19th centuries. They began to increase in the early 20th century, and have increased strongly in use over the course of that century. Similarly, Figure 6 shows that prepositional phrases as noun modifiers have increased strongly in use over the past century. *Of*-phrases were already prevalent in the 18th century, and their frequency has remained relatively constant. However, the use of other prepositions as noun modifiers has increased strongly across these centuries. Appositive noun phrases are less frequent than prepositional phrases, but they have shown a similar increase in use. In fact, even in the mid 19th century, appositive noun phrases were generally rare; the dense use of these devices currently found in academic research writing is essentially a 20th c. phenomenon.

As noted above, these are all characteristics of the noun phrase. However, there is also evidence that this style of discourse is spreading to a less explicit marking of meaning relations generally in academic texts. One reflection of this trend is a marked decline in the use of linking adverbials: clause connectors like *however, therefore, thus, for example, furthermore, in addition*. Linking adverbials are probably the most important grammatical device used to explicitly specify the logical relationships among clauses. As Figure 7 shows, linking adverbials were quite common in academic writing in the 18th and 19th centuries, but they have decreased rapidly in use in the 20th century. In contrast, colons have increased rapidly in use in the 20th century. Thus here again we see the general historical trend away from the explicit marking of meaning relations towards a discourse style that is much more compressed structurally, and as a consequence, much less explicit in meaning.
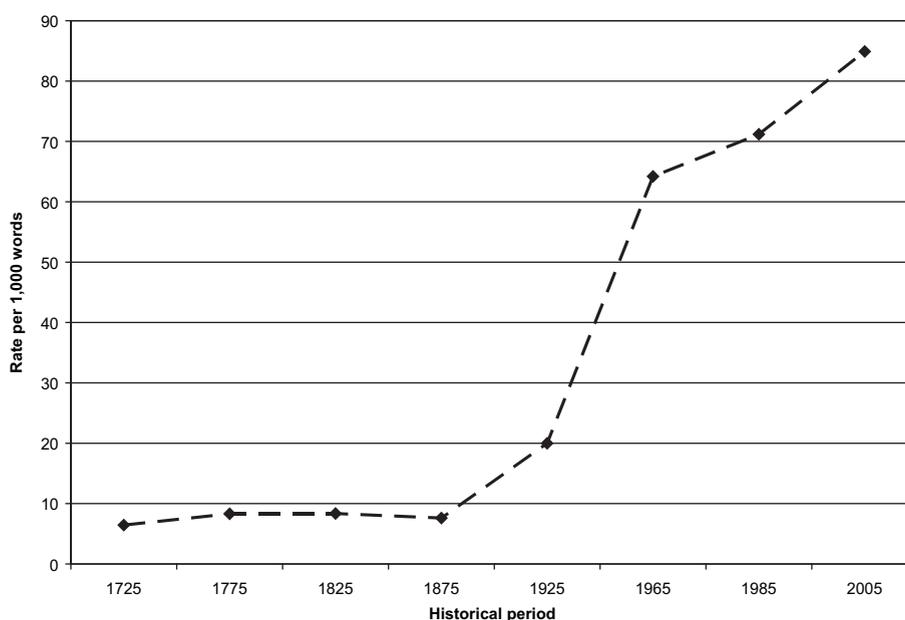

Fig. 5. Historical change in the use of nouns as nominal pre-modifiers in academic prose.
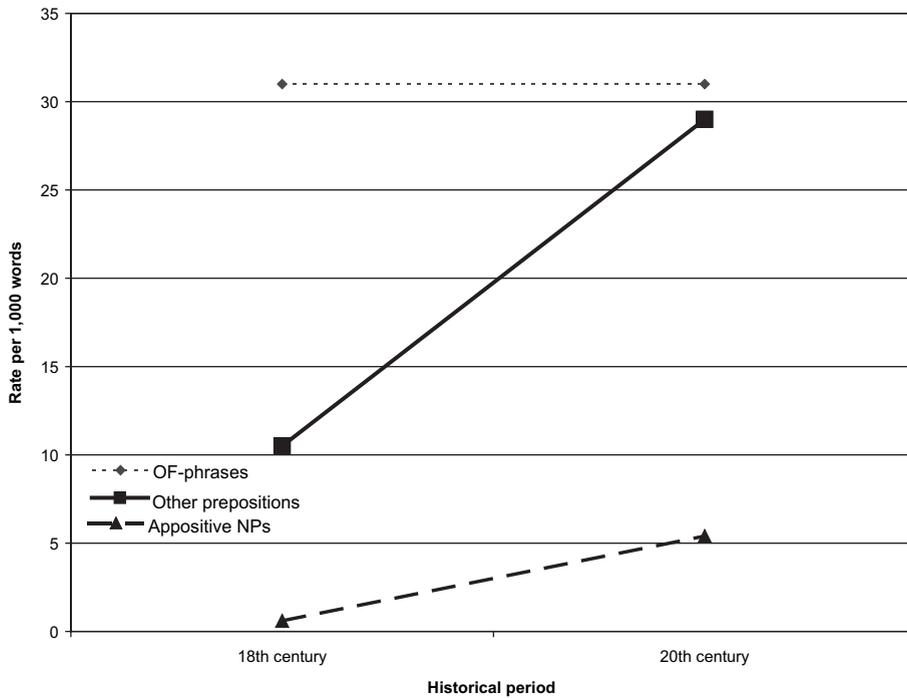

Fig. 6. Historical change in the use of phrasal as post-nominal modifiers in academic prose (medical).
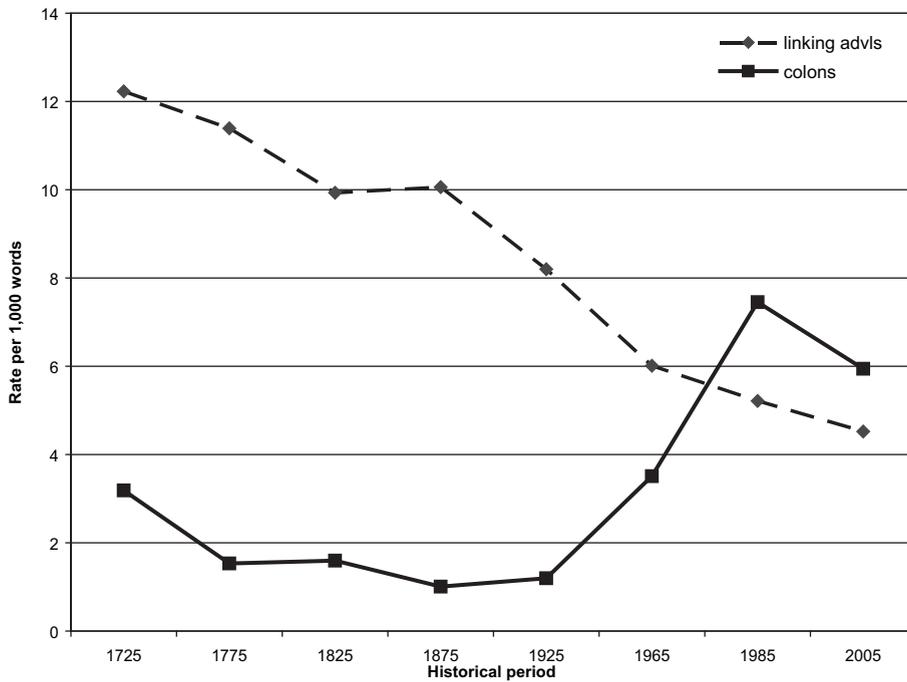
Fig. 7. Historical change in the use of linking adverbials versus colons as clause connectors in academic prose.

5.1. Colloquial features in academic writing

A complementary stereotype is that academic writing has changed historically to become more speech-like and less formal. For example, researchers have noted that authors of modern academic prose sometimes refer directly to themselves (using the pronouns *I* and *we*; see Harwood, 2005) and assume the existence of a specific addressee (e.g., using imperative constructions; see Swales, Ahmad, Chang, Chavez, Dressen, & Seymour, 1998).

Although features like these are quite salient when they occur, the historical facts do not support a general shift to more colloquial styles. For example, Figure 8 plots the frequency of the first person pronouns *I* and *we* in medical/science prose across the last three centuries. Both pronoun forms were used with moderate frequencies in the 18th century, and that pattern of use continued into the 19th century. Then, with the rise of the modern research article, there is a marked decline in both pronouns in the early 20th century, and that pattern continues into the second half of the 20th century (the 1965 sub-corpus in our data). Frequencies for the first person singular pronoun *I* continue to be low up to the present time. In contrast, there has been a notable recent increase in the use of *we*, beginning with the 1985 sub-corpus and shown more strongly in the 2005 sub-corpus. However, even with this increase, current rates of use for *we* have returned only to the level typical of the 18th–19th centuries.

The more important point for our purposes here is that this historical change is minor in comparison to the pervasive change to a nominal/phrasal discourse style. Virtually every sentence in a present-day written academic text illustrates the use of complex noun phrase constructions, coupled with the relative absence of finite verb phrases. In contrast, clauses with the pronoun *we* occur on average only once every 1–2 pages of prose (i.e., a rate of 4 times per 1,000 words, Figure 8).

When these pronouns do occur, they generally do not at all reduce the overall reliance on nominal/phrasal structures. Rather, they provide a personal frame to introduce the information in subsequent complex noun phrase structures, as in:

We investigated the effects of changes in taxonomic resolution on analyses of patterns of multivariate variation at different spatial scales for the highly diverse fauna inhabiting holdfasts of the kelp Ecklonia radiata.

Specifically, we were interested in the qualitative ecological difference in emphasis between changes in composition vs. changes in relative abundance.
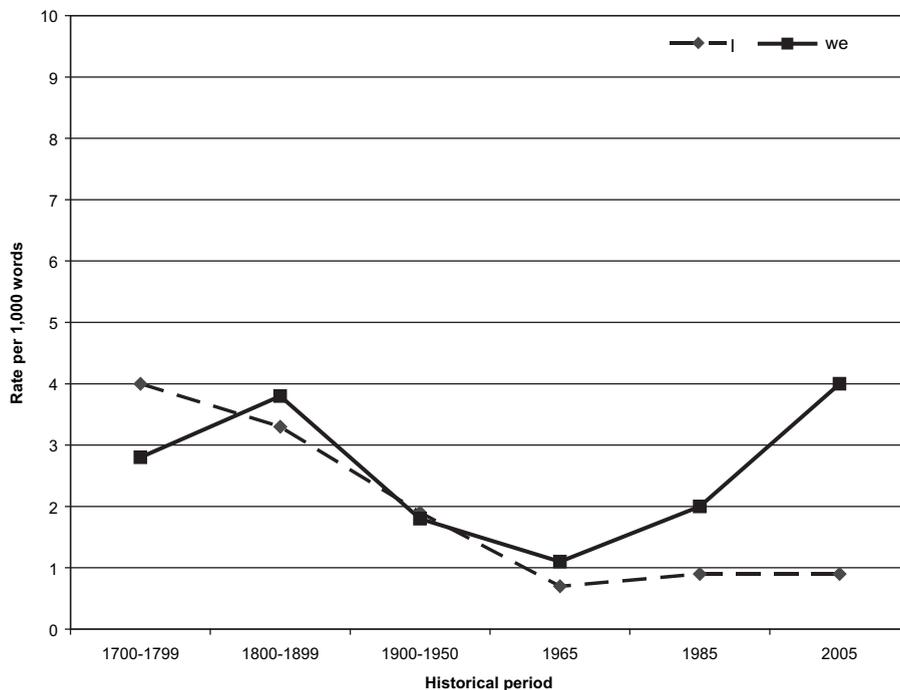

Fig. 8. Historical change in the use of first person pronouns in academic prose.

Both of these examples start off with a simple clause that incorporates a first person subject (*we*) and a finite verb (*investigated, were*):

> *we investigated…*
> *we were interested…*

However, both sentences are then immediately followed by extremely long and complex noun phrases, with multiple levels of modification:

> *the effects [[of changes [in taxonomic resolution]][on analyses [of patterns [of multivariate variation [at different spatial scales]]]] [for the highly diverse fauna [inhabiting holdfasts [of the kelp Ecklonia radiate]]]]*

> *the qualitative ecological difference [[in emphasis] [between changes [in composition] [vs. changes [in relative abundance]]]]*

In addition, these sentences employ numerous phrasal premodifiers of nouns (e.g., *taxonomic, multivariate, different, spatial, diverse, kelp, qualitative, ecological, relative*). These structures are unlike any structures found in speech, in part because they have multiple levels of embedding, but more importantly, because they employ phrasal rather than clausal modifiers.

Thus, the recent 'colloquial' changes in academic writing are perceptually salient but not actually frequent. More importantly, these changes have had essentially no mitigating influence on the pervasive nominal/phrasal style of discourse used in modern academic writing. It is useful to document both historical patterns, but also important to recognize the dramatic difference in scope: the preference for nominal/phrasal structures influences academic written texts at the most basic level, while occasional direct acknowledgements of the author/reader are much less common and do not counteract the preference for nominal/phrasal structures when they do occur.

6. Summary and pedagogical implications

In sum, present-day professional academic writing (e.g., research articles and university textbooks) is one of the most distinctive registers in English. In its grammatical characteristics, it is dramatically different from all spoken registers and most other written registers. It does occasionally use 'spoken' features (like first person pronouns), but the basic grammatical structure of discourse is nominal/phrasal rather than clausal.

Academic writing is certainly complex, elaborated, and explicit, but it does not conform to our stereotypes about these characteristics:

- complex: yes, but not in its use of the traditional measures — see 'elaborated' below
- elaborated:
  ○ in the use of embedded phrases, especially in noun phrases: yes
  ○ in the use of clausal subordination — the traditional measure of elaboration: no
- explicit:
  ○ in specifying the identity of referents: yes
  ○ in the expression of logical relations among elements in the text: no

Thus, on the one hand, academic writing is dramatically different from speech, but on the other hand, it does not conform to the stereotypes of 'literate' discourse. Rather, it has developed a unique style, characterized especially by the reliance on nominal/phrasal rather than clausal structures.

Several factors have contributed to the development of this discourse style (see Atkinson, 1999; Gross, Harmon, & Reidy, 2002), including the rise of the experimental research article, the development of numerous academic subdisciplines, the associated 'information explosion', and changes in technology (e.g., the development of the typewriter and more recently the computer, both facilitating revision and editing of the written text). One important motivation is that this new style is highly efficient for academic professionals: because prose is so compact, an expert reader can quickly scan through a research article and extract the essential information. The lack of explicitness causes few (if any) problems, because the expert reader anticipates the expected readings that will occur in this context. Thus,

a compact (and inexplicit) style actually helps expert readers keep up with the increasing volume of information produced by scientific researchers.

In contrast to the academic professional, the compact, inexplicit discourse styles of research articles are difficult for novice students. This is because students lack the specialist knowledge that would allow them to readily infer the expected meaning of compact, inexplicit constructions. Thus, there are clear implications of these findings for the teaching of academic reading: whether we like these discourse styles or not, it is a certainty that our students will encounter professional writing with these characteristics, and that their academic success will depend on their ability to extract the intended meaning from these texts.

Traditional grammar practice for advanced academic purposes tends to focus on elaborated structures, often dependent clauses like relative clauses, adverbial clauses, and complement clauses. Phrasal modification — especially noun phrase structures with multiple levels of phrasal embedding — is usually given much less attention. This practice might in part reflect a perception that phrasal modification is somehow easier than clausal embedding. However, as documented in the preceding sections, the opposite is in fact the case: meaning relations are much clearer and more explicit in clausal embedding than in phrasal embedding. The implication is that EAP reading courses should provide extensive practice in decoding texts with extensive phrasal modification.

The implications for the teaching of advanced academic writing are less straightforward, in large part because there is no general consensus on what the target is for EAP writing instruction. For example, Hyland (2002, p. 44) notes: ''Approaches are varied, but generally seek to give students experience of authentic, purposeful writing related to their target communities''.

The guidance offered in disciplinary academic style guides is informative here, because they presumably reflect the concerns of writing instructors and professional readers. Bennett (2009) surveyed 20 style manuals to identify the extent to which the same general principles are shared across academic disciplines. Interestingly, the two most important concerns that Bennett (2009, p. 45) identified in these style manuals are 'clarity' (related to explictness; 16 of the 20 manuals) and 'economy or conciseness' (10 out of 20 manuals). A major problem for the novice writer — seemingly not addressed in the style manuals — is how to balance those two concerns: producing discourse that is compact and economical, with the consequence that it is inexplicit in the signaling of grammatical relations, while at the same time still achieving 'clarity'.

Yli-Jokipii and Jorgensen (2004) investigate this tension, showing how the editorial changes made by English NS editors on NNS writers' manuscripts influence both the explicitness and implicitness of the texts:

> ''The increased explicitness concerns the overall continuity of the text (i.e., the macro-level flow and continuity of thought). The editors have thus sought to ensure that the discourse is framed with explicit, unequivocally coded cues. […] In contrast, reduced explicitness seems to derive from micro-level and structural concerns rather than more subtle rhetorical considerations. The native editors have tolerated greater implicitness on the micro-level than assumed by the non-native writers.'' (p. 354)

Thus, both goals — 'clarity' and 'economy' — are important for students of advanced academic writing. There is a fundamental tension between these competing goals. Students need to learn how to write prose that is clear, where the reader has no doubts about the intended meaning. But at the same time, compact prose is valued in academic writing, and a high level of implicitness is tolerated by expert readers. It is not clear how these competing demands are best handled in advanced EAP writing courses, but given that nearly all academic research writing has these characteristics, this is clearly an area that requires additional research.

The main goal of the present study has been descriptive, to challenge the widely-held perceptions that academic writing is elaborated and explicit, and to instead document the ways in which it is compressed and inexplicit. In order to succeed in an academic profession, students must learn to efficiently read and to eventually write this style of discourse. Future research is required to determine how that process can best be facilitated through EAP instruction.

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