

# From section headings to assignment macrostructures in undergraduate student writing

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## 1. INTRODUCTION

Little has been written about section headings in academic writing, and yet for a substantial proportion of assignments in our corpus of student writing they are important indicators not only of the organisational skeleton of the assignments, the macrostructures, but also of disciplinary differences in how and where different meanings and functions are foregrounded. The nature of section headings in assessed undergraduate assignments is investigated here through an analysis of the meaning potential of section headings in the BAWE corpus (see 1.1) of student writing.

Following a brief description of our research project, and a general overview of section headings, we examine the textual, ideational and interpersonal meanings of section headings. We then develop a classification of undergraduate assignment macrostructures as simple, complex or compound, based on the relationship between sections. The chapter concludes with a comparison of our classification with graduate thesis macrostructure classification – a comparison that points to similarities and differences between the two levels of student writing. The frameworks developed in this chapter contribute to our project aims of characterising genres in a corpus of assessed student writing.

## 1.1 THE BAWE CORPUS PROJECT

The British Academic Written English (BAWE) corpus is a collection of student assignments compiled at the British universities of Oxford Brookes, Reading and Warwick as part of the ESRC funded project (RES-000-23-0800) *An Investigation of Genres of Assessed Writing in British Higher Education*. Final holdings comprise 2,761 assignments from students at four levels of study (essentially undergraduate years 1-3, postgraduate year 1) in more than 30 departments across the three universities. Assignments awarded grades of merit or distinction by subject tutors were included, with the aim of constructing a corpus of proficient student writing.

The corpus is being analysed from four broad perspectives:

- Investigations of register using multidimensional analysis (Biber, 1988; Conrad & Biber, 2001) of lexico-grammatical features of the corpus as text.
- Genre analysis of the assignments as texts using the tools of Systemic Functional Linguistics (Martin, 1992; Halliday & Matthiessen, 2004).
- Discourse community perspectives on genres investigated through interviews with tutors (Nesi & Gardner, 2006) and with students (Gardner & Powell, 2006).
- Structural comparisons across years, text types, disciplines and disciplinary groupings according to textual properties derivable from the tagging, such as sentence and paragraph length, or number of references.

To enable this structural analysis, corpus files are tagged using XML, following the TEI standard document type definition (Harold & Means, 2002; Sperberg-McQueen & Burnard, 2004). The main tagged features are:

- title and title page
- table of contents
- abstract or summary
- section headings
- figures and diagrams
- lists (simple, bulleted and ordered)
- quotations
- bibliography
- appendices
- <s> and <p> units, corresponding to sentences and paragraphs respectively.

Further information on these features and discussion of tagging issues can be found in Ebeling and Heuboeck (2007) and *the BAWE Corpus Manual* (Heuboeck, Holmes & Nesi, 2008). Since section headings are easy to identify, and they are tagged in the corpus files, they are readily accessible for study here.

To characterise the assignment macrostructures of assessed student writing across disciplines, the current study investigates the use of section headings to partition undergraduate assignments. Studies of collections of graduate dissertations and theses (Dudley-Evans, 1999; Paltridge 2002; Ridley, 2000; Starfield & Ravelli, 2006) have demonstrated that chapter headings provide useful information on thesis macrostructure. Here we explore how section headings are used in shorter undergraduate student assignments, and develop a comparable classification of student assignment macrostructures.

## 1.2 PREDICTIVE FUNCTION OF SECTION HEADINGS

Martin suggests that:

Once texts develop to [a] level of internal complexity, titles, subtitles, headings and subheadings are commonly deployed to keep track of the composition structure being erected (1992: 443)

Arguably all student assignments have a composition structure in this sense, but not all have section headings to make this structure explicit. Indeed there are many traditional essays with no section headings in our corpus. In other types of assessed academic writing, however, the use of section headings is conventional: writers are expected to structure their texts in specific ways, and to provide explicit clues for the reader to those structures and to the roles of individual parts in those structures. As Nesi and Gardner note:

In Law and Physics, among others, clear guidelines are given [by tutors] not only on the expected sections and subsections of specific genres such as Moots and Laboratory Reports, but also on the content and language expected in each section. (2006: 112)

Even where the particular structure of the text is not prescribed, many tutors value explicitly marked structure: students are expected to have organized their writing and to provide clues of this, which may or may not be realised as section headings, to the reader. Other tutors actively discourage explicit reference to structure (*ibid*: 112) and expect readers to follow lines of argumentation with minimal signposting or reference to macrostructure. Nevertheless, the ability to structure writing is viewed as an important skill that the students need to acquire, and as a criterion in the assigning of a grade to student work.

One way in which section headings can make explicit the structure of a text, particularly where the text is of a type with a prescribed structure, is by referring directly to the prescribed generic stage (e.g. *Results*, *Discussion*). These indicate not only how the section fits into the overall macro-structure, but also how it is likely to be organised and the kinds of information it contains. Another way is by functioning as macro-themes or hyper-themes (Martin, 1992; Ravelli, 2004) of the following sections, for example: *What is polysemy?*, *What is antonymy?* These may function like thesis statements or topic sentences pointing cataphorically to the ideas to be expressed in the following section. In both cases, the heading allows some meanings of the following section to be predicted by the reader. In this sense, headings are interactive resources (Thompson, 2001) which guide the reader through the text. So section headings are commonly deployed, meaningful signposts, but not always considered desirable.

## 1.3 IDENTIFYING SECTION HEADINGS

If section headings are explicit signals of the unfolding structure of text, then they need to be identifiable to the reader. Various devices are employed to iden-

tify parts of the text as section headings, and to define the role of the heading. In the corpus files these are frequently conditioned by the functionality made available by Microsoft Word, which most students use in preparing their work. The following devices are commonly used:

- font: section headings may be emboldened, italicised or underlined (or some combination of two or all three); sometimes a different font or font size is used from the body of the text
- layout: section headings are typically presented on a line of their own, perhaps indented and/or surrounded by extra line space; the paragraph following a section heading may be formatted differently from the other paragraphs in the body of the text
- numbering: section headings are often numbered; this is particularly used where sections are referred to in the text (see 3.2)
- syntax: section headings often consist of single words or nominal groups; these may refer to the function of the relevant section (*Introduction, Conclusion* etc, see 2.2)
- levels: where the text is partitioned into more than one level, the textual devices outlined above are also applied to identify the level of each heading; headings at different levels may have different formatting and layout and where headings are numbered, the numbering reflects the level

Section headings in the corpus files are identified during the tagging process by coders who attend to the features identified above. Since we are dealing with real texts, coders sometimes need to apply their own judgment in the description of a particular piece of text as a section heading. Although the assignments have all received high grades, as assessed by subject tutors, and thus should conform to disciplinary expectations, students do not always apply layout or format devices consistently, or manage subsections successfully. There are also cases where a choice has to be made between a subsection and a bulleted paragraph. The XML tag applied to section headings encodes the level and any formatting used. Example 1 is an extract from a corpus file, showing a single section (an *Introduction*). The section consists of a division (<div>) enclosed between the tags <div1> and </div1>, the number indicating the level of the section. The <div1> contains a <head> and a number, in this case four, of paragraph <p> units. The <head> contains the section heading, which is here emboldened, but not numbered.

```
<div1 type="section">
<head rend="bold">Introduction</head>
<p n="p2.13"><s n="s1.5;p2.13">Mutations are naturally [...]</p>
<p n="p3.13"><s n="s1.8;p3.13">Genetic exchange permits [...]</p>
<p n="p4.13"><s n="s1.6;p4.13">In conjugation, an F pilus[...]</p>
<p n="p5.13"><s n="s1.2;p5.13">In this experiment, conjug[...]</p>
</div1>
```

Example 1. Extract from 0006a, a Biological Science Report<sup>1</sup>.

Having located our study of section headings in the larger research project, pointed to conflicting tutor views on section headings, and explained how headings are identified and tagged, we now turn to the meanings projected by section headings.

## 2. MEANINGS, METAFUNCTIONS AND SECTION HEADINGS

### 2.1 SECTION HEADING FUNCTIONS

As outlined above (1.2), section headings are used to structure texts, or to make explicit the unfolding structure. They do this by referring to properties of the preceding and/or following sections. In this way, section headings predict properties of the sections they introduce. They mark the beginning and ends of sections, and in this sense are frame markers. Hyland and Tse (2004) argue that all metadiscourse is essentially interpersonal and textual in that it guides the reader and structures the text. We agree with this, but want to go beyond this general understanding of interactive metadiscourse, to look at the choices in specific meanings of the grammatical elements that function as section headings. When a section follows a *Methods* section and begins with the heading *Results*, it is expected to contain certain types of information, sequenced in a certain way, and to function in a specific way with respect to the wider text; when a section begins with the heading *Respect and Trust*, it is harder to predict the information flow. In this way, *Results* foregrounds the textual meaning, the message or the information flow in its prediction, where *Respect and Trust* foregrounds the ideational meaning anticipated.

The choice of textual or ideational foregrounding in section headings is not random. Pramoolsook (2005) observes, for example, that dissertations and research articles in Biotechnology almost exclusively use section headings which foreground ideational meaning, whereas corresponding Environmental Engineering texts tend to use section headings which foreground textual meanings. The former tell us what the texts are about; the latter tell us how they are organised. In both cases experimental studies are being reported, so the difference in type of section heading is more a matter of disciplinary culture than of difference in genre. Before we identify patterns that are characteristic of assignments in specific disciplines or text types, we explore further the meaning potential of headings from a trifunctional perspective:

as always with questions of meaning, the answer can be found in the metafunctional organization: differences turn out to be (i) ideational, (ii) textual and (iii) interpersonal (Halliday & Matthiessen, 2004: 597).

### 2.2 SECTION HEADINGS FOREGROUNDING THE TEXTUAL

Some section headings perform primarily a textual function, predicting the information flow patterns of textual meanings. Example 2 shows the six section headings of part of an applied linguistics assignment. The level one heading

identifies it as an interview, and the level 2 headings define the functions of the parts in that context.

```
<div1 type="text"><head rend="bold">Task 2. An interview concerning  
an area of contested language use.</head>  
<div2><head rend="underline">Introduction</head>  
<div2><head rend="underline">Experiment</head>  
<div2><head rend="underline">Method</head>  
<div2><head rend="underline">Results</head>  
<div2><head rend="underline">Comments</head>  
<div2><head rend="underline">Conclusion</head>
```

Example 2. Extract from 6010a, an Applied Linguistics Assignment.

The level 2 headings in Example 2 allow us to predict the rhetorical functions of each section, but they tell us little or nothing about the disciplinary field: they could equally well be from an assignment in one of the physical or life sciences. Most commonly the names and relative positions of the sections are more or less fixed: the text is of a prescribed type whose organisational structure is defined and made salient in terms of section headings such as *Introduction*, *Method*, *Results* and *Conclusion*. Such sets of headings are clear indicators of genre.

### 2.3 SECTION HEADINGS FOREGROUNDING THE IDEATIONAL

Section headings also vary according to the generality of the ideational meaning they convey. Section headings with 'logical' meanings sequence sections and group them through letters and numbers, such as 1, 2, 3, and 1.1, 1.2. These help the reader appreciate how one section fits with another and tend to be used in combination with other headings. In contrast, headings such as *What is polysemy?* (6064e) or *Analysis of three product development processes* (0159e) point to both how the sections may be internally organised and the experiential meanings or ideas in them, including both specific textual and ideational meaning. Others primarily foreground the ideational meaning, telling us little about how the section is internally organised.

```
<div2><head rend="bold">INTRODUCTION</head>  
<div2><head rend="bold">2.1 Product development processes</head>  
<div3><head rend="bold">2.1.1 First generation process</head>  
<div3><head rend="bold">2.1.2 Concurrent engineering</head>  
<div3><head rend="bold">2.1.3 Stage gate process</head>
```

Example 3. Extract from 0159e, an Engineering Assignment.

We know from the <div3> headings in Example 3 that the sections 2.1.1-3 are grouped under 2.1, and the words point to the semantic fields being written about, but they are poor predictors of how the information in the sections unfolds or of its rhetorical purpose.

## 2.4 SECTION HEADINGS FOREGROUNDING THE INTERPERSONAL

The third set of section headings points to interpersonal aspects of the texts. Since the assignments are written in response to a prompt by the module tutor, it is quite common to find the section headings reproduce the tutor's prompt. In Example 4, the questions are referred to by number alone: the numbers here refer exophorically to the tutor's questions rather than internally to the sequencing of sections in the assignment.

```
<titlePart type="main"><hi rend="bold">Econometrics first assignment:</hi></titlePart>
```

```
<div1><head rend="bold">Question 1.</head>
<div1><head rend="bold">Question 2a.</head>
<div1><head rend="bold">Question 2b.</head>
<div1><head rend="bold">Question 2c.</head>
<div1><head rend="bold">Question 3.</head>
<div1><head rend="bold">Question 4.</head>
<div1><head rend="bold">Question 5.</head>
<div1><head rend="bold">Question 6.</head>
```

Example 4. Extract from 0099d, an Economics Exercise.

In Example 5 the tutor's prompt is repeated in section 1, and echoed in the <div2> headings such as *Key factors for creative organization* which predict ideationally as well as responding interpersonally to the tutor's prompt.

```
<div1 type="text"><head rend="bold">Part1 Question 1</head>
```

During the module you were issued with papers from journals. Use these papers as the foundation to a discussion that identifies and describes the key factors required for a creative organisation and the key barriers to implementing the above factors in an organisation and how these barriers can be overcome.

```
<div2><head rend="bold">Introduction</head>
<div2><head rend="bold">1.1 Key factors for creative organization </head>
<div2><head rend="bold">1.2 Key barriers for implementation of creative organization</head>
<div2><head rend="bold">Conclusion</head>
```

Example 5. Extract from 0159e, an Engineering Assignment.

Headings which project interpersonal meaning may follow an **initiation-response** pattern (Hamp-Lyons 1988, Sinclair & Coulthard 1975/1992), as in the examples above, where the tutor has provided the **initiation**, and the student's assignment constitutes the **response**. The **evaluation** or **feedback** occurs when the

work is assessed, and in this way the assignment is positioned very clearly as a student response in the typical IRF pedagogical exchange.

There are also examples of section headings which foreground an interpersonal meaning where the initiation, or question, is not provided by the tutor. The writer in Example 6 has used a series of rhetorical questions as section headings. These set up an interaction for the reader between the writer's own questions and the responses given in the sections.

```
<front>
<titlePart>ES21V INTERMEDIATE TECHNOLOGY AND FIELD COURSE</ti-
tlePart>
<docTitle><titlePart rend="italic">Micro-hydro report</titlePart></docTitle>
</front>

<body>
<div1><head rend="underline">Background</head>
<div1><head rend="underline">What is the state of play of the stream?</head>
<div1><head rend="underline">What's the estimation of the pipe?</head>
<div1><head rend="underline">What about ROCs?</head>
<div1><head rend="underline">Is connection to the grid an option?</head>
<div1><head rend="underline">How about a new turbine?</head>
<div1><head rend="underline">Which pipe and how is it best to route it?</head>
<div1><head rend="underline">Would a grant be possible?</head>
<div1><head rend="underline">What is the likely longevity of the scheme?</head>
<div1><head rend="underline">Conclusions</head>
</body>

<back>
<div1 type="bibliography"><head rend="underline">References</head>
</back>
```

Example 6. Extract from 0023c, an Engineering Report.

These examples highlight the interpersonal function of a text as the site of an interaction between the writer and their audience or reader(s) (Hoey 2001: 11-34). In exercises (Example 4) the audience is construed more narrowly as members of the pedagogic discourse community who have access to the questions set, and in particular the module tutor who will mark the work. In comparison, the IMRD format would be familiar and accessible to a wide range of scientific discourse communities, pedagogic and professional, and students in science departments and others are often encouraged to write for a wider audience in the style of published research journal articles (Nesi & Gardner, 2006).

## 2.5 SECTION HEADING COMBINATIONS AND PERMUTATIONS

If we accept that section headings may foreground the ideational, the textual or the interpersonal, we can then examine how section headings foreground combinations of any two or three of these in single headings. We can also explore how assignments used mixed sets of section headings, and how they embed headings of different types at different levels.

### 2.5.1 COMBINATIONS

Section headings may foreground one of the ideational, interpersonal or textual, or combinations of these. For example, *Task 2. An interview concerning an area of contested language use* combines the interpersonal *Task 2* with the textual *an interview* and the ideational *an area of contested language use*. *Factors in favour of mitochondrial and chloroplast endosymbiosis* combines the textual *Factors in favour of* with the ideational *mitochondrial and chloroplast endosymbiosis*.

It is perhaps surprising if we consider the function of section headings as projecting meaning that few disciplines tend to favour the highly informative combination of textual and ideational section headings throughout. This tendency to avoid combined textual and ideational section headings reminds us that section headings also have a role in pointing to the macrostructure. To include both textual and ideational throughout is perhaps to obscure a clearer view of the macrostructure of the assignment as a whole. Instead, assignments either mix types or use different permutations of levels of headings to combine the textual and the ideational.

### 2.5.2 MIXED TYPES

Example 7 shows a text with a mixture of textual (*Abstract, Introduction, Summary*) and textual/ideational (*History of Endosymbiotic Theory, Factors in favour of mitochondrial and chloroplast endosymbiosis*) section headings. The prototype for such mixing is perhaps the ‘five paragraph essay’ (e.g. Warschauer, 2002) with its introduction, three arguments and conclusion.

```
<front>
<docTitle><hi rend="bold">Endosymbiotic Theory </hi></docTitle>
</front>

<body>
<div1 type="abstract"><head rend="bold">Abstract</head>
<div1><head rend="bold">Introduction</head>
<div1><head rend="bold">History of Endosymbiotic Theory</head>
<div1><head rend="bold">Factors in favour of mitochondrial and chloroplast
endosymbiosis</head>
```

```
<div1><head rend="bold">Summary</head>
</body>
```

```
<back>
<div1 type="front/back matter">
<p n="p1.1">Word count: 2700</p>
</div1>
<div1 type="bibliography">
<head rend="bold">REFERENCE</head>
</div1>
</back>
```

Example 7. Extract from 0006c, a Biology Essay.

### 2.5.3. PERMUTATIONS

While mixings may be influenced by school ideas of essays, permutations are influenced by wordprocessing capabilities and report genres. In this case, headings at different levels have different explicit functions. Thus in Example 8, the level 1 heading is interpersonal (referring to the question set); the level 2 headings are mixed, with the textual *Introduction* and *Conclusion* (referring to the generic stages) and ideational meanings (the logical 2.1, 2.2 and experiential *product development processes*); and the level 3 headings are predominantly ideational (also with combinations of logical and experiential meanings) referring to the different kinds of process discussed.

```
<div1 type="text"><head rend="bold">Part 2 Question 4</head>
<div2><head rend="bold">Introduction</head>
<div2><head rend="bold">2.1 Product development processes</head>
<div3><head rend="bold">2.1.1 First generation process</head>
<div3><head rend="bold">2.1.2 Concurrent engineering</head>
<div3><head rend="bold">2.1.3 Stage gate process</head>
<div2><head rend="bold">2.2 Analysis of three product development processes</head>
<div3><head rend="bold">2.2.1 Similarity between three processes</head>
<div3><head rend="bold">2.2.2 Differences between three processes</head>
<div2><head rend="bold">Conclusion</head>
```

Example 8. Extract from 0159e, an Engineering Assignment.

An alternative permutation is seen in Example 9 which combines an interpersonal/ideational level 1 heading (*Task 2. An interview concerning an area of contested language use.*) and textual level 2 headings (*Introduction, Experiment, Method, Results, Comments*).

```
<div1 type="text"><head rend="bold">Task 2. An interview concerning an
area of contested language use.</head>
```

```

<div2><head rend="underline">Introduction</head>
<div2><head rend="underline">Experiment</head>
<div2><head rend="underline">Method</head>
<div2><head rend="underline">Results</head>
<div2><head rend="underline">Comments</head>
<div2><head rend="underline">Conclusion</head>

```

Example 9. Extract from 6010a, an Applied Linguistics Assignment.

The preferred order for permutations seems to be interpersonal> textual> ideational with headings such as *Task 1*, and *Experiment G* followed by headings such as *Background* and *Discussion*, then by more field specific headings such as *Advanced Micro Devices*. An alternative order of ideational> textual is seen in Example 10, where a SWOT analysis with textual headings is embedded in a report with ideational headings such as *Customer Margin*.

```

<div1 type="abstract"><head rend="bold">Executive Summary</head>
<div1><head rend="bold">Main Report</head>
<div1><head rend="bold">Customer Margin</head>
<div1><head rend="bold">Payback and Net Present Value (NPV) of the
Project</head>
<div1><head rend="bold">Factors That May Change Over The Life Of The
Project </head>
<div1><head rend="bold">Strengths, Weaknesses, Opportunities and Threats
(SWOT)</head>
<div2><head rend="bold">a) Strengths</head>
<div2><head rend="bold">b) Weaknesses</head>
<div2><head rend="bold">c) Opportunities</head>
<div2><head rend="bold">d) Threats</head>
<div1><head rend="bold">Reaction of Competitors</head>
<div1><head rend="bold">Conclusion</head>
<div1><head rend="bold">Appendix:</head>

```

Example 10. Extract from 0076c, a Report in Business.

In this section we have characterised headings as foregrounding ideational, interpersonal and/or textual meaning and presented examples of sets of such headings in isolation and variously combined, mixed and embedded at different levels. In the following section we develop a classification of types of assignment, based on their macrostructure as indicated by section headings.

### 3. TEXT PARTITIONING AND ASSIGNMENT TYPES

The use of section headings to structure assignments varies across genres and across disciplines. Thus essays are less likely to have headings than reports. In a sample of 180 assignments from twelve departments, it was found that all 15 assignments in

Biology and Engineering had sections; most (8 to 11) assignments in Business, Law, Agriculture, Hospitality and Food Sciences had sections, whereas 5 or fewer of those in Anthropology, Classics, Psychology, History and English had sections. Although this sample was stratified by year, and not genre, there is evidence (Gardner & Holmes, 2009) that these disciplinary differences go beyond different proportions of genres. For example, essays in Biology and Engineering are more likely to have headings than those in English and History. We now develop a classification of assignments according to parts typically signalled by headings.

### 3.1 ASSIGNMENTS WITH SIMPLE MACROSTRUCTURES

Some of our assignments have simple structures: they consist of one main text part. This is usual in short (1500-2500 word) English, History, and Philosophy essays. It cannot be considered a property of essays *per se* however, as long essays (over 4500 words), as well as essays in the physical, life and applied sciences, may have several parts. In addition to front matter such as a title, student ID number and module name, assignments with a simple structure, or one main text part, may also have end matter such as a reference section or end notes. Example 11 shows an essay with a simple structure from Psychology. There is a one line title followed by several paragraphs of running text. Note that these texts may have a highly complex internal structure, and may realise the same generic stages as texts with multiple parts, but this complexity is not reflected in the use of section headings.

```
<docTitle><titlePart rend="bold/underline">Imagine you are designing a
curriculum for primary school science classes. Consider how research in cog-
nitive development could help you decide which concepts are taught when.</
titlePart></docTitle>
<p>The structure of education has been shaped by many cogniti[...]
<p> [...]
```

Example 11. Extract from 0022a, an Essay in Psychology.

Essays are not the only type of assignment with a simple macrostructure. Example 12 has front matter in two parts, including the title, student ID, module name and tutor name, and back matter of a word count. The front and back matter clearly mark this as a university assignment. As illustrated here, front and back matter are not tagged as sections. The types of text that occur as front and back matter are limited, and specified directly in the tagging (Ebeling & Heuboeck, 2007, and *The BAWE Corpus Manual*).

```
<docTitle><titlePart rend="bold">An urban ethnography of two bookshops in
Leamington Spa, November 2004.</titlePart></docTitle>
<titlePart>By {anonymised: student name}, History and Sociology. Tutor: {an-
onymised: module leader}.</titlePart>
<p>On Friday afternoon, the 26th of November, I conducted my [...]
<div1 type="front/back matter">
```

```
<p n="p1.1">Word count: 1443.</p>
</div1>
```

Example 12. Extract from 0003b, an Ethnography in Sociology.

Within this, there is one main text part, with no section headings, whose title points to its being an ethnography. Other assignments with a simple macrostructure are reviews and summaries, but the most frequent, and prototypical, assignment with a simple macrostructure is the short humanities essay.

### 3.2 ASSIGNMENTS WITH COMPLEX MACROSTRUCTURES

In section 2 of this chapter we saw how the main text of assignments can be partitioned by section headings. An *Introduction* section, for instance, predicts sections of the body of the text will follow. An *Introduction* is typically well-formed as an Introduction, but incomplete as an assignment. This is similar to the way that a subordinate clause is incomplete or dependent in traditional grammar. Assignments with Introductions and other section headings can be characterised as well-formed ‘complex’ assignments, by analogy with complex sentences in traditional grammar.

Frequently, assignments with a complex structure conform to a recognised type. In these cases, the section headings tend to reflect generic stages. The specific labels for these stages may be prescribed as part of the assignment, and typically reflect disciplinary variation. For example, what students in Biology lab reports include under *Method* may correspond to what students in Physics include under *Experimental Details*.

Example 13 is extracted from a Laboratory Report in Biological Science. The title identifies it as an experiment; this particular report starts with a section titled *Aim / Abstract*, which is less predictable than the IMRD structure that follows. The appearance of an appendix is not uncommon in laboratory reports: it is used to include detailed tables of results or other data.

```
<docTitle><titlePart rend="bold">Experiment 15: Aspects of bacterial genetics: Conjugation and Recombination </titlePart></docTitle>
```

```
<div1><head rend="bold">Aim / Abstract</head>
<div1><head rend="bold">Introduction</head>
<div1><head rend="bold">Method</head>
<div1><head rend="bold">Results</head>
<div1><head rend="bold">Discussion</head>
<div1><head rend="bold">Conclusion</head>
<div1 type="appendix"><head rend="bold">Appendix</head>
```

Example 13. Extract from 0006a, a Report in Biological Science.

Compare this with Example 14, which shows a Laboratory Report in Physics.

```
<titlePart rend="bold">Experiment FC3</titlePart>
<docTitle><titlePart rend="bold">Planck's Constant </titlePart></docTitle>

<div1><head rend="bold/underline">1. Introduction</head>
<div1><head rend="bold/underline">2. Experimental Detail</head>
<div1><head rend="bold/underline">3. Results</head>
<div1><head rend="bold/underline">4. Discussion</head>
```

Example 14. Extract from 0074a, a Report in Physics.

Example 13 and Example 14 show the Level 1 (<div1>) headings only. Each of these sections will have its own internal structure which may also be signalled by sub-headings, as in Example 15.

```
<div1><head rend="bold/underline">6.0 Observations and Results </head>
<div2><head rend="bold">6.1 Quantitive Results</head>
<div2><head rend="bold">6.2 Estimates of Errors</head>
<div2><head rend="bold">6.3 Qualitative Observations </head>
```

Example 15. Extract from 0021a, an Engineering Report.

Sometimes these second level headings point to a particular genre being embedded in a macrogenre, as in 0076c (Example 10 above), where a SWOT analysis is embedded in a Company Report.

It is hardly surprising that subsection headings should vary in the same ways as section headings: they may be used or not used, they may foreground ideational, textual or interpersonal meaning, or some combination of these; they may reflect explicit disciplinary conventions or simply arise in the student's planning of the text.

As is suggested by the examples given, the typical complex assignment is a report. But not all complex assignments are reports. Alongside laboratory reports, company reports and SWOT analyses, we find engineering proposals, case studies and legal texts all typically with section headings that point to the generic structure of the assignment.

The parts of complex assignments are interdependent: no one part is written to be read on its own and the meanings of the parts are derived from their relationships with other parts, each contributing to the meaning of the whole. Occasionally in Biological Sciences assignments are set which ask for *only* the Introduction, or *only* the Discussion section, but in such cases, the missing sections are given by the tutor. Such assignments may be realised with a simple macrostructure that corresponds to part of a recognised assignment type. Just as sentences are marked by initial capitals and final punctuation marks, so too, assignments are marked by front matter (title, Student ID number) and optionally by end matter such as a word count, references or appendices.

### 3.3 ASSIGNMENTS WITH COMPOUND STRUCTURES

The parts of a complex sentence are related by hypotaxis: they are structurally related through dependency relations. In compound sentences, by contrast, the parts are related paratactically: they are related essentially by their juxtaposition in the clause complex and are structurally independent. We can extend our analogy between complex sentences and complex assignments and recognise a class of compound assignments that correspond to compound sentences. Less than 5% of the assignments in the corpus are compound in this sense. They consist of more than one text, each of a recognisable simple or complex type, which is often reflected or named in the title or headings. For example, a collection of essays or a collection of lab reports.

The compound assignments in the corpus have some of the properties of **colonies** identified by Hoey (1991: 72-92). Hoey defines a colony as “*a discourse whose component parts do not derive their meaning from the sequence in which they are placed*” (ibid: 75 italics in original), and he presents nine properties of these texts, four of which are relevant here:

- parts are unordered: the order of the parts of a compound assignment is not meaningful, in that it does not contribute to the structural relationships between the parts; in some cases the parts are ordered chronologically, or according to some other principle
- parts are self sufficient: each one is able to function as an autonomous text
- parts have parallel functions: in some cases, the parts of a compound assignment are texts of the same kind and are structured in the same ways
- parts are embedded in a larger text (a “framing context” ibid: 79) which determines the number and nature of the parts and any relationships between them

This last property is particularly relevant. Hoey’s colonies include dictionaries, acts of parliament etc, where the parts function together to meet the requirements of the colony type (the genre). Similarly, the embedding of texts in compound assignments provides for the cohesion of the whole. Hoey’s colonies consist of an embedding text and a number of embedded sub-texts. It is the embedding text that determines the functions of the sub-texts, and the embedding text has cohesion, despite the paucity of cohesive relations among its parts, because its writer(s) and readers recognise the kind of text it represents and understand the functional relations among its parts. In the words of Halliday and Hasan, the embedding ensures the text “functions as a unity with respect to its environment” (1976: 2), from which it derives its texture and thereby cohesion.

Some compound assignments in the corpus consist of collections of lab reports. Example 16 shows the structure of a collection of lab reports in Biological Science. The <div1> tags (emboldened) have a type attribute with the value “text”, which identifies them as independent sub-texts. Apart from some shared ideational content, the three reports are not functionally related; they could have been presented in any order (they are in chronological order), they are not connected by strong cohesive ties and each could in principle stand alone (as we have seen above, a single lab report can be an independent assignment). In this case,

however, the three reports are presented together as a single assignment, and it is this that gives cohesion to the whole: in the Biology module for which this assignment was written, credit is given only to collections of three lab reports and so all three must be present for it to function as an assignment in this context.

```
<div1 type="text"><head rend="bold/underline">Agrobacterium-mediated transformation of Arabidopsis by floral dip, and selection of transformants</head>
```

```
<div2><head rend="bold">Introduction</head>
```

```
<div2><head rend="bold">Methods</head>
```

```
<div2><head rend="bold">Results</head>
```

```
<div2><head rend="bold">Discussion</head>
```

```
<div1 type="text"><head rend="bold/underline">GUS staining of Arabidopsis seedlings transformed with a promoter trap construct</head>
```

```
<div2><head rend="bold">Introduction</head>
```

```
<div2><head rend="bold">Methods</head>
```

```
<div2><head rend="bold">Results</head>
```

```
<div2><head rend="bold">Discussion</head>
```

```
<div1 type="text"><head rend="bold/underline">Luciferase as a dynamic reporter for gene expression in Arabidopsis</head>
```

```
<div2><head rend="bold">Introduction</head>
```

```
<div2><head rend="bold">Methods</head>
```

```
<div2><head rend="bold">Results</head>
```

```
<div2><head rend="bold">Discussion</head>
```

Example 16. Extract from 0009c, a Report in Biological Science.

In the above example, although there is front matter (in the form of a page header giving the date, the student's name and the names of two lab partners), there is no framing text: the cohesion between the parts is implicit in the presentation of the three reports in one document, and in their being assessed as a unit, but is not explicitly realised in the text. In other cases, however, there is considerable framing material. In Example 17, we see a compound assignment consisting of extensive front matter, including many title parts (module tutor, name, ID number, plagiarism declaration and more) and a table of contents, as well as end matter of a bibliography. Within this there are three autonomous texts, or 'questions', two with their own subheadings which identify them each as corresponding to independent complex texts (the internal structure of Question 4 is shown in Example 8 above).

```
<sourceDesc>
```

```
<p n="essayID">0159e</p>
```

```
<p n="disc">Engineering</p>
<p n="genre family">essay + essay + narrative recount</p>
</sourceDesc>
```

```
<front>
```

```
<docTitle><titlePart rend="bold">POST MODULE ASSIGNMENT for PROD-
UCT DESIGN AND DEVELOPMENT MANAGEMENT</titlePart></docTitle>
```

```
<titlePart>Module Tutor: <name type="tutor"/></titlePart>
```

```
<titlePart>By: <name type="student"/>, Engineering Business Manage-
ment, Student no. <name type="studentID"/><<titlePart>I have read and
understood the rules on cheating, plagiarism and appropriate referencing
as outlined in my handbook and I declare that the work contained in this
assignment is my own, unless otherwise acknowledged. Signed: <name
type="student"/></titlePart>
```

```
<titlePart>MODULE TITLE: Product Design & Development Management</titlePart>
```

```
<titlePart>MODULE CODE: 05EBo</titlePart>
```

```
<titlePart>MODULE DATE: 14TH - 18th November 2005</titlePart>
```

```
<titlePart>NAME: <name type="student"/></titlePart>
```

```
<titlePart>GROUP: I</titlePart>
```

```
</front>
```

```
<body>
```

```
<div1 type="ToC"><head>CONTENTS</head>
```

```
<div1 type="text"><head rend="bold">Part 1 Question 1</head>
```

```
<div2><head rend="bold">Introduction</head>
```

```
<div2><head rend="bold">1.1 Key factors for creative organization</head>
```

```
<div2><head rend="bold">1.2 Key barriers to implementation of creative or-
ganization</head>
```

```
<div2><head rend="bold">Conclusion</head>
```

```
<div1 type="text"><head rend="bold">Part 2 Question 4</head>
```

```
<div2><head rend="bold">Introduction</head>
```

```
<div2><head rend="bold">2.1 Product development processes</head>
```

```
<div2><head rend="bold">2.2 Analysis of three product development proc-
esses</head>
```

```
<div2><head rend="bold">Conclusion</head>
```

```
<div1 type="text"><head rend="bold">Part 3 Post project review</head>
```

```
</body>
```

```
<back>
```

```
<div1 type="bibliography"><head rend="bold">Reference</head>
```

```
</back>
```

Example 17. Extract from 0159e, a 3 part Assignment in Engineering.

In Examples 16 and 17 the parts have parallel functions (recall that this is one of the properties of Hoey's colonies [2001: 83]), and in Example 16 this property is also reflected in their parallel structures. However, not all compound assignments in the corpus have parts with parallel functions. 6066g (Example 18) consists of an *essay* followed by what is described as a *review* or a *literary criticism*. Each part has its own title and bibliography.

```
<div1 type="text"><head><hi rend="underline">In the Iliad, is being a good
hero compatible with good leadership?</hi>
<hi rend="underline">By {anonymised: student name}</hi></head>
<div1 type="bibliography"><head rend="underline">Bibliography</head>
```

```
<div1 type="text"><head><hi rend="underline">In the Iliad, is being a good
hero compatible with good leadership?</hi>
<hi rend="underline">Literary Criticism:</hi>
<hi rend="underline">By {anonymised: student name}</hi></head>
<div1 type="bibliography"><head rend="underline">Bibliography</head>
```

Example 18. Extract from 6066g, an *Essay plus Review in Classics*.

6010a (Example 19) consists of two *Tasks*, called an *Exercise* and an *Interview*. The latter is essentially an experiment in sociolinguistics, and has the same structure as a lab report. In this case, there is also some framing material: a title at the beginning and a word count, a bibliography and two appendices at the end.

```
<titlePart rend="bold">Assignment 2.</titlePart>

<div1 type="text"><head rend="bold">Task 1. An exercise in multimodal dis-
course analysis.</head>
<div1 type="text"><head rend="bold">Task 2. An interview concerning an
area of contested language use.</head>
<div2><head rend="underline">Introduction</head>
<div2><head rend="underline">Experiment</head>
<div2><head rend="underline">Method</head>
<div2><head rend="underline">Results</head>
<div2><head rend="underline">Comments</head>
<div2><head rend="underline">Conclusion</head>
<div1 type="front/back matter"><p n="p1.1">1097 words</p></div1>

<div1 type="bibliography"><head rend="bold">References</head>
<div1 type="appendix"><head rend="bold">Appendix 1</head>
<div1 type="appendix"><head rend="bold">Appendix 2</head>
```

Extract from 6010a, a 2 part *Assignment in Linguistics*.

In this example we have a simple text part (*Task 1*) and a complex text part (*Task 2*) embedded in a compound assignment (*Assignment 2*). In Example 17 we had

two different complex text parts embedded in a compound assignment, whereas in Example 16 we had several complex text parts of the same type. Through our examination of assignments in the corpus, we have developed the following classification of assignment macrostructures:

Table 1: A classification of Assignment Macrostructure

TYPES	STRUCTURES	EXAMPLES
<b>1. Simple</b>	<b>FM ^ Text 1 [section a] ^ (BM)</b>	Philosophy essay, Sociology ethnography
<b>2. Complex</b>	<b>FM ^ Text 1 [section a ^ section b (^ ... section n) ]^ (BM)</b>	
2A Genre based	Complex with generic or 'textual' headings	Lab Report, SWOT analysis
2B Topic based	Complex with specific or 'ideational' headings	Long History essay Annotated bibliography
2C Context based	Complex with contextual or 'interpersonal' headings	Exercise Seminar notes
2D Mixed	Complex with mixed headings	Biology essay, Engineering report
<b>3. Compound</b>	<b>FM ^ Text 1 ^Text 2 (^ ... Text N) ^ (BM)</b>	
3A Colony	Parallel texts	Compilation of Lab Reports
3B Portfolio	Complementary Texts	Essay plus review
3C Mixed	Parallel and Complementary Texts	Compilation of Case Notes and (one) Reflection

Key: FM = Front Matter; BM = Back Matter; ^ = followed by; ( ) = optional; [ ] realised as

The initial classification is into assignments with simple, complex and compound macrostructures. According to whether the parts of compound assignments correspond to the same or different text types, compound assignments are sub-classified as **colony** or **portfolio compounds**, respectively. A third type of compound assignment is 'mixed', which corresponds to several of one text type and at least one of a different type.

The classification further differentiates within complex macrostructures according to the meaning potential of the section headings. We have labelled these **genre based**, **topic based** and **context based** for those foregrounding textual, ideational or interpersonal meanings respectively. Thus laboratory reports tend to have IMRD type headings; long essays tend to have headings that foreground the topic of each section; and exercises tend to have numerical headings that refer to tutor questions.

This classification shows the possibilities for initial partitioning at the assignment level. Further embedding is of course possible as texts and sections are further partitioned. In the example for 3A, for instance, each lab report has a complex macrostructure, and each section of each lab report may also have a complex macrostructure. Although many permutations and levels of embedding are theoretically possible, further research could usefully describe which permutations typically occur, and how robust our interpersonal>textual>ideational hypothesis is.

#### 4. SECTION HEADINGS AND GENRES: DISCUSSION

Our aim in this chapter was to examine the meaning potential of section headings, to develop a classification of assignment macrostructures, and to explore the contribution to our characterisation of assessed genres.

We found that section headings differ in their meaning potential. Some foreground the ideational content of the assignment; others the 'question(s)' set; and others the generic structure of the assignment. Where the ideational content and question set include terms such as 'factors' or 'reasons', they also provide clues to the assignment genre. It follows that a classification of assignments according to their macrostructure is a useful step towards a characterisation of genres. And since section headings can easily be extracted, the classification of assignments in this way can be partially automated, and the description of large numbers of assignments in our corpus will be expedited.

In developing our classification of simple, complex and compound assignments, we found that although essays are the typical simple assignment, not all essays have this simple macrostructure, and not all assignments with simple macrostructures are essays. Thus although tutors in some departments may not approve of explicit signposting in essays, there are essays with section headings that have received good marks (a criterion for inclusion in the corpus). Our analysis suggests that essays with complex macrostructures tend to be science, social science or longer humanities essays.

The typical complex assignments are reports, and we found variety not only in the labels applied to similar sections, but also in the number of levels of em-

bedding. Further research (Gardner & Holmes, 2009) sheds light on disciplinary patterns here. Finally, influenced by Hoey's notion of colony texts (1991), we proposed the notion of compound assignments to account for those with multiple text parts.

Extracting section headings provides a unique lens on changes in assignment macrostructure. For example, in both complex and compound texts we see the inclusion of headings indicative of reflective writing, such as evaluations of work completed or diaries of research processes. There has been a trend towards increased writing of this type (Nesi & Gardner, 2006) influenced in part by national initiatives to increase student self-awareness and critical assessment. Our analysis focusing on section headings readily allows us to note such 'extra' sections added to assignments in response to external forces. It is possibly in these reflective writing sections more than any other that the section headings do not reflect the promise of the heading (Nesi, 2007) as students, and perhaps tutors too, are uncertain what exactly they should do – a further reminder that analysis of section headings cannot substitute for genre analysis.

Our classification of undergraduate assignments based on section headings bears comparison with Paltridge's (2002) classification of doctoral theses based on chapter headings which itself draws on earlier studies. In terms of similarities, it reinforces the predominance of the IMRD experimental report texts (of type 2A in table 1 above) across student (and professional academic) writing as the most easily recognisable genre from an examination of section or chapter headings. It shows a parallel between topic-based theses, topic-based dissertations (Dudley-Evans, 1999) and topic-based assignments (2B); between compilations (Dong, 1996; Thompson, 1999) and colonies (3A), and between the mixed compounds (3C). The same analysis issues arise in distinguishing an assignment/thesis that consists essentially of a number of parallel texts, and is compound in our sense, and an assignment/thesis where several parallel texts are embedded in a section, which is complex in our sense. Further research is needed to investigate the typical patterns of embedding in macrostructures.

In terms of differences between our classification and Paltridge's, we have identified three additional types. His absence of 'simple' texts (1) supports our finding that 'long' essays have section headings. Our classification points to a gap in thesis types where student assignments have 'questions' (3A), and where they consist of two complementary texts (3B). For readers interested in the macrostructure of theses, we suggest these are gaps worth pursuing. We could imagine that in, for example, theatre studies, a thesis might consist of two complementary texts such as a play and commentary on the same.

This chapter has explored the nature of section headings and proposed a classification of assignment macrostructures which can be applied to the BAWE corpus, and other similarly tagged corpora, using partially automated analyses. Through the extraction of section headings, large numbers of assignments can be more readily described, and the approach proposed here joins others (e.g. Gardner, 2008) being developed to characterise genres of assessed writing at British universities.

## NOTES

1. '0006a' identifies this assignment, the 4 digit number identifies the student; 0006b would be a different assignment from the same student. 'Biological Science' refers to the assigning department; the text type label 'Report' also comes from the discourse community (tutors, students, handbooks) rather than from any genre analysis.

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