Aspects of multimodality in higher education monographs

Tuomo Hiippala
Centre for Applied Language Studies
University of Jyväskylä

Introduction

This chapter aims to contribute to the growing body of research on multimodality and higher education by viewing the research monograph – a common vehicle for disseminating knowledge within many fields of study – through the lens of multimodal analysis. Influential ideas require space, and the way major works are published testifies to the power of a monograph. Yet research monographs have not received much attention in multimodal research, possibly because their text-driven structure is not perceived as being multimodally interesting.

At a time of pervasive multimodality, the research monographs continue to be dominated by written language, which is occasionally interrupted by figures, diagrams, tables and other graphic elements. Granted that language does most of the semiotic work in academic discourse, to support both learners and teachers (see Gourlay, chapter 4 this volume), we should also be able to describe what characterises the research monograph and other forms of academic discourse in terms of multimodality. Language, in short, offers powerful means for construing and disseminating academic knowledge, but covers only a part of today's communicative spectrum. In this aspect, making the multimodal structure of research monographs explicit should ideally help readers to access their content. An improved understanding of their structure may support learners' metacognitive activities (Kirsh, 2005), such as extracting knowledge from research monographs, while teachers may benefit with new ways of recontextualising the same knowledge in classroom settings and in other multimodal artefacts intended for learning, such as presentations (Jewitt 2014b; Thesen, chapter 2 this volume).

To support this kind of work and to better appreciate the research monograph as a form of multimodal academic discourse, I first outline several requirements for

investigating the research monographs, before presenting several analytical tools geared towards their description. I then continue by exemplifying how these analytical tools may be used to capture different types of multimodal phenomena by applying them to a page from a research monograph. Now, to set us on our course, I begin with a brief overview of previous work on multimodality in educational contexts.

Multimodality in academic discourse

There has been a long-standing interest in the relationship between multimodality and education (Kress, 1998, 2003; Kress et al., 2001; Unsworth, 2008). Despite growing interest in recent years (Archer and Newfield, 2014), Archer (2010) observes that academic discourse has not received much attention in multimodal research, although images frequently accompany written language "to provide context, illustrate a point, make an argument, furnish evidence, organise data" (Archer 2010, p. 202; Archer, chapter 5 this volume). It is precisely the relations between language and images that have gained the most attention in the study of multimodality in academic discourse. Taboada and Habel (2013), for instance, examine the rhetorical relations holding between text, figures and tables in an academic journal. Their analysis, which covered a total of 645 pages with 137 figures and 139 tables, concluded that figures often elaborate the accompanying text, whereas tables are used to present evidence.

From the perspective of the current study, Taboada and Habel's (2013) observation that figures, tables, diagrams and other graphic elements can stand in a variety of relations to the accompanying text – elaborating or presenting evidence – is particularly interesting. Additionally, Taboada and Habel (2013, pp. 81–82) note the possibility that multiple relationships can be simultaneously drawn between a single graphic element and the accompanying text. What this implies is that there are likely to be different types of multimodal structure at play. More specifically, these multimodal structures may be configured as necessary, ranging from defining specific text-image relations to ensuring that the content presented in text and graphics forms a coherent whole that works towards a common communicative goal. For multimodal researchers, the main questions are: Where does this potential arise from? What are the resources available for meaning-making on the page?

Parodi (2012) proposes that the source of this potential may be traced back to at least four semiotic systems active in academic discourse. These are the verbal, graphic, mathematical and typographic systems, which may be deployed on the page and configured to interact with each other (see Alyousef & Mickan, chapter 10 this volume). Emphasising the synergy between these systems, Parodi (2012)

argues that if we continue to talk about "the text and the figures" or "the text and the images" and treat them as separate entities, we may fail to truly appreciate the fundamental role of multimodality in academic discourse (p. 264). In Parodi's view, the text-image relations constitute only a part of what is going on the page in terms of multimodality. In contrast, the entire multimodal page takes on the functions set out for images by Archer (2010, p. 202). It is the *page* that illustrates, argues and elaborates by combining text, graphics, diagrams and tables.

In this aspect, Parodi's (2012) proposal bears close resemblance to Bateman's (2008) view of the page as a "site of integration" for several distinct resources for representation, which he characterises using the terms text-typographic, graphic and diagrammatic (p. 106). Moreover, the page has the potential to organise these resources in the two-dimensional layout space and combine their output in new ways. These combinations result in what Lemke (1998) calls the multiplication of meaning in scientific discourse. For this reason, understanding the page should be our first priority. The page provides a suitable point of departure for the current study, because it is something shared by all research monographs. Many other forms of academic discourse also work with a "page metaphor" (Bateman, 2008, p. 9), that is, organise their content along the vertical and horizontal dimensions. In order to take the page apart, we need a set of applicable analytical tools, beginning with an effective notion of 'mode'.

Semiotic modes in the research monographs

The concept of mode is central to multimodal research: the debates surrounding its definition also affirm its importance. Within the last two decades, various proposals for defining a mode have been put forward to help us understand the interaction between language, image, layout and other communicative resources. Some of the major proposals have been outlined in Jewitt (2014a), whereas other views can be found in, for example, Elleström (2010) and Forceville (2014). What is important to understand in this connection is that the definition of a mode is motivated by its use.

Whereas a social semiotic approach to mode, which places emphasis on the sign-maker, can be particularly revealing for studying multimodality from the learner's perspective (see e.g. Simpson, 2014), this chapter describes a multimodal arte-fact, which is designed to serve a set of communicative functions (Bateman, 2008; Hiippala, 2015). For research monographs, these may be broadly described as participating in building knowledge within a field by engaging with previous research through argument (cf. e.g. Maton, 2014). To fulfil these functions, the research monograph can draw on a variety of resources. Parodi (2012) conceptualises these resources as semiotic systems, whereas Bateman (2008, p. 106) characterises them as text-typographic, graphic and diagrammatic resources: what connects these

two approaches is the focus on the page. Now, if we take the page as the starting point, as proposed above, we need to identify a definition of mode that can help us explain how text-typographic, graphic and diagrammatic resources interact in the research monograph (see also Simpson, chapter 11 this volume). Only then we may attempt to identify the semiotic modes active on the page.

Considering the dominant role of written language in the research monograph, it is possible to draw on a very specific proposal presented in Bateman (2009) for identifying the semiotic mode: text-flow. According to Bateman (2009), the semiotic mode of

> text-flow ... is found within page-based artefacts whenever there is verbal text. Here the visual line of the developing text provides a basic one-dimensional organisational scheme. Although this may incorporate contributions involving other presentational modes, such as diagrams, tables, and related texts (e.g. footnotes, side notes, etc.), the most important distinguishing feature of this mode is that the spatial nature of the page is not made to carry significant meanings in its own right. (p. 61)

To summarise, text-flow is built around the one-dimensional, linear structure of written language, and does not take advantage of the layout space to make additional meanings. This does not, however, prevent the use of text-flow in multimodal artefacts that use the entire two-dimensional layout space. In fact, this is entirely common: one such example is contemporary secondary school English textbooks, whose layout and placement of textual and graphical content is described as "fluid" by Bezemer and Kress (2009, p. 261). They see "a clear shift from predominantly written text set in constrained typography and confined to a rigid, single- or two-column grid to a composition of (typo)graphically irregular writing and image-based elements placed fluidly on a two-page spread" (ibid.).

Yet in some other artefacts, such as the research monograph, text-flow appears to be the dominant semiotic mode, taking over the entire page to realise a one- or two-column layout: one such example may be found right before your eyes. Although the principle of one-dimensional linearity governs the general organisation of text-flow, this does not rule out the possibility of exploiting the two-dimensional layout space within the diagrammatic mode, which can interrupt text-flow in the form of diagrams, figures, and other graphical elements – an issue to which I will return shortly below. With this brief description of text-flow, we are already a step closer to the research monograph, which reflects many of the characteristics ascribed to this semiotic mode above.

But how does the semiotic mode of text-flow help us to understand the research monograph, as opposed to working with the assumption that language and images constitute their own semiotic modes? With text-flow, we can advance beyond the

traditional language/image dichotomy, and focus on how written language and the accompanying graphic elements interact on the page, while the general organising principle remains linear and one-dimensional (Bateman, 2009, p. 61). At the same time, we naturally continue to observe how language and image are used to realise this particular semiotic mode. It is important to understand, however, that text-flow – like any other semiotic mode – is an abstraction. In reality, what the semiotic mode is used for determines its structure: when used for feature journalism, text-flow may take a very different form than in academic discourse. Additionally, within academic discourse, the configuration of text-flow is likely to vary multimodally (Parodi, 2012) and linguistically (Hyland and Bondi, 2006) according to disciplinary conventions.

Because text-flow is driven by written language, we can also leverage previous research conducted within linguistics, particularly in the area of text organisation and structure (see e.g. Mann and Thompson, 1988; Martin, 1992). This places us in a relatively strong position with respect to written language on the page, but much more work remains to be done to achieve a similar position in terms of what occurs among the blocks of text-flow. The graphic and diagrammatic modes and their many realisations – figures, diagrams, tables, charts, in addition to their combinations in information graphics – have so far evaded comprehensive description. This may require, however, reconsidering our imports from the field of linguistics, as the diagrammatic mode, in particular, may involve increasingly complex multimodal structures. Guo (2004), for instance, has shown that diagrams can organise their content into sequences, while simultaneously grouping parts of the sequence together into a conceptual structure. In the case studied by Guo, making sense of the diagram requires the simultaneous application of two distinct interpretations to identify the sequential and conceptual structures. Without identifying and interpreting this kind of dual structure, the reader is unlikely to understand the meanings conveyed by the diagram.

As said, much work remains to be done in mapping the diagrammatic mode, before our knowledge of its structure and functions matches the level of detail achieved for written language within the field of linguistics. For this reason, I seek to strengthen the analytical framework developed in this chapter by introducing two additional concepts, medium and genre, which help to tie together the textual and graphical contributions to the research monograph and its pages.

Complementing the framework with medium and genre

The concept of text-flow serves as a foundation for analysing the research monographs, but the framework may be considerably reinforced by introducing two additional concepts: medium and genre. These concepts improve our capability to distinguish between the research monographs and other multimodal artefacts

used in higher education. This capability is crucial, particularly if we wish to better understand what happens when the content of the research monograph is recontextualised – or "resemiotised", to use Iedema's (2003) term – in a classroom presentation or other form of learning material. To provide a general view of the framework, the relations between genre, medium, and semiotic modes are set out in Figure 1.
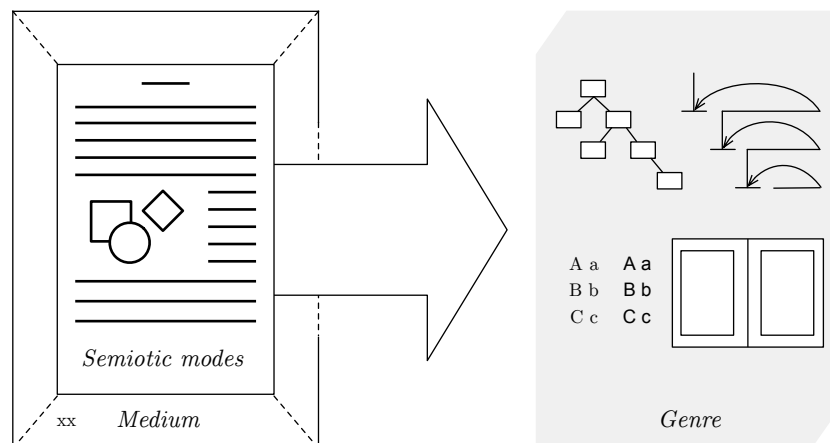

Figure 1: Medium, semiotic modes and genre. The left-hand side shows a medium – such as a book – that provides a range of semiotic modes, whose specific configuration depends on what kind of multimodal artefact is realised using the semiotic modes. These are reflected in genre-specific patterns in the artefact structure, illustrated on the right-hand side, which include at least the content hierarchy, rhetorical organisation, typographic and graphic features and the use of layout space.

The first concept, medium, is concerned with the material underlying of the semiotic modes. No semiotic mode, including text-flow, can emerge without a material that can be manipulated for communicative purposes by a group of users. Over time, these materials can take a more permanent form as their production and consumption stabilises. Prime examples of contemporary print media include newspapers and books, which provide a range of semiotic modes that can be used to realise various genres (Kress, 2005, p. 11). The newspaper, for instance, is a medium that can realise both tabloids and broadsheets. The book medium, in turn, commonly carries genres ranging from the research monograph to novels and non-fiction books.

The second concept, genre, is frequently used in multimodal research to describe various artefacts and situations, and to circumscribe the phenomena under analysis (Hiippala, 2014, p. 111). In addition, this concept has been used to build analytical frameworks that aim to capture the differences between multimodal

artefacts: this is also how the concept will be put to use in this chapter. The most well-known development in this area is the Genre and Multimodality model (hereafter GeM; see Bateman, 2008), which seeks to identify multimodal genre patterns. To capture these patterns, the model attends to various aspects of the multimodal artefact, including the content, its hierarchical organisation, appearance, placement in layout, and rhetorical relations. These patterns, together with the social practices associated with the use of the artefact, constitute the notion of genre within the GeM model (Bateman, 2008, 16). I will introduce the analytical tools provided by the GeM model in more detail shortly below, as I deploy them to describe the multimodal characteristics of the research monograph.

But why it is necessary to bring in medium and genre to complement the concept of semiotic modes? I have argued elsewhere that their joint contribution is significant to any multimodal artefact (Hiippala, 2015). The medium provides the available semiotic modes, which are configured to reflect the properties of the genre that is being realised. The end result is a multimodal artefact, which is more or less appropriate for some communicative purpose, depending on how well it meets the requirements set for the particular genre in question. As Forceville (2014) argues:

But why it is necessary to bring in medium and genre to complement the concept of semiotic modes? I have argued elsewhere that their joint contribution is significant to any multimodal artefact (**?**). The medium provides the available semiotic modes, which are configured to reflect the properties of the genre that is being realised. The end result is a multimodal artefact, which is more or less appropriate for some communicative purpose, depending on how well it meets the requirements set for the particular genre in question. As Forceville (2014, p. 63, original emphasis) argues:

> *Genre is an element of context whose importance cannot be underestimated.* Genre-attribution moreover occurs mostly subconsciously and in milliseconds, and is in my view the single most important element in the addressee's cognitive environment steering his strategy of interpretation of any pictorial or multimodal message. (p. 63, original emphasis)

This also applies to the research monograph, whether it is realised in printed form or as electronic books, as the moment readers set their eyes on the artefact, they begin to make assumptions about its content and structure: What is this text about? What is the best strategy for engaging with the text? Genre generates expectations, and how it is able to do so can only be understood by considering genre in connection with both medium and semiotic modes. However, the contributions of medium, genre and semiotic modes are subtle and often conflated, thus

explicating them requires a systematic approach, such as the one advocated by the GeM model.

Describing the research monograph

In the following section, I will show how the analytical tools introduced above can be used to bring out certain characteristics of the research monograph as a multimodal artefact. Methodologically, I will mainly draw on the GeM model (Bateman, 2008), applying its tools to analyse a page from Bateman and Schmidt (2012). The research monograph in question proposes a new approach to multimodal film analysis, treating film as a kind of document (see also Bateman, 2013). Within the monograph, this specific page is a part of the theoretical discussion. It introduces several different perspectives to documents, and like many other research monographs, it does so by using the semiotic mode of text-flow. Moreover, as the page also integrates contributions from the diagrammatic mode, it presents a suitable target of analysis for this chapter.

My analysis proceeds in the order described shortly below, because the GeM model builds its analysis layer by layer. Due to this approach, the model is best introduced as the analysis unfolds. Those wishing to introduce themselves to the GeM model before engaging with the analysis below may refer to the principles behind the model, which are set out in a concise form in Hiippala (2014) and more extensively in Hiippala (2015, chapters 3 and 5). In the following analysis, I will first use the GeM model to dissect the page into distinct analytical units, before moving on to consider aspects of page layout and its organisation. Having established a sufficient understanding of the layout structure, I proceed to consider how text-image relations emerge on the page. Finally, I present my conclusions based on these analyses, considering how an improved understanding of the research monographs' multimodal structure may help both learners and teachers.

Dissecting the page

Table 1 shows the content on page 52 in Bateman and Schmidt (2012) and distributes this content into two analytical categories: base and layout units, which serve as the point of departure for the discussion. The centre column presents the actual content on the page, which is also marked for its typographic features, indicating the use of bold and italic typefaces. The left-hand column segments this content into base units, while the right-hand column distributes the identified base units into layout units (Bateman, 2008, pp. 111–117). Throughout this chapter, I will frequently use the numbers for base units to refer to the content found on the page. To put this convention into practice right away, Table 1 also includes

Table 1: Page 52 in Bateman and Schmidt (2012)

Base unit	Content	Layout unit
1	52	Page number
2	*Semiotics and documents*	Running head
3	**2.3.1 Three general perspectives on documents**	Header
4	For documents in general one can essentially adopt three perspectives: the **content view**, the **logical view**, and the **layout view**.	Paragraph #1
5	These perspectives are suggested graphically in Figure 2.5.	
6	In this section, we will characterise them in general and then in Chapters 5 and 7 work with them for capturing the specifics of films.	
7	[A diagram showing the three perspectives, see Figure 2]	Figure
8	*Figure 2.5 Three basic perspectives on a document*	Caption
9	The content view perspective covers the 'typical observer' interest in a document: that is, assuming for now a range of presumedly intended 'readers', what these readers will generally orient towards will be the 'represented content' of the document.	Paragraph #2
10	Although much can be said about such content, in this book we will only consider this view to the extent that it is relevant for building our analytic framework for the moving image.	
11	From the document perspective, the notion of content used corresponds to the body of material that has, by some means, been selected for presentation within some document; with respect to the document, therefore, it can be seen as 'pre-existing' and the main question concerns the organisation that is imposed upon it in order to construct a document.	
12	We will impose constraints on the kind of content that is admissible as we proceed.	Paragraph #3
13	For example, and to begin, since we will be focusing exclusively on filmic documents in this book, the content will be taken to be 'raw' recordings or creations of some pro-filmic material.	
14	This can be taken as corresponding loosely to the various 'takes' produced during filming before being edited into their appearance in the final film.	
15	For film, therefore, the 'shot' serves as a typical example of a content portion.	
16	Such content portions may be constituted by material of different kinds.	Paragraph #4
17	All that is required for current purposes, however, is that we can assume ... [page break]	

a diagram (7), which is represented in Figure Figure 2. Next, I will explain how these analytical units help us to take the first step in investigating the multimodal structure of the page.

Logical view

Title
Chapter
Section
Paragraph
...

Content view

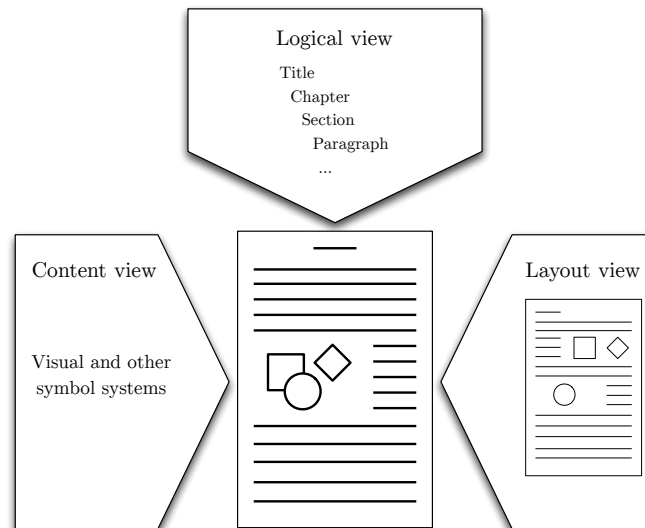Visual and other
symbol systems

Layout view

Figure 2: A sketch of Figure 2.5 on page 52 in Bateman and Schmidt (2012), which retains the original layout and conceptual structure.

The GeM model defines a range of base units to ensure comparable and reproducible analyses. In a strict sense, these definitions limit what can be talked about in the analysis, in order to avoid getting lost in the "infinite detail" (Forceville, 2007, p. 1236). This kind of detail accumulates rapidly if artefact parts are randomly picked up for analysis. The base units defined in the GeM model are given in Bateman (2008), but certain units can be showcased here using the examples presented in the left-hand column of 1. The base units identified in the GeM model include, for instance,

- page numbers (1),

- running heads (2),

- headers (3),

- sentences (4),

- and diagrams (7).

These base units constitute the minimal units of analysis, underlining the rather broad approach to multimodal analysis taken within the GeM model. None of the

aforementioned analytical units, including sentences and diagrams, are decomposed further, because maintaining a tight grip on analytical granularity allows the framework to "concentrate on the combination of information across modes" (Bateman, 2008, p. 111). This is precisely what we need, considering our goal, that is, an improved understanding of how this particular page operates multimodally as a part of the research monograph.

However, the GeM model does more than segments the content into analytical units: after identification, the base units are handed over to a variety of analytical layers for further description. One such layer is the layout layer, which describes the content on the page from various perspectives: what kinds of hierarchical relations hold between the content, what are its typographic and graphic features, and where the content is located in the layout. In order to scale up the description, the base units are joined together to form layout units. As the right-hand column in Table 1 indicates, sentences, for instance, are combined into paragraphs in the layout layer: the base units 4, 5 and 6 make up paragraph #1. The resulting layout units may be then observed from various perspectives introduced above: hierarchy, appearance and placement.

The first perspective to be examined is the layout structure, which determines how the layout units relate to each other in terms of hierarchical relationships. These relations are typically represented using a tree structure, as shown in 3, which visualises the layout structure of page 52 in Bateman and Schmidt (2012).
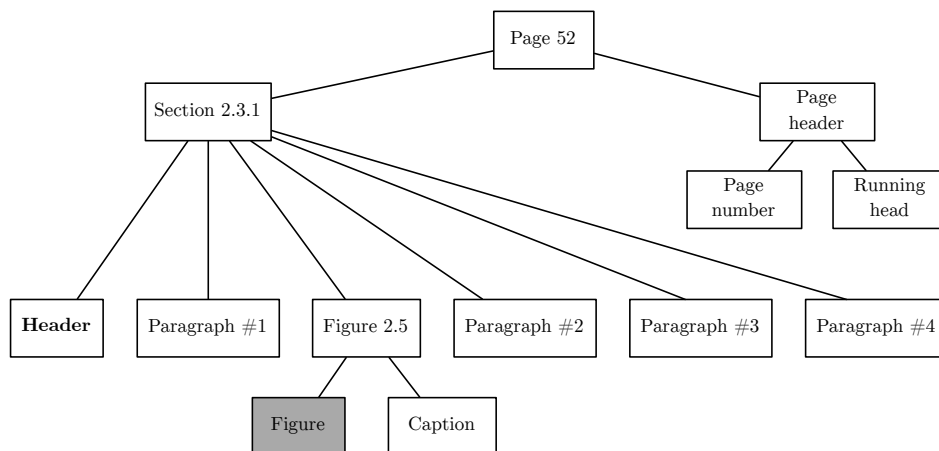

Figure 3: The layout structure of page 52

On the top of the tree diagram is the page, which does not constitute an actual layout unit itself, as indicated by its absence in 1. The layout structure, however, requires this unit to provide a root for the hierarchical organisation. Beginning from the top, the page 52 breaks into two branches: *Section 2.3.1* and *Page header*.

At this point, we can already begin to build bridges between the page analysed here and the concepts of medium and genre introduced above. Under *Page header* we can find a page number ('52') and a running head ('Semiotics and documents'). These features – page numbers and running heads –can be found in a variety of books, regardless of the genre realised using the book medium. They are, in short, a feature of this particular medium (and many others), and for this reason, they should not be conflated with the contributions arising from genre within our framework. They do not participate in organising or presenting the content, but act as navigational devices that support the use of the entire artefact (Bateman, 2008, p. 114).

The actual content, which can be more appropriately described in terms of genre, resides under the branch *Section 2.3.1*. This content consists of the header and the paragraphs that follow, which realise the semiotic mode of text-flow on page 52. Keeping the initial characterisation of text-flow in mind, the paragraphs proceed in a linear order, but are interrupted by a diagrammatic element, *Figure 2.5*, which cuts the flow of written language. The presence of this figure within text-flow is marked by the introduction of an additional level to the hierarchy represented by the layout structure: the composite unit *Figure 2.5*, which joins together the diagram and its caption.

This composite unit is particularly interesting from the perspective of artefact structure, because the introduction of an additional level to the layout hierarchy may also be perceived as a structural cue to the reader. Effectively, this structure puts the text-flow on hold, prompting the reader to reconsider and select the appropriate mode of interpretation to make sense of the diagram. As I will show shortly below, this also encourages the reader to seek out the relations holding between the diagram and the surrounding text-flow. Although text-flow proceeds in a linear order, a similar organisational principle does not necessarily hold for the diagrammatic mode used to realise *Figure 2.5*, as we saw in the case described above by Guo (2004).

Holsanova and Nord (2010) have proposed that these structural cues play an important part in making sense of multimodal artefacts. They write:

> ... the user recognises functional patterns and principles behind the structure, knows where to look for specific things, how to find entry points and possible reading paths, how to recognise information hierarchies, etc. (Holsanova and Nord, 2010, p. 83)

The research monograph has functional patterns to support its interpretation, as exemplified by the layout structure used to introduce the diagram. It also has a very clear organising principle behind its structure, linearity, which is reflected in the positioning of the paragraphs on the same level of the layout hierarchy. Built around the one-dimensional linear structure of text-flow, the research monograph

is far less demanding terms of visual perception and interpretation, particularly when compared to other genres taking advantage of the layout space. This can be made explicit by comparing the layout structure in Figure 3 to those found in other genres, such as a tourist brochure and an in-flight magazine, which are presented in Figure 4.

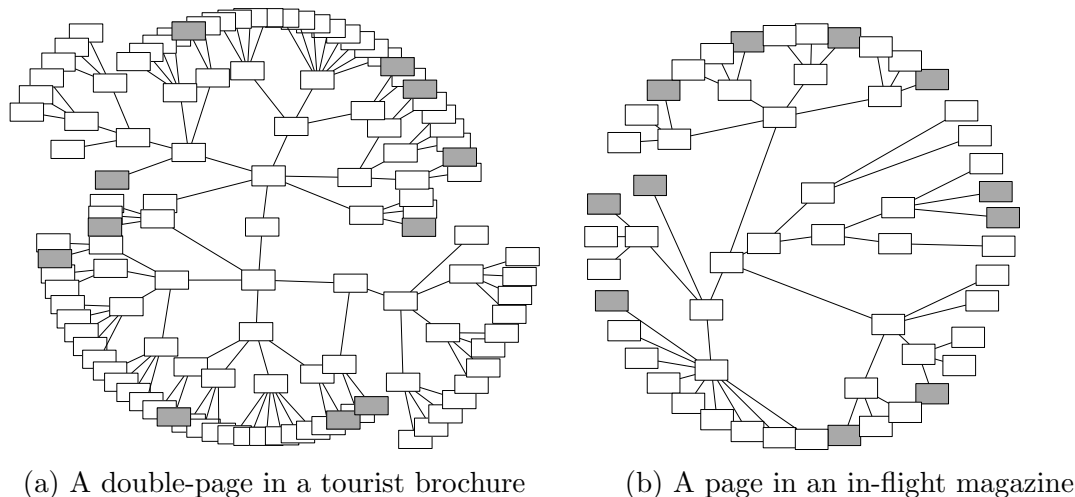(a) A double-page in a tourist brochure   (b) A page in an in-flight magazine

Figure 4: Layout structures in a tourist brochure and an in-flight magazine

As Figure 4 shows, genres that take advantage of the layout space to organise their content can have far more complex layout structures. Constructing composite units of text and graphics and demarcating them from each other in the layout space, while simultaneously establishing connections between the different parts of the content requires a complex layout structure. This is evident, for instance, in the tourist brochures, in which a double-page can host a wealth of different multimodal ensembles: descriptive texts, photographs with captions, information boxes, lists of destinations, schedules in tables, and so forth, which all work towards the same communicative goal. Compared to the tourist brochure and in-flight magazine, the research monograph is far less complex in terms of the layout structure. Why?

Examined using the GeM model, which focuses on multimodal structure, the page of a research monograph appears deceptively simple. However, the complexity of text-flow in the research monograph is revealed upon zooming in to the written language deployed within this semiotic mode. What can be found here is language, used for academic purposes, which encodes and compresses meanings to a high degree (Ventola, 1996; Halliday, 1998). Because unpacking academic discourse is a demanding task, the research monograph – as a multimodal artefact – has to support easy access to the content. If the reader would have to simultaneously resolve a complex layout structure, such as those found in the tourist brochure or

in-flight magazine shown in Figure 4, this would add considerably to the demands presented by the artefact to the reader. It may be proposed that by adopting a 'shallow' layout structure, the research monograph supports a specific type of activity: strategic reading. During strategic reading, the readers actively monitor their response to the content: this is different from skimming or searching, which are used when seeking an answer to a question (Waller, 2012, pp. 239–241). For this kind of reading, the complex but immediate layout structure of the tourist brochure may be more appropriate, given the right structural cues.

What has not been discussed so far are the more explicit forms of cue structures, particularly those arising from the text-typographic resources available within the semiotic mode of text-flow. As Table 1 shows, several base units or their parts on page 52 are highlighted typographically. Within the actual content of the page, a header (3), parts of a sentence (4) and a caption (8) are emphasised either using a bold or italic typeface. Both the header and the caption may be considered "access structures", which are distinguished typographically from the main body of content (Waller, 2012, p. 241). The three nominal groups – 'content view', 'logical view' and 'layout view' – marked using a bold typeface are particularly interesting, because these nominal groups are also present in the accompanying diagram (7) (see Figure 2). This kind of structural cuing is a common way of directing the reader's attention from text to images, which has also been noted in the study of "multimedia learning" (see e.g. the references in Holsanova et al., 2009, p. 1216). However, on the current page, these typographically highlighted nominal groups do not constitute the sole reference to the diagram: it is also referred to explicitly in the following sentence (5). To shed light on the text-image relations, in the following section, I examine the relations between text-flow and diagrammatic mode, showing that the two examples introduced above – the nominal groups and the sentence – participate in different types of structure commonly found in the research monograph and other multimodal genres.

Examining the relations between text and images

Several frameworks have been developed for describing text-image relations in multimodal artefacts (see e.g. Martinec and Salway, 2005; Kong, 2006). These frameworks draw mainly on previous proposals in linguistics and semiotics to provide detailed analyses of text-image relations. Bateman (2008, p. 145), however, argues that many of these accounts suffer from a significant limitation. They often draw "single relations between elements", such as the diagram and its caption on page 52, while simultaneously assuming that similar text-image relations may also hold between collections of textual and graphic elements. Due to the lack of a supporting notion of structure, text-image relations are often drawn between any elements that appear connected.

This analytical problem presents a challenge for the current study, which needs to be resolved if we wish to understand how page 52 is structured multimodally. As I pointed out above, both sentences 4 and 5 on page 52 seem to relate to the diagram (7) and its caption (8), which will be now bundled together into "an image-text-complex", following the term proposed by Kvåle (2010). I do so based on the observation made in the layout structure: incorporating the diagram and its caption into the text-flow requires an additional level in the layout structure. Given this structural cue, it is likely that a text-image relation holds between the elements participating in the image-text complex – this is where we could also apply the frameworks proposed in Martinec and Salway (2005) and Kong (2006). Yet this would raise another question: if a text-image relation holds between the diagram and its caption, what kinds of relations hold between the image-text-complex and sentences 4 and 5, which also refer to the diagram and its caption?

To achieve a more comprehensive and precise description of how text and images work together on the page, the GeM model carries the notion of structure over from the base layer to the description of text-image relations. These relations are described using Rhetorical Structure Theory (hereafter RST; see e.g. Mann and Thompson, 1988; Taboada and Mann, 2006) – an established theory of text structure and coherence, which provides a set of relations to describe how parts of discourse relate to each other. The GeM model extends these relations to cover the entire page, examining relations within text-flow, that is, how sentences relate to each other, while also acknowledging the possibility that relations may hold between particular segments in the text-flow and the accompanying graphic or diagrammatic element. As a part of the GeM model, RST has been applied successfully to various multimodal artefacts. It has been used, for instance, to draw out genre differences across cultures (Kong, 2013; Thomas, 2014) and to criticise graphic and document design (Delin and Bateman, 2002).

It is important to understand, however, that RST does not pursue a description of rhetoric in its traditional sense as a form of persuasion, nor as it is often understood in North America (especially in relation to genre; see Bawarshi and Reiff, 2010, chapter 6). Instead, the aim of the rhetorical analysis in the GeM model is to uncover how multimodal artefacts achieve coherence, or well-formedness, which is an essential property, if the artefact is to achieve its designated communicative goals. Taboada and Habel (2013) summarise coherence effectively by defining it "as a property of texts whereby all parts of a text have a reason to be in the text and, furthermore, there is no sense that there are parts that are somehow missing" (p. 66). In plain words, coherence is achieved when the text meets the readers' expectations. These expectations arise from genre and apply also to multimodal artefacts (Bateman, 2014a).
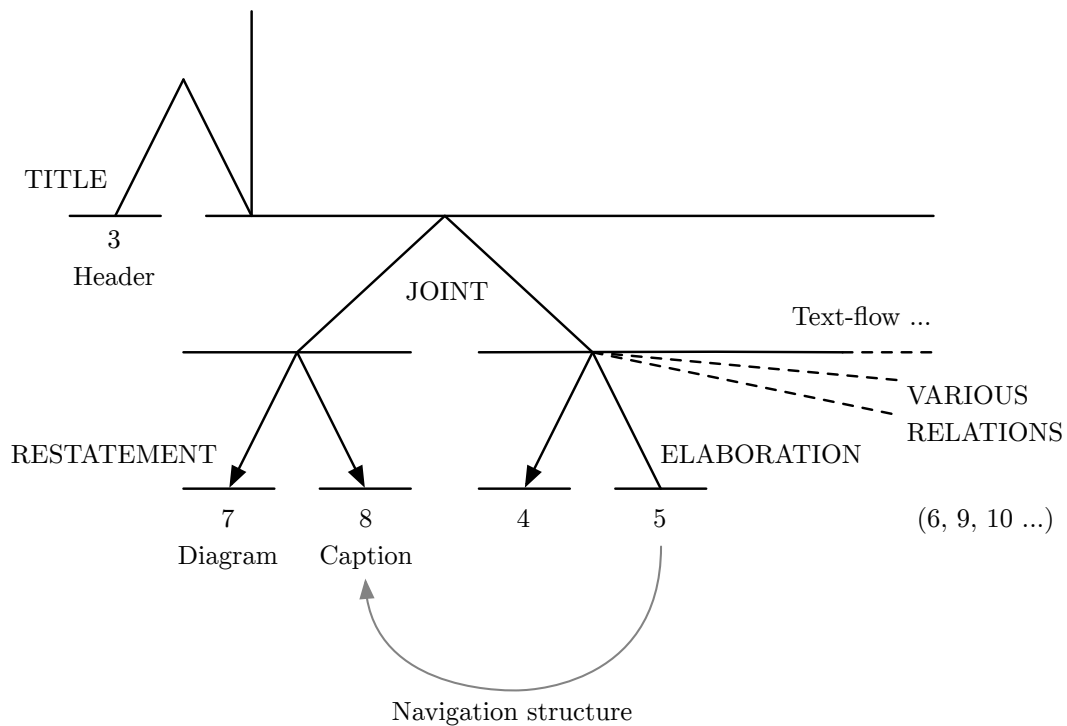
Figure 5: A partial rhetorical structure on page 52 in Bateman and Schmidt (2012). The numbers indicating the identified rhetorical units correspond to those presented in Table 1.

Rhetorical relations are often presented using tree-like diagrams, such as the one shown in Figure 5 (see also Taboada and Mann, 2006, pp. 425-426). The diagram in Figure 5 presents a part of the rhetorical structure found on page 52 of Bateman and Schmidt (2012). In the following description, I will focus especially on how the diagram is integrated into the rhetorical structure, which handles discourse relations within text-flow. The various relations present in text- flow have not been expanded in Figure 5, as indicated by the right-hand side of the diagram. For text-image relations, Figure 5 proposes that a specific relation, RESTATE-MENT, holds between the diagram (7) and its caption (8). Essentially, this means that the diagram and its caption are treated as equals: they restate each other (see Bateman, 2008, pp. 158–159). What is worth noting here is that this image-text-complex falls under a different branch of the rhetorical structure as the units that make up the text-flow (4, 5, 6, 9, and so on). For this reason, in terms of the rhetorical structure, no direct rhetorical relation exists between the text-flow and the image-text-complex (7–8) incorporated within it.

Although sentence 5 refers explicitly to the image-text-complex, as a part of the rhetorical structure its purpose is to add information to sentence 4. As Figure

5 shows, a relation of ELABORATION holds between the two sentences. It is also worth noting that Table 1 shows sentence 6 standing between sentence 5 and the diagram: the reference is embedded within text-flow and does not immediately precede the diagram. Thus, given the linear principle that governs text-flow, it may be more appropriate to describe the connection to the diagram established in sentence 5 as a navigation structure. This structure is realised using a direct reference in sentence 5 to caption 8: "These perspectives are suggested graphically in Figure 2.5." We can use the navigation layer of the GeM model to explicate how the navigation structure is established. In sentence 5, 'Figure 2.5' acts as a pointer towards caption 8. It is caption 8, in turn, which identifies the accompanying figure as 2.5, that acts as an entry point in the navigation structure (Henschel, 2003, pp. 20–21).

According to Taboada and Habel (2013), "rhetorical relations between figures and text can be understood as coherence links, contributing to the perceived coherence of a document" (p. 66). With the help of the GeM model and its multiple analytical layers, we can make increasingly precise observations about the nature of coherence in multimodal artefacts, situate them within the framework and consequently, complement Taboada and Habel's (2013) already extensive description. The example in Figure 5 suggests that coherence can also be achieved using other means than drawing rhetorical relations between the content on the page. As I showed above for sentence 5 and the image-text-complex, a navigation structure may also contribute towards coherence in a multimodal artefact: it may be suggested that the readers engaging with the research monograph genre expect the contributions from the graphic and diagrammatic modes to be signposted clearly within text-flow, either using the rhetorical structure or some other structure. Alternatively, this kind of signposting may involve the cooperation of multiple structures, such as rhetorical and navigation structures with typographic emphasis.

As stated, the different kinds of structures found in multimodal artefacts are often intertwined. As Bernhardt (1985) writes:

> When a writer elects to make a text visually informative, the decision has consequences which extend down through the text to all levels of structuring, from the large rhetorical divisions of the text, to the intersentential strategies of cohesion, to the syntax of individual clauses. (p. 19)

So far, we have not considered the introductory sentence (4) on the page, except for its use of the bold typeface to emphasise certain nominal groups: "For documents in general one can essentially adopt three perspectives: the **content view**, the **logical view**, and the **layout view**." As Figure 2 showed, these nominal groups are also rendered linguistically as labels in the diagrammatic mode. However, I also

emphasised that the GeM model does not extend rhetorical analysis to nominal groups or clauses within sentences, nor does it deconstruct graphic or diagrammatic elements. Therefore, to account for the apparent text-image relations that lie beyond the reach of rhetorical analysis, we need to trace the steps outlined by Bernhardt (1985) and move from the rhetorical structure towards cohesion.

In multimodal research, cohesion is often understood in terms set out for language by Halliday and Hasan (1976). Essentially, Halliday and Hasan (1976) treat cohesion in language as a non-structural resource for making meaning, that is, cohesion is not bound to any particular type of linguistic structure. In plain words, text achieves cohesion by talking about the same or related things, which together form a cohesive field of meaning. Within multimodal research, the concept of cohesion has been applied to the study of text-image relations by Royce (1998, 2007) and developed further in Liu and O'Halloran (2009). Bateman (2014b, p. 161) points out that it is not surprising that cohesion has gained currency in multimodal research, because the concept is not bound to any specific type of structure. Lacking the constraining notion of structure, cohesive ties may be readily drawn across multiple modes, as I have already shown in the case of the apparent links between the typographically-emphasised nominal groups in sentence (4) and their rendition in the diagrammatic mode in diagram (7). In this chapter, turning towards cohesion represents a departure from the approach pursued so far, which has emphasised the benefit of having the constrained notion of structure at hand.

To examine cohesion in action, Table 2 tracks the cohesive ties found on page 52. As the table shows, cohesive ties may be found across the entire page, cross-cutting both text-flow and the diagram. Although Table 2 does not describe the actual mechanisms that create cohesion, for which proposals may be found in the work of Royce, Liu and O'Halloran, the table illustrates how the cohesive chains instantly weave a web across the entire page. As Taboada (2004, p. 168) points out, cohesive chains are rarely found in isolation: instead, they occur parallel to other chains. In this case, we may identify three cohesive chains, which correspond to the typographically-highlighted nominal groups: content view, logical view and layout view. The three chains are first introduced (4–6) and then visualised using the image-text-complex (7–8), followed by an examination of the first chain, that is, the content view. The logical and layout views are discussed later: for this reason, their cohesive chains disappear after sentence 8, because Table 2 does not extend beyond page 52. These chains are naturally picked up on the following pages. The reader is likely to know this as well, as such cohesive discontinuities are a common feature of the research monograph genre.

Now, what does this brief analysis of cohesion reveal about multimodality on the page of a research monograph? The cohesive ties obviously cross-cut both text-flow and the diagram, but whether the analysis reveals any additional insights into

Table 2: Cohesive chains on page 52 of Bateman and Schmidt (2012). A bracketed letter L indicates a linguistic instance in the cohesive chain, whereas a bracketed letter V marks a visual instance. The cohesive chains are organised according to their respective topics: the content, logical, and layout views on document structure. The lines that span all three columns indicate where the chains merge.

Base unit	Content view	Logical view	Layout view
3 [Header]	[—————— L: **three general perspectives** ——————]		
4	[L: **the content view**]	[L: **the logical view**]	[L: **the layout view**]
5 [Pointer to 8]	[—————— L: these perspectives ——————]		
6	[—————— L: them ——————]		
7 [Diagram]	[L: the content view]	[L: the logical view]	[L: the layout view]
8 [Caption]	[—————— L: three basic perspectives ——————]		
9	[L: the content view perspective]		
10	[L: this view]		
11	[L: the notion of content]		
12	[L: the kind of content]		
13	[L: the content]		
14	[L: this]		
15	[L: a content portion]		
16	[L: such content portions]		

the multimodal structure of the page is questionable. In fact, it may be argued that the description of cohesive ties actually raises more questions, particularly in relation to how the typographically-emphasised nominal groups are used on the page. So far, we have worked with the assumption that these nominal groups were somehow related to the diagram. Given their position in Table 2, however, we may also consider whether the typographic resources are actually used to highlight the beginning of the three cohesive chains. This would mean that they are used as a structural cue to support metacognition, emphasising the most important topics to be discussed in the text, which extend beyond the page currently under analysis. At the same time, they can reinforce text-image relations on the page, but their presence would not be necessary: the diagram remains integrated into the artefact structure through the cross-reference in the navigational structure. Because the typographically highlighted text has the potential to serve two different purposes – highlight the beginning of cohesive chains and text-image relations – it may be suggested that this reflects precisely what Lemke (1998) called the multiplication of meaning on the page in scientific discourse.

Generally, what this brief analysis implies is that we must evaluate the page in terms of multimodality, which encompasses far more than text-image relations. This proposition ties in particularly with Parodi's (2012) observation that we must reconsider our often language-centric position and consider the page as an ensem-

ble that works toward a common communicative goal. Depending on the artefact in question, the page will use the available text-typographic, graphic and diagrammatic resources as necessary to meet this goal. Moreover, the page is likely to have multiple strategies for doing so: for instance, as I showed above, text-image relations can be handled through both rhetoric and navigational structures. It is also possible to leave these relations to be handled by cohesion. However, in certain artefacts, such as the research monograph, abandoning the explicit references in the rhetorical or layout structure may result in reduced *coherence*, as the readers expect these relations to be set out using these structures. This concludes the analysis of page 52: in the following section, I will provide a brief summary of the analysis before considering its implications.

Conclusion

In this chapter, I have described certain features of the research monograph as a multimodal artefact. First of all, I proposed that the research monograph can be described effectively by working with a specific definition of a semiotic mode, that is, examining its language-driven structure as *text-flow*. I then suggested that appropriate analytical tools can be used to reveal certain patterns that are characteristic of the research monograph as a *genre* realised using the book *medium*. These patterns, which comprised the layout, rhetorical and navigational structures, were described using the Genre and Multimodality model (Bateman, 2008; Hiippala, 2015).

The layout structure, responsible for organising the content into hierarchies, revealed a relatively simple and shallow organisation: I proposed that the simple layout structure is motivated by the needs of using language for academic purposes. Unpacking the highly compressed meanings of academic discourse already requires significant effort from the reader. For this reason, the shallow hierarchy in the layout structure facilitates the reader's access to the content, while simultaneously supporting the use of the artefact by signalling breaks in the text-flow, which may come in the form of tables, diagrams, and figures and other graphic and diagrammatic elements.

To examine text-image relations in the research monograph, I analysed how text-flow handles relations between written language and the diagram on the page. I showed that text-image relations, which constitute one aspect of coherence in multimodal artefacts (Taboada and Habel, 2013; Bateman, 2014a), can also be realised using a navigation structure. Instead of embedding the diagram into the rhetorical structure, a direct reference is sufficient for integrating the diagram into the multimodal structure of the page, because the page constitutes a multimodal ensemble that works towards a shared communicative goal (cf. Hiippala, 2015,

chapter 2). Finally, I considered aspects of cohesion, that is, how the page ensures continuity in presenting the subject matter, while also examining how typography can simultaneously support both cohesion and text-image relations.

What I have attempted to show with this brief analysis of a single page in a research monograph is that by applying state-of-the-art theories and methods in multimodal analysis, we can also make useful observations about genres that may not be instantly perceived as multimodally interesting. In higher education, however, an improved understanding of such genres – the research monograph, for instance – may help to identify the most effective strategies for recontextualising its content in other genres, such as presentations, handouts, and in other media, such as blackboards or interactive whiteboards. The content may be recontextualised in various ways: the use of comics to introduce French critical theory (see O'Halloran, 1999) may be considered an extreme case, as this involves rendering the content using another semiotic mode (Bateman and Wildfeuer, 2014). A more ordinary situation facing the teacher may involve creating a slideshow using presentation software.

From the perspective of this chapter, the recontextualisation of content involves a transition from one genre to another, which can also entail a change of the medium, for instance, from book to presentation. The contribution of the medium should not be underestimated, because it is the medium that makes the semiotic modes available. Apart from attending to the possibilities provided by dynamic digital media, this raises several questions for those working within areas of multimodal research and education: What are the most efficient strategies for recontextualising the content from research monographs in presentations? Can we summarise academic arguments realised using text-flow effectively in bullet points? Can we carry over the content in the diagrammatic mode to the presentation without any changes at all? Answering these kinds of questions will likely require input from researchers in education and other relevant fields specialising in the reception of learning materials, not to mention the students themselves. In any case, the more we know about multimodality in both 'source' and 'target' genres and media, the better.

This leads us to the final point made in this chapter, that is, whether multimodal analysis can help the learners to better cope with research monographs. This does not, of course, involve them performing actual analyses of learning materials. Instead, an awareness of multimodality should provide various tools to support metacognition. Tracing the cohesive chains, for instance, may help to follow an argument in academic discourse. Based on my personal experience of teaching academic writing, students often tend to stop reading the moment they encounter an unfamiliar word or concept. Following through the cohesive chain on the page may help to contextualise the concept under discussion, and therefore,

support strategic reading. Additionally, encouraging learners to attend to text-image relations may help them to make sense of the diagrammatic mode, and how this mode operates alongside text-flow. Moreover, explicating these structures to learners may help them to draw on their previous knowledge of complex multi-modal genres acquired outside the classroom and consequently, help them to apply these literacies in academic contexts.

Acknowledgements

References

Archer, A. (2010). Multimodal texts in higher education and the implications for writing pedagogy. *English in Education*, 44(3), 201–213.

Archer, A. and Newfield, D. (Eds.) (2014). *Multimodal Approaches to Research and Pedagogy: Recognition, Resources, and Pedagogy*. Routledge, New York and London.

Bateman, J. A. (2008). *Multimodality and Genre: A Foundation for the Systematic Analysis of Multimodal Documents*. Palgrave Macmillan, London.

Bateman, J. A. (2009). Discourse across semiotic modes. In J. Renkema (Ed.), *Discourse, of course: An overview of research in discourse studies*, (pp. 55–66). Benjamins, Amsterdam/Philadelphia.

Bateman, J. A. (2013). Multimodal analysis of film within the GeM framework. *Ilha do Desterro*, 64, 49–84.

Bateman, J. A. (2014a). Multimodal coherence research and its applications. In H. Gruber and G. Redeker (Eds.), *The Pragmatics of Discourse Coherence: Theories and Applications*, (pp. 145–177). Benjamins, Amsterdam.

Bateman, J. A. (2014b). *Text and Image: A Critical Introduction to the Visual/Verbal Divide*. Routledge, London and New York.

Bateman, J. A. and Schmidt, K.-H. (2012). *Multimodal Film Analysis: How Films Mean*. Routledge, London.

Bateman, J. A. and Wildfeuer, J. (2014). A multimodal discourse theory of visual narrative. *Journal of Pragmatics*, 74, 180–208.

Bawarshi, A. S. and Reiff, M. J. (2010). *Genre: An Introduction to History, Theory, Research, and Pedagogy*. Parlor, West Lafayette.

Bernhardt, S. A. (1985). Text structure and graphic design: The visible design. In J. D. Benson and W. S. Greaves (Eds.), *Systemic Perspectives on Discourse*, volume 2, (pp. 18–38). Ablex, Norwood, NJ.

Bezemer, J. and Kress, G. (2009). Visualizing English: a social semiotic history of a school subject. *Visual Communication*, 8(3), 247–262.

Delin, J. L. and Bateman, J. A. (2002). Describing and critiquing multimodal documents. *Document Design*, 3(2), 140–155.

Elleström, L. (2010). The modalities of media: A model for understanding intermedial relations. In L. Elleström (Ed.), *Media Borders, Multimodality and Intermediality*, (pp. 11–48). Palgrave, London.

Forceville, C. (2007). Book review: Multimodal Transcription and Text Analysis: A Multimedia Toolkit and Coursebook. *Journal of Pragmatics*, 39(6), 1235–1238.

Forceville, C. (2014). Relevance Theory as model for analysing visual and multimodal communication. In D. Machin (Ed.), *Visual Communication*, (pp. 51–70). De Gruyter Mouton, Berlin.

Guo, L. (2004). Multimodality in a biology textbook. In K. L. O'Halloran (Ed.), *Multimodal Discourse Analysis: Systemic Functional Perspectives*, (pp. 196–219). Continuum, London.

Halliday, M. A. K. (1998). Language and knowledge: The 'unpacking' of text. In D. Allison, L. Wee, B. Zhiming, and S. A. Abraham (Eds.), *Text in Education and Society*, (pp. 157–178). Singapore University Press, Singapore.

Halliday, M. A. K. and Hasan, R. (1976). *Cohesion in English*. Longman, London.

Henschel, R. (2003). *GeM Annotation Manual*. University of Bremen, University of Stirling, second edition.

Hiippala, T. (2014). Multimodal genre analysis. In S. Norris and C. D. Maier (Eds.), *Interactions, Images and Texts: A Reader in Multimodality*, (pp. 111–123). De Gruyter Mouton, Berlin and New York.

Hiippala, T. (2015). *The Structure of Multimodal Documents: An Empirical Approach*. Routledge, New York and London.

Holsanova, J., Holmberg, N., and Holmqvist, K. (2009). Reading information graphics: the role of spatial contiguity and dual attentional guidance. *Applied Cognitive Psychology*, 23, 1215–1226.

Holsanova, J. and Nord, A. (2010). Multimodal design: Media structures, media principles and users meaning-making in printed and digital media. In H.-J. Bucher, T. Gloning, and K. Lehnen (Eds.), *Neue Medie - neue Formate: Ausdifferenzierung und Konvergenz in der Medienkommunikation*, (pp. 81–103). Campus, Frankfurt/New York.

Hyland, K. and Bondi, M. (Eds.) (2006). *Academic discourse across disciplines*. Peter Lang, Bern.

Iedema, R. (2003). Multimodality, resemiotization: extending the analysis of discourse as multi-semiotic practice. *Visual Communication*, 2(1), 29–57.

Jewitt, C. (2014a). Different approaches to multimodality. In C. Jewitt (Ed.), *The Routledge Handbook of Multimodal Analysis*, (pp. 31–43). Routledge, London, second edition.

Jewitt, C. (2014b). A multimodal lens on the school classroom. In D. Machin (Ed.), *Visual Communication*, (pp. 387–404). De Gruyter Mouton, Berlin.

Kirsh, D. (2005). Metacognition, distributed cognition and visual design. In P. Johansson and P. Gärdenfors (Eds.), *Cognition, Education and Communication Technology*, (pp. 147–179). Lawrence Erlbaum, Mahwah, NJ.

Kong, K. C. C. (2006). A taxonomy of the discourse relations between words and visuals. *Information Design Journal*, 14(3), 207–230.

Kong, K. C. C. (2013). A corpus-based study in comparing the multimodality of Chinese- and English-language newspapers. *Visual Communication*, 12(2), 173–196.

Kress, G. (1998). Visual and verbal modes of representation in electronically mediated communication: the potentials of new forms of text. In I. Snyder (Ed.), *Page to Screen: Taking Literacy into the Electronic Era*, (pp. 53–79). Routledge, London and New York.

Kress, G. (2003). *Literacy in the New Media Age.* Routledge, London.

Kress, G. (2005). Gains and losses: New forms of texts, knowledge, and learning. *Computers and Composition*, 22(1), 5–22.

Kress, G., Jewitt, C., Ogborn, J., and Tsatsarelis, C. (2001). *Multimodal Teaching and Learning: The Rhetorics of the Science Classroom.* Continuum, London and New York.

Kvåle, G. (2010). Invitasjon til destinasjon: Multimodal retorikk i turistkommunikasjon. In M. Engebretsen (Ed.), *Skrift/bilde/lyd: Analyse av sammensatte tekster*, (pp. 39–55). Høyskoleforlaget, Kristiansand.

Lemke, J. L. (1998). Multiplying meaning: Visual and verbal semiotics in scientific text. In J. R. Martin and R. Veel (Eds.), *Reading Science: Critical and Functional Perspectives on Discourses of Science*, (pp. 87–113). Routledge, New York, NY.

Liu, Y. and O'Halloran, K. L. (2009). Intersemiotic texture: analyzing cohesive devices between language and images. *Social Semiotics*, 19(4), 367–388.

Mann, W. C. and Thompson, S. A. (1988). Rhetorical Structure Theory: Toward a functional theory of text organization. *Text*, 8(3), 243–281.

Martin, J. R. (1992). *English Text: System and Structure.* Benjamins, Amsterdam.

Martinec, R. and Salway, A. (2005). A system for image-text relations in new (and old) media. *Visual Communication*, 4(3), 337–371.

Maton, K. (2014). *Knowledge and Knowers: Towards a Realist Sociology of Education.* Routledge, New York and London.

O'Halloran, K. L. (1999). Interdependence, interaction and metaphor in multi-semiotic texts. *Social Semiotics*, 9(3), 317–354.

Parodi, G. (2012). University genres and multisemiotic features: accessing specialized knowledge through disciplinarity. *Fórum Linguístico*, 9(4), 259–282.

Royce, T. D. (1998). Synergy on the page: Exploring intersemiotic complementarity in page-based multimodal text. *JASFL Occasional Papers*, 1(1), 25–49.

Royce, T. D. (2007). Intersemiotic complementarity: A framework for multimodal discourse analysis. In T. D. Royce and W. L. Bowcher (Eds.), *New Directions in the Analysis of Multimodal Discourse*, (pp. 63–109). Lawrence Erlbaum, Mahwah, NJ.

Simpson, Z. (2014). Resources, representation, and regulation in civil engineering drawing: An autoethnographic perspective. In A. Archer and D. Newfield (Eds.), *Multimodal Approaches to Research and Pedagogy: Recognition, Resources, and Pedagogy*, (pp. 41–56). Routledge, New York and London.

Taboada, M. and Habel, C. (2013). Rhetorical relations in multimodal documents. *Discourse Studies*, 15(1), 65–89.

Taboada, M. and Mann, W. C. (2006). Rhetorical structure theory: looking back and moving ahead. *Discourse Studies*, 8(3), 423–459.

Taboada, M. T. (2004). *Building Coherence and Cohesion: Task-oriented Dialogue in English and Spanish.* Benjamins, Amsterdam.

Thomas, M. (2014). Evidence and circularity in multimodal discourse analysis. *Visual Communication*, 13(2), 163–189.

Unsworth, L. (Ed.) (2008). *Multimodal Semiotics: Functional Analysis in Contexts of Education.* Continuum, London.

Ventola, E. (1996). Packing and unpacking of information in academic texts. In E. Ventola and A. Mauranen (Eds.), *Academic Writing: Intercultural and Textual Issues*, (pp. 153–194). Benjamins, Amsterdam.

Waller, R. H. W. (2012). Graphic literacies for a digital age: The survival of layout. *The Information Society*, 28(4), 236–252.