Article:
Thomas, M (2014) Evidence and circularity in multimodal discourse analysis. Visual Communication, 13 (2). pp. 163-189. ISSN 1470-3572

https://doi.org/10.1177/1470357213516725

Evidence and circularity in multimodal discourse analysis

Journal:	*Visual Communication*
Manuscript ID:	Draft
Manuscript Type:	Article
Keywords:	document design, empiricism, genre, multimodality, typography, localization
Abstract:	In the context of rapid theoretical development in multimodal discourse analysis, and of its growing inter-disciplinary influence, it is crucial that those working in the field give due consideration to methodological rigour. The corpus-based approach described here offers a means of addressing some key methodological issues. Firstly, this approach provides a check on over- and under-interpretation and also reveals a more nuanced picture of data about specific genres than might be derived from even the closest observation of individual instances. Thus it helps avoid pitfalls associated with relying on hand-picked examples. Secondly, the semi-automated implementation of a multilayered annotation scheme, which separates the representation of layout from rhetorical structure, supports the empirical investigation of a variety of research questions, while minimizing the influence of the analyst on the data itself by delaying interpretation insofar as possible until it becomes unavoidable. This article illustrates the corpus-based approach through a contrastive case study of one very visual genre, product packaging, with data taken from two locales, Taiwan and the United Kingdom. In so doing, issues of the selection of texts for inclusion and corpus design are addressed and the principles and practicalities involved in data preparation are discussed. Consideration is also given to the types of question which such an approach enables us to explore. In addition, since the data analyzed here is drawn from different languages and cultures, the present study sheds light on some issues of interest from the perspective of localization. Finally, some benefits of the approach are suggested, among which not least that a stronger basis for the critique of designs in turn supports identification of opportunities for their improvement. This is not possible when the analysis is itself circular.

1 Introduction

This paper sets out to do two things: 1) to address fundamental questions about dominant methodological approaches to multimodal discourse analysis; 2) to propose an alternative, corpus-based, approach, describing its implementation and presenting illustrative results.

In the context of rapid theoretical development in multimodal discourse analysis, and of its growing inter-disciplinary influence, it is crucial that those working in the field give due consideration to methodological rigour. This article addresses two key concerns: 1) a perceived weakness of the evidence used in theory-building; 2) circularity in the interpretation of that evidence which is considered. Examples illustrating both concerns will be discussed in section 3.

It is suggested here that a corpus-based approach offers a means of addressing both issues. Firstly, as with traditional language corpora, this approach provides a check on over- and under-interpretation (cf. O'Halloran and Coffin 2004) and also reveals a more nuanced picture of data about specific genres than might be derived from even the closest observation of individual instances. Thus it helps avoid pitfalls associated with relying on hand-picked examples. Secondly, the semi-automated implementation of a multilayered annotation scheme, which separates the representation of layout from rhetorical structure, supports the empirical investigation of a variety of research questions, while minimizing the influence of the analyst on the data itself by delaying interpretation insofar as possible until it becomes unavoidable.

This article illustrates the corpus-based approach through a contrastive case study of one very visual genre, product packaging, with data taken from two locales, Taiwan (TW) and United Kingdom (UK). In so doing, issues of the selection of texts for inclusion and corpus design are addressed and the principles and practicalities involved in data preparation are discussed. Consideration is also given to the types of question which such an approach enables us to explore. In addition, since the data analysed here is drawn from different languages and cultures, the present study sheds light on some issues of interest from the perspective of localisation.

Finally, some benefits of the approach are suggested, among which not least that a stronger basis for the critique of designs in turn supports identification of opportunities for their improvement. This is not possible when the analysis is itself circular.

2 Why do contrastive multimodal analysis?

The motivations for doing cross-cultural multimodal analysis are essentially two-fold: descriptive and evaluative.

In order adequately to describe texts and variation between them, linguistic analysis alone often does not suffice. This situation is now acknowledged even by theorists whose focus is linguistic analysis. For example, Martin and Rose (2008, p.45) explain that mapping cultures as systems of genre, 'depends on multi-modal discourse analysis, since genres are typically realised through more than one modality of communication'. This is especially true of genres, such as pack messages, which use a rich variety of graphic resources for the expression of both verbal and non-verbal components. In such texts graphic realization may be used to substitute for linguistic constituency: indeed, the relative paucity of finite clauses in pack messages means that linguistic analysis alone is unlikely to be very productive.

The literature on multimodal discourse has tended to focus on examples from more or less constrained sets of genres without special regard to cross-cultural variation. While there is some consensus that, from a multimodal perspective, cultures differ in the semiotic division of labour among different resources (see, e.g., Kress 2010, p.83), there has been little theoretical development beyond this common-sense proposition. Where comparisons are made across cultures, they tend to be invoked in support of general points about a theoretical position and its limits (see, e.g., Kress and van Leeuwen 1996, p.199, pp.203–206), rather than in the service of contrastive textual analysis. Indeed, while there exist a few comparative case studies (see, e.g., Carroll and Delin 1998, Knox 2007, Martinec 2003, Wang 2000, Wang and Wang 2009), relatively little cross-cultural contrastive multimodal discourse analysis has so far been undertaken. The research presented here makes a contribution by adding to this existing body of work.

The other basic motivation for this project relies to an extent on the first: it is hoped that a systematic description of the realization of the texts under consideration here will provide a way into their evaluation. Specifically, by seeing the texts as instantiations of attempts at solving problems of multilingual text design, it is hoped that we might identify potential errors and opportunities for improvement. Such an approach is especially valuable given the tacit nature of much expert knowledge about information design (Waller, Delin and Thomas 2012).

The present article draws on data from a very visual genre, packaging. Specifically, it is based on a contrastive study of messages on

toothpaste and shampoo packs from Chinese- and English-speaking contexts.

Packaging is used to communicate various types of message. These include warnings (e.g. may contain nuts), information (best before/use by, ingredients, provenance) and instructions (for use, storage, disposal), as well as brand identification and promotion. Certain messages may be required by law in some countries. Others are set by corporate policy. Most messages have hybrid functions. For instance, information about the nutritional value or provenance of a product may also play a role in persuading the potential consumer to buy it.

In order to make the most of the opportunity afforded by pack messages to communicate with consumers at the point of purchase, they must not only be comprehensible, but also appeal to the local audience. In the case of most imported products, this requires that they be *localized* to make them 'linguistically and culturally appropriate to the target locale (country/region) where [the product] will be used and sold' (Localisation Industry Standards Association (LISA) definition, quoted in Esselink 2000, p.3). Currently, we lack robust and nuanced guidelines which might inform such localization.

It goes without saying that English and Chinese differ in many ways. Specifically, differences between the writing systems of the two languages — one alphabetic, the other logographic — offer potential for interesting contrastive analysis in terms of graphic expression. They also present particular design challenges and opportunities for those involved in localization. To take one rather stark example, as Sadek and Zhukov (1997) have demonstrated, Chinese typically requires a little over 60% of the total space required by English to present equivalent information. Thus, typographic considerations clearly interact with translation phenomena per se, such as text expansion and contraction.

3 The need for empirical robustness

In the growing literature on multimodal discourse analysis, some significant claims have been made – and theoretical constructs expounded – on the basis of rather scant evidence. While it is natural that such claims find support in examples hand picked for the purpose, their wider applicability comes into question when counter-examples are found.

This situation is all the more significant for the extent to which, in some cases, such contestable claims have proliferated through the literature. To take one example, Kress and van Leeuwen's extension of

the concepts of Given and New (1996, pp.186–192) is influential to the extent that it has become almost naturalized (see, e.g., Unsworth 2001, Baldry and Thibault 2006, Machin 2007). While the literature is not entirely lacking in critique of certain points, often naturalized claims are taken at face value, providing the basic assumptions on which subsequent discussion is built.

Kress and van Leeuwen elaborate a set of relationships between compositional layout and various types of meaning (1996, pp.186–211). These are illustrated in Figure 1 and include: left-right compositional arrangements, which they relate to Given-New information structures; top-bottom arrangements, which they claim express distinctions between the Ideal and the Real; and Centre-Margin positioning, which they claim suggests nuclear and ancillary information values respectively. They refer to the composition of individual pictures as well as multimodal displays.

INSERT Figure 1: Representation of Kress and van Leeuwen's dimensions of visual space (1996, p.208) re-drawn by the author

Kress and van Leeuwen acknowledge that the conventions on which these sets of relations are based are culturally specific (1996, p.199):

> Cultures which have long-established reading directions of a different kind (right to left or top to bottom) are likely to attach different values to these positions.[1]

We will focus here on Kress and van Leeuwen's conception of Given-New structures. They claim that, 'when pictures or layouts make significant use of the horizontal axis […] the elements placed on the left are presented as Given, the elements placed on the right as New' (1996, p.187). This notion is now widely adopted in the literature. For instance, despite Thibault's earlier scepticism[2], in their recent account of 'how the metafunctions are typically enacted in visual genres', Baldry & Thibault (2006, p.39) cite Kress & van Leeuwen (1996, pp.186–202) when restating the claim that:

> the most important textual/compositional resources when expressing the textual metafunction would appear to be: (a) horizontal structure when presenting visual information as Given or New and (b) vertical structure when presenting visual information as Ideal or Real.

For the present purposes, another consideration, to which Kress and van Leeuwen themselves allude, is the variable reading direction of Chinese. Running text may be read in rows from left to right, with the

rows themselves following a sequence from top to bottom, or in columns from top to bottom, with these columns following a sequence from right to left. If Kress and van Leeuwen's prediction is correct, and reading direction influences the allocation of information value to different positions in visual layouts, we should expect the theory to hold for English examples but not necessarily for examples produced for a Chinese-speaking audience.[3]

However, as has been demonstrated elsewhere (e.g. Bateman 2008, Knox 2007, Thomas 2009b), it is not difficult to identify instances of texts which meet the requirements stipulated by Kress and van Leeuwen, both in terms of cultural provenance and layout, and yet for which no interpretation in terms of their mapping of information values onto spatial position seems plausible.[4]

At this point it is useful to turn to a concrete example. Given their oblong shape and their typically landscape orientation on the supermarket shelf, toothpaste boxes would seem good candidate examples of layouts 'which make significant use of the horizontal axis' (Kress & van Leeuwen, 1996, p.187).

Figure 2 shows one face of a very multilingual toothpaste pack, which is sold in several locales. It carries verbal messages in English (EN), Thai and Chinese (ZH). A metaphorical reading of the presentation in terms of Given and New information might be plausible: messages in English are presented on the left and adaptations in new, additional languages (here, Thai and Chinese) are presented on the right. However, the story seems to be rather more complex. For example, the messages highlighted by super-imposed red boxes might be considered equivalent in functional terms, each giving information about distribution relevant to specific locales (Singapore, Hong Kong, Malaysia, Thailand and Taiwan, respectively). However, their position along the horizontal axis would seem unrelated to their information status, especially since these messages are neither source texts nor translations, but do offer locale-specific information.

Consideration of this example brings us to a second issue of methodological concern, namely segmentation, which is well-known as a potential source of circularity in discourse analysis. Passonneau and Litman (1993, p.148) identified this problem in relation to purely linguistic approaches:

> The segmental structure of discourse has been claimed to constrain and be constrained by disparate phenomena […] However, there is weak consensus on the nature of segments and the criteria for recognizing or generating them in a

> natural language processing system. Until recently, little empirical work has been directed at establishing objectively verifiable segment boundaries, even though this is a precondition for avoiding circularity in relating segments to linguistic phenomena.

Taking into account the spatial allocation of graphic resources, Baldry and Thibault (2006, p.11) propose the *cluster* as a unit of segmentation for multimodal transcription:

> In our approach to multimodal text analysis and transcription, clusters are groupings of resources that form recognisable textual subunits that carry out specific functions within a specific text. Multimodal transcription typically serves to identify the components of each cluster and the function that each specific cluster plays within a text. A further function of multimodal transcription is to identify relations between clusters in the same text and the relationship between specific multimodal clusters and cluster types.

INSERT Figure 2: Darlie for kids, TW, Importers/Distributors

INSERT Figure 3: Darlie for kids, TW, pea-sized amount

This definition takes as unproblematic the conflation of visual and rhetorical phenomena: the analyst knows both the function and scope in terms of layout of a cluster before it is transcribed. As Bateman (2008, p.54) suggests, this seriously limits the critical productivity of subsequent analyses:

> If we are to analyse whether a document is effectively orchestrating its diverse modal presentations, we cannot assume too quickly that a particular function is served even by spatially 'connected' or proximal collections of elements […] We need crucially to break into the interpretation circle in order only to posit clusters when they are potentially really 'there' in some fairly strictly defined sense.

Similarly, in a discussion of Schriver's (1997) *rhetorical clusters*, Bateman, Delin and Henschel (2002, pp.7–8) suggest that the degree of integration of layout and rhetorical purposes may be dependent on genre. They suggest that 'It does not appear to be the case that an absolute relationship between rhetorical distinctions and layout design decisions can be upheld as a general rule.' In relation to pack designs, we can certainly identify instances in which the visual placement of messages and their rhetorical relatedness are not closely integrated. As we will see in section 6.2, further investigation elicits clear patterns in the distribution of such phenomena in our data.

The EN instructions in Figure 3 state that children under 6 should use a pea-sized amount of toothpaste (highlighted by super-imposed box). This message is accompanied by a pictorial illustration which contrasts the amounts suitable for adults and children. The 'pea-sized amount' direction is restated literally in ZH. However, as we see from the highlighting in red, the ZH version of the message could hardly be placed further from the pictorial illustration. Finally, no equivalent message is provided in Thai. In sum, the assumption that visual and rhetorical clusters naturally align does not hold in this instance.

Such examples are not restricted to texts in which multilinguality might be seen as a factor complicating the placement of messages. A similar, though less extreme, monolingual example is reproduced in Figure 4. Here the verbal message, 'Apply to scalp and hair ensuring full coverage from root to tip' seems to relate semantically to the illustration above and to the right. This relationship is not reinforced visually.

INSERT Figure 4: Head and Shoulders, UK, from root to tip

There are two important points to make here. Firstly, the visual segmentation of graphic messages should be just that: as far as possible it should not be influenced by rhetorical or functional considerations. Secondly, leaving open the possibility of disjunction between the visual and the rhetorical realization of multimodal discourse supports the adoption of a critical, or evaluative, stance with regard to text design.

In sum, the identification of such elements, in which components form a visual entity but lack functional cohesion or, conversely, are visually disconnected but functionally related, offers an example of how multimodal analysis might make a contribution, beyond academic research, to document design and evaluation. Moreover, any such contribution is dependent on the problematization of the relationship between the visual and the semantic.

The corpus-based approach proposed here is not intended as a means of establishing the extent to which constructs, such as Kress and van Leeuwen's Given-New framework or Baldy and Thibault's clusters may be valid. Indeed, it remains unclear how the validity of the former might be established on an empirical basis (cf. Bateman et al, 2004, pp. 66-67). Rather, this approach is intended as a means of supporting the development and exploration of hypotheses which are susceptible to empirical investigation.

Significantly, such exploration might inform document design practice. In this context, testing hypotheses against corpora of texts whose selection is motivated by articulated criteria offers a path around some of the pitfalls mapped out above, as well as a providing a useful complement to expert, often tacit, knowledge (Waller, Delin and Thomas, 2012).

5 Corpus design

5.1 Data selection

Halliday and Matthiessen (2004, pp.49–50) remind us of the importance of sampling in corpus creation:

> The difference between a corpus and a text archive is not a sharp one; but the general principle is that a corpus represents a systematic sample of text collected according to clearly stated criteria, whereas a text archive is assembled in a more opportunistic fashion; thus given such criteria, a corpus can be extracted from a text archive.

In terms of corpus size, Sinclair's maxim that there is 'no virtue in being small' (2004, p.189) is usefully nuanced by Ooi's suggestion that 'the optimal size [of a corpus] can be reached only when the collection of more texts does not shed any more light on its lexicogrammatical or discourse patterning' (quoted in Baker, Gabrielatos, Khosravinik, Krzyżanowski, McEnery and Wodak 2008, p.275).

In the case of pack messages, while supermarket shelves present an apparently innumerable range of, say, varieties of toothpaste, in fact this range tends to be dominated by a relatively small number of brands. Moreover the realization of pack messages within product families for a given brand tends to be quite regular. As such, returns diminish quite sharply and careful selection of texts for inclusion can compensate for overall corpus size while supporting claims for representativeness.

In all, more than 120 TW and UK packs were collected. From this archive, 13 TW packs (11 toothpaste, 2 shampoo) and 11 UK packs (8 toothpaste, 3 shampoo/shower gel) were selected for post-processing and inclusion in the fully annotated corpus. The composition of this corpus is shown in Table 1. In four cases, packs for the same variety of the same brand from both locales are included in the corpus. These *parallel* texts are indicated by parallel horizontal rules in the table (i.e. Head & Shoulders, Sensodyne and two varieties of Colgate). Where packs have been localized for a new target market, the source language (SL) is given. In four cases, TW packs are considered to be local (Bairen, Jiechi and two varieties of Bailing), as distinct from localized – as such, no SL is given.

The selection of texts for inclusion in the corpus reflects my intention to ensure an approximate balance between TW and UK packs representing popular brands from each locale. The need to include local and localized packs collected from TW motivated weighting the corpus slightly in this direction. The localized TW packs include examples localized from English- and Chinese-speaking locales. In the interests of representativeness, one example of a Japanese toothpaste brand ubiquitous in TW is also included.

Category	Brand	Pack		SL
		UK variety	TW variety	
Shampoo	Head & Shoulders	sensitive	pampering scalp care	EN
Shampoo	Herbal Essences	Normal Hair		
Shampoo	Pert (飛柔)		Ginseng Nourishment	EN
Shower gel	Sanex	dermo essentials		
Toothpaste	Aquafresh	Fresh & Minty	Triple Protection	EN
Toothpaste	Bailing (百齡)		Yazhoubing (牙周病)	
Toothpaste	Bailing (百齡)		Xianxing (鹹性)	
Toothpaste	Bairen (白人)		not stated	
Toothpaste	Colgate	Advanced Whitening	Advanced Whitening	EN
Toothpaste	Colgate	Cavity Protection	Maximum Cavity Protection	EN
Toothpaste	Euthymol	not stated		
Toothpaste	Green		not stated	JA
Toothpaste	Heiren (黑人)		Chaofu (超氟)	ZH
Toothpaste	Heiren (黑人)		Kangmingan Liangbai (抗敏感亮白)	ZH
Toothpaste	Jiechi (潔齒)		not stated	
Toothpaste	Macleans	fresh mint		
Toothpaste	Mentadent SR	Original SR flavour		
Toothpaste	Sensodyne	Original	not given	EN
Toothpaste	Superdrug	Just Toothpaste		

Table 1: Composition of the annotated corpus of 24 packs

5.2 Preparing data for inclusion in the corpus

Given the lack of established procedures for the development of document corpora enriched with information intended to support multimodal investigation, it seems worthwhile to describe here the processes involved in preparing data for inclusion in the annotated corpus.

In the corpus, each pack constitutes a record. Each record consists of a set of files, which together represent all faces of the pack in its unopened state, i.e. as presented to the potential consumer. Each pack face is assigned a number according to a conventionalized scheme, with the intended front as Face 1 and the back, where readily identifiable, as Face 3. Each pack face is scanned to generate a high-resolution, full-colour image. Optical Character Recognition (OCR) technology is then used to capture information about the verbal content of the pack messages, as well as their graphic realization and placement. In so far as possible, every message on each face of each pack is recorded and described in formal annotation.

While made in the context of analysis of spoken data, Ochs' observation (1979, p.45), that 'one of the consequences of ignoring transcription procedure is that researchers rarely produce a transcript that does reflect their research goals' is particularly germane here. It is not always possible, nor is it necessarily productive, to describe every detail. For example, in digital images the variety of colour values that might be recorded is limited in theory only by the delicacy of the colour space. Thibault (2000, p.338) suggests, in pragmatic terms, with regard to colour in film that 'there is no need to transcribe all of the colours that occur in a given Shot. However, it may be felt necessary to refer to specific colours which have a special salience or significance in the text.' In order to mitigate the risk of circularity inherent in making a priori assumptions about the significance of specific colours, while at the same time remaining pragmatic, in the pack message corpus colours used in setting type are recorded, though those used in illustrations and other images are not. This supports the investigation of typographic use of colours, e.g. in support of textual or interpersonal functions.

5.3 Corpus annotation

The GeM annotation model is described comprehensively by Henschel (2003). Its extension to support the analysis presented here has been fully documented elsewhere (Thomas, 2009a). The scheme implements a series of layers of annotation. While each is independent of the others, relationships between them are recoverable, thus supporting analysis of patterns of interaction.

The *base* layer segments the document into *base units*, taking the sentence as the prototypical unit. Base units are split into sub-units if there is any change in graphic realization (e.g. use of bold or italic type). These base units are cross-referenced by layers which describe *layout*, *rhetorical structure* and *navigation*, thus providing a common index, as represented in Figure 5.

INSERT Figure 5: The GeM annotation model adapted from Henschel (2003)

The *layout* layer describes low-level typographical properties, such as type face, size, weight colour and style, as well as the placement of elements. Units are grouped together as *layout chunks* placed within an *area model*. This allows us to build a fairly comprehensive picture of the graphic realization of document elements. Figure 6 illustrates how GeM-style annotation can be used to record and recover information about the visual segmentation of multimodal artefacts. Here red boxes represent first-order chunks, while green boxes represent embedded chunks.

INSERT Figure 6: Scanned image of the back of a shampoo pack with layout *chunks* indicated by super-imposed boxes

Rhetorical relations between annotated units are expressed in terms of Rhetorical Structure Theory (Mann and Thompson 1987). RST focuses on the communicative aims of text and how these are realised through relations holding between 'non-overlapping text spans' (Mann and Thompson 1987, p.4).

In most RST relations, the status of each participating span is identified either as *nucleus* or *satellite*. Mann and Thompson (1987, p.32) explain that a text from which all satellites were deleted would remain coherent, while if nuclei were deleted, 'the result should be incoherent and the central message difficult or impossible to comprehend.'

In the GeM implementation, RST has been extended to accommodate the lack of manifest linearity and other features of graphic texts. The GeM implementation also involves some redefinition of existing RST relations, such as allowing a multinuclear variant of *restatement*

(Henschel 2003, p.15). Finally, the RST relation set is supplemented by a number of *intra-clausal relations* (Henschel 2003, p.16), such as *class-ascription*. These provide a means of accounting for object-object/property relations that hold between separate layout units, where, for example, whitespace or a colon functions as an elided-*is*, thus setting up a clause-like structure.

I added a *message-type* layer to the original GeM scheme. Table 2 presents a typology of messages found on packaging and provides the labels used to record these in annotation. This set of types was developed on the basis of consultation of the relevant regulations from the two locales, discussion with professionals from the fields of product and packaging development, and graphic and information design, and observation of over a hundred packs from various product categories in both locales.

This annotation model provides an elegant way of accommodating cross-cutting and overlapping phenomena. Significantly, the GeM scheme supports the analytical separation of layout and rhetorical function and then comparison of the two perspectives. This avoids conflation of the sort identified as problematic in section 3 and supports recovery of phenomena such as the 'pea-sized amount' discussed in relation to Figure 3. At the same time, the addition of the *message-type* layer provides a principled basis on which to compare the different graphic resources used to realize messages of similar types across texts or sets of texts, defined say, by locale or brand. This allows the formulation and empirical investigation of specific hypotheses.

In sum, the aim of the annotation is not to support low-level lexicogrammatical analysis, but rather to facilitate the uncovering of patterns in the linguistic and graphic realization of pack messages and to relate these to functional values expressed in terms of RST relations and message-types. Such patterns may reflect local design conventions and language-dependent typographic strategies. Equally they may reflect coincidences of and variation between the external constraints.

	Message type	message_type
1	brand name/logo	brand_identity brand_owner_identity
2	flashes and claims	brand_campaign brand_claim
3	product description	
a	name	prod_name
b	variety	prod_variety
c	volume/weight	prod_size
4	brand/product story	brand_story
5	instructions	
a	use	instr_use prod_lifetime item_lifetime
b	storage/disposal	instr_storage instr_disposal
c	warnings	instr_warning
6	ingredients	prod_contains
7	contact details	contact_brand_owner contact_brand contact_manufacturer contact_importer
8	barcode	prod_barcode

Table 2: Pack message types and annotation labels

6 Corpus analysis

Having developed a rationale for the selection of texts for inclusion in the corpus and implemented mechanisms through which salient properties might be recorded, we need a means of interrogating the data. As with the annotation, such means respond to the types of questions we might ask. In the present study, we are essentially interested in identifying three types of feature: 1) those which characterise typical instances of the genre, i.e. pack messages; 2) those which vary according to locale, or translation status, i.e. whether a given text is 'original' or adapted from another source text for use in a new target

locale; 3) those which offer opportunities for improving current designs and design processes.

Existing approaches to corpus interrogation typically seek to leverage the power of the concordance as a means of accessing information about the collocational properties of language in use. These are subject to certain limitations. As Thibault (2000, p.368) explains:

> If language form and function are themselves shaped by the kinds of inter-semiotic relations into which language typically enters, then I would argue that those concordancing practices which ignore this fundamental fact about language will fail in the longer run to provide entirely adequate explanations of language itself and the ways in which language, too, is changing under pressure from the newly emergent forms of multimodal and multimedia meaning-making practices with which it is co-deployed and with which it has always co-evolved.

I have some sympathy with this position, but would suggest two caveats. Firstly, we do not have to look as far as 'the other semiotic modalities' with which language interacts to see a problem with current concordancing practices: an 'entirely adequate' explanation of language itself would need to take into account the phonic and graphic resources available for its expression, and it might be argued that the resources for graphic expression in particular have been rather neglected. Secondly, we should bear in mind that what might be considered adequate in a given context will depend on its purpose, and, here, Thibault seems to be setting the ambitions of corpus linguistics very high indeed. In fact, a given corpus-based study is more likely to attempt something rather more prosaic, which may well be achievable through an intra-semiotic approach.

In addition to implementing a kind of multimodal concordancer, with a user interface which supports the design and modification of corpus queries, allowing the user to control variables across the various annotation layers described in section 5, and which presents results in a manner which preserves as much of the native graphic realization of search results as possible, it was also necessary to develop ad hoc scripts designed to retrieve results in response to particular queries. This software is documented in full elsewhere (Thomas 2009a).

6.1 Genre-specific features and cross-locale considerations

One key benefit of the approach outlined here is its ability to refine previous, more general observations about the relationship between linguistic meaning-making and typographic form.

To take an apparently straightforward typographic resource, we might look at type weight. As Kress explains, 'Bolding in *writing* and "loudness" in *speech* are both signifiers of *intensity* and are one means of realizing meanings (signifieds) of "emphasis".' (2010, p.80). This echoes Lemke's (1998, p.95) comment that 'the use of italic and boldface type signals emphasis or importance'. Given our annotation, type style and weight offer a tractable way in to the analysis of the typographic expression of verbal messages in our carefully selected corpus of instances of one particular genre. It seems that type style and weight do more than signal emphasis.

weight	**normal**	**bold**	**bold**	**normal**	
style	**normal**	**normal**	**italic**	**italic**	
TW	76.29%	6.00%	10.66%	7.06%	
	1081	85	151	100	**1417**
UK	61.13%	20.38%	13.38%	5.12%	
	585	195	128	49	**957**
Combined	70.18%	11.79%	11.75%	6.28%	
	1666	280	279	149	**2374**

Table 3: Font weight and style realizations, by locale

The figures in Table 3 show that, as we might expect, type set with normal weight and style occurs with a frequency that suggests it is the *unmarked* form in both locales. However, in these terms, a relatively high proportion of verbal base units, almost 30% overall, are *marked* in some way. Moreover, almost exactly the same proportion of units, some 12%, is doubly marked — by being set bold *and* italic — as are marked by bold weight alone. Overall, both of these forms are much more common than marking of normal weight type by italic style,[5] though we note an apparent preference for italic over bold on the TW packs, which might be explained by the need to maintain legibility of Traditional Chinese characters whose stroke density prohibits the use of bold weight at small sizes.

Given the suggestion that directly jumping to such double marking is typographically ungrammatical (Bringhurst 2002, p.55), this finding lends weight to the claim that intuition, however expert, might usefully

be complemented by genre-sensitive analyses of corpus data. Moreover, it seems likely that *consumption constraints* (Delin, Bateman and Allen 2002) play a part here: in contexts, such as supermarket shopping, where the encounter with a text is brief, a greater degree of graphic signalling may be required in order to be noticed by the reader than is the case, say, when reading a novel or a journal article. Apart from the high frequency of doubly marked units, if the use of these typographic resources was simply intended to signal importance, this would seem to indicate significant redundancy. Moreover, it would seem odd to risk undermining the status of important messages by introducing excessive noise: a typographic form of 'crying wolf'.

If we look at the kinds of things that marked messages do, a clearer picture emerges. In total, 15 different message types are realized by the 279 units with a bold weight and italic style. However, just three message types account for 212 (~76%) of these units: `brand_identity` (84), `brand_claim` (67) and `prod_variety` (61). It seems plausible that each of these message types be considered relatively important by brand owners.

67	brand_story	8	prod_production
39	prod_variety	5	contact_brand
32	brand_identity	5	instr_warning
30	brand_claim	4	brand_campaign
15	brand_owner_identity	3	item_manufacture
13	prod_contains	2	brand_endorsement
12	prod_size	2	contact_manufacturer
11	instr_use	1	item_lifetime
11	prod_name	1	unknown
9	brand_cross_market	1	prod_lifetime
9	contact_brand_owner		
		280	**total**

Table 4: Base units from both locales realized with bold weight and normal style, with message types

In contrast, as we see in Table 4, the 280 units realized with bold weight but normal style were assigned to 21 message types and their distribution among these is less polarized: in fact, only by totalling the figures for the top seven types do we approach 74%. While all the message types at the top of this list are no doubt also important to brand owners, it is interesting that `brand_story`, which often

features running verbal text, is at the very top. Moreover, that `prod_contains` and `instr_use` figure quite high in the list suggests that the bold weight might be serving here as a graphic means to create visual cohesion among messages that together form sets (e.g. lists of ingredients, procedural steps), i.e. a textual function in Hallidayan terms, rather than as an indication of salience as we might assume would be the case in other genres.

			ave	avedev	range	count
instr_use	TW	EN	8.91	0.17	3	34
		ZH	7.76	1.99	7	91
	UK	EN	5.51	0.56	2	81
brand_identity	TW	EN	36.75	22.16	79	28
		ZH	43.77	16.19	74	60
	UK	EN	34.72	17.63	85	65

Table 5: Message-type font-size (in points)

Table 5 shows a relationship between message type and the range of sizes of type used to realize messages. I deliberately selected two message types, `instr_use` and `brand_identity`, which on the one hand appear on each pack selected from each locale and are frequently realized verbally, and which on the other hand differ significantly in their typographic realization. The size of type used to realize `instr_use` messages is remarkably consistent for each language in each locale. This is particularly so for UK EN in which 81 base units are realized within a range of just 2 points. It would appear that, other variables being equal, realizing EN product instructions at somewhere between 5 and 6 points is sufficient to meet the easy legibility requirement of the UK Cosmetic Products (Safety) Regulations 2004[6]. There appears to be greater variation in the realization of ZH `instr_use` messages: the mean size of 7.76 points falls within a total range of 7 points. However, at 1.99, the average deviation from the mean is small. Again, it would seem safe to say that the setting of such messages at between 7 and 8 points falls within conventional bounds: it is also significantly larger than the 1.2mm required by the regulations which hold for the vast majority of TW packs in the corpus.[7]

With regard to the `brand_identity` messages the story is very different, though again the situation in both locales is very similar. This

time, the average size of characters used to realize these messages is much larger. But taken alone, this average masks huge variety. Not only are wide ranges of sizes used to realize the messages in each language-locale combination, the average deviations confirm that these ranges are not influenced unduly by rogue realizations at either end of the scale. Of course, elements serving the brand identity are often reproduced several times in varying forms across a pack, especially in the case of a cuboid toothpaste box.

Thus, while we might make fairly concrete recommendations about conventional setting of text for some pack message types, such as `instr_use`, it would seem meaningless to do so for messages with other functions.

Clearly, we cannot expect an undifferentiated and directly proportional relationship between size and importance: if this were so, the numbers printed as part of a barcode should be seen as more important than other verbal messages on the same display. Notions of importance must take into account the intended recipient of information and the use to which it might be put. As such, the barcode might be seen as having over-riding importance for the laser scanner at the checkout, though it offers little for the end consumer. This said, in general, it does seem that Lemke's (1998, p.95) common sense suggestion that 'the relative point-size of type in titles, headings, abstracts, footnotes, captions, labels' is an orientational signal of 'emphasis or importance' is borne out here.

Although findings based on the dataset in this study should be taken as suggestive rather than compelling, the analytical separation of graphic form and rhetorical function afforded by the GeM annotation scheme enables us to illustrate the use of bold weight, italic style and type size in quantitative terms – and to provide a more nuanced account that is sensitive to considerations relating to genre and writing system.

N	22.41	(928)	TW	24.35	(576)	ZH	24.48	(383)
						EN	29.69	(134)
						other		(0)
						non-lang	11.41	(59)
			UK	19.22	(352)	EN	20.04	(323)
						other	6.40	(10)
						non-lang	12.05	(19)
S	12.04	(893)	TW	14.12	(524)	ZH	14.55	(373)
						EN	13.38	(133)
						other	16.00	(1)
						non-lang	10.47	(17)
			UK	9.09	(369)	EN	8.98	(341)
						other	6.77	(13)
						non-lang	13.47	(15)

Table 6: Nucleus and Satellite font-sizes (in points)

Table 6 shows average sizes for RST segments realized by verbal elements. Figures for the number of units in each subset are given in parentheses. The values in the table illustrate a number of points.

Firstly, and in contrast to what we would expect in graphically less rich genres, there seems to be quite a marked variation of font-sizes in relation to status in terms of RST nuclearity. If we start from the left, we see that the 928 units participating in the nucleus (N) role in an RST span are realized at an average of something over 22 points, while the 893 in a satellite (S) role are realized, on average, at almost half this size, just over 12 points. This is true despite the fact that the data contains substantial numbers of cases which do not conform to this pattern. On one hand, every item in each list of ingredients counts as an instance of N. These messages are typically realized in relatively small type. On the other, in relations such as `preparation`, we might expect the S, often a heading which orientates the reader, to be larger

than the N to which it relates.[8] Furthermore, it is not uncommon for a given segment to act as S in one analyzed span and then, in turn, become the N in another (e.g. as may be found in chains of elaboration). The figures also show that in both N and S roles, on average, TW messages are realized larger than their UK counterparts. This would seem to reflect the common sense observation that, in order to be legible, Chinese characters, especially those in traditional form, need to be realized larger than English letters as they typically contain more strokes. Moreover, closer inspection of the figures reveals that the difference in size between the TW and UK messages is proportionally greater at the smaller end (S) than it is at the larger end (N). Before saying any more about differences across the locales, we should ensure that we are making valid comparisons. The TW portion includes a substantial subset of EN messages. We should not directly compare sizes of EN and ZH messages on TW packs without also considering their functions, which may differ significantly. For now, let us compare UK-EN with TW-ZH messages. Starting with the S realizations, the average UK-EN type size (8.98 points) must be multiplied by ~1.62 to reach the average TW-ZH size (14.55 points). In the case of the N realizations, the average UK-EN type size (20.04 points) must be multiplied by ~1.22 to reach the average TW-ZH size (24.48 points). As such, a scaling factor seems to be at work: when moving from EN to ZH typographic realizations, it is necessary to increase the size of smaller type to a greater degree than is the case for larger type.

6.2 Opportunities for improving design

In addition to description, this study has an evaluative aim. No claims are made that the tools described here can accurately identify design faults, much less supply solutions. However, they do allow the analyst to look for potential problems, and provide a means for comparing realizations of specific functions with other texts in the corpus. As such, successful approaches to common problems might be identified. The other benefit of using a corpus-based approach is that it can give an indication of the relative frequency of particular phenomena, the significance of which might be overlooked or, as seems more likely, exaggerated in an analysis of hand-picked examples.

As was suggested in the discussion in section 3, separating the visual from the rhetorical realization of messages seems critical in identifying one potential source of difficulty for the reader of multimodal texts, i.e. perceiving the semantic relationships between two text spans where their graphic realization is not supportive of this. I illustrated the

problem with the 'pea-sized amount' example in Figure 3). Table 7 shows the results of an attempt to identify patterns in the placement of messages which are related in terms of RST spans.

	same chunk		**other chunk**		
any face	**87.53%**	351	**12.47%**	50	**401**
TW	88.18%	179	11.82%	24	203
UK	86.87%	172	13.13%	26	198
face 1	**37.25%**	19	**62.75%**	32	**51**
TW	37.50%	9	62.50%	15	24
UK	37.04%	10	62.96%	17	27
face 3	**94.86%**	332	**5.14%**	18	**350**
TW	94.97%	170	5.03%	9	179
UK	94.74%	162	5.26%	9	171

Table 7: RST segments related to other segments realized in same/other chunks

We should note that the results for 'same chunk' only include those segments whose RST relations are *all* realized within the same layout chunk. It is therefore possible that searches for *more specific* queries, e.g. `restatement` realized in the same chunk, may match segments which are not represented here, i.e. while it may be counter intuitive, a more specific query could result in more matches than a more general query. We should also be aware that the figures here account for the shampoo packs only: while it limits the data available, this filtering allows us to make the assumption that Face 3 will be the back of the pack. This is significant in that relations involving segments realized in other chunks seem to be quite normal on the front of packs: here the population of messages is relatively sparse, with real estate being generously allocated for the delivery of a few key messages. However, long distance relationships found on the back of packs, where messages are more densely realized, may offer opportunities to improve design. In particular, it might be productive to focus on a few key relations which we might expect to be closely integrated visually, such as `preparation` and `background`, which respectively describe relations between segments intended to orientate the reader and increase comprehensibility respectively, or even to look at combinations of RST relations and message-type, such as `elaboration` and `evidence` in `instr_*` message types. From

the annotated data available here, however, it seems that such phenomena are rare: I found only one instance of an `instr_use` message realized by an RST span across layout chunks. The remaining segments realized across chunks on the back of this small sample of shampoo bottles are used to identify or promote the brand or product. Finally, it is interesting to note that while we might expect the design challenges specific to producing multilingual packs to result in more long-distance relationships on these packs, in fact, the numbers reveal a remarkably consistent picture across the locales.

While the long distance relationships described above might suggest problems in typographic *segmentation*, the two types of problem presented below relate to typographic *modulation* (cf. Waller 1987). In the example in Figure 7, the same `product_variety` message is realized in English and Chinese, but its typographic expression differs radically: the EN message appears in relatively small dark blue type against the bright green background inherited from the pack label, while the ZH message is in larger white type reversed out of gold lozenge which has a white border. In other words, nothing about the typographic realization of these messages, apart from their proximity to one another, suggests that they perform the same function.

INSERT Figure 7: Pert, TW, variety realization

We find a similar situation, albeit using very different resources, in the example from a local TW brand shown in Figure 8, in which both EN and ZH message realize the brand identity of the product ('Whitemen Toothpaste'). In this case, not only are the colours and sizes used in the expression of the messages radically different, elements within the EN variant are visually differentiated.

INSERT Figure 8: Bairen, TW, brand identity

However, despite these rather striking examples, it seems that this phenomenon is relatively rare, at least in this corpus. This is of particular interest, given that colour is a typographic property which, unlike case or size, does not need to vary simply because of differences in the writing systems of the two languages. Moreover, as a resource which is potentially subject to cost constraints, its use is likely to be deliberate. Identifying instances of `restatement` which directly involve segments realized in different colours results in 11 instances,

all of which are cross-language relations occurring on five TW packs. They include: five instances of restated `prod_variety` on four faces of one pack (Bailing Yazhoubing) and the one from the back of the Pert pack (shown in Figure 7); five instances of restated `brand_identity`, three on different faces of Sunstar Green, one on the front of the Head & Shoulders pack and the one from the Bairen pack (shown in Figure 8); and one instance of a `brand_campaign` message on the front of the Pert pack.

7 Conclusions

This article reports on the implementation of an analytical approach which attempts to negotiate the two methodological pitfalls identified in the introduction. The careful selection and enrichment of comparable data allows us to make some comment on the prevalence of phenomena and reduces the tendency to under- or over-statement. The implementation of the GeM annotation model and the use here of OCR to capture layout information allows us to avoid conflation of visual realizations and rhetorical relations. In addition to reducing the risk of analytical circularity, this approach supports the identification of opportunities for the improvement of designs.

Two types of potential design problem have been identified here: (1) long distance relationships, and (2) markedly different typographic realization of equivalent messages in two languages. I have proposed techniques for semi-automated identification of such phenomena among annotated data. It turns out that they occur rather less frequently than might have been assumed had we relied on those examples which do present such features, without reference to other comparable texts.

More specifically, by deliberately constraining the selection of data it has been possible to identify features specific to the genre: for example, we would not necessarily expect the finding that size gives a better indication of importance than type style or weight to apply equally to other genres in which other forms of typographic variation are more conventionally used, such as text books or financial reports. This approach also enables us to identify patterns of variation within texts belonging to the genre under consideration: for instance, there seem to be clear differences in terms of frequencies of long-distance relationships between front and back of shampoo bottles. As such, it is important to recognize that, taken in isolation, these phenomena themselves may not constitute errors: in the genre of pack messages, it actually seems quite conventional that messages be related rhetorically despite their graphic separation, at least on the front of packs. However,

in other cases, the scope of which might be explicitly constrained functionally, say by message type, long distance relationships may indicate an opportunity for improving design. This aspect of the work seems especially apt in the context of multilingual multimodal text production, in which constraints (Delin, Bateman and Allen 2002) may present special challenges.

Finally, the cross-cultural dimension to this work opens the possibility of formulating more nuanced guidelines for document localization than has so far been the case. To take one example, while previous work on comparative typography has demonstrated the different footprint of equivalent passages of running prose in different languages (see, e.g., Sadek and Zhukov 1997), the work presented here suggests that, when localizing from English to Chinese, it is necessary to increase the size of smaller type to a greater degree than is the case for larger type.

Acknowledgements

This work was supported by an EPSRC CASE award sponsored by the Faraday Packaging Partnership.

I would like to thank the anonymous reviewers of an early version of this article, whose very helpful criticism encouraged me radically to re-think its structure and orientation.

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[1]It might be noted that such considerations are not new. For instance, Ochs (1979, p.49) writes that leftness in written English is 'linked with priority and also with the inception of a statement or entire discourse'.

[2]Thibault has raised concerns about the validity of extending the concept of constituency in the way implied by this adaptation of Halliday's account of information structure (2000, p.330).

[3]Chinese perhaps offers a particularly good opportunity to test Kress and van Leeuwen's hypothesis: while in certain contexts Chinese characters may be read vertically from top-to-bottom, the unmarked information structure in the Chinese clause follows the same pattern as in English, i.e. Given-New (Li 2007, p.186).

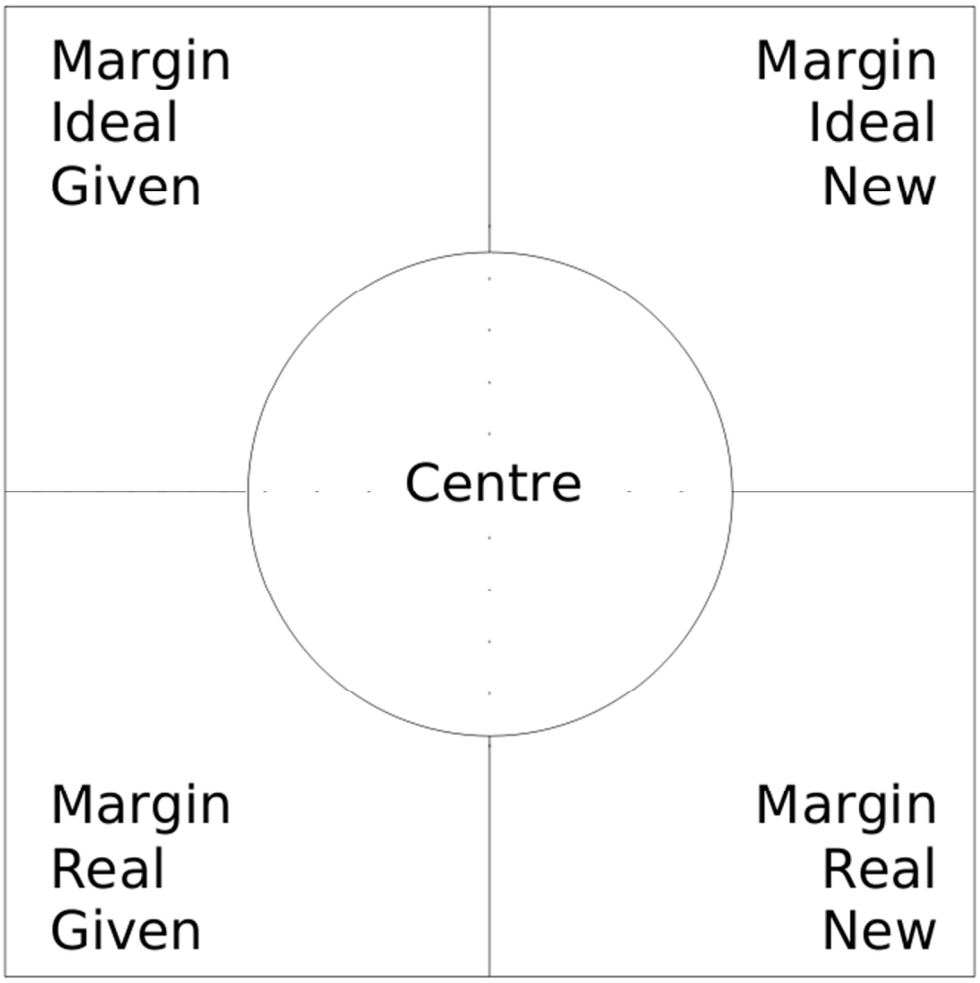
[4]The weakness of the empirical basis for Kress and van Leeuwen's claims has been taken up elsewhere. In a relatively early critique, Forceville (1999, pp.172–173) questions the representativeness of the examples presented by the authors and doubts the intersubjective validity of their interpretations. Bateman, Delin and Henschel (2004, pp.66–67) point out that not only do Kress and van Leeuwen fail to provide support for their claims, it remains unclear how they might be supported. In a more recent formulation, Bateman (2008, p.46) notes that their 'characterization has not received the same kind of empirical evaluation that would normally be expected of a linguistic account'.

[5]It should be noted that, if anything, the frequency of normal-weight italic-style units might be over-reported here: while I have made efforts to correct the annotations derived from OCR output, the raw output betrayed a conservative approach to the assignment of bold weight.

[6]These regulations were superseded in 2008 after the collection of packs. A copy of the 2004 regulations was downloaded 01.05.2009 from
http://www.opsi.gov.uk/si/si2004/uksi_20042152_en.pdf

[7]The Regulations for Package Labelling for Cosmetic Products (化妝品之標籤仿單包裝之標示規定 — downloaded 01.05.2009 from: http://www.doh.gov.tw/ufile/doc/\%e5\%85\%ac\%e5\%91\%8a\%e4\%bf\%ae\%e6\%ad\%a3\%e5\%8c\%96\%e5\%a6\%9d\%e5\%93\%81\%e6\%a8\%99\%e7\%a4\%ba\%e8\%a6\%8f\%e5\%ae\%9a.pdf) specify minimum font sizes for the prescribed messages for products belonging to various bands based on weight or volume of content. The toothpaste packs I collected all contain less than 300g and, in most cases, more than 80g of product.

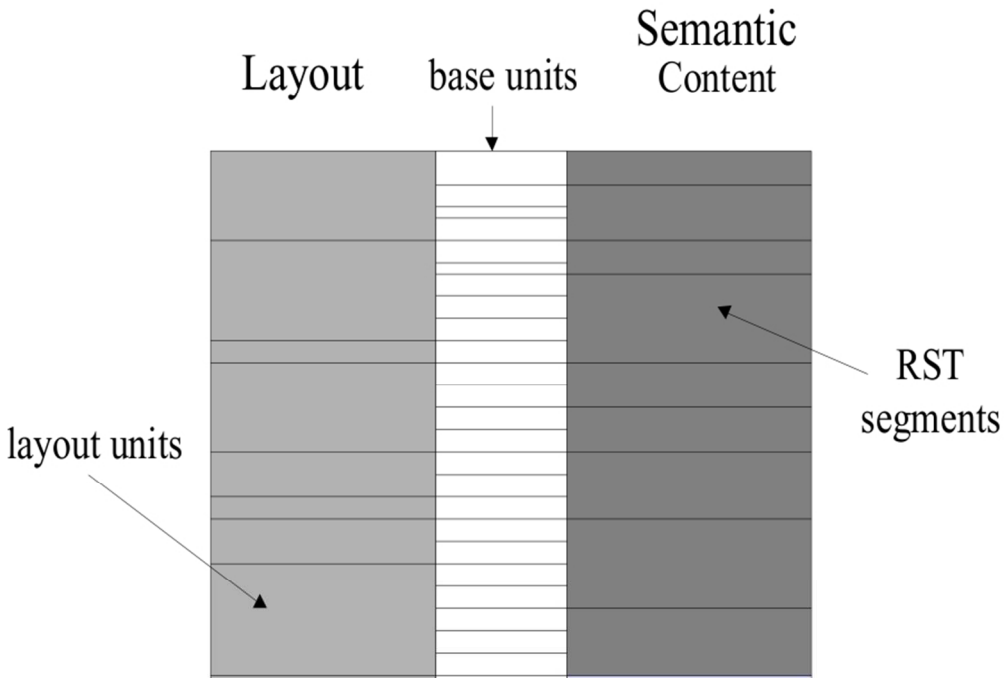
[8]Thus, in genres such as newspaper reports, in which larger type is often used for orientational headlines, we might expect to find the opposite: that, on average, S is larger than N.



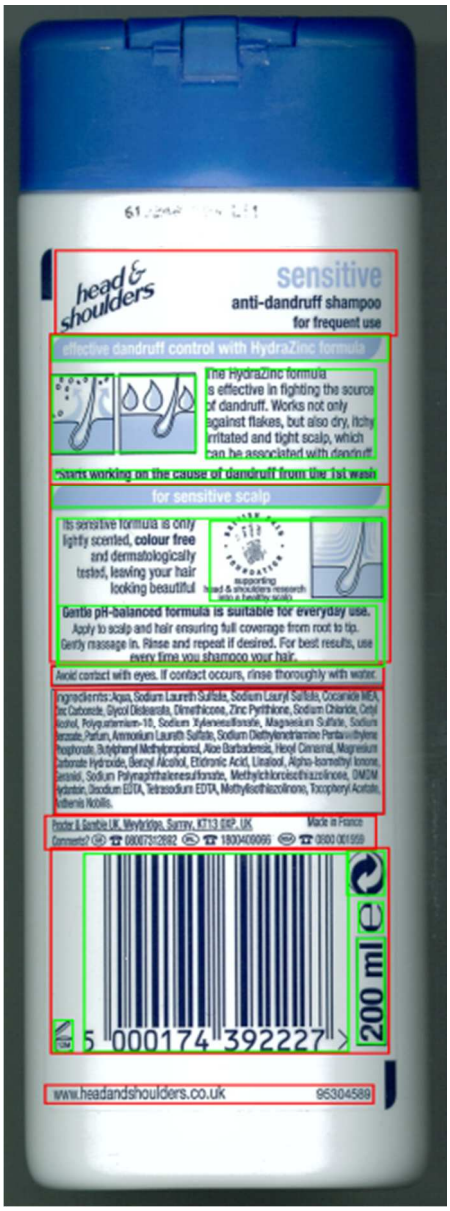
239x238mm (72 x 72 DPI)

246x828mm (72 x 72 DPI)

246x828mm (72 x 72 DPI)



317x216mm (72 x 72 DPI)


head & shoulders
sensitive
anti-dandruff shampoo
for frequent use
effective dandruff control with HydraZinc formula
The HydraZinc formula is effective in fighting the source of dandruff. Works not only against flakes, but also dry, itchy irritated and tight scalp, which can be associated with dandruff
Start working on the cause of dandruff from the 1st wash
for sensitive scalp
Its sensitive formula is only lightly scented, colour free and dermatologically tested, leaving your hair looking beautiful
supporting head & shoulders research into a healthy scalp
Gentle pH-balanced formula is suitable for everyday use.
Apply to scalp and hair ensuring full coverage from root to tip. Gently massage in. Rinse and repeat if desired. For best results, use every time you shampoo your hair.
Avoid contact with eyes. If contact occurs, rinse thoroughly with water.
Ingredients: Aqua, Sodium Laureth Sulfate, Sodium Lauryl Sulfate, Cocamide MEA, Zinc Carbonate, Glycol Distearate, Dimethicone, Zinc Pyrithione, Sodium Chloride, Cetyl Alcohol, Polyquaternium-10, Sodium Xylenesulfonate, Magnesium Sulfate, Sodium Benzoate, Parfum, Ammonium Laureth Sulfate, Sodium Diethylenetriamine Pentamethylene Phosphonate, Butylphenyl Methylpropional, Aloe Barbadensis, Hexyl Cinnamal, Magnesium Carbonate Hydroxide, Benzyl Alcohol, Etidronic Acid, Linalool, Alpha-Isomethyl Ionone, Geraniol, Sodium Polynaphthalenesulfonate, Methylchloroisothiazolinone, DMDM Hydantoin, Disodium EDTA, Tetrasodium EDTA, Methylisothiazolinone, Tocopheryl Acetate, Anthemis Nobilis.
Procter & Gamble UK, Weybridge, Surrey, KT13 0XP, UK
Made in France
Comments? 08007312682 1800400666 0800 001559
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www.headandshoulders.co.uk
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24x11mm (300 x 300 DPI)

12x3mm (300 x 300 DPI)