

Graphic aspects of complex texts: Typography as macro-punctuation

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A case is made for the inclusion of graphic and spatial factors in the linguistic analysis of text, and in common rules and guidelines for clear writing. Some conceptual problems are considered and a parallel is drawn between the roles of punctuation and typography at the micro- and macro-levels of texts. The gradual codification of punctuation, from the original vernacular through an elocutionary or stylistic role to a well-specified syntactic role, is suggested as an indication of a direction for future typographic analysis.

The study of typography as a functional component of written communication has a relatively short history. Consequently, we have a rather poor armoury of concepts, definitions, metaphors, or frameworks with which to handle a subject area that straddles the critical frontiers between verbal and graphic communication, the writer and the reader, and creative writing and the manufacture of print.

This paper neither reports data nor discusses methodology; rather, it attempts by model and metaphor to establish a background necessary for the formulation of sensible research questions and the design of productive experiments.

Typographic study has suffered from the distinction drawn between two meanings of the word "writing": its literary sense (composing) as distinct from its graphic sense (making meaningful marks). Thus we can "write" (literarily) a speech or a broadcast and we can "write" (graphically) a complex mathematical equation. The one is a transcription of words for which graphic form is simply a recording medium, the other cannot be well encoded verbally and its spatial qualities comprise a syntax.

The majority of printed materials fall into neither of these extreme categories. A typical educational text, for example, consists of a number of verbal sequences, together with illustrative and tabular displays, the organization of which is achieved both by cross-reference and by graphic and spatial arrangement on the page and in the book. The contribution made by typography here is at the "macro" level of text organization, as distinct from the "micro" level that occurs within a linear sequence (such as the mathematical formula).

In the past, typography has been too readily defined in simple operational terms as "what typographers do." Because, for various historical and managerial reasons, the professional activity of typographers is normally confined to the graphic treatment of a (literarily) finished text, we thereby reduce it, in theoretical terms as well, to a largely decorative role. In so doing, we ignore the fact that the "finished" text almost certainly uses many typographic organizational

Table 2. Some functions of micro- and macro-punctuation.

	Micro-level	Macro-level
Delineation	initial capital full point comma semi-colon colon	headings title pages space rules
Interpolation	parentheses dashes commas	footnotes boxed inserts marginalia indentation
Serialization	commas semi-colons oblique strokes bullets numerals	headings, numerals tabular format regular spacing/styling
Stylization	quotation marks exclamation marks question marks	size variation style variation layout variation

Delineation refers to methods of indicating the beginning and end of text segments, ranging from clauses (which can be bounded by commas), through sentences (bounded by initial capitals and full points), paragraphs, chapters, parts, and ultimately, to books (bounded by covers).

Interpolation refers to the insertion or juxtaposition of a short segment into a longer one in such a way that the continuity of the sentence, paragraph, page, chapter, or book is not destroyed.

Serialization refers to the organization of segments into clear structures, sets, or series. For example, this paragraph is one of a set of four that is signalled simply by the linguistic rhythm of the first two words; the set could have been numbered, bulleted, or typographically distinguished from the rest of the text.

Stylization refers to the indication of a mode of discourse differing in voice or genre from the main body of text.

Delineation and stylization have obvious equivalents in spoken language:

options such as footnotes, headings, captions, lists, and tables. For all these devices, spatial and graphic distinctions are of the essence. However, while rules for the composition of graphically simple verbal sequences exist in usages, and have been described in grammars, the state of typographic theory is relatively primitive. That is, although rules of some kind may exist (and, of course, it is by no means certain that they do) they have not yet been formally codified. Consequently, there is no assurance that writers, or indeed typographers, use typographic options consistently; there is no well-argued and theoretically-sound source of guidance for the composition or evaluation of complex text; and there is no consistent set of rules on which to base the kind of effective-reading instruction that advises students to make sensible use of visually signalled text structure.

For many years linguistics was confined almost exclusively to intra-sentence analysis but recently more attention has been given to the structure of entire texts and discourses. Some of this work has been inspired by the application of computers to language study. Research on machine translation and artificial intelligence has suggested that the interpretation of stories and arguments is governed by grammar-like rules, and that computers must be programmed with these rules, together with contextually relevant background "knowledge," before they can process even the simplest text. The application of computers to practical text-handling (typesetting, editing, and design) may have a similar effect on typography, imposing a similar degree of discipline on our thinking. Text-processing systems offer typographic menus that restrict users to a limited range of options. The quality of such systems will depend on the analysis on which they are based.

A further demand for the codification of a greater part of typographic practice will come from legislators. The "plain English" laws now being passed in a number of states in the U.S.A. are likely the pattern for the future and they will probably encompass graphic as well as linguistic factors of document design.

Such developments will require us to systematize aspects of text presentation that we have previously been content to leave completely to intuition. This is not as great a threat to the graphic designer as it appears. The existence of grammatical rules has not diminished the art of writing and the production of effective documents will always require sophisticated personal skills. The concerned designer will welcome any means whereby the reliability and quality of his products might be assured, and his professional skills might be more fully integrated into our general concept of literacy.

Text and speech

The definitional distinction between written and spoken discourse is, plainly, that the first is encoded in graphic marks on a surface or field, while the second is encoded in sound. At the micro-linguistic (word) level the phonic and graphic

media are adequately equivalent but, at the broader level of discourse, significant differences are found. With some exceptions, such as text-like speech (a scripted monologue, for instance) or speech-like text (a spontaneous personal letter), the two forms of discourse, and their sub-varieties, display distinct forms of argument, syntax, and other stylistic variables less easily described. Distinctions of this sort stem not so much from the cognitive differences between reading and listening, or talking and writing, as from the strategic implications of the separation of writer and reader in time and place.

All language is artificial, written language especially so. The degree to which language systems are natural or innate is debatable but there is no doubt that any particular discourse is a constructed affair, derived from the linguistic and cognitive competencies and the social and information needs of its participants. Speech and text relate to the same lexical and syntactic base but an effective performance in either medium requires mastery of contextual and pragmatic factors that lie outside the language and are often peculiar to a particular situation or subject. Competence in speech is acquired more or less naturally, and in normal conversation there are opportunities to query, repeat, or rephrase information. In text, however, clear explanation of complex events (journalism), sciences (school-books), regulations (government documents), or instructions (technical manuals) is an enormously skilled task that few master thoroughly. Studies by Baldwin and Coady (1978) seem to reinforce this view of the artificiality of written language; they found that punctuation—an artificial, non-verbal syntactic aid—had little effect on the comprehension of text by young children but was an acquired and relatively sophisticated skill developed only by older, more experienced readers. There is no lack of evidence that even highly-skilled readers can suffer from the poor standard of writing resulting from a process of education that teaches the established formalities of English grammar to the exclusion of less well-documented communication strategies.

So, while speech is on the whole spontaneous, text is a planned communication and makes a series of assumptions and predictions about the reader. It is, therefore, the product of a design process; and whereas the production of a text involves predictions ranging from the reader's knowledge and purposes to his or her eyesight or the size of the bookshelf, clearly our concept of "design" must refer not only to the visual appearance of the document but to all aspects of information defined in the broadest manner. If "literacy" may be taken to refer to the skilled use of the written word, it is as much a design as a linguistic skill. A fully literate writer, then, is one who has mastered not only conventional grammar (rules for the construction of language that are divorced from either the spoken or the written context) but also the full implications of the "written-ness" of language that is, the constraints and opportunities that result from, first, the separation between the writer and his or her readers and, second, the physical and visual nature of documents and graphic language.

Writers and readers, speakers and listeners

Wright (1979) reports that many people prefer to ask someone for information rather than look it up in a book or pamphlet. For example, a person needing information about his or her eligibility for welfare is normally well advised to ask about it rather than attempt to interpret a complex document. The clerk can ask a series of questions about the enquirer's status and quickly give the correct ruling. To rely on the equivalent written information requires careful sifting of the relevant information from a maze of conditional explanations intended to serve many enquirers with a wide range of questions and backgrounds. In face-to-face conversation the expert can eliminate large amounts of irrelevant detail with each question but in the document the individual reader carries the whole burden of search and interpretation.

An appreciation of this type of problem as distinct, for example, from that of purely narrative or descriptive text leads us to treat with caution oversimple models of communication. It is common (for example Guirard, 1968) to find the communication process modelled as a simple one-way transmission of a message from a sender to a receiver, with various embellishments to describe more detailed models of the encoding, transmitting, and decoding mechanisms. Many such models were published (Johnson and Klare, 1961) during the years following the appearance of Shannon and Weaver's (1949) information theory. They were attractive because their mathematical origins gave them a certain scientific status but, although we can identify analogous components in electronic signalling systems and networks of purposive human beings, there is no reason to suppose that they operate in the same way (Waller, 1979).

An inappropriate model can bias the way a subject is researched and taught. In graphic design the prevalence of poorly-posed research questions, with consequently inoperable results, has regrettably turned most practitioners and teachers away from educational psychology as a source of theory and data. A text is not merely a psycholinguistic phenomenon. It is also a physical artefact, the product of writing and publishing processes, and a component in the user's life. A model of textual communication that accounts for all graphically organized text features must relate to these broader, pragmatic issues.

I have argued that because writer and reader are separated in time and place, text plays a role in their relationship quite different from that of speech. Text differs from speech first to compensate for the poverty of prose in comparison with certain aspects of dialogue and second to capitalize on its relative superiority.

The poverty of prose stems from the lack of opportunity for immediate feedback to the communicator about whether or not his or her audience regards the message as relevant, comprehensible, credible, or persuasive. Authors can make fewer accurate assumptions about the pragmatics of communication—the context, purposes, and knowledge of their readers. Explanatory or instructional

text therefore contains frequent interpolations in the form of digressions, overviews, conditionals, definitions, and recapitulations, to answer a wide range of anticipated queries from readers. These exist in spoken discourse, too, but they can be tailored to fit a particular audience or to respond to specific feedback cues. Instructional text consists of prose treated graphically and spatially to enable readers to handle its organizational complexity.

The relative superiority of text lies in its physical nature: it provides a permanent organized record that allows analysis, criticism, refinement, reflection, and review, permitting private study and the economical distribution of information.

In direct conversation language is only one element in our recognition and comprehension of another person. A text must completely replace that other, to become a surrogate reader for writer and vice versa. The written-ness of language, its typographic and spatial nature, can be seen from these two perspectives: for the writer it has primarily a rhetorical function, enhancing the available means of expression; for the reader it has an additional access function, enabling the purposive, reflective, and selective use of texts and enhancing the available means of enquiry.

As Table 1 illustrates, some typographically signalled devices are exclusively components of text-as-argument, while others belong to text-as-artefact; many can be placed in both schemas. A typical textbook is, then, a complex system of intermeshed components, some arranged in a simple sequential order, but many displayed in parallel with other components or dispersed throughout the text.

Because this organized complexity of function and structure has no direct equivalent in unscripted spoken discourse, conventions or rules for its display will not be found in natural language. And, because graphic language is thus artificial, such rules must derive from some consideration of the source of that artificiality: the practical aspects of writing and printing systems.

Codifying rules for graphic language

The formal codification of English orthography was relatively recent. The development of letterforms was to a large degree frozen by the spread of printing and it was only during the seventeenth and eighteenth centuries after many years of vernacular development in which a wide variety of forms was in use that English spelling and punctuation were standardized. The codification of punctuation suggests an interesting parallel with typography. Punctuation is the single aspect of written language, for which grammatical rules exist, that does not represent words themselves but the spaces between them. It is, then, an organizational system at the micro-text level functioning in much the same way as typographic signals and the use of space at the macro-text level.

Table 1. Some functions of the typographic organization of text.

Rhetorical functions	
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About the argument	summarization (title, summary) introduction (foreword, preface, introduction)
Within the argument	emphasis (underlining, italics, etc.) transition (headings, space, etc.) bifurcation (alternative options, parallel texts, interpolation sections)
Extra to the argument	substantiation (footnotes, appendices, references) addenda (apologia, acknowledgements, etc.)

Access functions	
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About the book	overviews (contents list, abstract) definitives (glossary, index) identifiers (title, author, style)
Within the book	locators (topical headings, typographic signalling) descriptors (functional headings, captions)
Extra to the book	study guidance (recommended reading, exercises)

Early grammarians regarded punctuation as an elocutionary aid, denoting breathing spaces, pauses for dramatic effect, and cues for special intonations or voices required of the reader (as in exclamation, interrogation, and quotation marks, and the "irony mark" proposed by several early linguists). For many years reading was usually vocalized; silent reading is surprisingly recent

(Pugh, 1975). During the late seventeenth and eighteenth centuries, writers of treatises on grammar began to develop a syntactic function for punctuation distinct from indications of timing, breathing, and voice. The various kinds of period—full point, comma, semi-colon, and colon—rather than denoting relative lengths of pauses, were seen as making syntactically distinct kinds of transitions within and between sentences. Honan (1960) describes how, in the nineteenth century, attempts to inject order and consistency into the use of punctuation led to the complete rejection of elocutionary theories and the description (or, to some, the imposition) of elaborate rules for syntactic punctuation.

At the same time, greater interest was also being shown in purely graphic aspects of text that did not share even the elocutionary link with spoken language: for example, the use of asterisks, matrices, braces, and oblique strokes to organize language spatially and the use of alternative type styles to differentiate text components. This interest was not carried very far, however, and grammarians neither developed rules for these devices nor suggested a place for them in a theory of linguistics.

Cohen (1977) remarks on the attention given to graphic factors by early linguists: “The language texts of the period [1640-1785], reflecting an effort to represent the obvious sense of the written language, include sections on punctuation, capitalization, and often, handwriting and type styles. These sections are significantly prominent” (p. 50). If modern complex instructional texts, maintenance manuals, or government regulations had existed at that time, it seems entirely possible that those linguists would have encompassed in their theories some of the typographic components discussed above.

In contrast, it is hard to find one modern general linguistics textbook that even mentions punctuation. Those linguists who do consider graphic factors are from more recent branches like stylistics (Crystal & Davy, 1969) or text linguistics (Werlich, 1976), although neither develops the topic to any depth. Where modern linguists study language as a key to understanding human thought, early linguists saw it primarily as a representation of reality.

Typography as macro-punctuation

Punctuation literally means “pointing,” and refers specifically to the use of such marks as the full point, comma, and so on. However, many of the effects achieved by punctuation can also be achieved by other means. For example, a comment that appears in parentheses might just as well appear in a footnote and, indeed, if it is a particularly long comment or quotation it normally is footnoted or may even appear in an appendix. Most other types of punctuation also seem to have equivalents at the macro-text level. Table 2 displays four common functions of punctuation for which there are corresponding devices at the micro- and macro-text levels.

delineation similar to the beginning and end of a segment of discourse, stylization having parallels with vocal tone or quality. Complex serialization is less easy to achieve in speech though possible because it refers to sequential aspects of language. Interpolation is particularly interesting because it includes a number of communication strategies that are purely spatial.

Complex text, broadly defined, typically comprises instructions, regulations, classifications, and procedures rather than simple narratives or descriptions; it serves a variety of readers with different needs and purposes; and it is a component of a larger system, industrial, administrative, or educational. Such text rarely has a single author and is often altered or enlarged to reflect new developments in the system, often without an overall review for many years. In effect, then, it contains a large number of embedded conditionals, definitions, digressions, quotations, and other interpolations that, in attempting to solve a wide variety of problems, increase the difficulties for the individual who must separate his or her requirements from those of others.

Because our concept of writing is basically non-graphic, spatial or typographic solutions tend to be used as a last resort: government documents often have boxed inserts containing warnings about the penalties for supplying incorrect information or reminders to sign or read a particular item. Instead of this "lifebelt" approach to the bemused reader, the document, or even the system to which it relates, should be completely redesigned.

A number of fairly radical graphic solutions have been proposed. One of the best known but least used is the ordinary-language algorithm (Lewis, Horabin, & Gane, 1967), which breaks down conditional information (if—then—unless constructions) into simple yes—no questions spatially arrayed in branching sequences. Educational texts frequently contain "concept maps," flow or systems diagrams of the text content that enable readers to see its structure independently of the precise sequence into which the writer has ordered it. Side headings or marginal notes are frequently used to similar effect. They enable the writer, or a commentator, teacher, or editor, to present a viewpoint, structure, or commentary separate from that provided by the author. In this sense, especially if they are so long as almost to rival the main discourse, they can be described as "parallel texts."

Parallel texts, the parallel juxtaposition of two or more texts on the same page, is a technique of language display that has flourished in the past. Medieval books frequently presented classic or sacred texts accompanied by a commentary. There are a number of books which have been overlaid with several generations of commentary, and commentary on the commentary, by a number of different readers. Contemporary parallel texts combine a variety of different text types. For example, texts with an unusually large number of footnotes have occasionally been "legitimized" by a parallel two-column layout; a popular electronics magazine recently published an article in three different but parallel versions that

referred to the same concepts and illustrations and were addressed respectively to the beginner, the scientist/expert, and the hobbyist wishing to construct the apparatus. A recent "futures" book interwove several perspectives on the same subject by using colour-coded pages throughout.

Work is still in progress on the analysis of parallel texts (how authors modify their linguistic signals in response to format and typographic options, how parallel texts relate to one another and indicate that relationship) but there is little doubt that exploiting such graphic opportunities for organizing information, displaying relationships and overviewing arguments, communicators can usefully extend the conventions of text beyond the linear form of spoken language.

Problems of description and analysis

Although the categories in Table 2 are neither exhaustive in content nor discrete in function, they represent a minimum set of structural concepts with which to handle visually complex text. In addition to the common devices and techniques listed, there are numerous typographic effects that remain unclassified and unnamed. For the linguist who wishes to include typographic factors in text analysis there are both simple practical problems of describing and naming typographic variables and interpretative problems of typographic semantics.

The only existing system for describing typography on which there is a large measure of agreement is that of technical specification in the printing industry. Even there it is not always possible for the designer to specify his intentions using only a limited set of proof-correction marks and technical instructions; he must often provide a drawing for the typesetter. Mountford (personal communication) has identified ten categories of graphic-linguistic devices for inclusion in the linguistic analysis of text, although problems still remain: incorporating those devices in linguistic notation, and describing them in purely linguistic terms to the exclusion of functional factors such as book production and information location. In a personal communication, Twyman notes that he is developing a system that may overcome the notational problem. It is restricted to characters available on a standard typewriter and thus obviates the need for the expensive and difficult reproduction of original documents. It is also content-free and technology-free: it can be used with other systems of linguistic description and is not confined to the limitation of a particular typesetting system.

The problems of typographic semantics have already been implied: there is no agreement about what typographic conventions mean, there is no consistency in their use, and in practical analysis there is even doubt that the phenomenon investigated actually carries a meaning in the ordinary sense of the word.

Table 3 contrasts four sources of graphic effects. Any particular graphic device or example of graphic organization may display a combination of these in a way that defeats a simple analysis of their purpose or function.

Table 3. Semantic confusions in typography.

Graphic effects	Semantic status
Conventional	Denotative
Representational	Onomatopoeic
Associational	Connotative
Artefactual	(none)
Positional	Syntactic and performative

Conventional effects are those that have arisen for a number of historical or accidental reasons (including other factors in this table), but which have acquired a meaning about which there is general agreement. In conventional graphic effects there is a visually arbitrary relationship between the graphic symbol, or effect, and its referent. For example, the letters of the alphabet are conventional, bearing no obvious relationship to the sound patterns of speech.

Representational effects are those that have some correspondence with visual experience or some relationship to sounds. For example, the use of bold type for emphasis reflects vocal stress, and musical notation reflects the use of the "up-down" metaphor in the description of music.

Associational effects result from stylization, exploiting graphic motifs originating from one of the other factors in this schema. They are responses to social conventions or aesthetic preferences that become attached to particular graphic effects. For example, the use of copperplate script on items purporting to be valuable (such as guarantee certificates) imitates the original functional use of such lettering in security printing and banknotes.

Artefactual effects result from the fact that a text is a manufactured object. Thus, many of the graphic features of a text that might be mistaken as having some quasi-linguistic intent can be explained in this way. For example, the choice of a typeface may result from the limitations of a printing system: bold type is absent from typewritten material simply because it is not available on a typewriter; and the amount of text or illustrative material that can be placed on a page is limited by the size of that page. Garland (1979) distinguishes between the influence on the form of a diagram of, first, the physical nature of the diagram, its contents, and external constraints of format (its "shape"), and, second, the use of a model, example, or accepted diagram convention (its "pattern").

Positional effects, the relative positions of text components on the page

or in a book, can relate to the performative nature of writing and reading. That is, in addition to the syntactic correctness or clarity of a particular sequence of components, their position may relate to an anticipated pattern of the reader in studying or using texts. An index is placed at the end of a book for easy reference; scientific journals frequently place their contents list on the front cover for ease of scanning; and page numbers and other similar reference devices have a purely performative function.

It is because of such potential confusions that successful analysis of typography will never be a simple mechanical process. It requires the same kind of personal skills and sensitivity as linguistic or literary analysis, even if the material examined is less profound. The student of verbal language is alert for metaphor, irony, or idiom, and does not attribute to coughs, grunts, or stutters the same kind of meaning as to words. The typographer also must be aware of the influences of cultural norms, stylistic associations, and technical constraints on the visual form of texts.

Conclusion

A case has been proposed for including typographic and spatial factors in the linguistic analysis of complex text. The problems, though, are numerous. Typography is not simply a linguistic phenomenon but reflects the problems of communicating across time and place through a manufactured medium. Although the difficulties involved in analysing and describing the relationship of discourse to its graphic array are challenging, they are not insurmountable, and the more skilful use of textual communication that might follow from such an effort would lead to considerable social and educational benefits.

References

- Baldwin, R. S., & Coady, J. M. Psycholinguistic approaches to a theory of punctuation. *Journal of Reading Behavior*, 1978, 10, 363-376.
- Cohen, M. *Sensible words: Linguistic practice in England 1640-1785*. Baltimore: The John Hopkins University Press, 1977.
- Crystal, D., & Davy, D. *Investigating English style*. London: Longmans, 1969.
- Garland, K. Some general characteristics present in diagrams denoting activity, event and relationship. *Information Design Journal*, 1979, 1, 15-22.
- Guiraud, P. *Semiology*. London: Routledge & Kegan Paul, 1971.
- Honan, P. Eighteenth and nineteenth century punctuation theory. *English Studies*, 1960, 41, 92-102.
- Johnson, F. C., & Klare, G. R. General models of communication research: A survey of the developments of a decade. *Journal of Communication*, 1961, 11, 13-26.

- Lewis, B. N., Horabin, I. S., & Gane, C. P. *Flow charts, logical trees and algorithms for rules and regulations*. London: Her Majesty's Stationery Office, 1967.
- Pugh, A. K. The development of silent reading. In W. Latham (Ed.), *The road to effective reading*. London: Ward Lock, 1975.
- Shannon, C.E., & Weaver, W. *The mathematical theory of communication*. Urbana, Ill.: University of Illinois Press, 1949.
- Waller, R. H. W. Four aspects of graphic communication. *Instructional Science*, 1979, 8, 213-222.
- Werlich, E. *A text grammar of English*. Heidelberg: Quelle & Meyer, 1976.
- Wright, P. The quality control of document design. *Information Design Journal*, 1979, 1, 33-42.