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# Graphetics: when mark-making becomes writing

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## Abstract

Graphetics is the study of how one recognises text, and how one differentiates it from other marks and drawings, for example when one views a manuscript and has to decide 'is this writing or just scribble'? It is related to the phenomenological experience of the symbolic or linguistic content of text 'emerging' from the other graphic marks on the page as one's gaze changes from merely seeing to reading. This article focusses on the pragmatics of graphetics and on the [philosophical] complexity of differentiating graphs into linguistic and non-linguistic content, i.e. the difference between seeing and reading.

The difference between linguistic and non-linguistic content becomes clear when one is preparing a digital text using structural markup, e.g. XML. One needs to differentiate between the form [shape] 'p' and the grapheme [letter] 'p' because it affects the encoding that differentiates shapes from letters. In digital environments such as the web, or e-libraries, search engines rely on such differentiation to retrieve the content one is seeking. However, the 'identity' or content of such marks is something that has to be initially decided by a human text encoder. Deciding the identity of marks when interpreting manuscript sources is sometimes problematic, and this article takes some examples from the project to digitize Wittgenstein's manuscripts, which are especially relevant because he conducts thought-experiments with imaginary letterforms and other ciphers.

Graphetics is a metalinguistic enquiry because it precedes any linguistic analysis that may take place on the elements that are identified as potentially having linguistic content. The method used in this article is a reductive graphological or pragmatic graphetic analysis of the manuscript source. It may also be regarded as an exercise in formal pragmatics, in the sense used by Habermas: 'the reconstruction of universal features of using [graphs]…'. This visual investigation is theorized in relation to the existing fields of semantics, text encoding and philosophy.

The results of the enquiry are threefold: that all manuscripts should be assumed to be graphical until textual content is discovered (which is the opposite of the normal assumptions about manuscripts by philologists); that 'being graphical' is a property not of appearance but of structure; and that a clear differentiation between text and graphics is not always possible. The author believes that the conclusions are fundamental to our interpretation of two-dimensional media, i.e. the differentiation of modes of communication. However, when looking so closely at a problem (letter by letter, mark by mark) it is sometimes difficult to maintain the reader's awareness of the broader context in which the problem has significance. The latter is an intrinsic problem of the so-called 'close-reading' approach in hermeneutics and is relevant to most doctoral/postdoctoral researchers.

**Introduction**

The digital environment highlights a problem that is normally hidden when considering the written or drawn page. What part of the page is writing and what part is pictures? Or, more specifically, what part can be represented as 'text' (using text file formats containing keyboard characters and Unicode) and what part needs to be represented as 'graphics' (using graphics file formats such as JPG). The distinction between these two file types for two different content types has led to an assumption in the digital environment that text file-types are synonymous with textual content and graphical file-types are synonymous with graphical content. However, in the non-digital environment (e.g. a piece of paper) it is clear that one cannot unambiguously draw a distinction between these two content types. For example, we can transcribe a hand-written note into a typewritten shopping list (text) but we would need to photocopy it (graphics) in order to analyse the author graphologically. Thus the distinction may be use-dependent. This ambiguity seems surprising because the terms 'graphics' and 'text' are in common use as opposites. Furthermore, it seems that a source need not be one or the other, but could be both, e.g. in many company logos. Unfortunately, the content-based or structural markup of digital sources normally requires one to state whether something is text or graphics, even if only for the purposes of which file type to use, bearing in mind that the contents of text files can be searched much more easily for textual content than can graphical file types. There is therefore a need to review how to approach the pragmatics of the text/graphics distinction and to develop appropriate markup strategies.

Both Crystal (1987: 185) and Gelb (1963: 23) note that the anthropological issue of how and when writing emerges from other forms of mark-making is worthy of further study. The contemporary philosophical version of the problem is how one recognises text, and how one differentiates it from graphics, when interpreting a manuscript source.

<INSERT FIGURE 1 NEAR HERE (LOCATION NOT CRITICAL)>

Figure 1: Bergen Nachlass Edition (BNE) MS113, 39v.
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http://www.wittgensteinsource.org/Ms-113.39v_f

This is somehow connected with the symbolic or linguistic content of text 'emerging' from the other graphic marks on the page as we recognise it and begin 'reading' it. It has both a pragmatic and a semantic aspect, as recognised by Morris (1971: 46). The basic problem immediately invites two further sub-questions: first, why this needs investigating given that manuscript interpretation has been going on successfully for hundreds of years, and second, why text and graphics are, could be, or should be differentiated as content apart from any technical considerations.

Let me address the second of these sub-questions first. A manuscript page contains a range of handmade marks which linguists refer to as graphs. In the simple case of handwritten correspondence we can quickly recognise the arrangement of marks in rows and the more-or-less accurate representation of letterforms (graphemes) that have

linguistic content according to handwriting conventions. An imaginary context of the correspondence arriving by post in an envelope would further reinforce our expectation of linguistic content. However, sometimes we receive correspondence in which the handwriting is difficult to interpret, for example because it departs from strict linearity, and in some cases we may be unable to interpret the potential graphemes. We may continue to act as though the manuscript has linguistic content, or we may conclude that it is mere scribble, without linguistic content, and stop trying to 'read'.

Between intelligibility and scribble there lies a range of possibilities of sequentially arranged graphemes including: linguistic content in an unfamiliar language (i.e. unintelligible to us); non-linguistic sign systems with which we are unfamiliar, e.g. logical notation (i.e. not made up of the usual alphanumeric graphemes) or an unfamiliar script (e.g. Chinese); errors of orthography on the part of the author, (i.e. not made up of recognised graphemes in any natural script: not Unicode); encryption, (i.e. recognisable graphemes but not forming words in any natural language), etc. All of these examples maintain the linear construction of alphabetic writing. Furthermore, using this same set of symbols we can also make tables, (i.e. non-sequential arrangements of graphemes) and other arrangements that depart from the linear construction. We may also depart from normal linear construction and a fixed character set in order to make diagrams and drawings, or patterns or scribble.

This is relevant to the second sub-question because, broadly speaking and subject to some caveats, everything described above within the category of 'sequentially arranged graphemes' has the potential for linguistic content, whereas what is described afterwards does not. If we seek to interpret a source with linguistic content we will use different interpretational strategies from those used for non-linguistic sources, e.g. we will seek to resolve the former into sequentially arranged graphemes from which to build words, sentences and linguistic content, whereas in the latter we will not.

Let me now address the first of the sub-questions: why this needs investigating. There are two reasons for investigating how we differentiate text from graphical marks: one is for source interpretation and the second is for source representation. As we have seen above, the differentiation of linguistic from non-linguistic content is necessary as a prelude to the application of different interpretational strategies to each. For example, the following figures could be investigated in terms of a topological (form-based) comparison:

<INSERT FIGURE 2 HERE, NO CAPTION>

in which the first shape can be rotated to become the second, but not the third or fourth. Such an investigation regards these shapes merely as forms, and under a stictly topological investigation it would be a mistake to interpret them as being the graphemes [letters] <p>, <d>, <b>, and <q>. In terms of form, it is correct to say that form-d is the mirror/reverse of form-b, but it makes no sense to claim that grapheme <d> is the reverse of grapheme <b>. Thus the interpretation of the source as either shapes or letters makes a difference to what we can say about them. Accordingly, it may be desirable or necessary to disambiguate the example above, i.e. whether the comparison is between shapes or

letters. If, for some reason, I wish to pursue the intrepretation of one shape being rotated to become 'the same' as the next, then in a digital environment I can encode this as 'a shape' rather than 'a letter' so that this possibility becomes clear. In the example displayed here this has been achieved by choosing a font (a manner of encoding) in which the 'shape' is capable of rotational mapping. In addition, in the text of this article the differentiation has been done lexically: hyphenating the prefix 'form' when the form-d is being referred to, and using the linguistic convention of angle brackets when the grapheme <d> is being referred to (cf. Sampson 1985: 43). When preparing a digital text using structural markup, e.g. XML, one encodes the former as different in content [meaning] from the latter. The point is that to achieve this one must first recognize the difference, which brings us back to the initial question: how does one recognise text, and how does one differentiate it from graphics when interpreting a manuscript source?

This article proposes that a graphological or graphetic analysis of the manuscript source is required. This is usually undertaken intuitively but boundary cases and probelmatic sources require it to be undertaken explicitly. My preferred term 'graphetic' is also adopted by Crystal (1985: 143) but it does not seem to have been widely used in text analytic discourse. I prefer it to 'graphological' because graphology is used mainly with reference to the analysis of personality through handwriting. Crystal (1987: 194) disambiguates this by differentiating 'psychological graphology' from 'linguistic graphology' although Gelb (1963: 23) thinks the term should be avoided altogether. Similarly 'grammatology' (Gelb 1963, Derrida 1976) implies the relationship of semantic content to writing systems, rather than the emergence of writing out of mark making, which is the central concern of this article. Graphetics is a metalinguistic enquiry because it precedes any linguistic analysis that may take place on the elements that are identified as potentially having linguistic content. For the present purpose it addresses the means by which graphs and graphemes are separated and explains a reader's normally intuitive competence in the recognition of indicators and in the correct identification of linguistic content amongst a range of graphs. Graphetics may therefore also be regarded as an exercise in formal pragmatics, in the sense used by Habermas (1998: 92) i.e. 'the reconstruction of universal features of using [graphs]…', by writers and readers to convey linguistic and non-linguistic content.

When speaking of the recognition of linguistic content implied in Wittgenstein's discussion of 'reading', Anscombe (1991: 4) says that 'non-philosophers are apt to think there are no philosophical problems about reading'. In her opinion, recognising the complexity of the process of reading, marks Wittgenstein out as a philosopher's philosopher. So it may be that one must first recognise the philosophical complexity of differentiating graphs into linguistic and non-linguistic content before one can appreciate the problem of describing the universal pragmatics that are at work here. Wittgenstein problematizes reading thus:

> Now what takes place when, say, he reads a newspaper? -- His eye passes -- as we say -- along the printed words, he says them out loud -- or only to himself; in particular he reads certain words by taking in their printed shapes as wholes; others when his eye has taken in the first syllables; others again he reads syllable by syllable, and an occasional one perhaps letter by letter. -- We should also say that he had read a sentence

if he spoke neither aloud nor to himself during the reading but was afterwards able to repeat the sentence word for word or nearly so. -- He may attend to what he reads, or again -- as we might put it -- function as a mere reading-machine: I mean, read aloud and correctly without attending to what he is reading; perhaps with his attention on something quite different (so that he is unable to say what he has been reading if he is asked about it immediately afterwards).

Now compare a beginner with this reader. The beginner reads the words by laboriously spelling them out. -- Some however he guesses from the context, or perhaps he already partly knows the passage by heart. Then his teacher says that he is not really reading the words (and in certain cases that he is only pretending to read them).

If we think of this sort of reading, the reading of a beginner, and ask ourselves what reading consists in, we shall be inclined to say: it is a special conscious activity of mind.
(*Philosophical Investigations* §156 [sic])

…Again, our eye passes over printed lines differently from the way it passes over arbitrary pothooks and flourishes. (I am not speaking here of what can be established by observing the movement of the eyes of a reader.) The eye passes, one would like to say, with particular ease, without being held up; and yet it doesn't skid. And at the same time involuntary speech goes on in the imagination. That is how it is when I read German and other languages, printed or written, and in various styles. -- But what in all this is essential to reading as such? Not any one feature that occurs in all cases of reading. (Compare reading ordinary print with reading words which are printed entirely in capital letters, as solutions of puzzles sometimes are. How different it is! -- Or reading our script from right to left.)
(*Philosophical Investigations* §168)

One of the difficulties is whether it is necessary or possible to separate the pragmatics of seeing from the semantics of 'seeing-as' (Wittgenstein 1953: 195), that is, of seeing a sign (e.g. form-d) as a grapheme (e.g. letter <d>) and using this to project a meaning that aids our interpretation of subsequent graphs as graphemes or otherwise. In the case of handwriting we seem to be in a constant mode of fluctuation between recognition and postulation, both when reading and when writing. Indeed, there is no agreement about what constitutes writing as opposed to what constitutes drawing or other mark making. Bloomfield defines writing as 'recording language by means of visible marks' (in Crystal 1987: 178). Gelb refines this as ' a system of human intercommunication by means of conventional visible marks' (1963: 12) moderated by the 'context of situation' (19). Coulmas changes the focus of what is conventional from the marks themselves to the relationship between writing and language when he identifies three of writing's fundamental characteristics, including 'the marks' conventional relation to language' (1989: 17). Biggs make a similar point in relation to the digital environment (Biggs and Huitfeldt 1997: 357). Sampson moves our attention from language to ideas by defining writing as 'to communicate relatively specific ideas by means of permanent visible marks' (1985: 26). Huitfeldt discusses the notion of a text in relation to the medium in which it is recorded and its dimensional capabilities (1992: 143), and Larkin and Simon also use dimensionality as a concept to differentiate text from graphics (1987: 65). Mitchell finds political differences between the two (1995: 4) and, more generally, problematizes the linguistic/pictorial divide (1995: 83ff.). Coombes, Renear and deRose

make the issue of recognition ('seeing-as') an explicit prerequisite in text encoding (1987).

## Problem analysis

Establishing the boundary between graphics and text seems to be principally a problem of identification rather than interpretation, although the two are not completely separable since reading-as an image or reading-as text are problem cases cited by Wittgenstein in his unpublished papers, e.g. the form-K rather than <K> in his unpublished MS132.

<INSERT FIGURE 3 HERE>

Figure 3: Bergen Nachlass Edition (BNE) MS132, 39.
http://www.wittgensteinsource.org/Ms-132.39_f

At this point it may be useful to consider the difference between the production issues and the content issues of so-called 'content markup' and 'presentation markup' in a digital environment. The initial production problem is to get the basic content onto the screen. Hence Unicode concentrates on the way in which text can be encoded so that it can be displayed, by developing a character set capable of representing every character in every language and script in the world. So basic is this notion that, at its simplest, a text is a sequence of characters, that even today simple text editors such as Windows Notepad and Mac TextEdit do not give any facility for controlling page layout. This reinforces the notion that all texts are a string requiring only sequential control, i.e. left-right or right-left character sequencing and top-bottom or botton-top line sequencing, and that style is a secondary feature that is separable from content. Further evidence for the independence of presentation may be found, for example, in the development of HTML stylesheets which, from the point of view of the designer and production, allow for changes in presentation without intervention in the basic document body and content encoding. But this kind of markup does not allow the designer to easily change her mind about what page elements a particular markup is applied to. Thus one might, in the initial stages, decide to italicise book titles in a reference list and then later decide against this style. Changing the stylesheet does not facilitate this unless book titles themselves are tagged with a unique code, e.g. as 'title' rather then as 'italic', in which case we encounter the difference between presentation and content markup. Content markup such as XML seeks to identify the structural units of the text independently of the style in which they are presented, e.g. paragraph, chapter, etc. Style is then applied independently. This can be experienced by users of MS Word when they apply 'styles' to text with content marked up as 'normal', 'title', 'footnote', etc. Presentation markup, on the other hand, seeks only to apply a style to a text element, e.g. 'italic', without saying anything about why that style is applied.

The constructive narrative aspect of interpretation provides a bridge between interpretation of graphics and the interpretation of text. One of the distinctions between the reading of text and reading of graphics is a contrast between their linearities. When one 'reads' an image there is usually no proscribed way of moving from one compositional element to another, digesting its content, and as a result constructing an interpretation of the graphic. Nonetheless, some narrative images do involve a process of interpretation in which the content of the image is sequentially unpacked, and to some extent, implicitly or explicitly, turned into a temporal series of events, some of which may be described verbally. That is to say, some images tell a story that can be retold in words. However, some narrative imgaes have multiple interpretations and these may be represented as hypertext, which offers an unpredictable sequence at the point of consumption. Although some control is exercised at the point of production according to what links are made available at what places, strict control over the experience of the content is loosened, making it closer to the experience of interpreting a manuscript source.

A well-formed text normally has a prescribed syntax at the level of sentence and paragraph whereas a hypertext offers the possiblity of breaking up the linear sequence of these units. So something that is beginning to emerge from this analysis is that different texts can have author- or reader-determined structures. James Joyce's *Finnegans Wake* offers a novel kind of author-determined sequencing compared to standard English language texts:

> MUTT Fiatfuit! Hereinunder lyethey. Llarge by the smal an' everynight life oslo th'estrange, babbylone the greatgrandhotelled with tit tit tittle-house, alp on earwig, drukn on ild, likeas equal to anequal in this sound seemetery which iz leebez luv.

Joyce, *The Restored Finnegans Wake,* Penguin 2012

Using the same approach to interpretation in the graphical realm, one can find examples of highly structured visual languages with combinatorial or grammatical rules directly analogous to spoken or written language, e.g. road and airport signs. One also encounters conventions that are sometimes referred to as visual 'languages' such as mouseovers and cursor behaviour common to many graphical user interfaces. So-called 'intuitive interfaces' rely on us recognising and exploiting the extended on-screen analogies, for example pointing to meaning units as though they were on paper, and grasping or dragging content from one place to another analogous to physical objects on the desktop, and throwing away. One can also find examples of graphics in which a normally structured narrative would be invoked in an account of content, e.g. narrative painting such as Waterhouse, *Lady of Shalott,* 1888, and examples of graphics in which an emotion is the main content rather than a story, e.g. expressive art such as Picasso *The Weeping Woman*, 1937, and examples of the complete integration of approaches to reading text and graphics, e.g. comic strips, company logos, etc.:

<INSERT FIGURE 4 HERE>

Figure 4: *Amazon logo, 2016.*

**Discussion**

**Writing**

At the point of production, the empty manuscript page is quite non-directive: one can use it in many different ways. To this extent it is a more liberal environment than sitting at the keyboard, because the latter already assumes the production of a text-string. The expression of ideas is not necessarily synonymous with the expression of linguistic content: it is only one model of authorial activity that consists of writing/typing linguistic content in a string so that it appears as an equivalent to the printed page that may be its intended final form. However, this one-dimensionality can be subverted: the manuscript may contain deletions, amendments, additions; it may contain content in a variety of languages, it may contain spelling and grammatical mistakes, it may be simple to understand the content, difficult, impossible for anyone other than the author, or it may be nonsense (impossible for anyone to understand or meaningless). All these are factors that would affect the later interpretation of the notation to be used to represent it. In addition the author may use what Bolinger and Sears call 'paragraphological notations' such as logic, mathematics or music (1981: 281), which share with alphabetic writing a set of conventionalised signs but depart from it in the rules for their combination and the spatial distribution of the symbols on the page, for example the difference between 22 and $2^2$; the so-called 'principle of position' (Gelb 1963: 19). Spatial distribution can also be exploited in the creation of tables of data which show correspondences according to spatial relationships of clusters of sequenced symbols. Finally, although this is not an exhaustive list of possibilities, graphics can be introduced which contain non-sequenced graphical marks or tokens, e.g. pictures made up of letters, or pure pictures made up of otherwise-meaningless lines. In describing the range of a source document one should also note that all of these possibilities are equally available at any place on the manuscript page and there is no requirement to start a new line for a graphic, or to place a table inside a box. Crucially, there are no devices to signify the beginning of a particular form of notation although there are cues in the structure of the notation itself, which result in confirmation or reinforcement of the hypothesised content.

In summary, it is therefore necessary to differentiate between markup in which the basic structure is sentential but the principle of position confers meaning on certain elements, e.g. mathematical notation, and fully diagrammatic structures in which there is no sentential organisation at all, such as tables. I will call mathematical (etc.) notations 'distributed-sentential structures' in order to reflect the way in which they occupy a mid-ground in terms of spatial structure. I also propose that, despite being unwieldy, such notations may have a linguistic equivalent, i.e. they can be 'read aloud' and converted into sentential structures. Or better: that graphics are those that normally have no linguistic equivalent.

**Reading**

At the point of consumption the reader is presented with the manuscript page in the absence of the author. The identification of the use of space is much more problematic than the interpretation of mere orthographic tokens as alphanumeric graphemes. On unruled paper orthographic mistakes and ambiguity can easily hide the signifying features of the notation and it is only as meaning is construed from hypothetical interpretations of the notation that we can become confident about a particular reading. If the author is mistaken in his or her use of convention or is being creative, as with Finnegans Wake, then interpretation is further problematized.

The interpretation of the page depends upon the identification of cues or metatextual elements. In turn this identification is a reflection of the interests of the reader; 'our aim in transcription is not to represent as correctly as possible the originals, but rather to prepare from the original text another text so as to serve as accurately as possible certain interests in the text' (Pichler 1995: 691). The principal deciphering activity is the identification of recognisable letterforms. The reader is cued to seek individual letterforms by the horizontal linear organisation of the marks on the page. Within this linearity the task is to identify letterforms from the variable orthography. Confirmation of linguistic content is achieved by the consistent identification of a character set which itself forms identifiable words delimited by spaces and line breaks, etc. At this point the main activity is the suppression of reading individual graphical marks as signifying tokens in preference to the interpretation of these marks as the repeated use of a limited range of graphemic units (Coulmas 1989: 51) belonging to a character set. Multi-linguistic texts may add an additional level of complexity but at a word level we are likely to be presented with single character sets at a time. Mixed character sets in a putative word unit (a space delimited string) may signify a non-linguistic notational form such as mathematics or logic. Logical notation provides an interesting case because examples can be constructed which use the characters from linguistic notation but which do not follow the combinatorial rules of natural language notation.

The cues to a change in language, or language group are to a lesser extent the presence of characteristic letterforms, such as Þ (Unicode 00DE, Latin uppercase Thorn, characteristic of Icelandic and Old English), but to a greater extent by the recognition of linearly organised letter-types delimited by spaces into word-units corresponding to a natural language vocabulary. Unpacking the activity of reading in this somewhat laborious way demonstrates the many processes that precede the identification of linguistic content that forms the default mode of the textual interpretation of source documents, i.e. intuitive reading. At any of these levels mistakes and ambiguities can interfere with the recognition of authorial content and the interpretation of notation, including the presence or absence of certain content objects such as text or graphics.

All this could be taken as the default mode, in other words, having identified linearly organised graphical marks that comprise orthographic tokens that can be interpreted as letter-types forming words with spatial delimiters, we proceed to interpret the marks on the basis that they continue to be text in the established natural language until we are

cued to adopt an alternative interpretational strategy. This corresponds to the assumption in text encoding, that the content consists of Unicode strings unless indicated to the contrary. The departure from this default interpretation is normally cued by a different spatial organisation, or by non-Unicode content. However, the example of typewriter art shows that one does not have to depart from Unicode in order to create graphics. If we describe the normal sentential organisation of the text string (which in English has a left-right in-line progression and a top-bottom block progression), as 'passive' then we can say that 'active' spatial organisation is a cue for an alternative interpretational strategy.

Tables are active spatial layouts of textual content in which the relative position of the elements is itself signifying. In this way they are unlike conventional text in which the relative spatial juxtaposition of elements other than the linear sequencing of the letters and word units, is non-signifying. This descripption accords with Larkin and Simon's definition of diagrammatic structure. Tables are not necessarily indicated by containment in boxes and so it is frequently the lack of expected sentential linearity, or the loss of meaning grammatically or semantically as sentential structure, that suggests that the author may have departed from sentential text-organisational mode. This cues us, on the assumption that the marks continue to be purposive and signifying, to seek other meaningful modes of textual organisation or meaningful non-textual signification. These might be further cued by extrinsic elements such as comments in the preceding text that refer to a table. Finally, an assumption of spatial signification may be imposed as a desperate attempt to satisfy our desire for signification in text that seems sententially disordered or ruptured (shopping lists, jottings, etc).


**Interpretation**


All this takes place in a context of purpose: an attempt to infer meaning from the source material. What is perceived as meaningful will depend on our interests. Perceiving something as meaningful depends on element recognition which in turn requires us to be receptive to a meaningful aspect (Renear 2001: 415). For example, it might be the case that until a graphologist draws our attention to the signification of handwriting, we attribute no particular significance to whether a document is written in the author's own hand or the hand of another. Wittgenstein calls this new awareness 'seeing an aspect' (1953: 213). If we do not even recognise the possibility of signification, e.g. of handwriting, we are said to be 'aspect-blind'. Wittgensteinian aspect-blindness is a problematizing factor in the encoding of text. One must 'first recognise the deliberate ambiguity, and then encode it so that the linguistic content and the on-screen presentation preserves these two senses' (Biggs & Huitfeldt 1997: 357). But this depends on seeing the ambiguity in the aspect and this in turn depends upon what interest one has in the text. There are also examples where the presentation is inextricable from the content, e.g. this is underlined, in which 'the medium is the message' (Biggs & Huitfeldt 1997: 356). There are therefore, many contextual presuppositions to the interpretation of a source and by implication, the reductive differentiation of 'graphical' content from 'linguistic/textual' content.

## Conclusion

This reductive method provides a pragmatic account of the interpretation of assumed textual content in a source document, and describes the way that text emerges from the graphical marks on the page. The disambiguation of marks into proto-text proceeds from letterforms to word units, etc. Disruption to these inferences in the form of unexpected spatial distribution causes us to try to find signification in proto-diagrammatic structures such as tables, or to find meaning in fully graphical forms such as depictions and abstract art. As a result of analysing the process of reading, a new intermediate category of distributed-sentential structures has been identified, e.g. mathematical and logical notation which uses the principle of position. It has been argued reductively that when content is not sententially organised, nor has linguistic content, then it may be graphical.

The advantage of this method is that it can identify graphical content or behaviour rather than relying on the perception of graphical appearance, e.g. drawn lines and pictures. This is more reliable than starting by trying to identify images in a complex manuscript source owing to their infinite diversity of form. The identification of graphics by the technological resources needed for their reproduction, i.e. text file-type or graphical file-type, reflects neither the strategy employed in their production nor their consumption (writing and reading).

|  | linguistic content | graphical content |
|---|---|---|
| sentential structure | <text> |  |
| distributed-sentential structure | <notation> (maths, logic, etc) | <notation> (music) |
| diagrammatic structure |  | <figure> (graphics) |

This article therefore modifies Larkin and Simon's binary description of language on the one hand and diagramatic structure or graphics on the other, by differentiating distributed-sentential structure from diagrammatic structure, thereby leaving the latter more closely associated with 'graphical content'. Owing to its reductive approach to the identification of content, it also implies that a manuscript source should be regarded as graphical until identified as textual, i.e. the process of interpretation is one of trying to first of all remove all the text from the source, and then seeing what is left.

The advantage of a reductive approach is to overcome the difficulty of accounting for the infinite diversity of graphical content and therefore of providing a characterising description of graphics in general. By extending the process of document feature description adopted for textual content one can narrow the field in which graphics lie. In particular one can show that sometimes letterforms and other 'textual content' can be used graphically, e.g. tables and typewriter art, and that some complex notation/spatial combinations such as logical notation lie between what has hithero been defined as graphics and what has been defined as text.

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