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The skeletons and dresses of writing systems

A (grapho)linguistic perspective on graphic structure and variation

Dimitrios Meletis

This chapter explores how linguistics has addressed the visual aspects of writing, focusing on two main perspectives. The first is a structural perspective, which examines how graphic features differentiate linguistic meaning, abstracting the physical forms of printed or handwritten letters into dematerialized graphic 'skeletons'. The second, a more recent sociolinguistic perspective, recognizes typography as a communicative resource that conveys meaning through the actual appearance of writing and the socially significant variation it entails. The chapter concludes by critiquing the Latin-centric bias in writing system typology, advocating for a comparative grapholinguistics that integrates structural, psycholinguistic, and sociolinguistic approaches to the study of writing.

Introduction

At the 1997 conference of the Association Typographique Internationale (ATypI), well-known linguist David Crystal gave a keynote titled 'Toward a typographical linguistics'. Before mentioning several graphic features of potential interest to said 'typographical linguistics' – including the connotative and even denotative potential of different typefaces or the spatial arrangement of text – he bemoans the scarceness of communication at the 'shadowy interface' (Crystal 1997, 7) between linguistics and typography. This scarceness results in, among other things, the lack of a shared terminology necessary for a fruitful cross-disciplinary exchange of ideas. The reason for this is not a big mystery: at the 'core' of their discipline, linguists have traditionally focused on features that are denotatively distinctive, i.e. convey a specific linguistic meaning differing from other such meanings within a given language system (such as English). By contrast, according to Crystal (1997, 12), typographers 'spend most of their time on the permanently present background features of (printed) graphic expression and very little on the way typographic features can directly influence the linguistic meaning'. These diverging approaches lead to a central epistemological distinction: typography is more interested in the *effect* of particular typographic choices, whereas linguistics has (for a long time) restricted itself to studying the linguistic *meaning* potentially affected by these choices. However, the meaning evoked by the choice of a specific mode of emphasis (instead of a different available one) such as bold font to highlight **part of a sentence** – to name just one example – is not as straightforwardly analysable as the difference in meaning brought upon by different meaning-distinguishing sounds (*phonemes*) in word pairs such as *bat* versus *cat*. Thus, the linguistic 'vagueness' of the large range of typographic features is what ultimately caused (especially

structuralist)[1] 'linguistics texts on the whole [to] ignore typography' (Crystal 1997, 7) – a situation that has, encouragingly, changed in the almost three decades since Crystal's assessment.

In this essay, I will trace how various branches of linguistics have addressed the heterogeneous questions subsumed by Crystal under the heading of 'typographical linguistics'. These questions encompass two perspectives: firstly, a more 'traditional' structural perspective that focuses on how (typo)graphic features visualize and thus (co)create, alter, or influence the overall linguistic meaning of a text. Secondly, a more pragmatic, sociolinguistic perspective that examines how writers and readers consciously or unconsciously use and interpret typography as a communicative resource capable of conveying social and contextual facets of meaning beyond the 'mere' meaning of a text. Following this brief historiographic sketch, the focus will be shifted to a linguistic subfield in which typography – and more generally the materiality of writing – remains a blind spot to this day: writing system typology. Specifically, the world's numerous scripts and writing systems have developed a range of spatial and graphic features that have not been sufficiently considered by a 'typographical linguistics' that has hitherto been largely focused on writing systems using Latin script and, in turn, Latin-based typography. The systematic investigation of these features in a multi-perspective and interdisciplinary study of writing – a 'grapholinguistics' – contributes to a more analytically insightful and culturally inclusive interface between linguistics and typography.

The skeleton: a focus on dematerialized written materiality

While this is not the right place to lament (once more) how linguistics has long disregarded writing as a subject of research in its own right (see, for example, Meletis and Dürscheid 2022, 5–11), it is worth reiterating that this neglect was couched in a curious paradox: while linguists overtly claimed to be concentrated mainly – or even solely – on spoken language as the main subject of research in linguistics,[2] especially before the possibility to record audio, they used written data (for example, transcriptions) as well as methods tailored to analysing written data to study it. This situation has become known as an implicit *written language bias* (cf. Linell 1982, 2005) or *scripti*(*ci*)*sm* (see Duncker 2022). As a consequence of this, writing effectively remained 'invisible' as a functional and material phenomenon

[1] Structural linguistics refers to a paradigm 'in which language is conceived as a self-contained, self-regulating semiotic system whose elements are defined by their relationship to other elements within the system' (https://en.wikipedia.org/wiki/Structural_linguistics, accessed 24 July 2023), thus focusing on language as a system and deprioritizing language use. It was fundamentally shaped by Swiss linguist Ferdinand de Saussure and his influential *Cours de linguistique générale* (1916).

[2] Technically, the focus was on an immaterial language system. However, speech was considered this system's primary manifestation, which is also reflected in the relatively early establishment of phonetics as a (sub)discipline dealing with the material aspects of spoken language.

to be studied in and of itself as linguists used it predominantly – and without necessarily being aware of it – as a means to study only the abstract language system as well as its spoken form.

In historiographic accounts of the linguistic study of writing – which remain sparse – important exceptions to this are regularly mentioned, such as the Prague School and especially its member Josef Vachek, who pioneered the analysis of written language (see Vachek 1989). Specific questions of how to approach writing were also sporadically pondered by American linguists at a time when linguistics as a discipline was still negotiating its core tenets (see, for example, Bazell 1956, Hall 1960, Hamp 1959, Herrick 1966, McIntosh 1961, Pulgram 1951). Notably, this happened in a rather unsystematic and individualistic manner, meaning no dedicated research program or community for studying writing was established. Most of the cited contributions were highly influenced by developments in phonology and addressed parallelisms between the structural analysis of spoken and that of written language, for example what the analytical usefulness of descriptive tools such as *phones* (concretely uttered sounds) and *phonemes* (abstracted sound classes) means for the potential definition of *graphs* and *graphemes*. These theoretical and methodological proposals also regularly – if only briefly – touched upon questions of the actual materialization, i.e. the form and appearance of written language. Notably, the graphic variation observed at this level – whether in handwritten or typographic form – proves pervasive but does not directly alter the linguistic meaning of texts. This is the main reason this kind of variation was often discarded as stylistic or 'paragraphemic' (see Hamp 1959); in fact, most often it was abstracted away based on the assumption that an <A> is always an <A> regardless of the font (or handwriting) in which it appears (see Assmann 1988, 144).

Around the same time the above-mentioned works were published, influential monographic works on writing originated in specific philological branches; most prominently Ignace J. Gelb's *A study of writing* (1952), which promoted a historical and most of all typological perspective to studying the world's writing systems (i.e. one in which they are assigned to different types, see also Table 1). This has, to this day, remained the focus of what little American research on writing systems there is (see, for instance, Daniels and Bright 1996, Gnanadesikan 2009, Daniels 1990, 2018), effectively curbing the development of a 'typographical linguistics' in a realm of the world that, incidentally, is often leading the advancement of theoretical paradigms and disciplinary focuses. Against this background, impetus had to come from a different region – Germany – as well as a non-structural branch of linguistics – sociolinguistics.

Table 1. Writing system typology, with an example of each type

World's writing systems	
Morphography (meaning-based, i.e. related to morphemes),	Phonography (sound-based)

e.g. Chinese: 中文

	Segmentary (individual sounds, i.e. phonemes)			Syllabary (syllables), e.g. Cherokee: ᏩᎳᏯ
	Alphabet, e.g. Georgian: მხედრული	Abjad, e.g. Arabic: كتابة عربية	Abugida, e.g. Devanagari: देवनागरी	

In the 1980s, in the then-separated parts of Germany, linguistic research on writing started to flourish in Germanist circles; at this point, it was still largely structuralist in nature. Its focus was (almost) solely on the German writing system, primarily the debate of how its letters relate to the language's distinctive sounds (phonemes) to constitute so-called 'graphemes' (see Kohrt 1986) as the basic linguistic units of the writing system. However, issues of materiality were also raised on occasion – if only in the margins. In this context, German linguists – most notably Hartmut Günther – shaped a linguistic subbranch focused on written materiality and named *graphetics*[3] (see Günther 1993; see Meletis 2020b for an overview) by analogy with phonetics, the study of the material aspects of speech. As already foreshadowed in the introduction to this essay, the scope of this structuralist-based graphetics was restricted to denotative meaning and thus the structural and semantically distinctive properties of linguistic phenomena – for example, what parts of a letter distinguish it from other letters so that they distinguish different meanings. An example of this is the position of the vertical stroke in <b> and <p>, letters that distinguish meaning as in the pair <back> and <pack>. Another trivial example of what was at times considered a distinctive graphic feature is the respective bottom stroke in the contrastive shape pairs |F|[4] versus |E| and |I| versus |L| (see Althaus 1973, Scharnhorst 1988), as all of these shapes are used for graphemes with different linguistic (i.e. sound) values in writing systems using Latin script. Thus, even though by definition, graphetics deals with the graphic (mostly visual)[5] substantiation of writing, its actual interest lies not in the concrete materiality of written utterances (including the appearance of the handwriting or the font in which it was written) but in questions concerning

[3] The term *graphetics* had been proposed much earlier by none other than David Crystal and his colleague Derek Davy in the context of a stylistic analysis of texts as they acknowledged that 'matters as the choice of type-size or colour in a text … may have clear linguistic implications' (Crystal and Davy 1969, 16).

[4] While graphemes – which are studied for their linguistic function – are written between angle brackets < >, in modern (German) grapholinguistics, the shapes that materialize them are enclosed in vertical strokes | |.

[5] Another aspect that is abstracted away in such an approach is materiality in a broader sense: writing requires tools and surfaces to be produced (and at a later point perceived), and both the dynamic modes of production and perception and the resulting product itself can be analysed under, for example, a haptic perspective, which takes into account features such as the texture of paper or screens on which we write and read.

abstractions. These include: Is there a closed set of distinctive graphic features in a script (such as Latin script) that can explain the graphic composition of its shapes and whether it follows certain 'systematics' (see Watt 1983)? And to elevate this to a genuinely 'linguistic' level: is there a correlation between such abstract graphic features and specific linguistic functions or values (such as sounds)? In his plea for a 'typographical linguistics', Crystal (1997, 23) even explicitly wondered whether there may exist a universal distinctive feature set:

> But why should there not be an International Graphetic Alphabet, identifying all the marks the human hand can make that are capable of playing a contrastive role in some language – the array of straight lines of varying length and orientation, curves, dots, thicknesses, and so on, which when combined result in written letters, syllables, and logograms?

There have indeed been numerous attempts within linguistics to define such a distinctive feature set for Latin script (see Watt 1975, 1980, 1981, Brekle 1994, Meletis and Dürscheid 2022, 69–74; see Figure 1 for an example), at times also complemented by assumptions of form-function correlations[6] (Primus 2004, Fuhrhop and Buchmann 2009, Bredel 2008). However, no single proposal of a segmentation or featural analysis of Latin letters (such as the one by Althaus 1973, see Figure 1) has prevailed, and the very feasibility and usefulness of such feature-based analyses is sometimes called into question (see Rezec 2009). Especially when considering a universal set of distinctive features (in the vein of Crystal's proposed International Graphetic Alphabet) that is potentially capable of explaining the structure underlying not only Latin script but all of the world's myriad scripts, a feature-based analysis appears near-impossible given their sheer graphic diversity. This diversity results directly from the boundlessness of what the human hand can graphically produce (to reference Crystal) or what we can nowadays (typo)graphically create using digital devices as well as what our eyes and brains can perceive and process perceptually and cognitively.

Figure 1. This is an example of a segmentation of Latin letters proposed within linguistics. Althaus (1973, 108) decomposed both letters (into 12 building blocks) and the line in which they are positioned (into 7 vertical subspaces) to arrive at descriptions in the form of formulae: for example, |D| is $1^6 \leftarrow 7^6$, i.e. element 1 is located in subspace 6,

[6] An example of such an assumed correlation in German is the fact that shapes with ascenders and descenders (such as in |d| or |p|) are used for graphemes that represent a special class of sounds (obstruents) (see Primus 2004).

which (as the arrow's direction emphasizes) is positioned to the left of element 7, which also occupies subspace 6. All illustrations by the author.

In sum, their different priorities and resulting approaches emphasize the great divide between a traditional, pre-2000's structuralist linguistics and typography: when it comes to the material and formal aspects of writing, linguistics is – if anything – interested in capturing the distinctive graphic *topology* that is located at an abstract level,[7] whereas typography is invested mostly in stylistic/aesthetic *geometry* (which, though in different and arguably more subtle ways, can certainly also alter the meaning of texts). Thus, for instance, from a linguistic point of view, there is only 'one' Latin script, and its shapes each have only one underlying abstract form – one 'skeleton'[8] – storing topological information such as: How many elements (strokes, curves, dots) does the shape consist of? How are these arranged in space, and how do they relate to one another (do they cross or touch, what is the angle between them, are they disconnected)? Psycholinguistically (depending on the specific theoretical modelling of reading processes), this information is stored in mental templates that we rely on to produce and recognize shapes. Scholars conducting typography research[9] and practitioners of typography certainly also need these skeletons to work with, especially type designers who require them to create different typefaces that superficially shape or alter a script's appearance (but simultaneously keep it readable) by lending it a new 'dress'.[10] It is precisely this dress (or better, plural *dresses*) – as a collection of important (typo)graphic[11] variables – that has been neglected by structural linguistics in favour of the bare skeleton that we assume underneath it. In conclusion, and metaphorically, typography is interested in what we actually see (the concrete and unique dresses), whereas graphetics (as the relevant subbranch of structural linguistics) has always strived for an x-ray method to uncover the underlying structure (the common skeleton). Accordingly, typography is invested in the possibilities of fine-grained pragmatic meaning and 'distinctiveness' (language use and linguistic/communicative performance), whereas graphetics restricts itself to semantic distinctiveness (the language system and linguistic competence).

This goes to show that with merely system-focused descriptive tools, linguistics lacks the resources – and indeed interest – to adequately capture graphic variation, which has been typographers' bread and

[7] This is a form of pattern recognition, which – from a different perspective and with different methods – is also at the centre of the field of *optical character recognition*, where variation is likewise considered 'noise' and abstracted away to arrive at a character's underlying categorial and functional identity.

[8] In modern grapholinguistics, this is captured by the unit of *basic shape* (see Meletis 2020b, 106–107).

[9] See Beier and Larson (2013) for an example.

[10] Hartmut Stöckl has metaphorically called typography the 'body and dress' of a text (2005).

[11] A question that, due to the lack of space, is neglected here is that these 'dresses' can of course not only be of typographic nature but also of handwritten or 'chirographic' nature, which was indeed their chronologically primary form.

butter. Thus, structural linguistics falls short theoretically and methodologically whenever elements of writing appear different on the surface but this difference is not distinctive in terms of the language system (such as a word printed in two different typefaces). We cannot deny that a difference exists, however, and it is often charged with significance – *social* significance. Enter the paradigm of sociolinguistics.

The dress(ers): a pragmatic turn towards the (socio)semiotic potential of graphic variation

According to sociolinguist Jürgen Spitzmüller (2016), who has studied typographic questions in depth (see especially Spitzmüller 2013), various (sub)disciplines within as well as bordering linguistics began translating their growing interest in analysing the appearance of texts into different approaches to typography, a development that gained traction at the turn of the millennium.[12] In his historiographic reconstruction, Spitzmüller focuses on linguistic typography research[13] and identifies as its main points of interest (1) *stylistic aspects* of typography, its (2) *organizing and guiding function*(*s*), and a (3) general tendency to conceptualize it in *communication theoretical terms* (Spitzmüller 2016, 103).

Most linguistic research on typography in some way relies on semiotics as a theoretical framework. In this context, a question that is still being discussed is whether typography is a secondary semiotic 'surplus', thus merely adding to the primary semiotic system that is language, or whether it is a full-fledged system in its own right. This is a specific iteration of the fundamental underlying question of whether typography is dependent on or independent of the linguistic content that it visualizes in texts which are nowadays overwhelmingly multimodal, i.e. contain also non-textual material (Spitzmüller 2016, 108). Semiotic methods, now, are employed to capture not only 'stylistic' aspects such as the connotation evoked by typefaces but also organizational features such as the spatial arrangements prototypical of different textual genres. As for the latter, in her historico-cultural book that remains well-received by German-language scholarship, Susanne Wehde shaped the concept of *typographic dispositifs* which refers to the semiotic potential of spatial configurations (or 'layouts') that allows the recognition of specific genres such as 'newspaper front page' or 'recipe' (Wehde 2000, 119–33).

This concept also serves as a fitting example to introduce a paradigmatic development in linguistic typography research. Importantly, typographic dispositifs such as the one signifying 'newspaper front page' are, although widespread, not universal and timeless, i.e. not recognized in all cultures across all times, which insinuates a dependence on specific regional and temporal contexts. And even at given

[12] This development coincided with a steady decrease of influence wielded by structuralism, which is also tied to various paradigmatic shifts (a material turn, a pragmatic turn, etc.).

[13] It is not incidental that Spitzmüller speaks of 'linguistic typography research' and not – like Crystal – of a 'typographical linguistics'. The different orders reflect distinct perspectival starting points.

places and points in time, they are, arguably, not signs in and of themselves. Instead, they are assigned meaning by writers and readers. This user-focused and context-dependent interpretation paves the way for a more (meta)pragmatic sociosemiotic perspective on typography. Accordingly, the fact that most people around the world are likely to recognize the front page of a newspaper as such even if it is printed in a writing system they cannot read points not to an inherent 'frontpaginess' but to the widespread dissemination of a specific facet of (typo)graphic knowledge shared by users, i.e. how elements – headlines, running text, images, etc. – are nowadays commonly arranged on the front pages of newspapers in many literate cultures (see Figure 2 for examples). In the corresponding pragmatic approaches, it is not the appearance of texts that is thought to carry meaning – a meaning which, in turn, is neither conceived of as text- or system-internal nor stable, for that matter. Instead, it is writers and readers who are ascribed typographic agency as they actively and habitually (re)construct meaning in their production and perception of texts based on their experience with and knowledge of design (see Spitzmüller 2013, 171–82).

Figure 2. Newspaper front pages printed in the German, Arabic, and Chinese writing systems. The commonalities in the spatial arrangement of elements are the basis for the respective – and in this case cross-cultural – typographic dispositif.

Interestingly, both the approaches focused on the features of texts (product-oriented) and the more dynamic approaches focused on reading and writing practices (use-oriented) stray far from the structural linguistics characterized in the previous section, so much so that they are not primarily interested in neutral typefaces or layouts (from which one could generalize patterns and commonalities inherent to the system) but in expressive designs 'deviating' from what is believed to be the typographic default; one could say their focus is 'fancy dresses'. This is due to an *expressive typography bias* (see Spitzmüller 2016, 115). For example, whereas structural linguistics uses what are assumed to be 'neutral' typefaces such as Arial (see Beatrice Primus' segmentation of Latin shapes, Primus 2006), most metapragmatic

studies focus on the negotiation of ideologies surrounding more 'striking' typefaces such as Comic Sans (see Meletis 2020c). Notably, the degree of expressiveness available to users and in turn for analysis depends, of course, on the breadth of resources existing in the first place, for example the number of available typefaces for a given script – which brings us to the next and final section of this essay, a plea for a typological perspective and increased consideration of non-Latin writing.

Typological and spatial aspects: from a Latin-centric to a global perspective

The large diversity displayed by the world's writing systems can be assessed at two levels: functionally and materially. From a functional perspective, depending on the linguistic level their graphemes relate to (either phonemes, syllables, or morphemes), conventional writing system typology assigns writing systems to the typological supercategories of *morphography* (relating to linguistic meaning) and *phonography* (relating to sound). The latter is an umbrella term for the more specific subtypes of *alphabet*, *abjad*, *abugida*, and *syllabary* (see Meletis and Dürscheid 2022, Chapter 6; see Table 1 for a rough overview). It must be noted that, while taxonomically useful, such types of writing systems remain – much like language types assumed in language typology – mere idealizations as systems 'belonging' to one type still often exhibit relevant system-dependent and system-specific features that, in fine-grained analyses, should not be swept under the rug. Furthermore, writing systems regularly display features characteristic of types other than the one they belong to, pointing to the prevalence of type-mixing (see Joyce and Meletis 2021).

By contrast, at the material level, which more directly affects a 'typographical linguistics', the graphic diversity displayed by the world's scripts (of which there are around three hundred) cannot be as neatly organized into a handful of categories, partially because it is unclear which criterion a classification should be based on.[14] Here, *script* is defined as a historically grown set of graphic marks used for the materialization of one or more writing system(s) (see Meletis 2020a, 22–3); examples are Latin or Cyrillic script.[15] The Eurocentricity of linguistic research – and, for a long time, typography – led to the disproportionate foregrounding of Latin script[16] and its graphic features. This is also

[14] This may be the reason that the appearance of scripts is consistently disregarded in writing system typology (cf. Daniels and Bright 1996, in which it plays almost no role at all).

[15] Linguist Rüdiger Weingarten (2011) has proposed defining writing systems as pairs of scripts and language systems: the German writing system pairs Latin script with the German language, the Swedish writing system Latin script with the Swedish language. The writing systems are named after the languages they record, which highlights that even if they use the same script (as German and Swedish and myriad other writing systems do in the case of Latin), they must be treated as distinct systems by virtue of the specific languages they are tied to (see also Meletis 2020a, 19–30). This also means that in this conception, scripts are not tied to specific writing systems or languages and can be studied independently of them.

[16] In (grapho)linguistics, the preferred term is 'Roman script' (for the differences between the designations 'Roman script' and 'Latin script', which are often considered synonyms, see Daniels 2018, 28–31). However, in this essay, I use 'Latin' due to

symptomatic of the hegemony reflected in the cultural restrictiveness of technological advances: a core driver of the dissemination and graphic stabilization of scripts in recent history has been their transfer from the analogue to the digital realm, a transfer that is contingent upon the availability of technological tools. Many such tools – examples being keyboards (as hardware) or typefaces (as a part of software) – have been tailor-made for Latin script (and particularly the subset/version used for English). For a long time, this made much of the visual richness characterizing the world's written languages invisible as these were effectively unusable for users of digital devices, leading to the emergence of Romanized versions of writing systems (such as *Arabizi* for Arabic or *Greeklish* for Greek), Latin-based input methods (for example, phonetic input methods used by writers of Chinese), and the adoption of Latin script – instead of the design of a new script – in the creation of writing systems for hitherto unwritten languages (consider, for example, many literacy development programs across Africa).

This situation has improved: Presently, more than 150 of the world's scripts are encoded in Unicode, making them usable on electronic devices and opening the doors to a more typologically inclusive 'typographical linguistics'.[17] However, according to the Missing Scripts Project (see Bergerhausen and Huot-Marchand 2021), almost as many scripts – roughly 130 – remain unencoded. Among them, several scripts are classified as 'living' as they are tied to writing systems still in use today; in other words, writers of many languages still cannot use their native scripts on computers or smartphones. An example is the Beria script used to write the Zaghawa language in Chad and Sudan.[18] From a typographic perspective, too, the question of whether a script is encoded in Unicode proves vital: digitally – with the digital sphere gradually having become the most important for typographic practice – unencoded scripts are simply unavailable, so typographically, they remain, for the most part, unchartered territory. But even for the large number of scripts that *are* encoded in Unicode, available resources are unevenly spread. In the context of typography, this concerns, among other things, the above-mentioned (lack of) availability of different typefaces for a given script or the lack of proper layout software,[19] suggesting a still-existing technological and visual supremacy of Latin script that in part also affects the linguistic study of writing. While this is certainly more thoroughly discussed elsewhere in this handbook, it should at least be mentioned here that in typographic practice, there is an

its predominant use in the typographic literature as well as the typographically ambiguous meaning of 'roman' (as opposed to 'italic(s)').

[17] https://worldswritingsystems.org (accessed 9 February 2023).

[18] https://scriptsource.org/cms/scripts/page.php?item_id=script_detail&key=Qaaz (accessed 18 February 2023).

[19] See the website *ScriptSource* for useful resources for different scripts: https://scriptsource.org/ (accessed 13 February 2023).

increasing awareness of the importance of considering and including 'non-Latin' scripts (see, for example, Wittner, Thoma, and Hartmann 2019 or Google's Noto fonts).[20]

For reasons mentioned above, there is no comparative linguistic study of scripts – and no International Graphetic Alphabet – yet (see Herrick 1974 for an early, if misguided, attempt). There certainly exist systematic studies of and analytical approaches to individual scripts (especially Latin script); these, however, often stem from particular philological branches – and sometimes specialized subfields such as palaeography or epigraphy – whose scientific exchange with outside disciplines is limited. In general, thus, the development of concepts and terminology in the linguistic analysis of scripts remains in its infancy (see Meletis 2020a, 54–9). Here, terminology well-established in typography could be of immense value: firstly, it can provide knowledge and experience from what is frequently referred to as the 'anatomy of type'[21] (Coles 2012), i.e. the classification and labelling of subsegmental parts of characters (such as 'cross-bar' or 'bowl'). Secondly, another area in which typographic practice appears much more descriptively sophisticated than linguistic theorizing is the suprasegmental spatial analysis of writing, which deals with the combination and arrangement of characters on a two-dimensional writing surface (see Stöckl 2005 for a proposal of transferring established typographic categories – including *micro-* and *macrotypography* – to a semiotic linguistics; see also the cartography of the writing surface in Figure 3).

[20] See https://fonts.google.com/noto (accessed 14 February 2023). Notably, the *Noto* project can also be criticized for propagating harmonizing and homogenizing tendencies, i.e. making scripts look more similar – especially to a Latin aesthetic – to achieve aesthetic coherence and thereby often downplaying important visual features of non-Latin scripts (see Wittner 2019, 7).

[21] This fits the metaphor of 'skeleton' used throughout this essay, although – as the name says – the anatomy of 'type' is interested in the features of typefaces, i.e. the actual 'dresses'.

Figure 3. The *segmental space* (top left) is occupied mostly by individual characters; the *linear space* (top right) is either partially filled by linear material (for example, words or phrases) with blank spaces between it, or fully filled (if the entire line is filled without internal blank spaces); the *areal space* (bottom left) is occupied by two-dimensional material, for example, paragraphs or columns that extend not only horizontally but also vertically (i.e. not only in one but two dimensions); and the *holistic space* (bottom right) entails the analysis of the combination and arrangement of textual and non-textual material; examples of holistic spaces are a page of a book (or a newspaper, as pictured here) or the part of a webpage that is currently displayed on a screen.

The reason for this asymmetry between typography and linguistics is that issues of compositional 'layout' (to put it colloquially) have long been a major focus of typographic practice. Typographers thus acknowledge the profound effect exerted by the spatial arrangement of the multimodal components that make up texts (see also the concept of *typographic dispositif* in the preceding section). Aspects regarding space and order are not taken as matter-of-fact, they are among the central variables exploited for their subtle 'meaning'-making potential. In linguistics, too, spatiality – rather than visuality – has been identified as the governing feature of writing (see Harris 2005, 74). However, again, linguistics focuses on the abstract – and in this case (almost) universal – features characterizing the written modality in general, including its two-dimensionality, rectilinearity, and directionality. Interestingly, these general spatial features are among the first grasped by children socialized in literate cultures – often before they are exposed to institutionalized literacy instruction, during which they are introduced to the relation between graphic marks and language (see Meletis 2020a, 265–76). This points to the perceptual and cognitive salience of spatial features. Echoing the skeleton/dress-distinction, linguistics is interested in

the existence of, for instance, blank spaces between words in many of the world's writing systems since these are of linguistic (and psychological) significance. However, as long as they are clearly distinct from the spaces between individual graphemes (what typography deals with under the heading of 'letter-spacing'), the exact width of word spaces is not of concern to structural linguistics but, much like concrete typefaces, disregarded as 'variation'.

In grapholinguistics, the consideration of systematic spatial features has recently been termed the 'cartography' of the writing surface (see Reißig 2015, Meletis 2020a, 2020b). The concept is based on different hierarchical spaces – segmental, linear, areal, and holistic – which are mainly distinguished by the existence of blank spaces of varying magnitude (see also Crystal 1979, Bredel 2008) and focuses on the written units occupying these different spaces. Figure 3 illustrates them, with Table 2 collecting some example questions whose investigation remains a grapholinguistic desideratum. This emphasizes the vast potential of a tight interlocking of linguistics and typography – and, indeed, that linguistics may need typography more than the other way around.

Table 2. Example questions regarding phenomena in the scope of different spaces from a typographic-linguistic perspective

Space	Example questions
Segmental	Is there an internal organization to the segmental space (as in the case of Chinese characters, where different graphic and functional components preferentially occur in the right versus the left parts of the segmental space)?
Linear	How is the linear space internally organized to capture systematic features shared by a script's shapes (for example, are there horizontal subspaces that are divided by lines such as the *base line* and captured with concepts such as *x-height* and *cap height* as well as relevant for elements such as *ascenders* and *descenders*)? Are the smallest blank spaces located between letters/characters (as in printed Latin script or the Chinese and Japanese writing systems), mostly between words (as in Arabic script), or between phrases (as in Thai)? Are there different kinds of spacing in the linear space (as in Latin, where we can distinguish letter-spacing and word-spacing)? Aside from blank spaces, how are larger – and linguistically potentially significant – structures visualized in writing? For example, how do ascenders and descenders visualize written syllable structures in German (see Fuhrhop and Buchmann 2009; an example in English would be the syllable <dog>, in which the ascender in |d| and the descender in |g| indicate boundaries)? How can lines be functionalized semantically (as in poetry, for example)?
Areal	How are areal spaces internally structured, and what could a typology of different areal elements (paragraph, footnote, etc.) look like? What is the visual structure of lists, and how does it distinguish them from running text (see Reißig 2015)?
Holistic	What are culturally dependent vs. cross-cultural typographic dispositifs? Is there a universal 'visual grammar' (see Kress and van Leeuwen 2021)? How does the spatial arrangement of the multimodal components of texts influence reading paths?

> What are significant differences between static holistic spaces (for example a page in a book) versus dynamically changing holistic spaces (for example the part of a document that is currently shown on a screen and that can be manipulated by actions such as zooming or scrolling)?

A holistic and shared way forward: the emergence of an interdisciplinary grapholinguistics

At the end of his keynote, David Crystal determined that there was still a long way to go to arrive at a 'typographical linguistics'. He claimed, for example, that 'there is not even a standard terminology for describing the distinctive letters and diacritics that turn up in different alphabets, let alone non-alphabetic systems', which ultimately led him to conclude that 'we are nowhere near a universal framework for describing typographic contrasts with structural relevance' (Crystal 1997, 23).

In this statement, Crystal encapsulates much of what was discussed in the present essay, including the rudimentary status of linguistic methods to not only describe the shapes of scripts but also to compare them. He highlights both the underdevelopment of graphetics and the lack of typological and non-Latin perspectives. It is also striking that after having cited throughout his paper many examples concerning 'dresses', to make his final point, Crystal (a linguist obviously influenced by the leading linguistic paradigms of the twentieth century) reverts to the perspective of the 'skeleton' by foregrounding the 'structural relevance' of typographic contrasts. Back in 1997, this could have been interpreted as a conflation of genuinely typographical questions concerning the subtle (connotative, social, psycholinguistic) effects of typographic choices with the fundamental underlying structure that is – even if only marginally, given its traditional focus on spoken language – attended to by a strictly structuralist linguistics. Of course, as sketched here, around the 2000s, coinciding with the steady popularization of sociolinguistics, a paradigmatic turn began to show its effects and questions of the 'dress' began to be negotiated in a (socio)semiotically based linguistics increasingly aware of the importance of the actual materiality of multimodal texts. Notably, the sociolinguistic study of writing, although quickly much more popular (but see Lillis and McKinney 2013 for some challenges), did not supersede the structural one. However, the overlap between their research agendas was slim to none, pointing to a possibly insurmountable incoherence in what Crystal envisioned as a 'typographical linguistics'.

This has changed with the gradual emergence of grapholinguistics as the interdisciplinary study of writing (see Meletis and Dürscheid 2022 for an overview). Terminologically, it is more cohesive and compact than Crystal's 'typographical linguistics'; by dropping the 'typo-', it implies a broader scope that encompasses all writing, i.e. not just type but also handwriting, and not just concrete materializations but also formal and functional abstractions. The goal of this field – which, like graphetics, developed out of the Germanist study of writing of the 1980s (as previously discussed) – is to provide a comprehensive theoretical and methodological framework for studying writing by

combining, among others, structural, psycholinguistic, and sociolinguistic perspectives to cover the system, use, and ideologies (what Silverstein called the 'total linguistic fact', see Silverstein 1985) of writing. Accordingly, grapholinguistics is interested in both the skeletons and dresses of all kinds of scripts and writing systems, whose study requires combining the knowledge and expertise of (not only) linguists and typographers. An example of this in action is the recent inception of a conference series titled *Grapholinguistics in the 21st Century*,[22] which was first held in 2018 in Brest, France. There, linguists and typographers come together to elucidate open questions regarding writing. As was argued in this essay, one of the next major steps is for scholars and practitioners of these as well as other disciplines to – together – step out of their still predominantly Latin-centric comfort zones and more systematically include in their research non-Latin scripts as well as the writing systems that employ them. Skeletons and dresses – or structure and variation – are not antithetical but cannot exist without one another. It is high time that this be reflected in research on writing.

References

Althaus, Hans P. 1973. 'Graphetik'. In *Lexikon der germanistischen Linguistik*, edited by Hans P. Althaus, Helmut Henne, and Herbert E. Wiegand, 105–18. Tübingen: Niemeyer.

Assmann, Jan. 1988. 'Im Schatten junger Medienblüte. Ägypten und die Materialität des Zeichens'. In *Materialität der Kommunikation*, edited by Hans Gumbrecht and Karl Ludwig Pfeiffer, 141–60. Frankfurt a. M.: Suhrkamp.

Bazell, C. E. 1956. 'The Grapheme'. *Litera* 3: 43–6.

Beier, Sofie, and Kevin Larson. 2013. 'How does typeface familiarity affect reading performance and reader preference?' *Information Design Journal* 20 (1): 16–31. https://doi.org/10.1075/idj.20.1.02bei

Bergerhausen, Johannes, and Thomas Huot-Marchand. 2021. 'The Missing Scripts Project'. In *Grapholinguistics in the 21st century, Proceedings, Part I, Paris, France, 2020*, edited by Yannis Haralambous, 439–454. Brest: Fluxus Editions. https://doi.org/10.36824/2020-graf-huot

Bredel, Ursula. 2008. *Die Interpunktion des Deutschen: Ein kompositionelles System zur Online-Steuerung des Lesens*. Tübingen: Niemeyer. https://doi.org/10.1515/9783484970502

[22] See https://grafematik2022.sciencesconf.org/ (accessed 19 February 2023) for the website of the third iteration of the conference (2022).

Brekle, Herbert E. 1994. *Die Antiqualinie von ca. −1500 bis ca. +1500. Untersuchungen zur Morphogenese des westlichen Alphabets auf kognitivistischer Basis*. Münster: Nodus.

Coles, Stephen. 2012. *The anatomy of type*. New York: HarperCollins.

Crystal, David, and Derek Davy. 1969. *Investigating English style*. London: Longman.

Crystal, David. 1979. 'Reading, grammar and the line'. In *Growth in reading. Proceedings of the Fifteenth Annual Course and Conference of the United Kingdom Reading Association Nene College, Northampton*, *1978*, edited by Derek Thackray, 26–38. London: Ward Lock.

Crystal, David. 1997. 'Toward a typographical linguistics'. *Type* 2 (1): 7–23.

Daniels, Peter T., and William Bright, eds. 1996. *The world's writing systems*. Oxford: Oxford University Press.

Daniels, Peter T. 1990. 'Fundamentals of grammatology'. *Journal of the American Oriental Society* 110 (4): 727–731. https://doi.org/10.2307/602899

Daniels, Peter T. 2018. *An exploration of writing*. Bristol: Equinox.

Duncker, Dorthe. 2022. 'Scriptism with a vengeance. Or, how writing was forgotten'. *Language & Communication* 86: 18–27. https://doi.org/10.1016/j.langcom.2022.06.005

Fuhrhop, Nanna, and Franziska Buchmann. 2009. 'Die Längenhierarchie: Zum Bau der graphematischen Silbe'. *Linguistische Berichte* 218: 127–55.

Gelb, Ignace J. 1952. *A study of writing*. Chicago: University of Chicago Press.

Gnanadesikan, Amalia E. 2009. *The writing revolution: cuneiform to the internet*. Oxford, Malden: Wiley-Blackwell. https://doi.org/10.1002/9781444304671

Günther, Hartmut. 1993. 'Graphetik – Ein Entwurf'. In *Homo scribens. Perspektiven der Schriftlichkeitsforschung*, edited by Jürgen Baurmann, Hartmut Günther, and Ulrich Knoop, 29–42. Berlin, Boston: De Gruyter. https://doi.org/10.1515/9783111377087

Hall, Robert A. 1960. 'A theory of graphemics'. *Acta Linguistica* 8: 13–20.

Hamp, Eric P. 1959. 'Graphemics and paragraphemics'. *Studies in Linguistics* 14 (1–2): 1–5.

Harris, Roy. 2005. 'Schrift und linguistische Theorie'. In *Schrift: Kulturtechnik zwischen Auge, Hand und Maschine*, edited by Gernot Grube, Werner Kogge, and Sybille Krämer, 61–80. München: Wilhelm Fink.

Herrick, Earl M. 1966. *A linguistic description of Roman alphabets*. Hartford: Hartford Seminary Foundation.

Herrick, Earl M. 1974. A taxonomy of alphabets and scripts. *Visible Language* 8 (1): 5–32.

Joyce, Terry, and Dimitrios Meletis. 2021. 'Alternative criteria for writing system typology: cross-linguistic observations from the German and Japanese writing systems'. *Zeitschrift für Sprachwissenschaft* 40 (3): 257–77. https://doi.org/10.1515/zfs-2021-2030

Kohrt, Manfred. 1986. 'The term "grapheme" in the history and theory of linguistics'. In *New trends in graphemics and orthography*, edited by Gerhard Augst, 80–96. Berlin, Boston: De Gruyter. https://doi.org/10.1515/9783110867329.80

Kress, Gunther, and Theo van Leeuwen. 2021. *Reading images: the grammar of visual design*. 3rd edn. London: Routledge.

Lillis, Theresa, and Carolyn McKinney. 2013. 'The sociolinguistics of writing in a global context: objects, lenses, consequences'. *Journal of Sociolinguistics* 17 (4): 415–39. https://doi.org/10.1111/j osl.12046

Linell, Per. 1982. *The written language bias in linguistics*. Linköping: University of Linköping.

Linell, Per. 2005. *The written language bias in linguistics. Its nature, origins and transformations*. London: Routledge. https://doi.org/10.4324/9780203342763

McIntosh, Angus. 1961. 'Graphology and meaning'. *Archivum Linguisticum* 13: 107–20.

Meletis, Dimitrios, and Christa Dürscheid. 2022. *Writing systems and their use: an overview of grapholinguistics*. Berlin, Boston: De Gruyter. https://doi.org/10.1515/9783110757835

Meletis, Dimitrios. 2020a. *The nature of writing: a theory of grapholinguistics*. Brest: Fluxus Editions. https://doi.org/10.36824/2020-meletis

Meletis, Dimitrios. 2020b. 'Reintroducing graphetics: the study of the materiality of writing'. *Scripta* 11: 91–131.

Meletis, Dimitrios. 2020c. 'Warum hassen alle Comic Sans? Metapragmatische Onlinediskurse zu einer typographischen Hassliebe'. In *Register des Graphischen: Variation, Interaktion und Reflexion in der digitalen Schriftlichkeit*, edited by Jannis Androutsopoulos, and Florian Busch, 253–84. Boston, Berlin: De Gruyter. https://doi.org/10.1515/9783110673241-010

Primus, Beatrice. 2004. 'A featural analysis of the Modern Roman Alphabet'. *Written Language & Literacy* 7 (2): 235–74. https://doi.org/10.1075/wll.7.2.06pri

Pulgram, Ernst. 1951. 'Phoneme and grapheme: a parallel'. *WORD* 7: 1–20. https://doi.org/10.1080/00437956.1951.11659389

Reißig, Tilo. 2015. *Typographie und Grammatik: Untersuchung zum Verhältnis von Syntax und Raum*. Tübingen: Stauffenburg.

Rezec, Oliver. 2009. 'Zur Struktur des deutschen Schriftsystems'. PhD diss., Ludwig-Maximilians-Universität München.

Saussure, Ferdinand de. 1916. *Cours de linguistique générale*. Lausanne/Paris: Payot.

Scharnhorst, Jürgen. 1988. 'Die graphische Ebene im Modell des Sprachsystems'. In *Probleme der geschriebenen Sprache. Beiträge zur Schriftlinguistik auf dem XIV. internationalen Linguistenkongreß 1987 in Berlin*, edited by Dieter Nerius, and Gerhard Augst, 87–102. Berlin: Akademie der Wissenschaften der DDR.

Silverstein, M. 1985. 'Language and the culture of gender: at the intersection of structure, usage and ideology'. In *Semiotic mediation: Sociocultural and psychological perspectives*, edited by E. Mertz, and R. A. Parmentier, 219–59. New York: Academic Press.

Spitzmüller, Jürgen. 2013. *Graphische Variation als soziale Praxis. Eine soziolinguistische Theorie skripturaler ‚Sichtbarkeit'*. Berlin, Boston: De Gruyter. https://doi.org/10.1515/9783110334241

Spitzmüller, Jürgen. 2016. 'Typographie – Sprache als Schriftbild'. In *Handbuch Sprache im multimodalen Kontext*, edited by Nina-Maria Klug, and Hartmut Stöckl, 99–120. Berlin, Boston: De Gruyter. https://doi.org/10.1515/9783110296099-005

Stöckl, Hartmut. 2005. 'Typography: Body and dress of a text – a signing mode between language and image'. *Visual Communication* 4 (2): 204–14. https://doi.org/10.1177/1470357205053403

Vachek, Josef. 1989. *Written language revisited*. Amsterdam, Philadelphia: John Benjamins.

Watt, W. C. 1975. 'What is the proper characterization of the alphabet? I: Desiderata'. *Visible Language* 9: 293–327.

Watt, W. C. 1980. 'What is the proper characterization of the alphabet? – II: Composition'. *Ars Semeiotica* 3 (1): 3–46.

Watt, W. C. 1981. 'What is the proper characterization of the alphabet? – III: Appearance'. *Ars Semeiotica* 4 (3): 269–313.

Watt, W. C. 1983. 'Grade der Systemhaftigkeit: Zur Homogenität der Alphabetschrift'. *Zeitschrift für Semiotik* 5 (4): 371–99.

Wehde, Susanne. 2000. *Typographische Kultur. Eine zeichentheoretische und kulturgeschichtliche Studie zur Typographie und ihrer Entwicklung*. Berlin, Boston: De Gruyter. https://doi.org/10.1515/9783110945799

Weingarten, Rüdiger. 2011. 'Comparative graphematics'. *Written Language & Literacy* 14 (1): 12–38. https://doi.org/10.1075/wll.14.1.02wei

Wittner, Ben, Sascha Thoma, and Timm Hartmann, eds. 2019. *Bi-scriptual: typography and graphic design with multiple script systems*. Salenstein: Niggli.

Wittner, Ben. 2019. 'Script is language is communication'. In *Bi-scriptual: typography and graphic design with multiple script systems*, edited by Ben Wittner, Sascha Thoma, and Timm Hartmann, 6–8. Salenstein: Niggli.