

17 Phonographic writing systems

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17.1 Introduction

Writing is certainly not the first modality that comes to mind in the context of iconicity in language, and to this day, iconicity in writing remains an understudied topic in linguistics – much like writing itself. The main reason for this is the prevalent and long largely unquestioned assumption that the spoken modality is primary (see Meletis and Dürscheid 2022: 5–11). The situation has gradually improved with the advent of grapholinguistics, an interdisciplinary field devoted to the study of writing. Studies focusing on iconicity, however, have remained sparse, as has work on writing in iconicity research;¹ this is a missed chance given that writing is indeed a fertile ground for various types of iconicity and their analysis.

Unlike speech and sign language, writing is a secondary semiotic system and thus – from a structural point of view – a secondary modality.² Written units themselves relate not directly to extralinguistic referents (or even abstract concepts of these) but are instead always associated with units of languages that are primarily spoken (or, in rare cases of notation systems for sign languages such as SignWriting or HamNoSys, units of primarily signed languages, cf. Braem 2012).³ This view, notably, presumes as axiomatic the so-called narrow definition of writing – nowadays overwhelmingly agreed upon in writing research – which defines as writing only graphic communication relating to units of language (rather than thoughts, ideas, etc.). Accordingly, writing can be referred to as ‘glottography’ (literally

¹ See the overviews of iconicity in Perniss et al.(2010), Dingemanse et al. (2020), or Taigel (2021), where writing is not mentioned alongside speech and sign language, although with respect to the latter, the potential of visuality for iconicity is explicitly emphasized.

² This is not an evaluative statement. Writing is not secondary to speech or sign language in that it is less important, it is secondary in its semiotic functioning as well as in its phylo- and ontogenetic development (see below).

³ Note that this does not mean that units of writing always relate to units of speech. As will be shown below, they may refer to morphemes, for example, which are, in theory, modality-indifferent units of an abstract language system.

‘language writing’) to distinguish it from so-called ‘semasiography’, graphic signs referring directly to extralinguistic meaning without a detour through language (cf. Glück 2011; DeFrancis 1989: 24–35). Examples of the latter are pictographic cave paintings (as forerunners of writing) or street signs. In the end, even in glottography, an association between units of writing and extralinguistic reality is established: a written word such as <tiger> relates to not only the morpheme *tiger* and its meaning, but, by doing so, also the mental concept ‘tiger’ and potentially a specific specimen of this category. However, it is paramount to emphasize the mediated, indirect nature between writing and extralinguistic ‘meaning’. These intricate relationships between (1) writing as a secondary, (2) speech and signing as primary modalities of language, as well as (3) extralinguistic meaning and the fact that iconicity operates between all three result in several layers of complexity in studying iconicity in writing (cf. Figure 17.1 for a schematic illustration). In other words, while many of this handbook’s chapters deal with how speech or sign language are iconic with respect to extralinguistic reality, writing may be iconic either with respect to itself, the other modalities of language, or extralinguistic referents (bypassing the linguistic units in between). To cap it all, these possibilities are not mutually exclusive, and writing can be iconic in all these ways simultaneously, rendering it a multi-iconic modality and relevant object of research in the study of linguistic iconicity. Notably, here, iconicity is conceived of as a matter of degree that is dynamic and dependent on interpreters – it is not an inherent structural feature but always in the eye of the beholder⁴ (see also Nänny 1999: 174).

⁴ In the view adopted here, this applies in an absolute sense: <O>, for example, may share its shape with, e.g., the sun or the moon (cf. Nänny 1999), but it ‘depicts’ them only if this iconicity is dynamically established in semiosis through viewers’ perception.

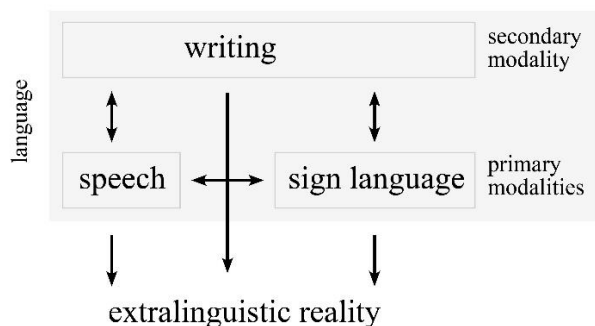


Figure 17.1: Possible iconic relationships between the modalities of language and extralinguistic reality

As established, writing is a modality of language, with writing systems being linguistic notation systems that serve the graphic representation of languages. They can be conceived of as pairs of material scripts and language systems (cf. Weingarten 2011): the English writing system, for example, pairs Roman script with the English language, the Russian writing system Cyrillic script with Russian. As linguistic systems, writing systems consist of basic structural units; these graphemes are signs combining visual signifiers with linguistic signifieds (cf. Meletis 2019), the latter being units at several linguistic levels depending on the system in question. In writing system typology, these levels motivate the classification of different types of writing systems (cf. Joyce and Meletis 2021). Agreed-upon units that graphemes relate to are phonemes, syllables, and morphemes; others that are being discussed include the phonological feature (see below), the mora, and the word. As units of segmental and suprasegmental phonology, respectively, phonemes and syllables form the basis of phonographic writing systems (segmentaries and syllabaries). These make up the majority of writing systems in use today and are the focus of this chapter; the second major type, morphography, will be covered in the following chapter (cf. Zhao and Kammerzell, this volume). Based on this broad typological distinction, and before any detailed analysis of types

of iconicity in writing, it is paramount to expand on how iconicity manifests differently in phonography vs. morphography.

The main reason for this difference is ‘double articulation’ (or ‘dual patterning’), a core design feature of human language (see Martinet [1949]; Hockett [1960]; cf. Mersmann [2015] for a discussion of how the two types are often juxtaposed as opposites concerning iconicity). Grapholinguistically, it is reflected in the distinction between cenemic and pleremic writing systems (see Haas 1976): morphographic graphemes are signs of signs as they relate to morphemes, meaning-bearing linguistic signs associating a form with a meaning, making morphography pleremic (from Greek *plērēs* ‘full’). The morphemes’ meanings make possible iconic relations – of the imagic kind (see below) – between graphemes, morphemes, and extralinguistic reality. Morphemes, now, are doubly articulated insofar as their form is comprised of meaningless units of sound, i.e., syllables, which are themselves made up of phonemes. These phonological units lack double articulation and are meaningless or ‘empty’, making phonographic systems cenemic (from Greek *kenós* ‘empty’). While iconicity does also occur in phonology (cf. the chapters in Part III of this volume), it operates at a categorically different level than morphological iconicity. What do syllables or phonemes ‘look’ like, can their acoustic form be iconically transposed to the graphic modality? Indeed, such a direct intermodal translation appears impossible, which is why imagic iconicity assumes a marginal role in the study of phonographic iconicity (with notable exceptions, see below). In any case, even if we can identify different types of iconicity (and/or indexicality) in them, graphemes – like all linguistic signs – are symbols and fundamentally arbitrary. Any investigation of iconicity in writing is thus an analysis of iconicity in symbols that derive their function(s) through convention(alization) (see Nöth 2001: 19).

This raises the question of what iconicity occurs in phonographic writing systems. To provide an answer, the referential perspective implicitly adopted thus far must be extended: while writing systems are secondary, they are still full-fledged semiotic systems. Thus,

graphemes are not only in relations with other linguistic units such as phonemes but always also in complex relationships with each other, which cannot be explained through recourse to (relations with or dependencies on) other linguistic levels. These manifold relations bring to the fore the diagrammatic type of iconicity. The analysis of diagrammaticity in writing is complicated by writing's secondary nature, which makes for a complex web of relations that constitute multiple types of diagrammaticity: not only are graphemes related to each other as well as to phonemes or syllables, but these phonemes or syllables also partake in their own relationships (independently of writing). The result is multiple relations in phonographic writing systems that can be iconic, schematically illustrated in Figure 17.2.

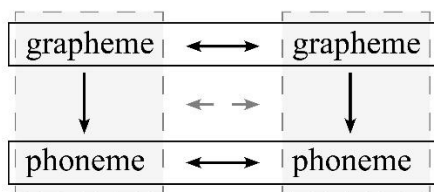


Figure 17.2: Different relational dimensions inherent in a relation between grapheme-phoneme correspondences

Due to the sparsity of existing research, the following sections aim to provide a systematic though selective overview of what and how different types of iconicity – based on the Peircean tripartite distinction of imagic, diagrammatic, and metaphoric iconicity (cf. Nöth 2001, this volume) – occur in phonographic writing systems. In Section 2, a special instance of imagic iconicity in the Korean alphabet will be presented, raising general questions regarding the possibility and feasibility of pictography in phonographic writing. The opposite relation will also be addressed: language referring iconically to the visual shapes of writing. Then, in Section 3, the focus will be shifted to diagrammatic iconicity to delve deeper into the writing system- and language-internal functioning of iconicity in phonography. To complete

the trichotomy, Section 4 discusses possible instances of metaphoric iconicity. Expanding the perspective from description to explanation, Section 5 is devoted to the cognitive foundations underlying the genesis and development of iconicity in writing. Section 6 closes the chapter.

17.2 Imagic iconicity and pictography

The first type of iconicity treated here is imagic iconicity, in which “the sign evinces an immediately perceptible similarity to its object of reference” (Nöth 2001: 21). Phonemes and syllables, the main units (or ‘objects’) of reference in phonographic writing systems, lack any linguistic meaning that could be depicted visually – they are no signs, just ‘form’, and, importantly, form in a different medium of transmission. In the world’s writing systems, no strategy has naturally developed to visually represent sounds in an iconic manner since sound has no palpable visual form that could be graphically imitated. In other words, the most direct form of graphic imagic iconicity – so-called ‘pictography’ – does not exist in purely⁵ phonographic writing systems. Syllables may be represented diagrammatically in various graphic (albeit non-written) forms such as spectrograms, made possible by the fact that syllables are suprasegmental structures exhibiting changes with(in) a temporal extension which can be depicted schematically. By contrast, meaningless segmental sounds can neither be directly depicted with graphic means nor display any (salient) temporal development that could be diagrammatically transposed to a graphic form (but cf. Everett 2019). Of course, sounds can be *transcribed*, which is the basis on which the IPA is founded. With transcription, however, we leave the realm of the iconic and are dealing with arbitrary symbols instead (whose relation to each other can still be diagrammatic, see next section).

⁵ In reality, there are no typologically ‘pure’ writing systems. What is discussed in this chapter is so-called ‘primary phonography’ in which the main graphematic relations are those with phonological units. In such systems, however, there is often secondary morphography, whereas in primary morphographic ones – such as Chinese – forms of secondary phonography can be found (cf. Meletis and Dürscheid 2022: 216–217).

Yet, there is an often-discussed (and idealized) alphabet that exhibits iconic traits – Korean.⁶ Its script, Han’gŭl, said to have been invented by King Sejong in the 15th century (see Lee 2009: 202; Mersmann 2015: 111), depicts (relatively systematically) places of articulation in the shapes that materialize consonant graphemes (see Figure 17.3). Structurally, the smallest graphematic relations in Korean are those between features of graphemes’ visual shapes and phonological features of the phonemes that these graphemes correspond with (cf. Kim [2011] for a sophisticated analysis of iconicity in Han’gŭl). Due to the ingenuity and uniqueness of using phonological features as level of representational mapping, Korean has prompted the proposal of a distinct type in writing system typology, the so-called ‘featural type’ (see Sampson [1985] 2015). While this appears to be an instance of true imagic iconicity in a phonographic system, it is paramount to note that it operates at a metalevel: the shapes depict not sounds but instead visually approximate places, modes, and/or organs of articulation involved in their production. Thus, to recognize the iconicity one requires certain (metalinguistic) awareness or even explicit knowledge of how a sound is produced. Consider <ㄱ> /k/, which is the shape used to derive other shapes of graphemes relating to velar consonants (i.e., <ㄲ> /k̟/ and <ㅋ> /kʰ/). When picturing a left-facing sagittal cut of the oral cavity as illustrated in Figure 17.3, this shape shows the dorsum approximating (or even touching) the velum. For bilabial and glottal consonants, the perspective is shifted, and a front view of the mouth is the basis for pictographic relationships (see also Figure 17.3); these spatial perspectives are captured by Kim’s (2011) ‘directional iconicity’.

⁶ Although the consensus is that “the letter of the Greco-Roman alphabet is effectively nothing more than the transcription of a phoneme” (Christin 2016: 20), Allott (2000) ponders the idea of an articulatory basis – much like the one witnessed in Han’gŭl – for the shapes of Roman script. In an interesting thought experiment, he hypothesizes how Roman shapes could have derived from shapes that were imagically iconic with respect to the articulation of corresponding sounds. Notably, such an iconic origin is not plausible in scripts – such as Roman – that adopted and modified shapes from other systems for which pictographic origins are attested (see Mersmann 2015: 102). It is, however, a core design feature in systems that were conceived as phonographic from scratch, as was the case in the deliberate creation of Han’gŭl but also in Alexander Melville Bell’s (1867) ‘Visible Speech’ (see MacMahon [1996: 838–841], who also mentions attempts preceding Bell’s).

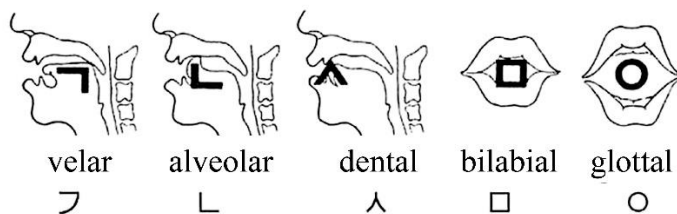


Figure 17.3: Pictography in the shapes of consonant graphemes in Korean Han'gŭl

The shapes of vowel graphemes function differently and showcase another, looser type of iconicity that is not imagic but arguably metaphoric (making it culture-specific, see Section 4) as the “vowel letters are based on the three philosophical symbols of the trinity: · (Heaven), — (Earth), and 丨 (Human)” (Lee 2009: 203).

The fact that phonetically/phonologically similar sounds are represented by graphemes whose shapes derive from the same graphic bases, on top of the respective metaphoric and imagic iconicity, adds diagrammatic iconicity, rendering Korean a hyper-iconic system (cf. Kim 2011). Notably, while the pictography in consonant graphemes and the metaphoric iconicity of vowel graphemes are exophoric,⁷ i.e., refer to something outside of the writing system and the language it is tied to, this latter diagrammaticity is endophoric, i.e., intrasystemic (see next section); in other terms, the former two are types of ‘form miming meaning’, the latter is ‘form miming form’ (cf. Nöth 2001, this volume).

⁷ It is important to add that these types of iconicity exist in addition to graphemes’ relation to given linguistic units. In other words, the existence of exophoric iconicity does not contradict the fact that all writing is glottographic, i.e., tied to linguistic units instead of directly to referents in extralinguistic reality. This also makes possible an evaluation of whether (endophoric) linguistic reference and exophoric iconicity are congruous or not: e.g., in the case of the Han'gŭl shapes used to represent consonant graphemes, the visual approximation of (aspects of) the corresponding consonants’ articulation leads to a certain congruence (at a metalevel). Such a congruence is arguably not given in the vowel graphemes, as there is no straightforward connection between vowel phonemes and “the three philosophical symbols of the trinity” (Lee 2009: 203); this iconicity is related to a *Weltanschauung* instead.

As for exophoric iconicity,⁸ the arrangement of Korean graphemes in syllable blocks must be mentioned. Structurally, Korean is an alphabet as its graphemes correspond with vowel and consonant phonemes, but, unlike in other alphabets, in which graphemes are laid out linearly on the writing surface, Korean graphemes are positioned together inside syllable blocks, each of which occupies a single space on the writing surface (see Meletis 2020a: 39). This arrangement visually reflects the influence of Chinese writing. Indeed, Korean can, much like Japanese writing – not only because both use some Chinese(-derived) characters, the hanja and kanji, respectively – be considered ‘sinographic’ (Handel 2019). The syllabic arrangement is motivated by a wish to conform to the “idealised square” (Tranter 2013: 5) “in accord with the appearance of the prestigious Chinese script” (Daniels 2017: 83). What this shows is that writing systems do not exist in a cultural, let alone visual, vacuum and often wield considerable influence on each other. This thought will be taken up again in Section 4 in discussing the socio-semiotic potential/sociocultural relevance of metaphoric iconicity. What Korean’s syllabic arrangement also illustrates is that not all imagic iconicity is pictographic: the syllable blocks do not imitate specific Chinese characters (in which case they would be graphic copies), it is rather a more general, abstract graphic trait that is visually approximated. However, the resemblance is still achieved visually, we can see it – hence we are still dealing with imagic iconicity, albeit a looser type closer to metaphoric iconicity. By contrast, in pictography, a concrete object is depicted more directly in varying levels of abstraction.

The main question thus far was how writing, through its materiality, exhibits iconicity with respect to extralinguistic reality.⁹ This will now be reversed to ask how language can be

⁸ Arguably, iconicity referring to something outside of the iconic sign is always in a way indexical (this also applies to the examples described in Section 4). The syllabic arrangement in Korean is thus not only iconic with respect to Chinese writing but also indexes it.

⁹ Both the imagic iconicity of grapheme shapes and of syllable blocks indirectly relate to language (by depicting articulation processes or resembling a different script) but are still technically directly related to extralinguistic reality.

iconic with respect to writing. In a little-received study, with examples from English, German, French, Spanish, Italian, Russian, and Hebrew,¹⁰ Brekle (1981) describes a word formation mechanism that functionalizes letters of alphabets (using Roman script) to describe the shapes of the objects denoted by the resulting lexemes, e.g., English *S-curve*, *T-shirt*, *U-turn*, *V-engine*, German *O-Beine* ‘bowlegs’, or French *décolleté en V* ‘V-neck’ and *jambes en X* ‘knock knees’. In all these compounds, the shapes of objects or concepts denoted resemble the shapes of the respective letters that are the basis of this type of word formation. These letters always modify heads, i.e., a T-shirt is a type of shirt. The existence of this word-formation strategy points to our awareness of letter shapes, whose visual configurations seem to be so perceptually salient that we exploit them to make sense of – and even name – objects in our environment in whose appearance they recur. Furthermore, and more generally, it underlines that even though writing is a secondary modality, it exerts an influence on other (primary) levels of language – in this case morphology. Crucially, this iconicity functions – and is imaged up to the point of identity – primarily when the words are encountered in their written form, where the letters in ‘their’ original, graphic, modality establish iconicity. By contrast, when they are spoken, the iconicity is lost in the translation of the visual to the acoustic. Specifically, in the spoken (or read) versions of these words, shapes are referred to by their respective letter names, as in /'ti:ʃɜ:t/ ‘T-shirt’. These likely invoke shapes, however, so while the iconicity is indirect, it plays a role as a mental image. As shown in Section 5, many shapes found in writing derive from shapes occurring in our environment. Their functionalization as ‘letters’ has made them available to us as palpable categories. These – as evidenced by this type of word formation – can be used to make sense of objects in our environment, thereby increasing the resources available for verbalizing our visual perception.

¹⁰ One example Brekle (1981: 198) provides for Hebrew is ‘*עקומה*’ *akkom S* ‘S curve’, noteworthy for including a letter from a different script than the one used in the language’s writing system. This, in a way, makes it doubly exophoric and requires a different (or at least additional) kind of knowledge to understand and make sense of the iconicity.

17.3 Diagrammatic iconicity

In diagrammatic iconicity (also ‘diagrammaticity’), “the similarity between the sign and its object is only a structural or relational one” (Nöth 2001: 21). The key word here is ‘relational’: the relation can be exophoric, i.e., when the structures of writing mimic structures found in extralinguistic reality (see Section 5), but in the following, the focus will be on endophoric diagrammaticity, in which relations are constituted within the language system. Here, given that writing is a secondary modality, we need to distinguish between diagrammaticity (1) within the writing system and (2) between the writing system and other linguistic structures within a language.

A central concept in the study of writing – especially from a psycholinguistic perspective¹¹ – is transparency. Its prominent status can be attributed to an assumed ideal of ‘one letter, one sound’ that writing systems should strive for; it is inherent in many writing-related works, especially in the context of comparing different systems (cf. Meletis [2018] for an overview). According to this ideal, grapheme-phoneme correspondences should be transparent, i.e., the relation between graphemes (as secondary units of writing systems) and phonemes¹² (as primary linguistic units) should be isomorphic – in terms of iconicity, diagrammatic. In models of reading, transparency has cemented its status as a measure of ‘quality’ in the form of, for example, the orthographic depth hypothesis (cf. Katz and Frost 1992) used to classify writing systems on a continuum from shallow (= transparent) to opaque. Finnish or Italian would be examples of shallow systems easier to acquire and read,

¹¹ The reason for its prominence in psycholinguistic reading research is the importance ascribed to (especially segmental) phonological awareness as a prerequisite (or sometimes by-product) of literacy acquisition.

¹² The term ‘grapheme-phoneme correspondence’ highlights the prevalent phonocentrism in grapholinguistics. The relation between graphemes and the linguistic units they relate to can of course also be assessed for morphography. However, grapheme-morpheme correspondences are largely marginalized given that transparency is implicitly understood in a restricted sense as phonographic transparency. If units or strings of writing are morphographically but not phonographically transparent (such as the graphemes of Chinese, in which one can – at best – only recover clues pointing to a pronunciation), they are often uncritically discarded as ‘opaque’.

while English or Danish are oft-named examples of opaque (and cognitively more demanding) systems.¹³ That transparency is not only a proclaimed ideal but indeed considered a vital factor in the acquisition and processing of literacy points to a potentially tight connection between diagrammaticity and cognition (see Krämer and Ljungberg 2016). In other words, the basic assumption is that the more diagrammatic a writing system, the easier it is to process. Isomorphy, of course, is a bilateral relation; in the paradigm of Natural Morphology, for example, diagrammaticity (or biuniqueness) is split up into the two subparameters of transparency and uniformity (see Crocco Galèas [1998]; see Meletis [2018, 2020a] for their application to writing): a grapheme is transparent if it is related to only one linguistic unit, and this linguistic unit is uniformly represented if it can be written with only one grapheme – and if both apply simultaneously, the bilateral relation is biunique. In German, for example, the grapheme <f> corresponds only with /f/; however, /f/ is represented not only by <f> but also – depending on specific contexts – by <v> or the digraph <ph> (cf. Balestra et al. 2014).

Compiling grapheme inventories – especially for alphabets – to analyze the inherent semiotic relationships between graphemes and linguistic units appears trivial, as does taking as bases phoneme or morpheme inventories and establishing how they are represented in writing. However, this straightforward evaluation of transparency only concerns the diagrammaticity of individual grapheme-phoneme correspondences. If, by comparison, two graphemes and the respective units they correspond with are considered, the analysis becomes more complex. An example is the grapheme pair <m> and <n> in alphabets using Roman script. Not only are their shapes visually similar, they also both correspond with nasal

¹³ As for a descriptive operationalization, Neef and Balestra (2011) have proposed a method of evaluating the graphematic transparency (the ‘gt-value’) of a writing system.

phonemes.¹⁴ Visual similarity can obviously be the basis of diagrammaticity – provided it is indeed paired or associated with similar functions, which is not necessarily the case.¹⁵

A special type of a non-alphabetic segmental system worth mentioning here is the so-called ‘abugida’ (cf. Daniels 1990) or mostly/fully vowelized āksharik segmentary (cf. Gnanadesikan 2017). In abugidas, each consonant phoneme is commonly represented by one shape. In their unmodified forms, these shapes correspond not only with consonants but also with an unmarked inherent vowel – in many systems a rendition of /a/. Yet, as the type’s more elaborate designation suggests, vowels other than this inherent one are also represented – by systematic modifications of the basic consonant graphemes. For example, in Thai, the vowel phoneme /i:/ is written by adding a small shape <◌◌◌> on top of the consonant shapes. In terms of diagrammaticity, this situation does not differ significantly from that in transparent alphabets, where vowel phonemes can also be represented by graphemes with only one (or few) shape(s). The decisive difference is, of course, the secondary status of vowel graphemes in abugidas (and ‘abjads’¹⁶): They are mostly smaller and positioned non-linearly in the periphery of consonant graphemes, on which they also depend. The (non-)inclusion of vowel graphemes and their secondary status when compared to consonant graphemes are important features in the typologization of writing systems and underline the (synchronic but also diachronic) primacy of consonants over vowels in writing (cf. Gnanadesikan 2017: 29) – and

¹⁴ For a study showing that “letters that look similar tend to sound similar in their canonical pronunciations” in Arabic, Hebrew, and English, cf. Jee et al. (2022).

¹⁵ For example, in Thai, the graphemes <u> and <ɿ> relate to /b/ and /p/ respectively, while <u> and <ɿ> represent /p^h/ and /f/. The elongation of the rightmost stroke in the second shapes in both pairs could have been assigned a consistent function (i.e., representing voicelessness), which would have established a diagrammatic relation. Such ‘unused diagrammatic potential’ can have many reasons (although it does not require a reason), among them sound change.

¹⁶ Abjads – examples of which are the writing systems of Arabic and Hebrew – are systems in which consonant and long vowel phonemes are represented by graphemes but not (or only optionally) short vowel phonemes (cf. Daniels 2017; Gnanadesikan 2017). Thus, in abjads, vowels are also graphematically secondary – arguably even more so than in abugidas, where they (both short and long) are mostly graphically secondary but always obligatory.

possibly language. At the most abstract level, this implies that what is explicitly represented in writing is only (or predominantly) the most salient features of language.

A fascinating outlier among abugidas shall be mentioned: the writing system of Cree, which uses a version of Canadian ‘syllabics’¹⁷. As illustrated in Table 17.1, each consonant phoneme is represented consistently by a given shape – which is typical of abugidas. What makes Canadian ‘syllabics’ unique is that vowel phonemes are not indicated by systematic graphic additions to shapes but by their orientation: the way that a shape is oriented in space signifies a specific vowel. To recognize the ‘direction’ of a shape, one needs to know the unmarked ‘base’ shape and its spatial configuration. Two more remarks are necessary: firstly, we lack (to my knowledge) experimental evidence that would show whether the acquisition (and use) of the system is complicated by the multifunctionality of shapes and whether (and how) orientation is suited as a distinctive feature. Such evidence would be valuable as Wiebelt’s (2004) detailed analysis reveals that extrinsic symmetry – a shape assuming multiple distinct functions in a system based solely on its orientation – poses challenges for processing due to object constancy, which enables us to recognize objects (e.g., a chair) regardless of the perspective from which we view them. This explains initial problems children encounter with the distinction between, e.g., <d> and <p> in writing systems using Roman script (cf. Pegado et al. 2011), pointing to the possibility that the feature ‘orientation’ may, from a cognitive perspective, not be suited for the establishment of diagrammaticity (at least with respect to such an important function as the representation of vowels). Secondly, Canadian ‘syllabics’ were invented only in the first half of the 19th century, meaning they are not only a deliberate invention (putting them in the same category as Han’gǔl) but also one that has not been in use long enough to have succumbed to human processing pressure like other writing systems have in which extrinsic symmetry was reduced (see also Wiebelt 2004).

¹⁷ The term ‘syllabics’ is put in quotation marks because the writing systems commonly referred to as ‘Canadian syllabics’ are not syllabographic but abugidic (see below).

Table 17.1: Cree grapheme inventory with consonants (*shape*) on the x-axis and vowels (*orientation*) on the y-axis

	-	p	t	k	ch	m	n	s	y
a	◁	<	⊂	Ⓟ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ
e	▽	∇	∪	∩	∩	∩	∩	∩	∩
i	△	∧	∩	∩	∩	∩	∩	∩	∩
o	▷	>	⊃	Ⓟ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ

The example of Cree also illustrates the difference between an abugida and a syllabary. That in Cree each grapheme corresponds with a sequence of consonant plus vowel may suggest it is a syllabographic system. However, the crucial difference between an abugida and a syllabary is that in the latter, graphemes correspond with syllables holistically, meaning one cannot recover in their shapes specific parts that relate to either the consonant or the vowel. Compare the three graphemes relating to the syllables (or moras, cf. Meletis and Dürscheid [2022: 240–42] for main points in this debate) /ma/, /me/, and /ke/ in Japanese hiragana vs. Cree, respectively: <ま>, <め>, <け>, and <L>, <∇>, <∩>. In the Japanese graphemes, no visual features or parts can be identified as corresponding with the consonant /m/ in the first two or the vowel /e/ in the latter two graphemes. In Cree, by contrast, as mentioned above, shapes relate to consonants while their orientation in space signals vowels. Thus, the graphematic distinctions in abugidas are more fine-grained than in syllabaries – which also means diagrammaticity can be found at the phonologically segmental level.

Thus far, what was addressed was diagrammaticity of or between different segmental units in writing systems. However, we do not write in segments, and especially in phonographic systems, whose basic units do not carry meaning, combining these to form

meaningful strings is a core strategy. The most salient unit in writing (and arguably every modality of language) is the word.¹⁸ In segmentaries and syllabaries (with notable exceptions such as the Thai abugida or the mixed system of Japanese), empty spaces make words visible and visually salient, rendering them perceivable based on their materiality alone: for instance, even in texts written in a writing system we cannot read, we can still identify which strings of texts are words (or word-like units) based on empty spaces between them. Furthermore, in phonography, written words are iconic with respect to length: usually, ‘longer’ spoken words, i.e., those that form an acoustic continuum extending over a longer period than other, ‘shorter’ words, consist of more graphemes and are thus graphically ‘longer’ in writing due to the correspondence between graphemes and units of sound (cf. also Mersmann [2015: 100] for ‘positional iconicity’).

The previous paragraphs showed that segmental and suprasegmental diagrammaticity is pervasive in phonography. For alphabets using Roman script, Primus (2004) suggested the existence of diagrammaticity also at the subsegmental, i.e., featural level. Based on a visual segmentation and hierarchization of shapes in heads and codas, she claimed that certain visual features of Roman shapes correspond with phonological features. While the details of her analysis cannot be reproduced here, one example shall be given: shapes with straight long heads (i.e., ascenders or descenders that extend horizontally over the entire line) – e.g., b, d, k, p, q – are used for graphemes that correspond with plosives. If one accepts her proposal as plausible (and there has been criticism, cf. Rezac 2010, 2011¹⁹), it represents an astonishing example of diagrammaticity, and the most pressing question becomes how it could have developed. The shapes of Roman script evolved over time, undergoing changes, some of

¹⁸ Notably, ‘word’ is an elusive concept. What is meant here specifically for the modality of writing is an unbroken string of graphemes between two empty spaces (cf. Fuhrhop 2008). This definition includes words with word marks – apostrophes, hyphens, or abbreviation periods – such as English <I’m>, <warm-up>, or <etc.> but is problematic for compounds such as <apple pie>.

¹⁹ The criticism is founded on the (blind) acceptance of the consensus that letter shapes are arbitrary. Interestingly, this echoes views in linguistics that for a long time hindered the systematic study of iconicity in language (cf. Perniss et al. 2010; Dingemanse et al. 2020).

which can be reconstructed based on existing data and some of which cannot. In most cases, changes were likely ‘accidental’ – they were not planned by any members of the literate community but happened unconsciously and gradually. This is also observed by Lee (2009: 210) when comparing Primus’ proposed iconicity with the one in Han’gŭl: “‘featural’ aspects in the [Modern Roman Alphabet] are accidental and planless compared to the Korean alphabet”. To understand how iconicity emerges in writing, however, this more ‘natural’ development is arguably more revelatory as it entails the question of why members of literate communities collectively strive toward an increase of systematicity in their writing systems – and how this is achieved (see also Section 5).

Primus’ analysis is relevant also to a different proposal, that of a graphematic syllable. Building on observations made in German grapholinguistics in the late 1980s, Fuhrhop and Buchmann (2009) describe graphematic syllable structures that are made visible by graphic features such as the long heads of shapes used to signify plosive phonemes. Since in German, for example, plosives frequently occur at syllable boundaries, long heads – in the form of graphic ascenders or descenders – visualize these boundaries. Much like letter shapes, syllable structures evolved; Fuhrhop and Schmidt (2014) trace some developments that led to a more visually salient syllable structure (such as the ousting of long |y| from the syllable nucleus position). Interestingly, such visualizations of syllable structures can be observed also in other alphabets using the Greek or Armenian scripts – not, however, in those using Cyrillic script²⁰ (cf. Meletis 2020a: 123–5). More fine-grained analyses of the diagrammaticity involved here are necessary.

²⁰ In Cyrillic script, many lowercase shapes are smaller replicas of uppercase shapes (e.g., <III> and <III>). This establishes an interesting iconic (both imagic and diagrammatic) relationship between majuscules and minuscules and their graphematic functions.

17.4 Metaphoric iconicity

Metaphoric iconicity (or ‘metaphoricity’) is the loosest type of iconicity; it is “mediated iconicity” as the “ideas conveyed by the sign and the idea of its object are mediated by a third idea” (Nöth 2001: 21). Thus, what applies to iconicity in general – that it lies in the eye of the beholder – is true to the largest degree for metaphoricity. Furthermore, to recognize it, one often requires specific awareness or knowledge that may be culture-specific (and/or bound to other variables such as time, the perceiver’s educational background, etc.). While no systematic descriptions of metaphoricity in writing exist (but cf. Hiraga [2005] for an analysis of visual metaphors in literary texts), in this section, selected phenomena are presented that illustrate how it can manifest in writing. Note that these are not restricted to phonography, as they concern more abstract levels of relevance for all types of writing.

While in the analysis of diagrammaticity, the functional – i.e., linguistic – aspects of writing were foregrounded, much of the metaphoricity in writing relies on its materiality. Interestingly, it was precisely these revelatory material features that were – and often still are – neglected in linguistics based on the assumption that they are non-distinctive (cf. Saussure 1916; Assmann 1988). This may be true structurally and denotatively, but not socially as well as connotatively and, in turn, metaphorically. Consider typefaces, tens of thousands of which nowadays exist for authors/designers to choose from. While handwriting is arguably much more individual, as every person’s handwriting is unique and auto-iconically (and somatically) refers to themselves as scribes, the socio-semiotic potential of type is much broader: typographic choices can index not only a variety of different things (‘form indexing meaning’) but also refer to scribes or – in this case more fittingly – designers; one could speak of ‘form indexing authors (as well as context)’. In a time in which people can easily design their own texts, the materiality of writing has become a significant sign providing a rich ground for analysis.

Specifically, the appearance of typefaces can render them metaphorically iconic. Comic Sans, for example (cf. Figure 17.4), due to its childlike design (which perceivers may or may not be consciously aware of) functions as a visual metaphor for childishness, restraining the way in which it ‘should’ be used. This can explain why not only its use in contexts in which it is perceived as inappropriate such as on the PowerPoint slides of professors but also more generally its overuse in all possible contexts are criticized and ridiculed in dynamic metapragmatic discourses (cf. Meletis 2020b). Another example in which typefaces participate in making meaning is typographic mimicry: as the name implies, typefaces are sometimes intended to imitate certain things. So-called ‘script typefaces’, for example, imitate handwriting, while ‘faux fonts’ or ‘exotypes’ (cf. Alessandrini 1979) rely on ‘visual stereotypes’ to index different cultures – as when Roman typefaces are made to look ‘Chinese’ on restaurant signage (see Figure 17.5 for examples of both). How well typographic mimicry functions depends on the graphic knowledge of designers and perceivers. While script typefaces are not considered problematic, the appropriateness of using faux fonts is the subject of metapragmatic discussion centering on questions such as cultural appropriation, racism, and agency (cf. Meletis 2021). This shows how emotional debates about typefaces – or ‘fontroversies’ (cf. Murphy 2017) – can get, underlining that people are aware of the iconic/indexical potential of written materiality, so much so that they engage in negotiations about it. Jürgen Spitzmüller (2013, 2015) has provided an extensive analytical framework of the socio-semiotic functions of typography, showing that it can be used to create patterns and signal genres (also through genre-specific layout, cf. the concept of ‘typographic dispositifs’ in Wehde [2000], and also Krämer [2003, 2012, in this volume] for the focus on writing as a two-dimensional, planar phenomenon), to express, negotiate, and ascribe attitudes and values (‘graphic ideologies’), or to position oneself socially with respect to other (groups of) people.

ABCDEFGHIJKLMNO
PQRSTUVWXYZÀÁÉ
abcdefghijklmnopqr
stuvwxyzàáéîõøü&12
34567890(\$£€.,!?)

Figure 17.4: Comic Sans

FAUX FONT
script typeface

Figure 17.5: Faux font mimicking Chinese (above) and script typeface mimicking handwriting (below)

But not only the materiality of writing can be metaphorical; also at the graphematic level of writing can we observe certain phenomena assuming the roles of metaphoric signs. A salient phenomenon – or strategy, when practiced intentionally – is deviance from orthographic norms, which can be the cause for various (mostly negative) ascriptions. This is possible as nowadays, in many literate communities, regulations restrict what is ‘correct’ writing – often in explicitly codified form via orthographic rules. While not binding by law, these are perceived by many as socially binding. Thus, unconscious deviance – in the form of errors or mistakes – is frequently associated with low intelligence or a lack of education (see Horobin 2013). It can consequently serve as a gatekeeper based on the ascriptions it evokes, which is

how writers who make mistakes can become the targets of social sanctions, e.g., when a person is ignored or dismissed in online dating due to their orthographic mistakes.

17.5 The genesis and development of iconicity in writing

In this section, the focus is shifted from description to explanation, foregrounding how iconicity is possible in writing and why it has emerged in the first place. Both structural and usage-based perspectives will be considered.

As established at the outset, writing is a secondary modality. This observation was made from a synchronic, structural point of view. But it is true also diachronically: both phylo- and ontogenetically, writing developed and develops after the primary modalities of speech and signing, and the history of writing, spanning only a couple thousands of years, is remarkably short when compared to the history of mankind (and language) in general. The forerunners of writing were heavily iconic; cave paintings, for example, were pictographic, depicting scenes that needed to be interpreted by viewers to extract (or make) meaning. Drawing/painting, like writing, is a human invention, and a process spawning cultural artefacts. Unlike for documented deliberate inventions of scripts and writing systems (such as Han'gūl above), we cannot reconstruct the thinking and motivation involved in the inception of the first and independently conceived writing systems, but the scenarios are obvious: humans invented them, and what they had at their disposal, aside from various writing surfaces and tools, were their cognition and their physical endowment (most importantly their eyes and hands). When the first step of not only externalizing signs but externalizing them in a (semi-)permanent form using body-external tools was achieved (which also highlights the primacy of signing over writing as the former does not require tools), drawing represented a logical development. Vision is often argued to be the most prominent of the human senses (but cf. the discussion in Majid et al. [2018]), and we often describe things based on our visual perception of their appearance. This explains why there is more (at least imagic) iconicity in signing than in

speech (cf. Pietrandrea and Russo 2007; Perniss et al. 2010). As for writing, the transfer of visual resemblance to the form of drawing – and later pictographic writing – is not surprising or difficult to reconstruct theoretically. Also, given that unlike signing, writing is not fleeting but (semi-)permanent, iconicity has in many cases been preserved.

In other words, the emergence of pictography in the first stages of writing – and it can be found in Chinese, Sumerian, Mayan, and Egyptian writing²¹ (see also the next chapter) – can be explained straightforwardly. The same applies to its gradual decrease, however, which is illustrated in Figure 17.6, showing the iconic origin and later stages of the shape of <A>. It is the human tendency for facilitation (see below) that led to an increase in abstractness in written shapes and, with it, arbitrariness in their relations to linguistic functions/meanings. While pictography may be ideal to conceive of shapes in the first place as well as to subsequently learn and recollect them, when an object was too complex visually (as many elements in our surroundings arguably are), depicting it in writing was too demanding. Then again, pictographic graphemes are no photographs, and a possible resemblance between grapheme and object is established individually and is a matter of degree. This means that in order for writing to be used in literate communities, conventionalization is required in any case, even for pictographic graphemes. This need for conventions and the relative ease and speed with which it is achieved (cf. Garrod et al. 2007; Caldwell and Smith 2012; Tamariz 2017) arguably fostered the increasing abstraction of shapes in the world's writing systems, making abstractness and arbitrariness core features of writing.²² While to this day, in Chinese, the only morphographic writing system still in use, remnants of pictography can be found (cf. Xiao and Treiman 2012), they are few, i.e., even morphographic graphemes are largely

²¹ It can also be found in Dongba, a system used mostly semasiographically (but potentially also glottographically, cf. Poupard [2019]), as well as in Rongorongo and Indus script, two undeciphered graphic systems whose status as writing is still debated.

²² In a strong view, it is claimed that writing must lose (some or all of) its iconicity to function as writing (cf. Glück 2011: 71; Mersmann 2015: 101). This is arguably inaccurate as graphemes can be both arbitrary and iconic at different levels, as evidenced by examples given in this chapter.

abstract. Where does this leave phonographic writing systems and the shapes used in them?
Are they all arbitrary?



Figure 17.6: Decrease of pictography from (A) Egyptian hieroglyph representing a bull-head to (B) the Phoenician grapheme for the glottal stop to (C) uppercase and lowercase alpha (from von Heiseler 2019: 5)

With respect to this question, the much-received work by Changizi et al. (2006) proves illuminating. In a large-scale study (not without its flaws, see Daniels [2018: 152]), they found that shapes in many of the world's writing systems exhibit topological configurations resembling those found in natural scenes in our environment, concluding that “visual signs have been culturally selected to match the kinds of conglomeration of contours found in natural scenes because that is what we have evolved to be good at visually processing” (Changizi et al. 2006: E117). Not only the elements that graphic shapes consist of but also their arrangement in space and placement with respect to each other constitute their visual categorial identity, which proves vital in distinguishing them from other shapes. For example, the Roman shapes T and L consist of the same two elements (a longer vertical stroke and a relatively shorter horizontal stroke) but differ significantly in their respective relation – their topology gives them their distinct identities, which can be graphematically associated with different linguistic functions (as in English, where T is related to /t/ and L to /l/). Apparently, even in their supposed abstractness, the shapes found in writing are iconic – at a less concrete level. They do not resemble the concrete shapes of objects occurring in our environment,

especially not ones they are in a semiotic ‘form-meaning’ relationship with, making this type of iconicity in a specific way exophoric, bypassing linguistic (or any) meaning. In other words, the shape T does not reflect visual configurations found in any specific object that is related to the function assumed by T in the alphabets in which it is used. The relation is abstract, implying that in visual perception, certain configurations are central to the recognition of objects, and in inventing and continually using writing, due to processing pressure, humans have gradually imprinted on writing systems these configurations (cf. Dehaene 2009). That is how the world’s writing systems are iconic with respect to the appearance of extralinguistic objects (and our visual perception of them). Following this line of thinking, very generally put, writing systems (and especially their diachronic development) can be conceptualized as iconic with respect to the cognitive capabilities of humans.²³ One can find external evidence underlining this (as well as the fact that phylogenesis is mirrored in ontogenesis) in that it is more difficult for children to learn and memorize shapes that they are not familiar with from their environment (see Treiman and Kessler [2014]; for children’s writing, see also Pontecorvo, this volume). This does not mean that they necessarily associate an O or an X with the contexts or ‘meanings’ that they originally encountered them in/with – it rather implies that, in light of what was discussed above, it is easier to process shapes we already know from outside writing.²⁴

Having addressed the emergence and decrease of pictography, what about diagrammaticity? According to Watt (1983), the human brain tends to make systems more systematic; one of the driving forces behind this process is homogenization, i.e., the tendency to render units in a system more like one another. This potentially increases the system’s

²³ Another interesting example of this is the cognitive preference for cardinal strokes in writing (cf. Morin 2018).

²⁴ In their study, Bialystok and Luk (2007) showed that children in Hong Kong acquiring morphographic Chinese were – when compared to a group of Canadian children acquiring alphabetic English – put at an advantage when it comes to the acquisition of iconic graphemes. The learning of entirely arbitrary graphemes, however, proceeded similarly in the two groups despite the typological differences between Chinese and English.

diagrammaticity (and, thus, its ‘systematicity’). Another important force is the above-mentioned facilitation, capturing the human inclination for that what is simple – and to simplify what is complex. Hence, the shapes of writing systems gradually become easier to produce (and/or to perceive) and – sometimes for this reason – more like each other. Crucial factors, here, are time and use, i.e., systems that have been used for a longer period have more likely organically increased their systematicity, making the distinction between deliberate (young) inventions such as Han’gǔl and historically grown inventories such as Roman script a decisive one (consider in this context also the application of invisible-hand theory to linguistics, cf. Keller [2014]; specifically for writing, Meletis [2020a]). In any case, the question of how diagrammaticity develops in writing is a crucial cornerstone going forward in the study of iconicity in writing.

17.6 Conclusion

As a visual linguistic modality affording features such as – in prototypical cases – permanence, writing offers optimal conditions for establishing iconicity between graphic form and extralinguistic meaning. Simultaneously, writing is a modality of language inseparably tied to linguistic structures, which may themselves already exhibit iconic relationships (with each other or extralinguistic meaning). As has been shown in this chapter, this produces many instances of iconicity in writing that are worthy of further systematic study. Much of what was discussed here applies to writing in general; as for phonography in particular, the most important type of iconicity found in it is endophoric diagrammaticity. Interestingly, in this, phonography echoes speech, whereas the situation for morphography resembles that in signing, in which imagic (and to a considerable degree exophoric) iconicity plays a prominent role.

As the study of iconicity in writing is still mostly in its infancy, no existing systematic accounts could be referenced (but cf. Mersmann [2015] for an impressive treatment of many

aspects as well as recent semiotic accounts in Klinkenberg and Polis [2018] and Meletis [2020a]), and in the restricted space available in a handbook chapter, only a rough theoretical overview can be given. This resulted in the unfortunate omission of important examples, such as – to name just two – the iconic potential of punctuation or specific (typo)graphic variables including font size, since big sizes can, for instance, metaphorically relate to shouting or are used to reflect actual extralinguistic size, as when children write the names of bigger animals in larger size than those of smaller ones (see Pontecorvo 1985, this volume).

With grapholinguistics gaining traction, hope is that questions of iconicity in writing will increasingly come into focus as they are also a core part of a comprehensive theory of writing. While descriptions of imagic iconicity are scattered throughout work on the – mostly morphographic – systems in which it occurs, a core desideratum remains the analysis of diagrammaticity in writing systems, in other words, analyzing all iconic relations that their material and functional resources partake in. To complement this descriptive structural approach, psycholinguistic and sociolinguistic questions must be asked, as was also (selectively) done here. Only a convergence of structural and usage-based perspectives can further our understanding of iconicity in writing.

17.7 References

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