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15 Writing systems and scripts

Abstract: Rather paradoxically, given the immense significance of writing for our modern societies, as Powell (2009) astutely declares, writing is generally “poorly understood” and, lamentably, enduring misconceptions about writing systems only obfuscate. Taking the development of a coherent and consistent typology of writing systems to be an essential task for researching and comprehending writing systems and writing, this chapter focuses primarily on some of the persistent misconceptions and problematic inconsistencies concerning writing systems. More specifically, after considering the relationship between language and writing, much of Section 2 discusses some of the various typological categories and terminology proposed within the research literature. Section 3 briefly introduces a selective handful of script examples – Chinese characters, the Japanese writing system, Korean hangŭl, and SignWriting – and the chapter ends with a few concluding remarks on the wider implications of improving our understandings of writing systems and writing.

Keywords: writing systems, scripts, typology, writing, terminology

It is not hard to see that writing is the single most important technology in human life, yet it is not easy to study or to think about.

Barry Powell (2009: 1)

1 Introduction

Several books on writing systems (Coulmas 1989, 2003, 2013; Gnanadesikan 2009; Robinson 1995, 2009; Rogers 2005; Sproat 2010) start with some observations about writing being the most consequential invention or technology of humans. Such observations often seek to illustrate the sheer range of activities and achievements enabled by writing – from remote communication (texting, email, letters), entertainment (comics, novels, literature), economic and social organization (invoices, accounting, laws), to the accumulation and dissemination of knowledge (research articles, textbooks, encyclopedias, Wikipedia) – to underscore how writing is an indispensable aspect of our modern societies. Although Powell’s (2009) statement also makes this basic point, far more uniquely, it also points to the rather strange, yet regrettably very real, paradox that, notwithstanding its undeniable significance, writing is “a difficult topic, little studied, poorly understood” (as the title of

his introduction chapter puts it). After a considerable period of general neglect, growing interest in writing and writing systems over the last couple of decades or so is gradually redressing the “little studied” situation. However, ameliorating the tragedy of “poorly understood” is obviously another matter completely. A more extensive literature alone will not necessarily foster greater understanding, unless it is prepared to continually challenge and reexamine our assumptions and to confront and dispel the deeply-engrained confusions that abound about writing, the relationships to speech and language, and how writing systems function.¹ Accordingly, Section 2 of this chapter focuses primarily on some terminology issues particularly germane to the typology of writing systems as an essential tool for understanding writing systems and writing. By their very nature as classification frameworks, typologies embody certain assumptions about the phenomenon under analysis, and, in turn, the categorical contrasts proposed and labeled simultaneously allow for the analysis of those inherent assumptions. Contrastive in both its length and focus, the shorter Section 3 provides brief outlines for a small sample of script examples. The chapter concludes with a few general comments about some wider implications. However, as already signaled, given that much of the discussion turns on terminology confusions, it is only fitting to start by noting a basic distinction between *writing system* and *script*, which, as Weingarten (2011) points out, are often confused.² According to a recent definition provided by Coulmas (2013: 17), *writing system* primarily “refers to an abstract type of graphic system” that functions at a particular linguistic level.³ This definition is entirely consistent with the focus in Section 2 on the typology of writing systems. In contrast, *script* refers to a specific realization of a writing system associated with a particular language, which is consistent with the focus of Section 3.

2 Typology of writing systems

It is beneficial at the outset to briefly state the gist of the matter. Writing systems represent language and, more specifically, they function essentially at one of three

1 For example, Powell (2009: 1) singles out three “popular confusions” addressed within his book; namely, 1. “the illusion that the *purpose*, *origin*, and *function* of writing is to represent speech” (original italics), 2. “the common supposition that writing comes from pictures”, and 3. “the misapprehension that writing necessarily evolves toward the goal of finer phonetic representation”.

2 Weingarten (2011) conceives of writing systems as pairings between a particular language and a particular script, such as Amharic-Latin versus Amharic-Ethiopic, referring, respectively, to the Amharic language written in the Latin script and the Amharic language written in the Ethiopic script. Although the interpretation of writing system differs somewhat from the one adopted here, the basic proposal of identifying the language-script pairing has merit and is, therefore, adopted in Section 3.

3 Coulmas (2013: 17–18) also acknowledges a secondary sense in referring to “the specific rules according to which the units of the system are interpreted in a given language”. That is essentially

linguistic levels; either at the levels of *morphemes* (smallest linguistic units of meaning), *syllables* (phonological units consisting of either a vowel alone or a combination of a vowel and consonant(s)), or *phonemes* (smallest contrastive phonological units). Thus, the primary goal of the typology of writing systems should be to clearly communicate these core observations. Regrettably, however, the relatively small, but expanding, collection of typologies proposed so far have generally failed to adequately do that (for selective reviews, see Coulmas (1996) and Joyce and Borgwaldt (2011)). While a number of these typology proposals are introduced whenever particularly relevant, this section seeks primarily to highlight the key issues that have shaped them and motivated their category labels. This focus is greatly inspired by Powell's (2009: xv) assertion that writing "can be defined and understood, but only with the help of a careful organization of categories and terms".⁴ It should, therefore, be noted that rather than attempting to outline a complete typology proposal,⁵ the spirit here is more to illuminate some of the entrenched misconceptions and problematic inconsistencies concerning writing systems with a view to advancing and further refining typology research, given that there is, arguably, much justification to Weingarten's (2011: 12) recent pronouncement that the "typology of writing systems is still in its beginnings".

2.1 Defining language and writing

As typologies of writing systems draw on basic assumptions about language and about the relationship between speech and writing as much as reflecting interpretations concerning the creation and historical development of writing systems (Henderson 1982; Joyce 2011), our discussions start with the misconceptions surrounding the definitions of language and of writing.

Language refers to both systems of contrastive symbols and the innate human faculty to manipulate the symbol systems for communicative and cognitive pur-

the sense underlining my customary usage of the term of *Japanese writing system* (i.e. Joyce 2002; 2011; Joyce, Hodošček and Nishina 2012; Joyce, Masuda and Ogawa 2014) to refer to the unique mixture of scripts (kanji, kana, alphabet) that together constitutes a single orthographic system.

4 Indicative of the huge obstacles to be overcome, however, Powell (2009: xv) also remarks that he knows "of no other humanistic topic more distorted through the careless use of categories and terms, so that things "everyone knows" are illusions". A little later on, he also suggests that "the misuse of three words more than any others have harmed the study of the history of writing: "pictogram," "ideogram" (or ideograph), and "alphabet"" (p. 3), but, arguably, the list could be much longer. In briefly commenting on the synonyms of pictograph and ideograph, respectively, from the perspective of Japanese kanji, Joyce (2011) stresses that, although the terms have some merit in the very narrow senses of referring to two principles of kanji creation, clearly neither principle can underpin a full writing system.

5 For instance, while largely excluded in the interests of brevity, the comprehensive typology of writing systems would undoubtedly also benefit from paying more attention to the issues of tone orthographies (Roberts 2011).

poses. However, largely influenced by Bloomfield (1933) and his much-cited comments about writing being merely a means of transcribing speech, many scholars still ascribe to the *language is speech* position (Joyce 2011) that simply confuses *language* with *speech* within the standard refrains that speech, but not writing, exists in all human communities and speech is naturally acquired, but writing requires instruction. Yet, only a passing familiarity with sign languages and a moment of contemplation are sufficient to realize that sound is not a defining characteristic of language (Kyle and Woll 1985; Sandler and Lillo-Martin 2011). Undeniably, speech is the most natural language medium for normal hearing individuals, but that alone does not privilege it over writing or signing, and all should be regarded as alternative mediums of expression linked through conventions that allow for approximate transformations of linguistic content across mediums.

Misconceptions rarely stand alone; rather they tend to become enmeshed with other confusions. Thus, the *language is speech* misconception has become merged with the further confusion that writing is simply a means of making speech visible. In recent times, the idea has undoubtedly gained wider circulation due to the famous work by DeFrancis (1989), entitled *Visible speech: The diverse oneness of writing systems*, but, as Harris (2009: 46) notes, the naïve assumption can be traced back to Graeco-Roman antiquity. Harris further clarifies that, even though they sometimes function in a complementary manner, speech and writing are “completely independent, having quite different semiological foundations” (p. 46).

Powell (2009) demonstrates the tendency for scholars to define writing primarily in terms of speech by citing a number of examples, but, it must suffice here to just note the straightforward substitution with *utterance* within the representative definition provided by Daniels (1996a: 3; 2009: 36), given his prominence within writing systems research, where “writing is defined as a *system of more or less permanent marks used to represent an utterance in such a way that it can be recovered more or less exactly without the intervention of the utterer*” (original italics). In contrast, Powell (2009: 13) states “writing is a *system of markings with a conventional reference that communicates information*” (original italics), which is preferable in avoiding the common pitfall of linking writing to language only via speech. Still, some might regard Powell’s definition as being somewhat incomplete, as it alone tells us little about the relationships between language, speech and writing, but, in fairness, the elusive challenge of clearly elucidating those complex relationships cannot fall to any single definition, but is, rather, a task for the complete typology of writing systems, as a collection of coherent categories and terminology (i.e. definitions).⁶

⁶ Powell (2009) does not ignore the larger issue, because just prior to providing his definition of writing, he also comments that the “relationship between the sounds of human speech and graphic material symbols that represent such sounds in lexigraphic writing is a central problem” (p. 13).

2.2 Typological categories and terminology

The preferred term – whether taxonomy, classification, or typology – varies across the different disciplines of scientific and academic research, but the general enterprise of attempting to bring order to various phenomena is unquestionably a hallmark of human intelligence. However, given that fuzzy boundaries are rather ubiquitous, it must also be acknowledged that, in reflecting certain opinions about what to emphasize, typologies are, to some degree, always arbitrary in nature. Notwithstanding the near axiomatic status of the claim that no *pure* writing systems exist (DeFrancis and Unger 1994; Gelb, 1963; Trigger, 2004), still, for typologies to be as instructive as possible, the distinctions employed in differentiating systems should strive both to meaningfully reflect the dominant principles underlying scripts and to employ consistent and informative terminology in signaling the principles (Joyce 2011).⁷

Although some typology proposals have explored alternative formats (i.e. DeFrancis and Unger 1994; Rogers 2005; Sproat 2000), many classifications have utilized inverted-tree diagrams, where category distinctions are represented as diverging branches (i.e. Gelb 1963; Sampson 1985; DeFrancis 1989; Powell 2009). In illustration of the basic approach, Figure 1 presents Sampson’s (1985) classification of writing systems which is generally representative of the inverted-tree format.

As the present discussion broadly moves from higher to lower classification categories, the first category/term that warrants comment is *semasiography* (*meaning, signification + writing*). The term was coined by Gelb (1963), in his seminal book *A study of writing*, to be an inclusive term for various symbolic devices for conveying general meanings. The category has been included within a number of classifications from Gelb (1963), Diringer (1962), Haas (1993), Sampson (1985) to Rogers (2005) and Powell (2009).⁸ Arguably, the category has some merit within a

⁷ Anderson’s (1992: 322) comments about typologies of language succinctly capture the ideal; “We can conclude that the parameters of a typology ought to be ones from which something follows: that is, they ought to identify groups of properties that co-vary with one another, so that knowing how one thing works entails knowing about others as well, as a direct consequence of whatever it is that motivates the typological labels”. In contrast, Sampson’s (in press: 2) comments allude more to the difficulties of characterizing the dominant principles; “in classifying scripts it is necessary to define a range of ideal types, and to bear in mind that real examples rarely or never perfectly exemplify the type under which they are categorized”.

⁸ Sampson (1994) has subsequently stressed that, rather than arguing for the existence of such systems, his intention was conjectural in nature (as the dotted line in his (1985) figure sought to indicate) and merely speculating on “whether there might ever be a semasiographic system comparable in expressive power to a spoken language” (pp. 119–120). Within a glossary entry, Rogers (2005) defines “semasiographic writing” as an “alternative name for semantic writing system” (p. 297); the term he uses. Rogers (2005) argues for the existence of one semantic writing system in Bliss symbols (Bliss 1965), which he discusses at some length, although Sproat (2010), who also discusses Blissymbolics in detail, stresses the limitations of Blissymbolics as a writing system.

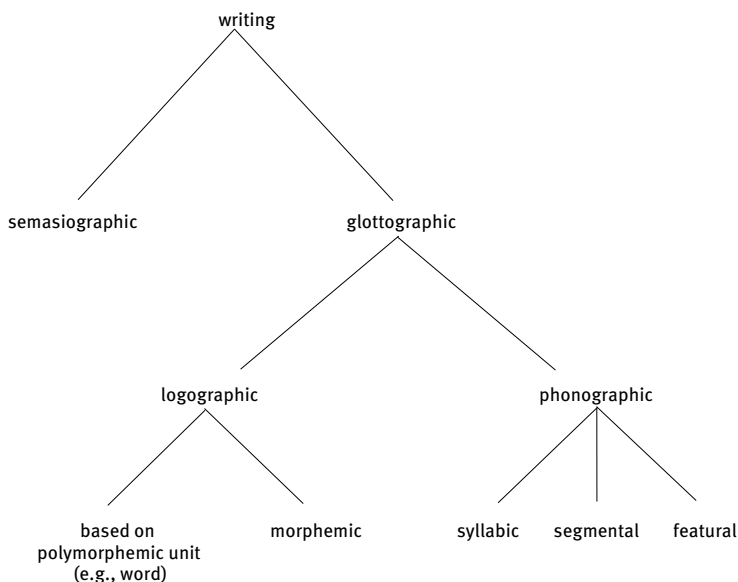


Fig. 1: Sampson's (1985) classification of writing systems.

broader classification of symbols or pictorial representations, but, as DeFrancis (1989) forcefully argues, it is vital to recognize that forms of semasiography are always extremely limited in what they can express. Consistent with DeFrancis' (1989) classification, a natural outcome of correctly regarding forms of semasiography as *nonwriting*, or, at best, as only *partial writing*, is the realization that the semasiography category falls just outside the scope of a typology of writing systems. However, typology proposals that include semasiography invariably differentiate it from some other category, such as the contrast with *glottography* (*speech + writing*) within Sampson's (1985) classification or with *lexigraphy* (*word + writing*) within Powell's (2009) classification. Although Powell (2009: 37) appears, at one point, to endorse the literal interpretation of lexigraphy in glossing it as "writing with words", from his definition of lexigraphy – "writing in which the signs are attached to necessary forms of speech" (p. 51) – it becomes clear that the superficial difference from glottography is essentially immaterial. It is not hard, however, to perceive the pervasive influence of the *language is speech* misconception behind both these terms.⁹

⁹ Given Powell's (2009) remonstrations against the confusions surrounding writing and, in particular, the first popular one cited in footnote 1 above (namely, "the illusion that ... *function* of writing is to represent speech" (p. 1), his definition of lexigraphy is all the more perplexing!

Before turning to the three linguistic levels at which writing systems basically function, there is one further typological demarcation that requires attention, because, arguably, the essence of the distinction has been one of the most elusive to conceptualize and has been one of the major sources of confusions about writing (Joyce and Borgwaldt 2011). Using the earliest and most problematic terminology, the division was once labeled as being between *phonography* (*sound + writing*) and *ideography* (*idea + writing*).¹⁰ However, now that the illusion associated with ideography – essentially, that it is possible to have a full system of writing based solely on *graphs* that directly express *ideas* independently of language – has largely been dispelled,¹¹ the contrast is usually framed as being between phonography and *logography* (*word + writing*). The deeper significance of this typological division becomes clearer once one realizes that it is essentially the same as the *pleremic* and *cenemic* contrast within the classification proposed by Haas (1976, 1983). The most important of the three binary choices within Haas' classification scheme is *empty-informed*, or *cenemic-pleremic* from the Greek words for *empty* and *full*, respectively. According to Haas' (1978, 1983) terminology, cenemic writing systems only represent sounds (i.e. phonography), but, in pleremic writing systems, the graphic units are *semantically informed* in denoting both sounds and meanings; the modern exemplar being Chinese characters. As Joyce (2011) points out, the enduring dilemma for advocates of the *language is speech* perspective is to provide an adequate account of the existence and function of the non-phonological, or semantic elements, of Chinese characters if writing is merely representing speech.

At this point, it is useful to unpack a little more the statement that writing systems represent language. Simply put, it turns out that there are just three levels of linguistic structure at which writing – as a system of marking with a conventional reference – can function in (generally) systematic ways in representing language – as a system of contrastive symbols that facilitates human communication and cognition. These are the morpheme, syllable, and phoneme levels. Moreover, the implications for a typology of writing systems should be immediately obvious; it should consist of three basic typological categories that correspond to these levels and these should be clearly distinguished with terminological labels that are both informative and consistent. Unfortunately, misconceptions and confusions also exist at these levels.

10 Taylor (1883) proposed one of the earliest classifications of writing systems. It consisted of 1. pictures, 2. pictorial symbols, 3. verbal signs, 4. syllabic signs, and 5. alphabetic signs, where (1–3) were referred to as ideograms and (4–5) as phonograms (as cited, for example, in Daniels 1996, 2001; DeFrancis 1989; Diringer 1962; Hill 1967; Trigger 2004),

11 As Sproat (2010: 183) comments, it is “most unfortunate” that the Unicode Consortium adopted the term ideograph to refer to Chinese characters.

Taking the morpheme level first, the main problem appears to be blind conservatism. As Joyce (2011) argues, given the consensus amongst scholars of writing systems (Daniels 1996, 2001; Fischer 2001; Gnanadesikan 2009; Hill 1967; Kess and Miyamoto 1999; Rogers 2005; Sampson 1985; Taylor 1988) that *morphography* is a more precise typological label than logography, typologies should cease to perpetuate this particular confusion. The sheer number of symbols necessary for a purely word-based writing system means that the only level above the syllable level that a writing system can function at is the morpheme level.¹²

Turning next to the syllable level, or *syllabography* category, although failures to consistently apply coherent criteria are highly endemic among typologies of writing systems, the ramifications are especially conspicuous at this level. The appropriate criteria must be the linguistic level that is predominately represented by the unitary symbols of the writing system. If it is the syllabic level, then the writing system should be classified as being syllabographic, irrespective of whether or not the symbols only provide approximate indications of a target syllable and irrespective of whether or not they possess internal structure or share visual similarities. As testimony to Daniels' (2001: 68) observation that the "key to the history of writing is the primacy of the syllable", it is hardly surprising that there should be a few variations in how syllabographic writing is actually realized, but, for a principled typology, it is vital to preserve the integrity of the linguistic level and to locate further method demarcations at a new level within the typology. Despite his keen insight about the significance of the syllable, Daniels' (1990, 1996, 2001, 2009) classification is perhaps the most influential example of a typology that is greatly undermined by the basic confounding problem. The classification consists of six categories of 1. logosyllabary (morphosyllabary), 2. syllabary, 3. abjad, 4. abugida, 5. alphabet, and 6. featural.¹³ However, as a number of these category labels are relatively unfamiliar, a little further explanation is probably required for the full extent of the typology problem to become apparent. Starting with *abjad*, which refers to a writing system where each character stands for a consonant, such as scripts used for Semitic languages, in contrast, *abugida* refers to a writing system where each character stands for a consonant accompanied by a particular vowel and combinations of the consonant and other vowels are indicated by additions to the base symbol, such as scripts used for various Indic languages. Analogous to

¹² In contrast to the phonological analysis of words within cenic writing systems, Hill (1967) astutely notes that the analysis of word meaning for pleremic writing systems naturally settles on the morpheme; the smallest element of linguistic meaning.

¹³ Daniels' (1990, 1996, 2001, 2009) justifies his proposals of abjads and abugidas by claiming they solve the problem of traditional classifications, such as Gelb (1963) which zealously presented the alphabet as telos (for further discussion of Gelb's classification, also see Coulmas (1996), Rogers (2005), Sproat (2000) and Trigger (2004)).

the term *alphabet* being derived from the names of the first two letters, *alpha* + *beta*, Daniels coined the term *abjad* from the first letters of the Arabic script and the term *abugida* similarly from the Ethiopic script. Moreover, the featural category refers to writing systems where the shapes of the characters correlate with phonetic features of segments, and the category was first proposed by Sampson (1985) solely for Korean *hangŭl*. From a typological perspective, however, Daniels' classification is undeniably confusing heterogeneous typological criteria in its mixture of linguistic levels (categories 1 and 2) with exemplar names (categories 3, 4, and 5) together with a description of grapheme structure (category 6). The serious consequence is that these typological categories essentially obscure the key point that syllabography is the common underlining principle for *syllabaries* (basically separate symbols), *adjads* (under-specification of the target syllable's vowel), *abugidas* (extensions to graphemes for core syllables) and *featural* (grapheme gestalt). Moreover, limited appreciation for the importance of maintaining coherent typological conventions is also apparent in a number of muddled compound labels, such as *consonantal alphabet* for *abjad* (Gnanadesikan 2009) and *alphasyllabic* for *abugida* (Bright 1999; Swank 2008), which fail as informative typological labels on the two counts of not consistently indicating the salient linguistic level and not sufficiently explaining grapheme structure. While stressing the clear logical imperative that, in order to preserve the significance of the linguistic level, finer demarcations of syllabographic writing systems must be located at a lower typological level, still, I readily defer to other researchers more familiar with the relevant scripts for appropriate category proposals, perhaps along the lines suggested in Faber (1992).

The ignorant hand of conservatism is also a major source of distortion at the final linguistic level of phonemic writing. Despite Diringer's (1962: 24) claim that "alphabetic writing has within the past three thousand years assumed such importance as to deserve a category of its own", the practice of labeling the category after its sole exemplar is absolutely antithetical to the objectives of a typology to be informative and consistent (Coulmas 1996; Hill 1967). From the perspective of illustrating the possible relationships between language and writing, it is vital to appreciate two related points about the phonemic writing system that consists of symbols for both consonants and vowels. The first is that all alphabets trace back to the Greek alphabet which "was a single invention that took place at a single time" (Powell 2009: 231) and the second, which also underscores its uniqueness, is the unnaturalness of phoneme segmentation, which Faber (1992) argues to be consequence of alphabetic writing rather than being a necessary precursor.

Taking the primary objective of the typology of writing systems to be in elucidating the fundamental relationships that mediate between contrastive symbols of language and the contrastive symbols of writing, clearly, it is most appropriate to base its core categories on the salient levels of linguistic structure. However, it is also equally clear that a single level of typological categories alone is insufficient

to adequately capture all the subtle nuances of writing systems. In addition to the especially thorny issue of how to meaningfully distinguish between various ways of realizing syllabography, which, as already noted, requires an additional typology level, another highly elusive issue, as also hinted at earlier, is that these basic typological categories are idealizations that are rarely realized by actual scripts. These two aspects are, arguably, related, but they undoubtedly represent serious challenges for the development of the comprehensive typology of writing systems. It is, therefore, instructive to briefly comment on a few typological proposals where the issue of typological *purity* is more visible. The first is what DeFrancis and Unger (1994) refer to as a *realistic* view of writing system typology. Assuming a theoretical continuum between *pure phonography* and *pure logography*, DeFrancis and Unger argue that the actual range of writing falls within the middle area of the continuum, in rejection of typologies they regard as *naïve* in locating two distinct groupings of writing systems separately towards the two extremes with an empty middle space.¹⁴ In more radical departures from the common tree-format typology, first, Sproat (2000) and, subsequently, Rogers (2005) adopt a similar strategy to locating writing systems within a theoretical space defined by two dimensions; namely, the type of phonography (five categories on horizontal axis) and the amount of logography/morphography (along vertical axis) involved within a system. In illustration, Figure 2 presents Rogers' (2005) classification of writing systems, which, although adopting Sproat's (2000) basic strategy, differs in two respects; namely in the labels for the five phonography categories and a preference for the term morphology over logography.

However, two problems stand out immediately. The first is that the relative placements of different writing systems on the proposed continuum or dimensions are highly subjective in not being based on any clear methodology for measuring or quantifying varying degrees of principle *purity*.¹⁵ The second problem is that, in positioning the five categories along the phonography dimension, they are essentially framed as being mutually exclusive (at least, as the basic strategy has been instantiated by Sproat (2000) and Roger (2005)). Arguably even more serious than the first problem, this seems to completely miss the deeper insight that principle

14 Of the six writing systems singled out by DeFrancis and Unger within the middle area, Finnish is located furthest towards the pure phonography extreme, with French and English progressively closer to the center, while Chinese is positioned furthest towards the pure logography side, with Japanese more central than Chinese and then Korean more central still.

15 In fairness, it may be noted that, despite an extensive literature on the related notions of orthographic depth or orthographic transparency, practical methodologies for measuring and cross-linguistic comparison of principle consistency are still largely under development. For example, Neef and Balestra (2011) propose a method for calculating graphematic transparency for phonemic (alphabetic) writing systems that yields a graphematic transparency value (g-t value).

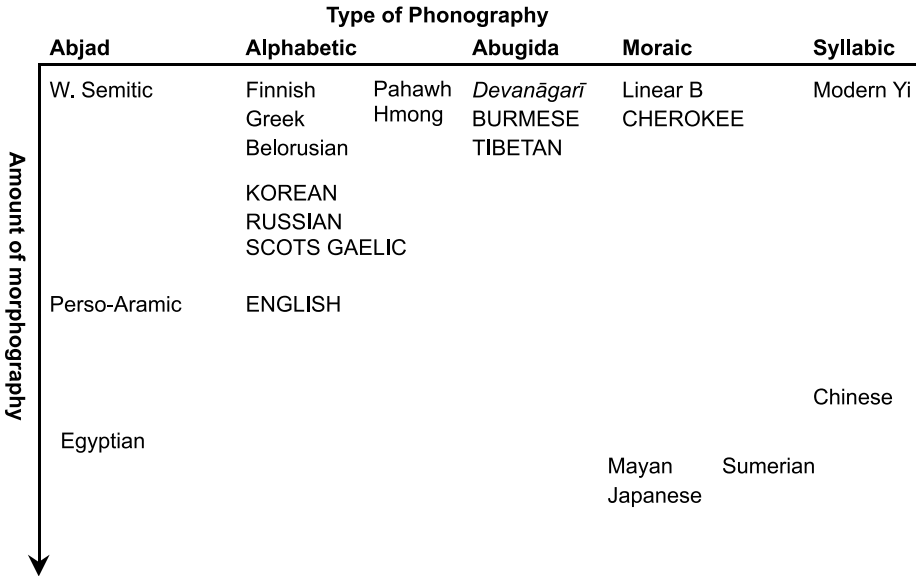


Fig. 2: Rogers' (2005) classification of writing systems (capitals show deep systems; regular type, shallow).

inconsistencies are a direct reflection of a particular script simultaneously utilizing a mixture of principles, of which morphography is one rather than being a separate dimension.

One of the crucial challenges for the typology of writing systems is to discern the core set of principles functioning within the apparent diversity of the world's scripts (Joyce and Borgwaldt 2011). As Coulmas (1996) rightly notes, the typology of writing systems must find the right balance between too many categories that ignore key commonalities and too few categories that obscure important distinctions. Accordingly, the present discussions have been largely shaped by two typological tenets. The first is that the primary categories of the typology must be the relevant linguistic levels – either the morpheme, syllable or phoneme levels – while the second is that, because further demarcations – whether attempting to capture different methods of realization or principle mixtures – are typologically different in nature, they require additional levels of categories. If typology research fails to adhere to coherent classification principles, regrettably, the consequences can only be misconceptions and confusions.

3 Handful of script examples

This short section seeks to be more illustrative in nature and consists of brief outlines for a small sampling of scripts. In contrast to the abstract dimension to the term *writing system*, *script* refers to the specific set of graphic symbols that is conventionally employed to express the written medium forms of a specific language based on the functional relationship between linguistic and graphic units.

3.1 Chinese-Chinese characters

The first language-script pairing singled out for specific comment is that of Chinese-Chinese characters (漢字 (traditional), 汉字 (simplified)¹⁶ /hanzi/ *Han character*). Despite its long history and wide-spread use, there is, undoubtedly, much to Sproat's (2010: 34) keen observation that "few writing systems have been more misunderstood than Chinese". Not surprisingly, these misunderstandings have been deeply entangled with the general confusions surrounding writing and the typology of writing systems. Since DeFrancis' (1989) classification, Chinese characters are often categorized as being morphosyllabic (or, less precisely, as logosyllabic) (Coulmas 1992; Daniels 1990, 1996, 2001, 2009; DeFrancis 1989; Hung 2012; Mair 1996; for related discussion, see also Joyce 2011). However, as discussed earlier, without clear typological conventions, such compound labels are far from informative and are open to subjective interpretation. For instance, DeFrancis' (1989) own analysis greatly stresses the phonetic value of the syllable and, while claiming not to deny the presence of morphemic (semantic) reference completely, largely fails to provide adequate account of it (Joyce 2011).

One important characteristic of the Chinese language is that it is a tonal language (Coulmas 2003; Hung 2012; Powell 2009; Rogers 2005), but, as already suggested, the implications of tone representation for typologies of writing systems have largely been ignored (Roberts 2011). The following (traditional/simplified) Chinese characters are frequently used in illustration of the five tones, with both diacritic and number marking conventions.

(1)	媽 妈	flat	mā ma1	<i>mother</i>
	麻 麻	rising	má ma2	<i>hemp</i>
	馬 马	falling-rising	mǎ ma3	<i>horse</i>
	罵 骂	falling	mà ma4	<i>scold</i>
	嗎 吗	neutral	ma ma (ma5, ma0)	<i>final interrogative particle</i>

¹⁶ The main thrust of writing reforms, or script engineering, efforts by the People's Republic of China has been the simplification of Chinese characters in terms of their stroke counts (Coulmas 2013; Mair 1996; Sproat 2010).

Hung (2012) provides a concise introduction to a number of important aspects relating to the use of Chinese characters as the Chinese writing system.¹⁷ These include brief comments about the complex relationships between the character and the morpheme, between the character and the syllable, and between the character and the word. For instance, the relationship between the character and the morpheme is not always one-to-one, as words like the two-character/mono-morpheme 葡萄 *grapes* clearly demonstrate. Similarly, the relationship between the character and the syllable is far from simple, where the incidences of homophones are very high, given that there are many more characters compared to the approximately 400 basic syllables (or about 1,300 with tone distinctions). Moreover, the relationship between the character and the word is also rather complex, where, for example, 筆 meaning *brush* can be a component of many compound words, such as 原子筆 *atom + brush = ballpoint pen* and 鉛筆 *lead + brush = pencil*. Hung (2012) also describes some other characteristics, such as the principles of character-formation and word-formation, respectively, as well as the lack of clear word boundaries.

- (2) 这是简体字书写的中文例句
- (3) zhe4/ shi4/ jian3ti3zi4/ shu1xie3/ de0/ zhong1wen2/ li4ju4
- (4) This/ is/ simplified characters/ write/ POSSESSIVE/ Chinese/ example sentence
- (5) This is a Chinese sentence example written in simplified Chinese characters

The Chinese-Chinese characters example (2) is written with simplified Chinese characters. The slashes in both transcription (3) and gloss (4) are indicating character and word segmentations.

3.2 Japanese-Japanese writing system

The next example pairing is of the Japanese language and the unique collection of scripts that constitute the Japanese writing system. The mixture includes morphographic kanji (漢字 *Chinese characters*), the two separate syllabographic scripts of

¹⁷ However, one serious problem that is frequently missed from general introductions of Chinese is the increasing use of Chinese characters in transcribing foreign names and foreign words entering the Chinese language. From the perspective of writing systems, the blurring of the morphographic and syllabographic principles is likely to have more serious, far-reaching consequences for Chinese than character simplification or limitation issues. Mair (1996: 201) provides one example and comments on the confusion potential, as follows: “Thus, because of semantic interference, readers frequently misinterpret such expressions as 特納廣播電台 *Tènà Guǎngbó Diàntái* as ‘Special Acceptance Broadcasting Station’ instead of as ‘Turner Broadcasting Station’”.

hiragana (平仮名) and *katakana* (片仮名), and phonemic *rōmaji* (ローマ字 literally *Roman alphabet*), which are employed together in complementary ways (Joyce 2011; Joyce, Hodošček and Nishina 2012; Smith 1996).

As Joyce (2011) documents, the literature on writing systems frequently describes the Japanese writing system as being the most complicated writing system. A number of the factors that undeniably contribute to the impressions of complexity have been discussed at some length elsewhere, such as the multi-script nature (Joyce, Hodošček and Nishina 2012), the dual-readings system of Sino-Japanese and Native-Japanese pronunciations associated with kanji (Joyce, Masuda and Ogawa 2014),¹⁸ the internal structures of kanji (Joyce, Masuda and Ogawa 2014), and the word-formation principles underlying two-kanji compound words (Joyce 2002, 2011), as well as the legacies of myths and confusions about kanji and their appropriate classification within the writing systems typology (Joyce 2011).

(6) これは漢字かな混じりで書かれた日本語の例である。

(7) kore/ wa/ kanji-kana-majiri/ de/ kakareta/ nihongo/ no/ rei/ dearu

(8) This/ TOPIC/ kanji-and-kana-mixture/ INSTRUMENTAL/ write-PASSIVE-PAST/ Japanese/ POSSESSIVE/ example/ COPULA

(9) This is a Japanese language example written in the Japanese writing system

Although *katakana* and *rōmaji* are missing from (6), it represents an authentic mixture of kanji (mainly nouns, verb and adjective stems) and *hiragana* (mainly grammatical elements). For instance, 書かれた /ka.kareta/ *written* consists of 書 representing the verb stem plus *hiragana* symbols for the PASSIVE-PAST inflections. While alternative terms exist, 漢字かな混じり (literally *mixture of kanji and kana*) is admittedly a less formal translation of ‘Japanese writing system’.

3.3 Korean-Hangŭl

The script associated with the Korean language is known as *hangŭl* (한글). Among the scripts of the world, it is significant for a couple of reasons. The first is that

¹⁸ Through the historical process of borrowing and adapting Chinese characters for the Japanese language, kanji have come to be associated with two separate lexical strata; Native-Japanese and Sino-Japanese. Thus, for example, 書 *write* is associated with the Native-Japanese pronunciation of /ka/ in the verb citation form of 書く /ka.ku/ *to write*, but the Sino-Japanese pronunciation of /sho/ is generally used when the kanji is a component of Sino-Japanese compound words, such as 書道 /shodō/ *write + way = calligraphy*.

history records its deliberate invention and promulgation by King Sejong the Great in 1446. The second is that it is often described as being one of the most scientifically designed and efficient scripts in the world (Gnanadesikan 2009; King 1996; Sproat 2010).

However, a third reason, which is more important for the present context, is that there has also been considerable debate among scholars concerning the appropriate classification of hangŭl within the typology of writing systems, which is, naturally, in turn, also highly illustrative of the misconceptions and confusions about writing systems. As noted earlier, Sampson (1985) specifically proposed the category of featural system for hangŭl, because the shapes of some consonant components indicate place of articulation, such as velar ㄱ /k/, dental ㅅ /s/, and bilabial ㅁ /m/. Although King (1996) refers to hangŭl as being a phonemically-based alphabet, he also acknowledges Taylor's (1979) categorization as an alphabetic syllabary because hangŭl are always written as a syllable block, such as 한 /han/ which consists of ㅎ /h/, ㅏ /a/ and ㄴ /n/.

Although not always acknowledged within linguistic descriptions of hangŭl, King insightfully points out (1996: 223) that the “history of Korean orthography is characterized by a tug-of-war between phonemicists and morphophonemicists”.¹⁹ The observation that orthographic principles can be mixed even with a script specifically designed to function at a particular level of linguistic structure would seem to have serious implications for thinking about principle consistency.

(10) 이것은 한글로 쓴 한국어의 예이다

(11) ikes-un/ hankul-lo/ ssun/ hankuke-ui/ yey-ita

(12) this-TOPIC/ Hangul-INSTRUMENTAL/ write-RELATIVE/ Korean language-POSSESSIVE/ example-COPULA-DECLARATIVE

(13) This is a Korean language example written with hangŭl

The spaces in (10) segment hangŭl syllable blocks into word + particle units known as *eojeol* groups. The slash segmentations in (11) and (12) are also based on *eojeol*, where, for instance, 한글로 consists of 한글 /hangŭl/ plus 로 /lo/ with *particle*. Similarly, the infinitive form of *to write* 쓰다 /ssuta/ becomes 쓴 /ssun/ write-RELATIVE.

¹⁹ According to personal communications from two Korean research colleagues, this basic tug-of-war is also at the heart of the orthography divide between South and North Korea.

3.4 American Sign Language-SignWriting

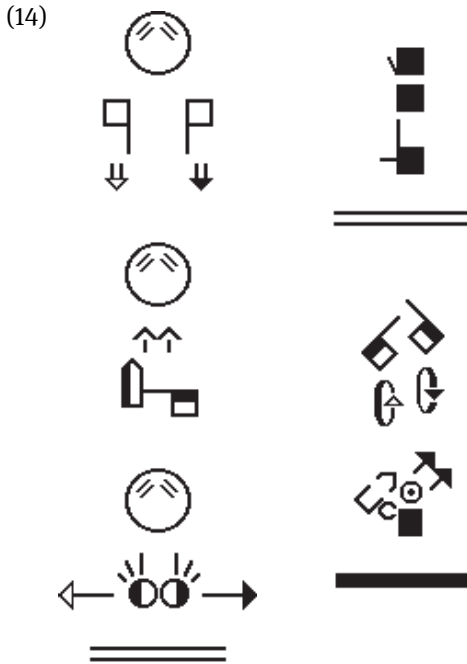
The final language-script pairing to be discussed is that of American Sign Language (ASL) and SignWriting.²⁰ In particular, this pairing warrants brief comment because of the profound implications that writing systems for sign languages have for the typology of writing systems.²¹ Although alluded to earlier, there is one point that bears repeating in this context. As sign languages provide indisputable testimony against the *language is speech* position, sound cannot be regarded as a defining characteristic of language. Moreover, as writing systems primarily represent language at either the morpheme, syllable or phoneme levels, and as it is essentially meaningless to refer to phonology in connection with sign languages, the natural inference is that writing systems for sign languages must function primarily at the morpheme level.²²

SignWriting was first developed by Valerie Sutton in 1974 from a notational system for dance (www.signwriting.org/; Coulmas 2013; Hopkins 2008; Thiessen 2011; van der Hulst and Channon 2010). SignWriting symbols are formed from component elements. There are seven categories of component symbols for hands, movement, dynamics and timing, head and face, body, detailed location, and punctuation. Within his analysis of components for encoding purposes, Thiessen (2011) counted slightly more than 35,000 symbols, with most being variations of 639 base symbols.

20 Firstly, notwithstanding Sandler and Lillo-Martin's (2001) assertion that sign languages have been recognized as bona fide linguistic systems since at least the 1960s, it should be stressed that ASL is not a gestural system related to the English language. Rather, ASL refers to the sign language used predominantly by the deaf communities in the United States and English-speaking regions of Canada. Secondly, I accept that referring to ASL-SignWriting as a language-script pairing is not totally consistent with the adopted definitions. More accurately, SignWriting refers to a writing system in the sense of the set of potential symbols that can be created from the component elements, of which only a subset (script) might be utilized in presenting a particular sign language. According to its website, SignWriting is used in more than 40 countries to represent different sign languages.

21 Even though the discussion of typology of writing systems in Section 2 focused primarily on categories and terminology issues, a considerable number of important typologies were noted, albeit only fleetingly in most cases. It is, however, particularly noteworthy that none of them attempt to incorporate writing systems for sign languages within their classifications. Although van der Hulst and Channon's (2010) discussion of notation systems for sign languages has a section on writing systems, far from proposing a typology, their main focus appears to be make distinctions between writing, transcription and coding systems.

22 While readily acknowledging that my familiarity with sign languages is extremely limited, attempts to draw parallels between the internal structures signs and phonology – which, from Sandler and Lillo-Martin's (2001) chapter on natural sign languages, appear to be fairly common practice – only seem to invite confusion. For instance, as evident in the following comment from van der Hulst and Channon (2010: 11): “SignWriting might at first appear to be a (word- or morpheme-based) semagraphic system, but it is actually phonographic: the graphs depict aspects of the phonological form of signs”.



(15) This is an American Sign Language example written with SignWriting.

(16) THIS/HERE EXAMPLE SENTENCE, ASL, SIGNWRITING.

(17) This example sentence is in ASL and SignWriting.

ASL-SignWriting (14) is read in columns from top-to-bottom and left-to-right.²³ Although the process of obtaining (14) started from (15), the Deaf informant explained that he avoided “written with” because it felt more natural in ASL to express the content according to the gloss in (16), with a more direct translation in (17). The common element in the first three symbols indicates brow raising (the circle represents the face) for topicalization, with the horizontal double lines indicating a pause. Between the final two symbols, the pause signifies “and”. The final solid horizontal line indicates a period. In illustration of its iconic nature, the WRITE element of SIGNWRITING consists of a left open palm (white hollow symbol) here signifying *surface* and a thumb to index closure here signifying *holding a pen*, together with double arrows to indicate direction of repeated movement here signifying *movement of pen-holding hand over a surface in writing*.

²³ Although the direction of writing in SignWriting was initially according to the left-to-right and top-to-bottom convention of English text, it seems that the community of SignWriting users find the top-to-bottom and left-to-right direction more natural (Hopkins 2008; SignWriting).

4 Concluding remarks

Much of this chapter has argued for the development of a coherent and consistent typology of writing systems as essential for overcoming many of the confusions surrounding writing and to gain deeper understandings of how writing systems and scripts actually function. This final section offers a few concluding remarks about some of the adjacent research areas where the misconceptions and confusions about writing have also cast distorting shadows.

Clearly, one such area is writing reform and its impact on literacy levels; related issues that have recently been explored by two highly prominent writing systems scholars. In the more recent, Coulmas (2013: 125) comments realistically, based on his careful examination of the complex interactions between the linguistic, social, political and economic aspects of writing reform, that “the perpetuation of inconsistencies and the introduction of new ones seem an inevitable side-effect of writing reforms”. Within his slightly earlier discussion of literacy, Sproat (2010) also touches on script engineering with the intent of raising literacy levels. In that context, he also reports on conducted correlation analyses, which indicate that “one factor that does not correlate with literacy is the complexity of the script” (p. 136), where complexity is based on code points for the basic script symbols. Although this is most interesting, clearly, as Sproat (2010) acknowledges, symbol set sizes alone are a blunt index of script complexity, which would also need to reflect other factors such as principle consistency. However, as noted earlier, reliable methods of assessing and comparing of script complexity and principle consistency are basically lacking.

Given the obvious relevance of writing systems research for research on visual word recognition and reading, it is quite understandable, even though most regrettable, that one also frequently encounters many misunderstandings about writing systems in those areas too. While acknowledging the gross simplifications for the sake of brevity here, visual word recognition – as the initial stage of a larger collection of cognitive processes underlying reading – is essentially about identifying the language symbol that is associated with a written symbol according to the principle of conventional reference utilized by a particular script. Obviously, how one approaches the modeling of the cognitive processes involved will heavily depend on how one (mis)understands the relationships between language and writing. The influence of the *language is speech* position is readily perceptible behind many models of reading that emphasize the role of phonology. For example, Perfetti and Dunlap (2008: 14) define two concepts that they claim to be universals of reading. The first, called the *language constraint of writing systems*, is that “writing systems encode spoken language, not meaning”, while the second, called the *universal phonological principle*, refers to a “generalization that word reading activates phonology at the lowest level of language allowed by the writing system”. However, one problem for models that stress that word recognition is essentially a process of

assembling a phonological symbol based on symbol-to-sound correspondences is the robust findings across writing systems of frequency or familiarity effects, where more frequently used, or more familiar, words are processed faster than less frequent or less familiar ones.

Based on his arguments that the peculiarities of the English-Latin alphabet writing system make it an *outlier* orthography, Share (2008) persuasively demonstrates how the dominance of an ‘Anglocentric research agenda’ within reading research has resulted in an excessively narrow focus on some issues, such as reading accuracy and phonological awareness, to the detriment of other issues, such as meaning access and modeling approaches. The focus of the present explication of writing systems and scripts – on the importance of developing a more coherent and consistent typology of writing systems – is similarly motivated by a deep concern for its significant and far-reaching implications not only for research in the areas of visual word recognition and reading, but for our basic understandings of writing and language in general.

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