

**Grapholinguistics in the 21st century, 2022:  
From graphemes to knowledge**

Télécom Paris, Palaiseau, France, June 8-10, 2022  
<https://grafematik2022.sciencesconf.org/>

**Reconsidering the distinction between  
partial and full writing systems**

**Terry Joyce**

Tama University, Japan  
terry@tama.ac.jp

## Overview

- Opening remarks
- Scope of writing systems typology (WST)
- Graphematic representation of lexical units
- Partial→full: Case of Japanese writing system (JWS)
- Closing remarks

## Opening remarks 1

### 0 Establishing some working definitions

**Writing system (WS):** Two common meanings;

- (1) Narrow range of abstract relationships between lexical units + graphemes (Joyce & Borgwaldt, 2011; Joyce 2016);
- (2) Specific grapheme inventory + use conventions for a particular language (Coulmas 2013; Joyce & Masuda 2019).

In Sections 1 + 2, sense (1) dominates, but shift to sense (2) in Section 3 taking case of Japanese writing system (JWS).

**Writing system typology (WST):** Enterprise of developing coherent frameworks for classifying diversity within WSs (Joyce 2016, in press; Joyce & Borgwaldt 2011; Joyce & Meletis 2021).

**Graphematic mapping:** Related to WS(1); refers to principles of graphematic representation by which graphemes map to lexical units.

## Opening remarks 2: Core claim

### 1 Partial - full dichotomy of deep significance for WST

Certainly, discernible in Gelb (1952):

**semasiography** (forerunners of writing) – **full writing** (phonography)

However, arguably, key prominence first in DeFrancis (1989: 3):

**Partial writing:** “a system of graphic symbols that can be used to convey only some thought ...”

**Full writing:** “can be used to convey any and all thought.”

Immediately vital to note 2 key caveats: (more on both soon)

(1) Dichotomy really about the potentiality to represent

**language** (as medium of thought);

(2) DeFrancis applied in differentiating **nonwriting** – **writing**.

(2) is valid, when treat as a sharp dichotomy; however, for issue of potentiality inherent in (1), more appropriate to regard as a continuum that is directly related to grapheme inventories.

## Opening remarks 3: Core proposal

### 2 Limit use of pleremic – cenemic terms to describing the graphematic mapping of lexical units [not whole WSSs]

Terms proposed by Haas' (1976, 1983) within his WST based on 3 binary choices: (1) **derived - original**, (2) **informed - empty**, and (3) **motivated - arbitrary**.

However, only (2) directly pertaining to WSSs, which, based on Greek words, Haas also referred to as:

**Pleremic:** graphemes are '**semantically-informed**' in denoting both sounds + meanings;

**Cenemic:** graphemes are '**semantically-empty**' in only denoting sounds.

Having declared this talk's core claim + core proposal at the very outset, I will next endeavor to both explicate + defend the two propositions.

## Overview

- Opening remarks
- Scope of writing systems typology (WST)
- Graphematic mapping of lexical units
- Partial→full: Case of Japanese writing system (JWS)
- Closing remarks

## Scope of WST 1: Core challenge + binaries

### **3 Core challenge for WSTs in differentiating properties as more significant [i.e., mapping] vs. marginal [i.e. linearity]**

[Joyce 2016, in press; Joyce & Meletis 2021]

Various typology proposals have undoubtedly embodied different notions of writing + have employed alternative formats, ranging from inverted-tree figures (most common; Gelb 1952; Sampson, 1985; 2015, DeFrancis 1989, Faber 1992, Powell 2009), 1- or 2-dimensional arrays (Unger & DeFrancis 1995; Sproat 2000; Rogers 2005) to a decision-tree-like table (Gnanadesikan 2017).

### **4 WSTs have generated an abundance [perhaps a surplus?] of contrastive binaries [including both dichotomies + continuums]**

Next 2 slides present a number of them, mostly grouped according to hierarchical level.

## Scope of WST 2: Binaries 1

Upper-level: Most relevant to issue of WST scope (more soon)

semasiography	- full writing	(Gelb 1952)
semasiography	- glottography	(Sampson 1985, 2015)
semasiography	- lexigraphy	(Powell 2009)
partial	- full writing	(DeFrancis 1989)
logography	- morphography	(Joyce 2002; 2011; 2016)

Mid-level: Typically **[something] - phonography**

[Arguably most elusive contrast: Joyce, 2016; Joyce & Borgwaldt; Sampson 2016]

logography	- phonography	(Faber 1992; Powell 2009; Sampson 1985, 2015)
<i>pure</i> logography	- <i>pure</i> phonography	(Unger & DeFrancis 1995)
morphography	- phonography	(Joyce 2002, 2011; Osterkamp & Schreiber 2021)
pleremic	- cenemic	(Haas 1976, 1983)

## Scope of WST 3: Binaries 2

Lower-level: Some focusing more on grapheme structure

syllabography	-	grammatography (alphabetic writing)	(Powell 2009)
syllabically linear	-	segmentally linear	(Faber 1992)
syllabically coded	-	segmentally coded	(Faber 1992)
other	-	segmentary	(Gnanadesiken 2017)
defective	-	complete	(Faber 1992)

Alternative binaries: Focusing on a single characteristic

deep	-	shallow	(Katz & Frost 1992)
open	-	closed	(Küster 2019)

Naturally, these binaries reflect classification goal of WSTs, but a serious challenge for terminology is to be both consistent + informative (Coulmas 1996; Hill 1967; Joyce 2016; in press).

## Scope of WST 4: Writing represents language 1

### 5 General consensus now that writing represents language

Within WS research (WSR), it is possible to discern a positive trend toward more language-orientated WSTs.

... every system of writing in relation to that which all systems represent, language (Hill, 1967).

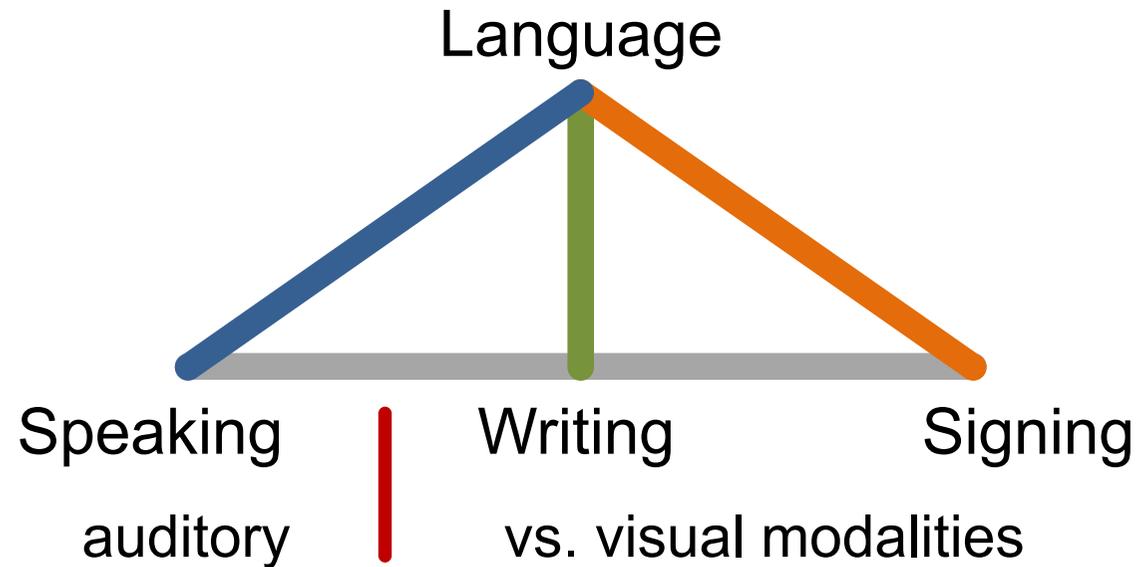
... all writing systems represent elements of *language*—not ideas or something else ... (Sproat, 2010: 9).

... writing represents language ... (Daniels, 2018: 157).

That noted, regrettably, confused interpretations about the nature of language are still encountered too frequently outside of WSR. A fuller appreciation of the **partial – full** dichotomy is particularly germane in that regard (almost there...).

## Scope of WST 5: Writing represents language 2

**6 Language** [abstract entity] **can be materialized in three ways**



Modified extract from Joyce (2011: 69) Fig. 1; schematic of the abstract entity view

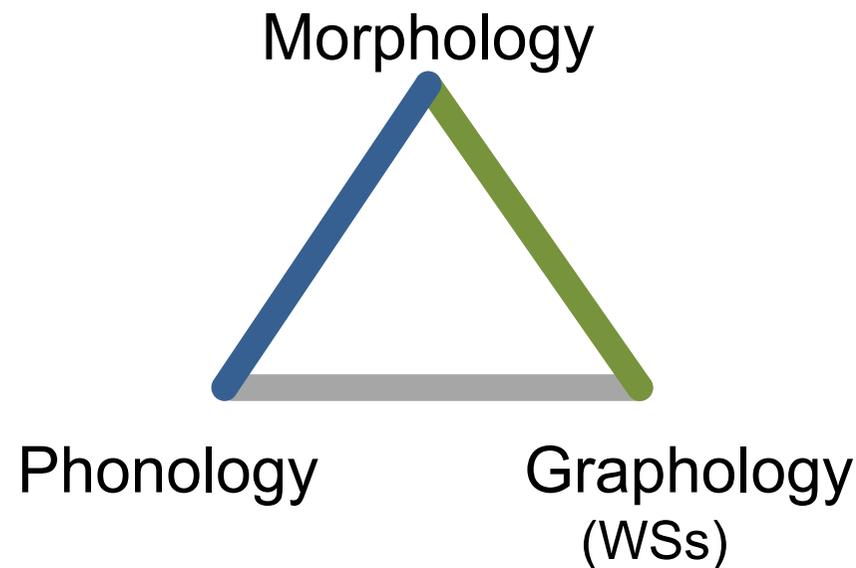
**7 Language = combination of words** [lexicon] **+ rules** [syntax]  
[Pinker 1999]

Setting aside syntactic influences, from a lexicalist perspective, WSTs concerned with just a 3-point triangle.

## Scope of WST 6: Core triangle + linguistic labels

**8 As lexicon is primarily concern of morphology, ideal labels are morphology, phonology + graphology**

For clarity of these correspondences alone, term **graphology** warrants reclaiming for WSR. Certainly, preferable to the **semantics-phonology-orthography** labels prevailing within psycholinguistic research on visual word recognition + reading.

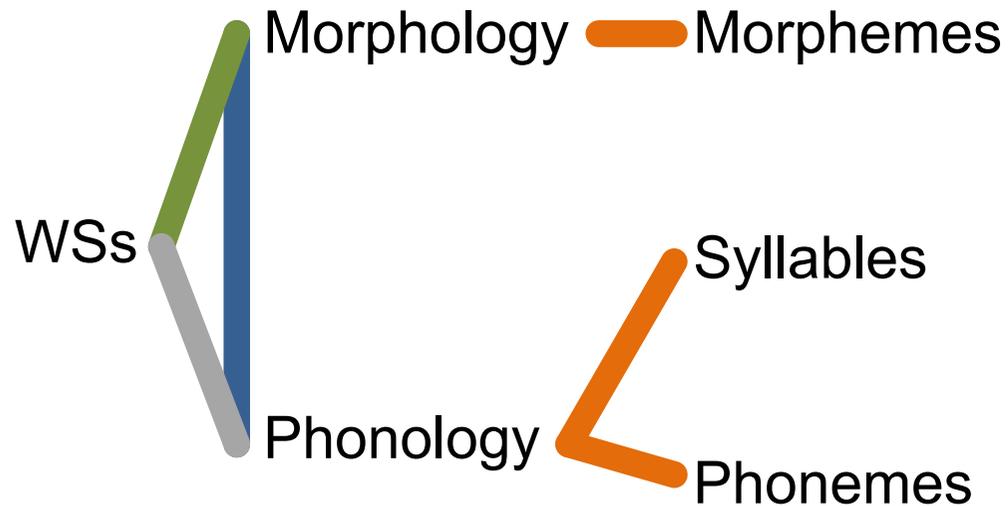


# Scope of WST 7: Linguistic levels of WSs 1

## 9 Pivoting triangle + positing linguistic levels of WSs on morphology-phonology dimension

Core triangle

Levels



# Scope of WST 7: Linguistic levels of WSs 1

## 9 Pivoting triangle + positing linguistic levels of WSs on morphology-phonology dimension

Core triangle	Levels	Daniels (2001)*	Comments
	Words	Logography	Misleading term
	Morphemes	†next slide	Morphography
	Syllables	Syllabary	Separate signs
		Abjad	Unspecified vowel
		Abugida	Core-syllable signs
		Featural*	Gestalt-sign
Phonemes	Alphabet	Segmentary	

If one Aligns Daniels' (2001) category terms on dimension, picture becomes highly muddled indeed.

\*Acknowledge that featural category subsumed as alphabet in Daniels (2018)

## Scope of WST 8: Upper binaries demark WST boundary

### 10 Upper-level binaries (i.e., semasiography – glottography) demarcate key boundary between semiotics + WSTs

At the heart of DeFrancis' (1989) **partial – full** (sharp) dichotomy is the valid conviction that the graphemes of functional WSTs map to linguistic units, at either **morphemic**, **syllabic** or **phonemic** levels.

Dichotomy is also key reason for not using **logography** term within WSTs (Joyce 2016; 2016; Joyce & Masuda 2019).

As Daniels (2018: 156) explicitly admits, within WSTs,

“Morphography” would actually be preferable to “logography”

because it is simply untenable to have separate graphemes for every word and the notion of **morphography** covers both free (words) + bound morphemes anyway.

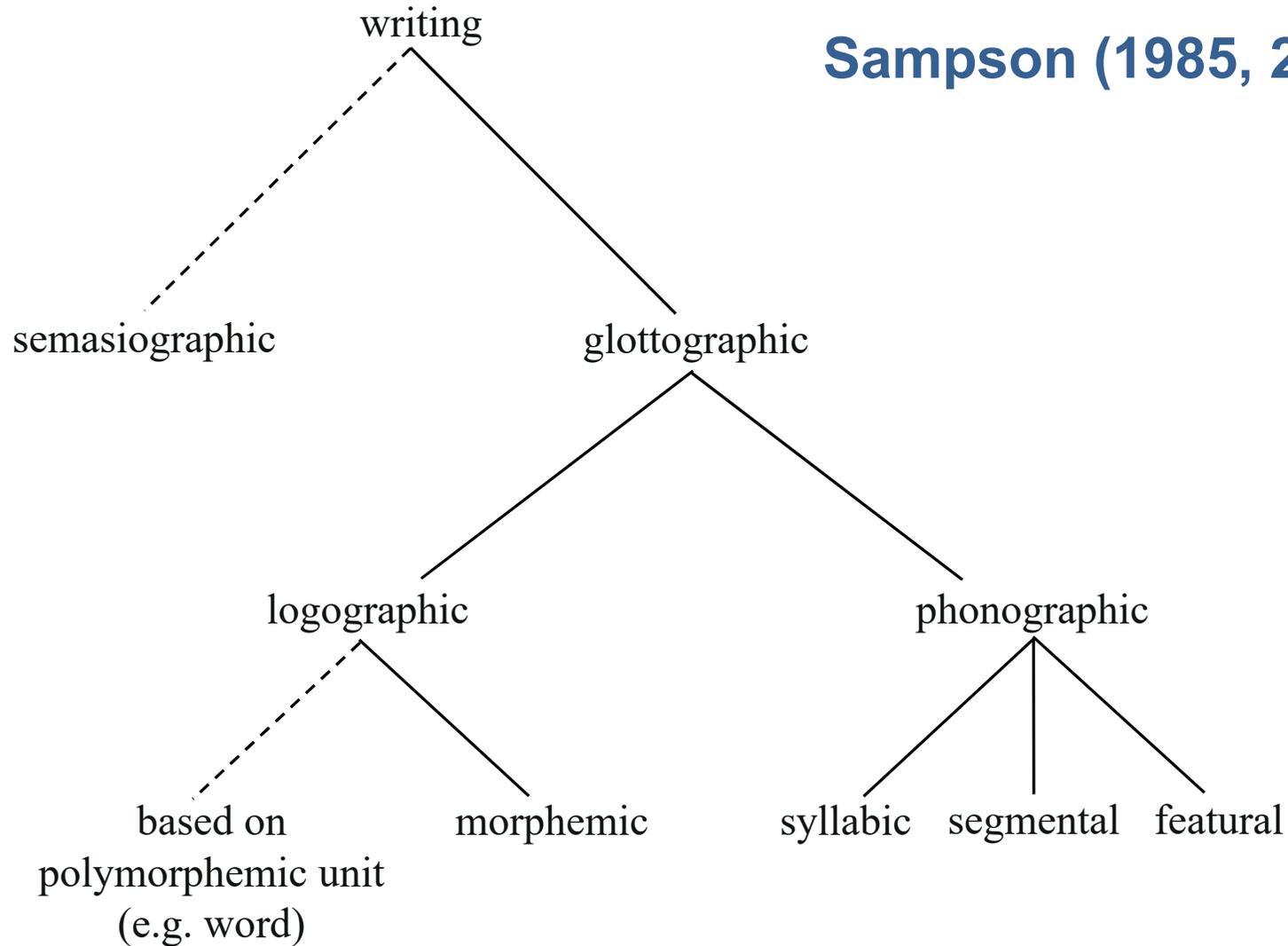
## Overview

- Opening remarks
- Scope of writing systems typology (WST)
- **Graphematic mapping of lexical units**
- Partial→full: Case of Japanese writing system (JWS)
- Closing remarks

# Graphematic mapping of lexical units 1

**11 Most WST proposals classify WSs according to single dominant principle [i.e., morphemic, syllabic or phonemic]**

**Sampson (1985, 2015)**



## Graphematic mapping of lexical units 2

### **12 WSTs seriously flawed as multiple mapping often co-exist; most WSs are, to varying degrees, mixed in nature**

[Gelb 1952, DeFrancis & Unger 1994, Joyce & Meletis 2021; Trigger 2004]

Undoubtedly, identifying dominant mapping greatly contributes to developing more coherent classification frameworks.

However, basic strategy also yields problematic terms such as “alphabetic principle” + “logographic principle” that compound inappropriate labels with gross simplification.

### **13 Appreciate that partial – full binary as actually a continuum within glottographic WSs**

Mapping inconsistencies mainly reflect:

- (1) Deficits of grapheme inventories (Desbordes 1997) (most WSs adapted with mapping challenges from outset) and
- (2) Propensity for mapping principles to become more **lexically-distinctive** over time (Sampson 2018).

## Graphematic mapping of lexical units 3

### 14 Time to explicitly connect partial – full continuum + pleremic – cenemic contrast

Slide 6 (WST2: Binaries 1) listed 4 mid-level binaries (plus remarked on level as being most elusive; Joyce & Borgwaldt; Sampson 2016).

Uncluttered of inappropriate terms/ideas and with some rearranging, the connections are more plainly manifest here:

WS category	Graphematic mapping	Potential continuum
Morphography	Pleremic [informed]	Partial
Phonography	Cenemic [empty]	Full

**Morphography** (alone) can only materialize **partial writing!**

**Pleremic** [i.e., semantically-informed] mapping [as a principle of graphematic representation] is simply not feasible for all morphemes of a language, due to their sheer numbers.

## Graphematic mapping of lexical units 4

### **15 Morphographic WSs can only expand from partial→full writing as a component of a mixed WS**

Moreover, only 2 possible expansion strategies available:

- (1) Develop conventions for using existing signs for cenic mappings [strategy adopted by Chinese writing system]; or
- (2) Supplement morphographic grapheme inventory with separate phonographic sub-system to handle cenic mappings [strategy that evolved for Japanese writing system].

### **16 Conversely, many phonographic WSs also require cenic mapping strategies for lexical distinctions**

Reflecting natural constraints on the phonological inventories of languages, even phonographic WSs need to deal with inventory gaps and lexical differentiation issues (homophones).

## Graphematic mapping of lexical units 5

### 17 Given prevalence of mixed WSs, WSTs should abandon single term classification labels

In that respect, Gnanadesikan's (2017) typology of phonemic scripts undoubtedly marks a significance advance.

3 examples of Gnanadesikan's (2017) script classifications (Table 2; p 29)

Han'gǔl	Fully vowelised syllabically arranged featural segmentary
Greek	Fully vowelised linear segmentary
Arabic ('unvocalized')	Partially vowelised linear segmentary

### 18 Still, to more fully elucidate mixed WSs, **cenemic – pleremic terms most expedient for describing mappings**

Succinct forms of expression are of immense value cognitively.

**“cenemic mapping”** is a concise shorthand for long phrase such as “... the principle of graphematic representation of this lexical unit is phonemic in nature (i.e., a segmental)...”.

## Overview

- Opening remarks
- Scope of writing systems typology (WST)
- Graphematic mapping of lexical units
- **Partial→full: Case of Japanese writing system (JWS)**
- Closing remarks

## Partial→full: Case of Japanese writing system (JWS) 1

### 19 Contemporary JWS is well renowned for its complexity

[Coulmas 1989; Joyce 2002, 2011]

[Japanese people] ... ended up with one of the worst overall systems of writing ever created. (DeFrancis 1989: 138)

Japanese is a complex system, certainly the most complex writing system in use today and a contender for the title of the most complex system ever. (Sproat 2010: 47)

The resulting syncretism of three scripts used simultaneously qualifies as the most complex writing system in modern use. (Gnanadesikan 2009: 113)

Although, as title of Gnanadesikan's (2009) chapter on JWS also observes, multiple scripts may actually be better than one!

## Partial→full: Case of Japanese writing system (JWS) 2

### 20 Mixed nature of modern JWS explicitly acknowledged in standard Japanese term 漢字仮名交じり文

/kan-ji-ka-na-ma.jiri.bun/\* mixed kanji and kana writing [kanji + kana + mixed + writing] \*// gloss; small-caps = on-yomi; - = kanji-kanji split; . = kanji-kana split

漢字 /KAN-JI/ Kanji Morphography

2,136 kanji prescribed by 常用漢字表 jō-yō-kan-ji-hyō ‘Kanji for general use’ guidelines (2010), but 6,355 on devices.

平仮名 /HIRA-GA-NA/ Hiragana Syllabography

片仮名 /KATA-KA-NA/ Katakana Syllabography

107 hiragana; 168 katakana (more for loanword mappings)

ローマ字 /rōma.JI/ Latin letters Segmentary

Standard alphabet + macrons (Āā, Īī, Ūū, Ēē, Ōō) sufficient for Japanese phonology, but also all diacritics for loanwords.

## Partial→full: Case of Japanese writing system (JWS) 3

### 21 Abridged outline of contemporary JWS's evolution 1 (mainly from perspective of graphematic mapping)

All extant WSs trace ultimately back to just 2 independent inventions; **Sumerian cuneiform** + **Chinese characters**. Both emerged from pictorial representations; initially followed similar developmental trajectories but Chinese characters remained (predominately) morphographic WS with conventions for cenic mappings (noting shortly).

### 22 Abridged outline 2: Allomorphic kanji (more soon)

**Sino-Japanese (SJ) morphemes:** By-product lexical stratum of adopting Chinese characters. Predominately bound elements of compound words

**Native-Japanese (NJ) morphemes:** Chinese characters became associated with Japanese morphemes.

## Partial→full: Case of Japanese writing system (JWS) 4

### 23 Abridged outline 3: Pictographic kanji

[象形文字 shō-kei mo-ji/; 264 jōyō (12.4%)]

木 SJ /BOKU/, /MOKU/; NJ /ki/, /ko/ ‘tree’ [trunk + branches]

山 SJ /SAN/; NJ /yama/ ‘mountain’ [outline shape of 3 peaks]

其 \*originally ‘winnowing basket’

→ not jōyō: SJ /ki/; NJ /sore/ /sono/ ‘that’

### 24 Abridged outline 4: ‘Ideographic kanji’ [\*limited scope only]

[指示文字 /shi-ji mo-ji/; 10 jōyō (0.5%)]

一 SJ /ICHI/, /ITSU/; NJ /hito/, /hitotsu/ ‘one’ [simple tally mark]

本 SJ /HON/; NJ /moto/ ‘base; main; book’ [stroke indicating base]

Few jōyō kanji according to these principles, due to fundamental limitations on their representational potentiality. Something of profound significance for prevalent confusions about the potentiality of 絵文字 /e-mo-ji/ emoji!

## Partial→full: Case of Japanese writing system (JWS) 5

### 25 Abridged outline 5: Initial emergence of cenemic mapping strategies for Chinese characters: **Rebus**

As Robertson (2004) astutely observes, possibility of full writing emerges from the **intersection** between

highly developed avenues of human perception – visual (iconic) and auditory (symbolic) perception. (Robertson, 2004: 19)

Namely, the **rebus principle**, which DeFrancis (1989) has stressed as key for partial-full writing transitions.

... a pictographic symbol was used not for its original meaning value but specifically to represent the sound evoked by the name of the symbol. (DeFrancis, 1989: 50).

That is, pleremic mapping (semantically-informed; pictogram-word) becomes a cenemic mapping (semantically-empty; grapheme-word).

## Partial→full: Case of Japanese writing system (JWS) 6

### 26 Abridged outline 6: Basic cenemic mapping strategy

其 Original pleremic mapping to ‘winnowing basket’  
→ cenemic mapping to stand for ‘that’

### 27 Abridged outline 7: Mapping intersection within the evolution of Chinese characters

Crucial significance of **phonetic compounds** [形声文字 /kei-sei mo-ji/; 1,312 (61.4%)]; a phonetic marker [音符 /on-pu/; i.e., a cenemic-element] is combined with a semantic marker [部首 /bu-shu/; i.e., a pleremic-element] creating new pleremic graphemes.

基 SJ /ki/; NJ /moto/, /motoi/ ‘foundation’ [土 ‘soil’ + cenemic /ki/]

棋 SJ /ki/ ‘chess piece’ [木 ‘wood’ + cenemic /ki/]

箕\* SJ /ki/; NJ /mi/ ‘winnowing’ [竹 ‘bamboo’ + cenemic /ki/]

\*Reflecting need to discriminate between pleremic + cenemic uses of 其

## Partial→full: Case of Japanese writing system (JWS) 7

### 28 Abridged outline 8: Brief aside on additional forms of cenemic mapping within Chinese writing system (CWS)

Understandably, compounding (combing morphemes) is main process of word-formation for morphographic WSs (more soon). Also, although some loanwords can be rendered by pleremic mappings (semantic translations) (Sampson 2015: 201).

電氣計算機 /tien<sup>4</sup>-tsu<sup>3</sup> tʃi<sup>4</sup>-suan<sup>4</sup> tʃi/ ‘computer’  
[electric+ calculate+machine]

電腦 /tien<sup>4</sup> nau<sup>3</sup>/ ‘computer’ (informal) [electric+brain]

Often necessary to resort to cenemic mappings;

涅槃 SJ /NEHAN/ Nirvana (from Sanskrit)

麒麟 SJ /KIRIN/ ‘qilin (Chinese unicorn)’; unicorn

博客 /po<sup>2</sup> k<sup>h</sup>ʔ<sup>4</sup>/ ‘blog’ (Sampson 2015; 201)

## Partial→full: Case of Japanese writing system (JWS) 8

### 29 Abridged outline 9: Compounding as most productive process of word-formation with Japanese kanji

Most kanji are allomorphemic; associated with both NJ + SJ morphemes.

NJ-morpheme		Meaning	SJ-morpheme	
水	mizu	water	水	SUI
防ぐ	fuse.gu	defend/ protect against	防	BŌ

## Partial→full: Case of Japanese writing system (JWS) 9

### 30 Abridged outline 10: Examples of Japanese two-, three- and four-kanji compound words

SJ morphemes predominately bound elements of compound words, from two-, three-, four-kanji, etc. (Joyce & Masuda 2021).

防水	BŌ-SUI	waterproofing [protect against + water]
予防	YO-BŌ	prevention; precaution [in advance + protect against]
防水性	BŌ-SUI-SEI	waterproofed [[waterproof] + nature]
癌予防	GAN-YO-BŌ	cancer prevention [cancer + [prevention]]
防水加工	BŌ-SUI-KA-KŌ	waterproof finish [[waterproof] + [add + craft = finish]]
予防医学	YO-BŌ-I-GAKU	preventative medicine [[prevention] + [medicine + study = medicine]]

## Partial→full: Case of Japanese writing system (JWS) 10

### 31 Abridged outline 11: Japan's partial→full solution; Emergence of two phonographic scripts (kana)

Similar to Chinese strategy of cenic-mapping, Japanese also initially used kanji for cenic mappings in 万葉集 /MAN-YŌ-SHŪ/, an anthology of Japanese verse (circa late 8C CE).

Katakana developed from scribal practices of Buddhist priests; tending to abbreviate graphemes by singling out element.

	a	i	u	e	o	ka	ki	ku	ke	ko
Man'yōgana	阿	伊	宇	江	於	加	機	久	介	己
Katakana	ア	イ	ウ	エ	オ	カ	キ	ク	ケ	コ

Hiragana evolved through distinct stages of cursive writing.

	a	i	u	e	o	ka	ki	ku	ke	ko
Man'yōgana	安	以	宇	衣	於	加	機	久	計	己
Hiragana	あ	い	う	え	お	か	き	く	け	こ

## Partial→full: Case of Japanese writing system (JWS) 11

### 32 Abridged outline 12: JWS's graphematic mappings + script mixture

JWS's mix of graphematic mappings + scripts generally used together in largely separate + complementary ways.

Script	Graphematic mapping	Lexical units
Kanji	Pleremic	Both NJ + SJ content morphemes
Hiragana	Cenemic	NJ grammatical morphemes
Katakana	Cenemic	Foreign-Japanese (loanwords)
Rōmaji	Cenemic	Foreign words

However, it also warrants stressing that this unique mixing of potentialities (partial + full) of graphematic mappings + multiple scripts means that **graphematic variation** is a pervasive characteristic of JWS (Joyce & Masuda, 2019).

## Overview

- Opening remarks
- Scope of writing systems typology (WST)
- Graphematic representation of lexical units
- Partial → full writing system (WS): Gap-filling
- Closing remarks

## Concluding remarks 1

### **33 Core claim: Partial - full dichotomy of deep significance for WST**

First section on scope of WSTs sought to illustrate how partial – full binary, as a sharp dichotomy, appropriately demarcates the key boundary between semiotics + WSTs.

Certainly, the clear ramification that all forms of semasiography, such as emoji, only constitute forms of nonwriting warrants wider appreciation.

## Concluding remarks 2

### 34 Core proposal: Call to utilize **pleremic – cenemic** as **cognitively-succinct shorthand for graphematic mappings**

More specifically, middle section advocated following points:

- (1) **Partial – full** binary is continuum within glottographic Ws;
- (2) **Partial – full** + **pleremic – cenemic** closely interconnected, as pleremic mapping alone cannot materialize full writing.
- (3) WsTs should abandon single-term classification labels that fail to convey the mixed nature of most Ws.
- (4) **Pleremic – cenemic** terms can greatly expediate greater attention to the graphematic mappings of lexical units.

## Concluding remarks 3

### 35 JWS as a case study illustrating only options for realizing the shift from partial→full writing

Although CWS employed strategies for cenic mappings (rebus), as applied to form phonetic compound characters, effectively created new pleremic graphemes.

In contrast, JWS pursued alternative option of supplementing pleremic kanji with separate phonographic sub-systems (two kana scripts) for cenic mappings, such as grammatical elements (hiragana) + coping with loanwords (katakana).

Growing consensus that morphography is the most appropriate term for alternative to phonography is a positive step.

As partial→full section tried to illustrate, as morphography alone can only materialize partial writing (as both CWS + JWS testify), next **(modest!)** step is to gain wider recognition that reality.

Thank you for your kind attention

ご清聴ありがとうございます

# References 1

- Coulmas, Florian. (1996). Typology of writing systems. In Hartmut Günther & Otto Ludwig (Eds.), *Schrift und Schriftlichkeit: Ein interdisziplinäres Handbuch internationaler Forschung* [Writing and its use: An interdisciplinary handbook of international research] Volume 2 (pp. 1380-1387). Berlin; New York: De Gruyter.
- Coulmas, Florian. (2013). *Writing and society: An introduction* (Key Topics in Sociolinguistics). Cambridge: Cambridge University Press.
- Daniels, Peter T. (2001). Writing systems. In Mark Aronoff & Janie Rees-Miller (Eds.), *The handbook of linguistics* (pp. 43–80). Malden, MA; Oxford: Blackwell.
- Daniels, Peter T. (2018). *An exploration of writing*. Sheffield: Equinox Publishing.
- DeFrancis, John. (1989). *Visible speech: The diverse oneness of writing systems*. Honolulu, HI: University of Hawai'i Press.
- Desbordes, Françoise. (1997). The notion of orthography: A Latin inheritance. In Clotilde Pontecorvo (Ed.), *Writing development: An interdisciplinary view* (Studies in Written Language and Literacy 6) (pp. 117–128). Amsterdam; Philadelphia: John Benjamins.
- Faber, Alice. (1992). Phonemic segmentation as epiphenomenon: Evidence from the history of alphabetic writing. In Pamela Downing, Susan D. Lima, & Michael Noonan (Eds.), *The linguistics of literacy* (Typological studies in language 21) (pp. 111–134). Amsterdam; Philadelphia: John Benjamins.
- Gelb, Ignace J. (1952). *A study of writing: The foundations of grammatology*. Chicago: University of Chicago Press.
- Gnanadesikan, Amalia E. (2009). *The writing revolution: Cuneiform to the Internet*. Chichester: Wiley Blackwell.
- Gnanadesikan, Amalia E. (2017). Towards a typology of phonemic scripts. *Writing Systems Research*, 9(1), 14–35. <https://doi.org/10.1080/17586801.2017.1308239>

## References 2

- Haas, William. (1976). Writing: The basic options. In William Haas (Ed.), *Writing without letters* (pp. 131–208). Manchester: Manchester University Press.
- Haas, William. (1983). Determining the level of a script. In Florian Coulmas & Konrad Ehlich (Eds.), *Writing in focus* (pp. 15–29). Berlin; New York; Amsterdam: Mouton Publishers.
- Hill, Archibald A. (1967). The typology of writing systems. In W. M. Austin (Ed.), *Papers in linguistics in honor of Leon Dostert* (pp 92–99). The Hague: Mouton.
- Joyce, Terry. (2002). *The Japanese mental Lexicon: The lexical retrieval and representation of two-kanji compound words from a morphological perspective*. Unpublished doctoral thesis. University of Tsukuba, Japan.
- Joyce, Terry. (2011). The significance of the morphographic principle for the classification of writing-systems. *Written Language & Literacy*, 14, 1, 58–81. <https://doi.org/10.1075/wll.14.1.04joy>
- Joyce, Terry. (2016). Writing systems and scripts. In Andrea Rocci & Louis de Saussure (Eds.), *Verbal communication* (Handbooks of Communication Science 3) (pp. 287–308). Berlin; Boston: De Gruyter Mouton. <https://doi.org/10.1515/9783110255478-016>
- Joyce, Terry (in press). Typologies of writing systems. In Condorelli, Marco, & Rutkowska (Eds.), *The Cambridge handbook of historical orthography*. Cambridge: Cambridge University Press.
- Joyce, Terry, & Borgwaldt, Susanne R. (2011). Typology of writing systems: Special issue introduction. *Written Language & Literacy*, 14(1), 1–11. <https://doi.org/10.1075/wll.14.1.01joy>
- Joyce, Terry, & Masuda, Hisashi. (2019). On the notions of graphematic representation and orthography from the perspective of the Japanese writing system. *Written Language & Literacy*, 22(2), 247–279. <https://doi.org/10.1075/wll.00028.joy>

## References 3

- Joyce, Terry, & Masuda, Hisashi. (2021). Constructing databases of Japanese three- and four-kanji compound words: Some observations concerning their morphological structures. In Yannis Haralambous (Ed.), *Grapholinguistics in the 21st century: /gɤafematik/ June 17–19, 2020. Proceedings, Part II* (Grapholinguistics and its applications 5) (pp. 579–619). Brest: Fluxus Editions. <https://doi.org/10.36824/2020-graf-joyc>
- Joyce, Terry, & Meletis, Dimitrios. (2021). Alternative criteria for writing system typology: Cross-linguistic observations from the German and Japanese writing systems. *Zeitschrift für Sprachwissenschaft*, 40(3), 257-277. <https://doi.org/10.1515/zfs-2021-2030>
- Katz, Leonard, & Frost, Ram. (1992b). The reading process is different for different orthographies: The orthographic depth hypothesis. In Ram Frost & Leonard Katz (Eds.), *Orthography, phonology, morphology, and meaning* (Advances in Psychology 94) (pp. 67–84). Amsterdam; London; New York; Tokyo: North-Holland.
- Küster, Marc Wilhelm. (2019). Open and closed writing systems. Some reflections. In Yannis Haralambous (Ed.), *Graphemics in the 21st century. Brest, June 13-15, 2018. Proceedings* (Grapholinguistics and its applications 1) (pp 17–26). Brest: Fluxus Editions. <https://doi.org/10.36824/2018-graf-kues>
- Osterkamp, Sven, & Schreiber, Gordian. (2021). Challenging the dichotomy between phonography and morphography: Transitions and grey areas. In Yannis Haralambous (Ed.), *Grapholinguistics in the 21st century: /gɤafematik/ June 17–19, 2020. Proceedings, Part I* (Grapholinguistics and its applications 4) (pp. 47–82). Brest: Fluxus Editions. <https://doi.org/10.36824/2020-graf-oste>
- Pinker, Steven. (1999). *Words and rules: The ingredients of language*. New York: Basic Books.
- Powell, Barry B. (2009). *Writing: Theory and history of the technology of civilization*. Chichester: Wiley-Blackwell.

## References 4

- Robertson, John S. (2004). The possibility and actuality of writing. In Stephen D. Houston (Ed.), *The first writing: Script invention as history and process* (pp. 16-38). Cambridge: Cambridge University Press.
- Sampson, Geoffrey. (1985). *Writing systems: A linguistic introduction*. London: Hutchinson; Stanford, CA: Stanford University Press.
- Sampson, Geoffrey. (2015). *Writing systems* (Second edition). Sheffield, UK: Equinox Publishing.
- Sampson, Geoffrey. (2016). Typology and the study of writing systems. *Linguistic Typology*, 20(3), 561-567. doi:10.1515/lingty-2016-0027
- Sampson, Geoffrey. (2018). From phonemic spelling to distinctive spelling. *Written Language & Literacy*, 21(1), 3–25. <https://doi.org/10.1075/wll.00008.sam>
- Sproat, Richard. (2000). *A computational theory of writing systems*. New York: Cambridge University Press.
- Sproat, Richard. (2010). *Language, technology, and society*. Oxford: Oxford University Press.
- Trigger, Bruce G. (2004). Writing systems: A case study in cultural evolution. In Stephen D. Houston (Ed.), *The first writing: Script invention as history and process* (pp. 39–68). Cambridge: Cambridge University Press.
- Unger, J. Marshall, & DeFrancis, John. (1995). Logographic and semasiographic writing systems: A critique of Sampson's classification. In Insup Taylor & David R. Olson (Eds.), *Scripts and literacy: Reading and learning to read alphabets, syllabaries and characters* (Neuropsychology and Cognition 7) (pp. 45–58). Dordrecht; Boston; London: Kluwer Academic Publishers.