The evolution of writing systems:
Empirical and cross-linguistic approaches workshop (AG5)
@ DGfS2020, Universität Hamburg, Germany; 4-6 March, 2020

‘Evolution’ of writing systems in terms of typological and other criteria: Cross-linguistic observations from the German and Japanese writing systems

Terry Joyce
Tama University, Japan
terry@tama.ac.jp

Dimitrios Meletis
University of Graz, Austria
dimitrios.meletis@outlook.com

Overview

- Opening remarks
- Selective sample of writing system (WS) typologies
- Alternative criteria for evaluating WSs
- Observations from German (GWS) + Japanese (JWS)
- Closing remarks

Opening remarks 1: Chaos over basic terminology!

Erring towards understatement, Gnanadesikan (2017: 15) notes,

> [t]here is, in general, significant variation in the basic terminology used in the study of writing systems.

Indeed, as Meletis (2018: 73) observes regarding the differences between the concepts of WS and orthography,

> [t]hese terms are often shockingly misused as synonyms, or *writing system* is not used at all and *orthography* is employed instead.

Similarly, Joyce and Masuda (in press) seek to differentiate between the elusive trinity of terms at heart of WS research; namely, script, WS, and orthography, with particular reference to the JWS.

Opening remarks 2: Our working definitions

WS_1 [Schrifttyp]**:** Abstract relations (i.e., morphographic, syllabographic, + phonemic), as focus of typologies.

WS_2 [Schriftsystem]**:** Common usage for signs + conventions of given language, such as GWS + JWS.

Script [Schrift]**:** Set of material signs for specific language.

Orthography [Orthographie]**:** Mediation between script + WS, but often with prescriptive connotations of **correct writing**.

Graphematic representation: Emerging from grapholinguistic approach, a neutral (ego preferable) alternative to orthography.

GWS: Use of extended alphabetic set, as used to represent written German language.

JWS: Collection of component scripts (kanji, hiragana, katakana, and rōmaji), as used to represent written Japanese language (Joyce & Masuda 2018).

Opening remarks 3: Reexamining WS typologies

WS typology aims to elucidate key characteristic(s) of WSs, but given their complex nature, general enterprise is not without inherent quagmires (Joyce & Borgwaldt 2011; Joyce 2016).

- Early fallacious assumptions of teleological transitions (Gelb 1952, Daniels 1990).
- Mainly synchronic in nature, the characteristic of focus is invariably the dominate level of graphematic representation.

However, such levels and their associated **spelling principles** (representational mappings) combine in complex ways.
In reality, most WSs are - to varying degrees - mixed in nature!

By briefly reflecting on some alternative criteria, this talk aspires to contribute to the ongoing reexamination of WS typology as a crucial tool for understanding WSs, from both synchronic and diachronic perspectives.

Overview

- Opening remarks
- Selective sample of writing system (WS) typologies
- Alternative criteria for evaluating WSs
- Observations from German (GWS) + Japanese (JWS)
- Closing remarks

WS typologies 1: Gelb (1952, 1963)

No Writing: *Pictures*

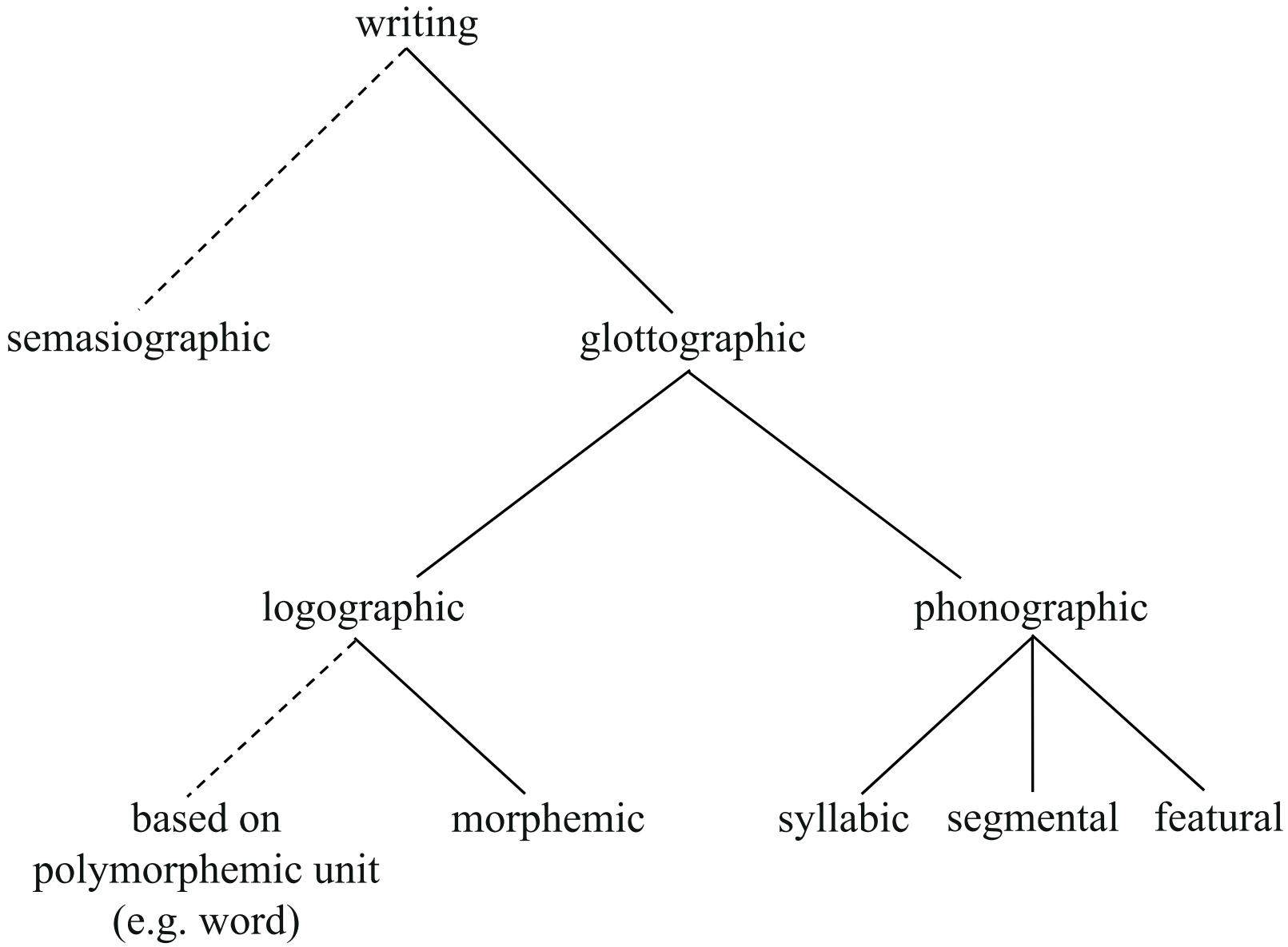
Forerunners of Writing: *Semasiography*

1. Descriptive-Representational Device
2. Identifying-Mnemonic Device

Full Writing: *Phonography*

1. *Word-Syllabic:*	Sumerian (Akkadian) |	Egyptian |	Hittite (Aegean) |	Chinese |
2. *Syllabic:*	Elamite Hurrian etc.	West Semitic (Phoenician) (Hebrew) (Aramaic) etc. |	Cypriote Phaistos? Byblos?	Japanese
3. *Alphabetic:*		Greek Aramaic (vocalized) Hebrew (vocalized) Latin Indic etc.		

WS typologies 2: Sampson (1985; 2015)



WS typologies 3: Daniels (1990, 2001, 2009, 2018)

Undoubtedly, Daniels' (1990, 2001, 2009, 2018) classification has been one of the most **influential** of the last two decades.
It initially consisted of **6 categories**, but 2018 version drops (6)!

(1) Logosyllabary (morphosyllabary)
(2) Syllabary,
(3) Abjad (Semitic-type script), where each character stands for a consonant
(4) Alphabet (Greek-type script)
(5) Abugida (Sanskrit-type script), where each character stands for a consonant accompanied by a particular vowel, with other vowels indicated by additions to the consonant symbol
(6) Featural, where shapes of the characters correlate with phonetic features of designated segments.

WS typologies 4: Gnanadesikan (2017)

Proposal for phonemic WSs (Table 1: 28)

Category	Values	Term
Characters (basically) represent segments	Yes	Segmentary/Phonemic script/Segmental script
	No	Other (e.g., Syllabary)
Other structures represented (other than those in 'higher-order structures' below)	Features	Featural
	Moras	Moraic
	None	(omit)
Higher-order structure represented	Peak/margin	*Āksharik*
	Syllables	Syllabically arranged/spaced
	None	Linear
Inclusion of vowels	All	Fully vowelled
	Most	Mostly vowelled
	Some	Partially vowelled
	None	Consonantal

Overview

- Opening remarks
- Selective sample of writing system (WS) typologies
- Alternative criteria for evaluating WSs
- Observations from German (GWS) + Japanese WS (JWS)
- Closing remarks

Alternative criteria 1: From typology to evaluation and back

WS typologies are descriptive in nature, but **conventional** category labels are also employed for (reductive) evaluations!

Jones & Mooney (2017: 13): Overall, it is argued that morphographic systems are inferior to phonographic ones.

Beyond representational mapping, **alternative criteria** are commonly used for evaluations.
However, they could also be beneficially employed for typological purposes.

- Indeed, any criterion that affords a classification of WSs into contrastive categories (such as spaced vs. unspaced) can serve as **tenable basis** for a typology.

Alternative criteria 2: Criteria for WS evaluation 1

Smalley (1964)
motivation for the learner
representation of speech
ease of learning
transfer
ease of reproduction

Baroni (2011)
maximum distinctiveness
size of the graph(em)ic inventory
cognitive salience
maximum naturalness
inner consistency

Cahill (2014)
linguistically sound
acceptable to all stakeholders
usable

Coulmas (2009)
convenience
tools
general applicability + linguistic fit
expressive power
simplicity
stability through time
monochrome coding

Daniels & Share (2018)
linguistic distance
spatial arrangement and non-linearity
visual uniformity + complexity
historical change
spelling constancy despite morphophonemic alternation
omission of phonological elements
allography
dual purpose letters
ligaturing
inventory size

Alternative criteria 3: Criteria for WS evaluation 2

Venezky (1977)

- mechanically suited for the language it is to reflect
- compatible with [...] its social-cultural setting
- psychologically/pedagogically appropriate for its speakers

Rogers (1995)

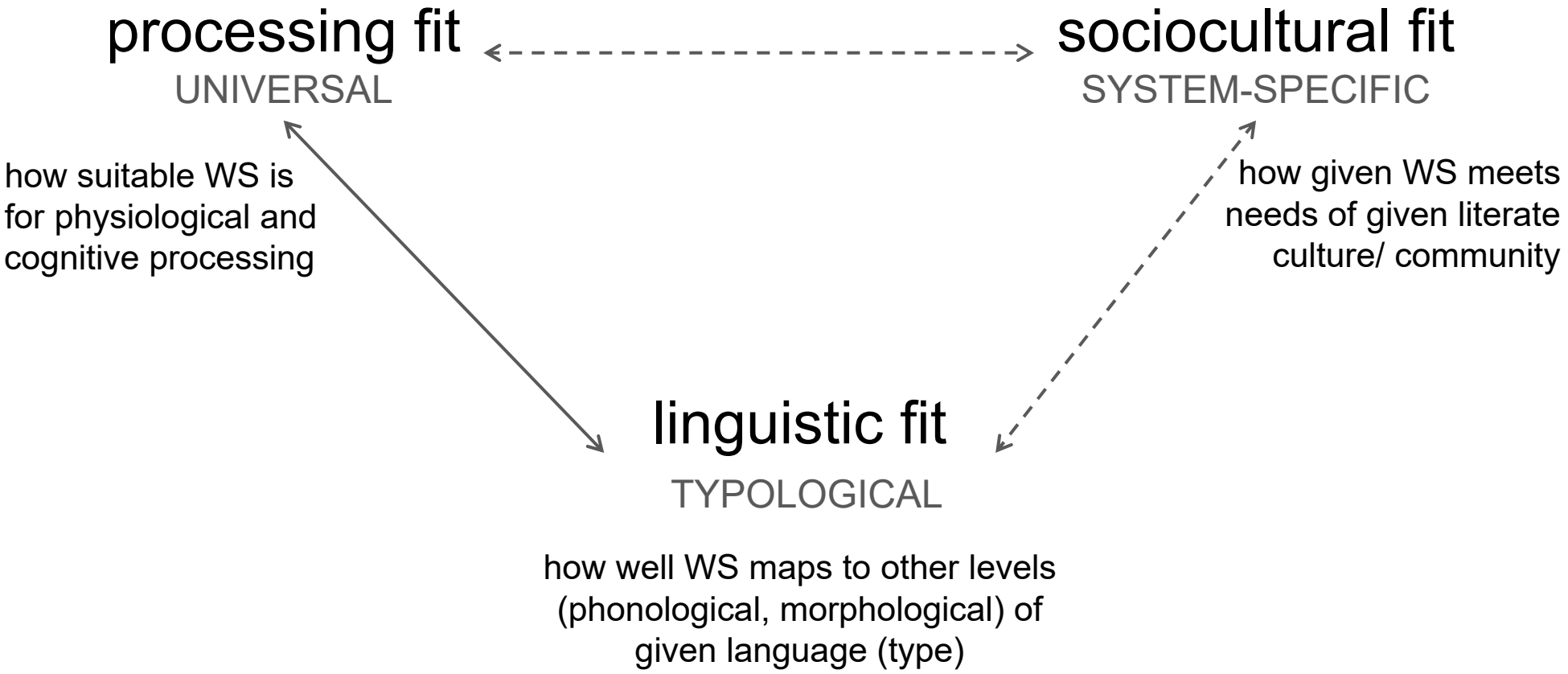
- linguistic
- psychological
- cultural
- technical

Bauernschmidt (1980)

- linguistic factors
- psycholinguistic factors
  - “magic of written language”
  - native speaker reactions
  - optimal inventory of symbols
  - overuse of symbols
- sociolinguistic factors
  - symbol value
  - adjustments for dialects
  - unity of language families
  - prestige, numbers, and so forth
  - established alphabets
  - government agencies
  - transfer value
- practical factors

Alternative criteria 4: Systematizing for WS evaluation

[Meletis 2019: Chapter 3]



Crucial (cyclical) interaction for **diachronic development**:
processing fit affects WS structure (linguistic fit), which, in turn, affects processing fit, …

Overview

- Opening remarks
- Selective sample of writing system (WS) typologies
- Alternative criteria for evaluating WSs
- Observations from German (GWS) + Japanese (JWS)
- Closing remarks

Observation 1: GWS 1: Representational mapping

Sampson (2018) notes WSs tend to evolve from phonetically-based when 'young' → **lexically-distinctive** as they 'mature'.

Written forms are less dependent on spoken forms, naturally, with huge implications for reading (and writing) processes.

Thus, even though segmental in nature, syllabic structures are rendered visible in GWS by graphe(ma)tic feature of **length** (most notably represented by ascenders and descenders).

Diachronically, visually long shapes have been ousted from the syllable nucleus position (Fuhrhop & Schmidt 2014) in order to render syllable boundaries more transparent.

- long |j| → non-long |i|, as in <jhn> → <ihn>, when syllable nucleus
- Inversely, <iung> → <jung>, with the long |j| representing the syllable boundary (Fuhrhop & Schmidt 2014: 559).

Observation 2: JWS 1: Mixed WS

漢字 /kan-ji/ (lit. 'Chinese characters'): Morphographic

Represent both native-Japanese and Sino-Japanese content words, including nouns, stems of verbs and of some adjectives, and some adverbs.

ひらがな /hira-ga-na/: Syllabographic

Represent functional words, inflectional elements of verbs and some adjectives, grammatical case marks and conjunctions.

カタカナ /kata-ka-na/: Syllabographic

Represent foreign-Japanese (but not Chinese words), foreign names, animal and plant species names, onomatopoeia, emphasis and as glosses.

Rōmaji: Phonemic

Represent foreign words and names, particularly in advertising and mass media.

Observation 3: GWS 2: Word spacing 1

Word spacing supports, at the graphetic (visual) level, **saccade programming**, and, at the graphematic (linguistic) level, **lexical segmentation**.

- Introduction of word spacing for alphabets heralded the breakthrough to silent reading – it was a response to processing needs.
- Experimental evidence suggests that deletion of word spacing (in absence of alternative boundary cues) is detrimental to reading processe for WSs that are standardly spaced; in contrast, the introduction of word spacing is not necessarily beneficial, where unspaced is the standard (e.g., Chinese, Thai).
- Word spacing is not the only way to provide boundary cues.

Observation 4: JWS 2: Word spacing 2: Not-spaced!

Joyce & Masuda (2018: 183) has following example of authentic Japanese sentence (Wikipedia entry for encoding standard) with all component scripts (attested, but admittedly rare).

JIS X 0208（ジス X 0208）は、日本語表記、地名、人名などで用いられる6,879図形文字を含む、主として情報交換用の2バイト符号化文字集合を規定する日本工業規格である。

Observation 4: JWS 2: Word spacing 2: Not-spaced!

Joyce & Masuda (2018: 183) has following example of authentic Japanese sentence (Wikipedia entry for encoding standard) with all component scripts (attested, but admittedly rare).

JIS X 0208（ジス **X 0208**）は、日本語表記、地名、人名などで用いられる**6,879**図形文字を含む、主として情報交換用の**2**バイト符号化文字集合を規定する日本工業規格である。

Color coding: **kanji**, **hiragana**, **katakana**, **rōmaji + numbers**

jisu ekusu rei-ni-rei-hachi (…) wa, ni-hon-go-hyōki, chi-mei, jin-mei nado de mochi.irareru rokusen-happyaku-nanajū-kyū zu-kei-mo-ji o fuku.mu, shu.toshite jō-hō-kō-kan-yō no ni.baito fu-gō-ka-mo-ji-shū-gō o ki-tei.suru ni-hon-kō-gyō-ki-kaku dearu.

JIS X 0208 is a Japanese Industrial Standard that stipulates a 2-byte encoded character set that is mainly used in information exchange that includes 6,879 graphic characters that are used for Japanese language writing, place names and personal names, etc.

Observation 5: GWS 3: Orthographic regulation 1

Structural characteristics of WSs are predictive of which aspects are likely to be subjected to standardization and orthographic regulation (Coulmas, 2016).

- 1996 reforms of German orthography included grapheme-phoneme correspondences (Stengel → Stängel, Kuß → Kuss), word divisions (radfahren → Rad fahren), capitalization (in bezug auf → in Bezug auf), and punctuation (no comma before und when followed by the main clause).
- 2006 reforms/amendements revoked some changes, while others made optional (both old + new variants permissible).
- However, optionality is not desirable to most users (Nerius 2007; Meletis 2019); significant role of orthography in prescribing what to regard as **correct** from among possible alternative graphematic representations.

Observation 6: JWS 3: Orthographic regulation 2

Kanji: From mid-20-century, Japanese government issuing guidelines aimed at limitations (plus some simplification)

'List of kanji for general use' guidelines	Date	Kanji
当用漢字表 /tō-yō-kan-ji-hyō/	1946	1,850
常用漢字表 /jō-yō-kan-ji-hyō/	1981 Oct	1,945
Jōyō kanji list revision [-5 +196 = 191]	2010 Nov	2,136
教育漢字 /kyō-iku-kan-ji/ 'education kanji' for Grades 1-6		(1,006)
Remainder taught during high school		(1,130)

Kana: Generally consistent, but modern kana usage influenced by some historical conventions;

- 3 kana inconsistent as case particles: は /ha/ → /wa/ (topic); へ /he/ → /e/ (destination); を /wo/ → /o/ (object; sole usage).
- Morphology influences: 鼻血 /hana-ji/ 'nose bleed' - はなぢ /hana-di/ (not はなじ), as 血 'blood' usually as ち /chi/.

Overview

- Opening remarks
- Selective sample of writing system (WS) typologies
- Alternative criteria for evaluating WSs
- Observations from German (GWS) + Japanese WS (JWS)
- Closing remarks

Closing remarks 1: Alternative criteria

With laudable aim of elucidating key characteristics, WS typology have generally focused on representational mapping.

However, it is vital to keep in mind that notions of morphographic, syllabographic + phonemic are idealizations.

Given that most WSs are mixed in nature, WS typological accounts should develop ways of more adequately capturing their mixed and complex nature.

Against that background, this talk advocates the exploration of alternative criteria – either in own right or in combination – which can potentially further enhance descriptions of WSs in all their glory.

Examples singled out for illustration relate to Meletis' (2019) framework for 3 kinds: **linguistic fit**, **processing fit** and **sociocultural fit**.

Closing remarks 2: Linguistic fit

Again, linguistic fit is assessed for individual WS, but usually employs WS typology notion of representational mapping.

JWS generally acknowledged as most problematic case (Joyce 2011, 2016; Sproat 2010), due its component scripts.

Orthographic convention is known as 漢字かな混じり文 /kan-ji.kana.ma.jiri.bun/ (lit. kanji + kana mixed writing).

Mix is also a factor for ubiquity of graphematic variation in JWS (Joyce, Hodošček, & Nishina 2012; Joyce & Masuda in press).

Script sensibilities (Joyce & Masuda in press)

私, わたし, ワタシ, watashi

/watashi/

'I' [both genders, but more commonly female]

Closing remarks 3: Processing fit

Also singled out presence/absence of word spacing, noting its presence aids saccade programming and lexical segmentation within phonemic WSs.

However, even such as ‘minimal’ shift can have potentially far-reaching implications, for the development of punctuation and hyphenation rules.

JIS X 0208（ジス X 0208）は、日本語表記、地名、人名などで用いられる6,879図形文字を含む、主として情報交換用の2バイト符号化文字集合を規定する日本工業規格である。

In non-spacing WS such as JWS, line-wrapping frequently occurs within word.

用いられる /mochi.irareru/ ‘that are used’ (plain passive)

2バイト符号化文字集合 ‘2-byte encoded character set’

Closing remarks 4: Sociocultural fit

Orthographic reforms are generally implemented on the grounds that they will help improve general literacy levels.
However, on the complex interactions between linguistic, social, political economic aspects, Coulmas (2013: 124) remarks

> the perpetuation of inconsistencies and the introduction of new ones seem an inevitable side-effect of writing reforms.

Also in connection with script engineering, Sproat's (2010: 136) correlation analyses indicate how

> one factor that does not correlate with literacy is the complexity of the script.

Closing remarks 5: Final thoughts

Given the complexities of natural WSs, it seems rather foolhardy to continuing overly focusing on single dimensions, such as representational mapping, no matter how well founded it might be from core linguistic perspectives.

There would seem to be considerable merit in considering alternative criteria – either independently or in tandem – in order to better understanding WSs, both from synchronic and diachronic perspectives.

Danke für Ihre Aufmerksamkeit

ご清聴ありがとうございます

Thank you for your kind attention

References 1

Baroni, Antonio. (2011). Alphabetic vs. non-alphabetic writing: Linguistic fit and natural tendencies. *Rivista di Linguistica,* 23(2), 127–159.

Bauernschmidt, Amy. (1980). The ideal orthography. *Notes on Literacy*, 32, 12–21.

Cahill, Michael. (2014). Non-linguistic factors in orthographies. In Michael Cahill & Keren Rice (Eds.), *Developing orthographies for unwritten languages* (pp. 9–25). Dallas: SIL International.

Coulmas, Florian. (2009). Evaluating merit – The evolution of writing reconsidered. *Writing Systems Research*, 1(1), 5–17. doi:10.1093/wsr/wsp001

Coulmas, Florian. (2016). Prescriptivism and writing systems. In Ingrid Tieken-Boon van Ostade & Carol Percy (Eds.), *Prescription and tradition in language: Establishing standards across time and space* (pp. 39–56). Bristol: Multilingual Matters.

Coulmas, Florian. (2013). *Writing and society: An introduction* (Key Topics in Sociolinguistics). Cambridge: Cambridge University Press.

Daniels, Peter T. (1990). Fundamentals of grammatology. *Journal of the American Oriental Society*, 110(4), 727–731. https://doi.org/10.2307/602899

Daniels, Peter T. (2001). Writing systems. In Mark Aronoff & Janie Rees-Miller (Eds.), *The handbook of linguistics* (pp. 43–80). Malden, MA; Oxford: Blackwell.

Daniels, Peter T. (2009). Grammatology. In David R. Olson, & Nancy Torrance (Eds.), *The Cambridge handbook of literacy* (pp. 25–45). Cambridge: Cambridge University Press.

Daniels, Peter T. (2018). *An exploration of writing*. Sheffield: Equinox Publishing.

Daniels, Peter T., & Share, David L. (2018). Writing system variation and its consequences for reading and dyslexia. *Scientific Studies of Reading*, 22(1), 101– 116. doi:10.1080/10888438.2 017.1379082

References 2

Fuhrhop, Nanna, & Schmidt, Karsten. (2014). Die zunehmende Profilierung der Schreibsilbe in der Geschichte des Deutschen. *Beiträge zur Geschichte der deutschen Sprache und Literatur*, 136(4) 538 – 568. doi:10.1515/bgsl-2014-0047

Gelb, Ignace J. (1952). *A study of writing: The foundations of grammatology*. Chicago: University of Chicago Press. [Revised edition, 1963]

Gnanadesikan, Amalia E. (2017). Towards a typology of phonemic scripts. *Writing Systems Research*, 9(1), 14–35. doi:10.1080/17586801.2017.1308239

Jones, Mari C., & Mooney, Damien. (2017). Creating orthographies for endangered languages. In Mari C. Jones & Damien Mooney (Eds.), *Creating orthographies for endangered languages*, (pp. 1 – 35). Cambridge: Cambridge University Press.

Joyce, Terry. (2011). The significance of the morphographic principle for the classification of writing-systems [Special issue: Typology of writing systems, edited by Susanne R. Borgwaldt & Terry Joyce]. *Written Language & Literacy*, 14(1), 58–81. doi: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. doi:10.1515/9783110255478

Joyce, Terry, & Borgwaldt, Susanne R. (2011). Typology of writing systems: Special issue introduction [Special issue: Typology of writing systems, edited by Susanne R. Borgwaldt & Terry Joyce]. *Written Language & Literacy*, 14(1), 1–11. doi:10.1075/wll.14.1.01joy

References 3

Joyce, Terry, Hodošček, Bor, & Nishina, Kikuko. (2012). Orthographic representation and variation within the Japanese writing system: Some corpus-based observations [Special issue: Units of language – units of writing, edited by Terry Joyce & David Roberts]. *Written Language & Literacy*, 15(2), 254–278. doi:10.1075/wll.15.2.07joy

Joyce, Terry, & Masuda, Hisashi. (2018). Introduction to the multi-script Japanese writing system and word processing. In Hye Pae (Ed.), *Writing systems, reading processes, and cross-linguistic influences: Reflections from the Chinese, Japanese and Korean languages* (Bilingual Processing and Acquisition 7) (pp. 179–199). Amsterdam: John Benjamins.

Joyce, Terry, & Masuda, Hisashi. (in press). On the notions of graphematic representation and orthography from the perspective of the Japanese writing system. [Special issue: Writing systems: Past, present (… and future?), edited by Terry Joyce & Robert Crellin]. *Written Language & Literacy*, 22(2), 248–280.

Meletis, Dimitrios. (2018). What is natural in writing? Prolegomena to a Natural Grapholinguistics [Special issue: Understanding writing systems, edited by Merijn Beeksma & Martin Neef]. *Written Language & Literacy*, 21(1), 52–88. doi:10.1075/wll.00010.mel

Meletis, Dimitrios. (2019). *Naturalness in scripts and writing systems: Outlining a Natural Grapholinguistics*, (PhD thesis), University of Graz.

Nerius, Dieter. (2007). Merkmale der Orthographie. In Dieter Nerius (et al.) (Eds.), *Deutsche Orthographie* 4th edition) (pp. 34–40). Hildesheim: Olms.

Rogers, Henry. (1995). Optimal orthographies. In Insup Taylor & David R. Olson (Eds.), *Scripts and literacy: Reading and learning to read alphabets, syllabaries and characters* (Neuropsychology and Cognition 7) (pp. 31–43). Dordrecht: Springer. doi:10.1007/978-94-011-1162 -1_3

References 4

Sampson, Geoffrey. (1985). *Writing systems: A linguistic introduction*. Stanford, CA: Stanford University Press. [Second edition, 2015, Sheffield, UK: Equinox Publishing]

Sampson, Geoffrey. (2018). From phonemic spelling to distinctive spelling [Special issue: Understanding writing systems, edited by Merijn Beeksma & Martin Neef]. *Written Language & Literacy*, 21(1), 3–25. doi:10.1075/wll.00008.sam

Smalley, William A. (1964): How shall I write this language? In William A. Smalley et al. (Eds.), *Orthography studies: Articles on new writing systems* (Helps for Translators, 6) (pp. 31–52). London: United Bible Societies.

Sproat, Richard. (2010). *Language, technology, and society*. Oxford: Oxford University Press.

Venezky, Richard L. (1977). Principles for the design of practical writing systems. In Joshua Fishman (Ed.), *Advances in the creation and revision of writing systems* (Contributions to the Sociology of Language, 8) (pp. 37–54). Berlin, Boston: De Gruyter. doi:10.1515/97831 10807097-004