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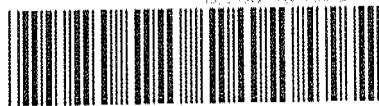
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Introduction: From letter to sound

New perspectives on writing systems

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A standard view on the nature of written language is congenially formulated and defended by Peter Daniels as follows (1996: 2): “Writing differs from language, though, in a very fundamental way. Language is a natural product of the human mind — the properties of people that make it possible for everyone to learn any language, provided they start at a young enough age — while writing is a deliberate product of human intellect: no infant illiterate absorbs its script along with its language; writing must be studied. Language continually develops and changes without the conscious interference of its speakers, but writing can be petrified or reformed or adapted or adopted at will. It is thus in the theoretical realm that grammatology [the study of writing systems] differs most from the rest of linguistics — the theory of writing must be very different from the theory of language. It is not expected that patterns or principles that describe language should apply to writing.”

These are major arguments for a widely held assumption that “speech is primary, and writing is secondary” (Daniels 1996: 1). They justify derivational accounts on writing systems, Nunn (1998) and Sproat (2000) serving as more recent examples. In these accounts, written representations are derived from spoken language representations, phonological ones playing an important role. In short, this perspective concentrates on mappings from sounds to letters. Constraints intrinsic to the graphematic level are treated as surface phenomena and dealt with marginally. Mappings from letter to sound, which are decisive in reading, are fully neglected.

The collection of papers in this volume calls the above-mentioned body of assumptions into question and presents evidence for alternative views on writing systems. Let us begin with the argument of naturalness. Contrary to Daniels’ claim cited above, languages spoken in civilizations are not natural products.

Thus, for instance, spoken Modern British English, or Standard German, is and has been different from any spoken regional or social variety and is a product of deliberate standardization processes in which written language has played an important role. Taken from a different angle, both written and spoken languages can be created deliberately (e.g. Esperanto and Korean Hankul). What is crucial about the naturalness argument is that mature writing systems belong to a coherent system of signifying elements that have mostly been shaped gradually through changes introduced inadvertently as part of their casual transmission from generation to generation. In short, they have been shaped, in large degree, by processes comparable to those which shape language itself (cf. Watt 1988: 199). As a consequence, mature writing systems and alphabets, which have been used for a long time by large communities for encoding a specific language, are as natural as any spoken language.

Alexandra Wiebelt's paper "Do symmetrical letter pairs affect readability? A cross-linguistic examination of writing systems with specific reference to the runes" is pertinent to the naturalness issue. Since symmetry plays a decisive role in human aesthetics, one might expect that it influences script design, especially if all scripts and alphabets are artificial products. However, as Wiebelt demonstrates, mature and invented scripts differ in their avoidance of symmetric pairs of characters, especially of pairs with different sound representations showing left-right symmetry. Whereas mature scripts and alphabets are well adapted to efficient reading, this does not hold for invented scripts to the same extent. Invented script is a cover term for novel scripts such as Cree, secret scripts, whose main purpose is to exclude readers, or literary scripts such as Tolkien's Anghertas. Since symmetric letter pairs negatively affect readability, a claim explained by Wiebelt on the basis of object perception, mature scripts avoid symmetry to a much larger extent than invented scripts. If disfunctional symmetry leading to a confusion of letters emerges in mature scripts (e.g. ⟨b⟩ and ⟨d⟩ in Latin scripts), it is modified by distinctive features such as serifs. Wiebelt demonstrates this bias against symmetry with statistical data in a broad cross-linguistic examination of different scripts and alphabets with special reference to the runes.

As to the acquisition argument of Daniels, the papers in this volume do not tackle this issue, but previous research has shown that both written and spoken language can be learned spontaneously, in principle, and that writing is learned intuitively to a large degree also in practice. Spontaneous learning of writing and reading in preschool children is discussed by Gibson & Levin (1975: 230f.). As discussed by Neef & Primus (2002), school children's performance

on deliberately taught phoneme-to-grapheme conversions is extremely poor whereas inner-graphematic constraints that cannot have been taught deliberately because they have not been formulated before are almost never violated.

In Daniels' view, the theory of writing must be very different from the theory of language since it is not expected that patterns or principles that describe language should apply to writing. This view is challenged by the results of several papers in this volume, the contributions of Primus and Wiese being particularly relevant for this issue.

In her contribution "A featural analysis of the Modern Roman Alphabet" Beatrice Primus analyses the internal structure of the letters of the Modern Roman Alphabet (MRA) and shows that graphematic feature structures obey both general and modality-specific constraints. The results corroborate a branching correspondence model in which general modality-independent constraints such as dependency, compositionality, markedness and iconism are shown to have modality-specific instantiations in writing with bidirectional correspondences serving as functional links across modalities. The functional correspondences are stated in terms of features in both directions of fit: from letter to sound and from sound to letter. The traditional sound-to-letter mappings are neither simpler nor more systematic than the traditionally neglected letter-to-sound ones. The formal framework of analysis is Optimality Theory (OT). In this framework many apparently unmotivated letter shapes turn out to be optimal choices among competing candidates that are evaluated by violable ranked constraints.

Richard Wiese's paper "How to optimize orthography" is based on the assumption that optimization, a general trait of language that is congenially modelled in OT, plays an important role in writing systems. Writing systems are supposed to follow general violable preferences that are in conflict with each other. This is the way constraints and their interaction are viewed in OT so that, as Wiese shows, this theory promises a better understanding of the role of optimization in writing systems. The paper presents an optimality-theoretic approach to the orthographic system of present-day German and focuses on sound-letter correspondences and on the (non-)doubling of graphemes. Thus, OT, as a general theory of language, and optimization, as a general 'principle' of language, are shown to offer better explanations for orthographic regularities than the traditional, domain-specific 'orthographic principles'.

Optimization is also Richard Venezky's major theme in his contribution "In search of the perfect orthography". Although not stated in formal OT-terms, Venezky's results, which are mainly drawn from English data, corroborate

those of Wiese's on German. The traditionally postulated ideal of a perfect correspondence between letters (phonemes) and sounds (graphemes) neglects the fact that writing systems are shaped by several competing factors which reflect linguistic, psychological and cultural considerations. Among the linguistic factors there is a competition between phonology, morphology and etymology, just to name the most important ones. This competition leads to irregularities in the mapping between sounds and letters. The study of psychological processing in reading, extensively reviewed in Venezky's paper, demonstrates that human capacities for processing print are so powerful that complex patterns and irregularities pose only a small challenge. The more a system tends towards a perfect sound-letter mapping the more it assists the new reader and the non-speaker of the language, while the more it marks etymology and morphology, the more it favours the experienced reader.

Both Wiese's and Venezky's results lead us to the conclusion that writing systems differ with respect to the question which factors or constraints are dominant. Consequently, alphabetic writing systems show more or less ambiguous relations between spelling and sound patterns. In transparent systems, like Italian, the pronunciation can be predicted from the spelling and vice versa. Opaque systems, like English, often display phonologically unpredictable spelling-sound correspondences, as demonstrated in Venezky's paper. In their contribution "Word-initial entropy in five languages — Letter to sound, and sound to letter", Susanne Borgwaldt, Frauke Hellwig and Annette de Groot deal with this typological distinction. In order to assess this variation more precisely, the authors apply an information-theoretic metric stated in terms of entropy values that measures the unpredictability of a variable to word-initial bi-directional spelling-sound correspondences for Dutch, English, French, German and Hungarian. This method allows to position the five investigated languages on the continuum from opaque to transparent orthographies, both in spelling-to-sound and sound-to-spelling directions. A remarkable outcome of this investigation is that the two directions of fit yield different results: English is the most opaque system in terms of spelling-to-sound relations and French in terms of sound-to-spelling correspondences. This demonstrates that both directions of fit have to be taken into consideration in the study of writing systems.

The reading, spelling-to-sound perspective is also central for the contributions of Bunčić and Neef. In his paper "The apostrophe — A neglected and misunderstood reading aid", Daniel Bunčić makes a new proposal for the function of the apostrophe that renders the traditional analysis as sign of omission of letters obsolete. The apostrophe is assumed to indicate morpheme bound-

aries wherever this seems necessary for certain reasons. On the basis of comparative data Bunčić shows that all apostrophes commonly assumed to indicate omission can also be explained as marking morpheme boundaries. One of the reasons that trigger the use of the apostrophe is often an unusual graphic shape of a morpheme due to the elision of letters. But the approach of Bunčić also captures contexts of use that would be exceptional in the traditional analysis such as proper names (e.g. *John's*), non-words (e.g. *two l's*), foreign words (e.g. Russian *laptop'a* 'laptop-GEN-SG') and phonetic reading difficulties (e.g. the occasional German misspelling *Häus'chen*).

Martin Neef's contribution "The relation of vowel letters to phonological syllables in English and German" offers a strong logical argument in favour of the letter-to-sound perspective. Given the uncontroversial assumption that any writing system is by definition dependent on a spoken language system, i.e. that a spoken language does not need a corresponding writing system in contrast to a writing system that presupposes a corresponding spoken language, phonological representations are a necessary condition for graphematic ones. By this logic, the mapping of letters to sounds is primary, i.e. ⟨l⟩ → [l], in which [l] is a necessary condition for ⟨l⟩, and the mapping of sounds to letters secondary. This is the logical basis of Neef's *Recoding Principle*. In his text, Neef delves into the relation of written representations to the number of phonological syllables, based on data from English and German. In both languages, words can have more syllables than they have vowel letters. In German but not in English the number of uninterrupted vowel letter sequences gives the lower boundary of the number of syllables a word can have. This regularity, however, is shown to be a side effect of basic elements of the German writing system.

This collection of papers emerged from the Third International Conference on Writing Systems "From Letter to Sound" in Cologne, September 2002. We gratefully acknowledge the help of our co-organizers Anneke Neijt (Radboud University Nijmegen) and Dominiek Sandra (University of Antwerp). The conference was sponsored by a grant of the Thyssen-Foundation (Az. 30.02.0.059) and by a grant of the Flemish Funding Agency for Scientific Research (Scientific Research Community on the theme 'Psycholinguistics: the Processes of Reading and Writing').

This volume is dedicated to the memory of Richard Venezky. As an outstanding researcher in the fields of spelling, literacy and education, and a pioneer of the letter-to-sound perspective, we have had the honour to welcome him as an invited speaker at our conference. On June 11, 2004 Richard Venezky passed away after a long illness.

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