

The Journal of Typographic Research
Volume IV, Number 2, Spring 1970

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The Journal of Typographic Research, Volume IV, Number 2, Spring 1970.
Published quarterly (Winter, Spring, Summer, and Fall) by the *Journal*,
c/o The Cleveland Museum of Art, Cleveland, Ohio, USA 44106.
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Subscription Rates

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Psycholinguistic Universals in the Reading Process

Kenneth S. Goodman

Literate speakers in any language have two alternative surface language forms which are realizations of the same deep structure and which represent alternate encodings of the same meaning. For the proficient reader, written language becomes parallel to speech and not a secondary representation of it. Listening and reading are processes in which the language user may sample, select, and predict from the available signal. Readers are users of language who process graphic, syntactic, and semantic information simultaneously. Readers develop strategies for the efficient sampling of the graphic signal in relation to the syntax of their language and the concepts and experiences with which the passage is concerned. The essential characteristics of the reading process are universal.

Reading is a psycholinguistic process by which the reader (a language user) reconstructs, as best he can, a message which has been encoded by a writer as a graphic display.

Through research on children reading English who are native speakers of some dialect of American English, I have evolved a basic theoretical view of the reading process. It should be understood that some of what follows is an extension of and projection of a theoretical view into dimensions that go beyond the research on which it is based. In this sense, what follows is hypothetical; other scholars are invited to test and challenge the hypotheses in terms of languages and orthographies other than English.

Generative and Receptive Aspects of Language

It is ironic that although most researchers agree that receptive control of aspects of language precedes generative control, more attention has been given to the process of language production than to the process by which language is understood.

Many linguists have assumed that listening and reading are simply the mirror images of speaking and writing. They have

assumed that since generative processes begin with meaning and result in a fully-formed phonological or graphic display that receptive processes begin with the encoded display and reverse the process, step by step, to get back to meaning.

In this too simple view, not enough consideration has been given to the variant nature of the productive and receptive tasks that are involved in language use. In *producing language*, the language user has thoughts which he wishes to express. In a transformational view, he creates a deep language structure which represents his meaning, applies a set of compulsory and optional transformational rules, and generates a surface structure. If the language user is literate, this surface structure may utilize a phonological signal and require the application of a set of phonological rules, or it may utilize a graphic signal and require use of a set of orthographic rules. The choice will be dictated, of course, by the language user's purpose.

The *receptive* process does start with the phonological or graphic display as input, and it does end with meaning as output, but the efficient language user takes the most direct route and touches the fewest bases necessary to get to his goal. He accomplishes this by *sampling*, relying on the redundancy of language, and his knowledge of linguistic constraints. He *predicts* structures, *tests* them against the semantic context which he builds up from the situation and the on-going discourse, and then *confirms* or *disconfirms* as he processes further language.

Receptive language processes are cycles of *sampling*, *predicting*, *testing*, and *confirming*. The language user relies on strategies which yield the most reliable prediction with the minimum use of the information available.

Neither listening nor reading are precise processes and, in fact, even what the language user perceives is only partly what he sees or hears and partly what he expects to see or hear. This is necessarily so not only because of the prediction in which the language user engages but also because he has learned to organize his perceptions according to what is and is not significant in the language. The language user must not simply know what to pay attention to but what not to pay attention to.

The producer of language will be most successful if the signal

he produces is complete and well-formed. With such a signal, the receiver of language is free to utilize his sampling strategies.

The necessary concern for oral language which had been neglected for so long caused many scholars to dismiss written language—without adequate consideration—as a secondary representation of oral language. But written language in a literate culture is not simply a way of preserving and recording oral language. It designates streets, places, and directions; it labels and classifies. It makes communication possible over time and space.

A key difference between oral and written language is that speech is most commonly encountered within the situations in which it is most relevant. Speakers may rely on the situational context to make referents explicit. Listeners may infer from the situational context and from the movements, actions, and gestures of speakers a great deal of semantic information to augment and constrain what they derive from the language.

Written language tends to be out of situational context. The writer must make referents and antecedents explicit, he must create contexts through the language to replace those which are not present. He must furthermore address himself to an unseen and frequently unknown audience. He gets no immediate linguistic or visual feedback to cue him as to whether his communicative efforts are successful.

Written language is perfectable in that the writer may edit it to be sure he has said exactly what he wished to say. It isn't perishable in the sense that oral language is.

These differences should not obscure the basic similarities between the alternate language forms for literate language users, but they should make clear that reading and listening will employ variant psycholinguistic strategies to cope with the variant characteristics of the two forms. Reading employs a strategy of regression to reread, for example, whereas listening cannot employ a comparable strategy. The listener must ask the speaker to repeat and that is not always feasible.

One misconception which has caused considerable confusion in dealing with the reading process is the notion that meaning may be derived only from oral language. It is assumed by some that readers engage in a process of recoding graphic input as aural

input and then decoding. While this may, in fact, take place in beginning stages of the acquisition of literacy among some learners, it is not necessary or characteristic of proficient reading. An analogy can be found in the early stages of learning a second language. The learner may be going through a process of continuous translation into his first language before he decodes. But eventually he must be able to derive meaning directly from the second language with no recourse to the first. Just so, the proficient reader becomes as skillful at deriving meaning from written language as he is from the aural form with no need to translate one to the other.

It must be remembered that oral language is no less an arbitrary code than written language. Neither has any direct relationship to meaning and the real world other than that which its users assign it.

Alphabetic writing systems have a number of virtues among which is that there is a built-in correspondence to the units and sequences of the oral language form. But this is not an unmitigated blessing. A writing system which is directly related to ideas and concepts has the virtue that it can be used for communication by speakers of different languages. The system of mathematical notation has that advantage. $6 + 9 = 15$ is a mathematical statement that will be immediately understood by speakers of a wide range of languages, whereas *six and nine equal fifteen* can only be understood if the reader knows English.

The Chinese writing system may indeed have its faults but it has the virtue of being understood by speakers of oral languages which are not mutually comprehensible. And, of course, the Chinese writing system—once it is mastered—does function quite well for its users. Alphabetic writing systems are not in fact necessary for literacy.

The Reading Process

The readers of English I have studied utilize three cue systems simultaneously. The starting point is graphic in reading and we may call one cue system *graphophonic*. The reader responds to graphic sequences and may utilize the correspondences between the graphic and phonological systems of his English dialect. I should point out that these are not phoneme-grapheme correspondences but in fact operate on morphophonemic levels (that is spelling patterns relate to sound sequences).

In English as in other languages the spelling system is fixed and standardized. This means that correspondences will vary from dialect to dialect and that over time changing phonology will loosen the fit of even the tightest alphabetic system.

The second cue system the reader uses is *syntactic*. The reader using pattern markers such as function words and inflectional suffixes as cues recognizes and predicts structures. Since the underlying or deep structure of written and oral language are the same, the reader seeks to infer the deep structure as he reads so that he may arrive at meaning.

The third cue system is *semantic*. In order to derive meaning from language, the language user must be able to provide semantic input. This is not simply a question of meaning for words but the much larger question of the reader having sufficient experience and conceptual background to feed into the reading process so that he can make sense out of what he's reading. All readers are illiterate in some senses, since no one can read everything written in his native language.

These cue systems are used simultaneously and interdependently. What constitutes useful graphic information depends on how much syntactic and semantic information is available. Within high contextual constraints an initial consonant may be all that is needed to identify an element and make possible the prediction of an ensuing sequence or the confirmation of prior predictions.

Proficient readers make generally successful predictions, but they are also able to recover when they produce miscues which change the meaning *in unacceptable ways*.

No readers read material they have not read before without errors. It must be understood that in the reading process accurate use of all cues available would not only be slow and inefficient but would actually lead the reader away from his primary goal which is comprehension. In fact in my research I have encountered many youngsters who are so busy matching letters to sounds and naming word shapes that they have no sense of the meaning of what they are reading. Reading requires not so much skills as strategies that make it possible to select the most productive cues.

These strategies will vary with the nature of the reading tasks. For example, literature has different characteristics than discursive

language. The writer will use unusual terms and phrases rather than the more trite but also more predictable ones which would be used to express the same meaning in everyday conversation. The reader needs strategies that adjust to the very different constraints in literary materials.

Because reading involves visual input, characteristics of the visual system do affect the reading process. The material must be scanned from left to right, as English is printed, and the eye must focus at specific points since it cannot provide input while it is in motion. At each fixation a very small circle of print is in clear, sharp focus. Some have argued that only print in sharp focus can be used in reading. But there is a large area of print in the peripheral field at each point of fixation which is not seen clearly but is sufficiently seen to be usable in the sampling, predicting, confirming aspects of reading. The reader can, in fact, work with partial, blurred, even mutilated, graphic input to a considerable degree.

That, too briefly, is what my research has told me about the process of reading English among native American speakers. I have no reason to believe that this process would vary except in minor degrees in the reading of any language. Whether the graphic sequence is from left to right, right to left, or top to bottom would be of little consequence to the basic reading process. The reader needs to scan appropriately but he will still sample and predict in much the same way.

With alphabetical orthographies the regularity of correspondence rules for letter-sound relationships is not nearly as important as many people have believed. Readers are able to use syntactic and semantic cues to such a considerable extent that they need only minimal graphic cues in many cases. They can tolerate a great deal of irregularity, ambiguity, and variability in orthographies without the reading process suffering. There is, in fact, a wide range in which an alphabetic orthography may exist and still be viable. Only minor adjustments in the reading process are required to deal with any unusual correspondence features.

An example in reading English is the variability of vowel representation. This is particularly confused since the unstressed vowel schwa, may be spelled by any vowel letter. Readers learn to rely more heavily on consonants, particularly initial ones for their

minimum cues and to use vowel letters only when other information is inadequate.

I confess to know nothing about problems of reading non-alphabetic writing systems, but I strongly believe that readers of languages which employ them will still be sampling using minimal graphic cues to predict grammatical structures.

Grammatical patterns and rules operate differently in each language, but readers will need to use their grammatical competence in much the same way. Some special reading strategies may result from particular characteristics of the grammatical system. Inflections are relatively unimportant in English grammar but positions in patterns are quite important. In a highly inflected language the reader would find it profitable to make strong use of inflectional cues. In English such cues are not terribly useful.

Semantic aspects of the reading process cannot vary to any extent from one language to another, since the key question is how much background the reader brings to the specific reading.

To sum up, it would seem that the reading process will be much the same for all languages with minor variations to accommodate the specific characteristics of the orthography used and the grammatical structure of the language.

Learning to Read One's Native Language

In the personal history of each individual in a literate society he learns first to control the spoken language and several years later to control the written language. He masters speech with no organized instruction. Normally he learns to read and write in school. It's puzzling that far less success is achieved in learning to read than in learning to speak.

Obviously there is not time to explore this vexing problem. But several key points need to be made:

1. Children who learn oral language should be able to learn to read.
2. Children who know oral language should be able to use this knowledge in learning to comprehend written language.
3. Reading instruction should center on comprehension strategies.
4. The reading process cannot be fractionated into sub-skills to be taught or sub-divided into code-breaking and comprehension without qualitatively changing it.

5. Reading instruction should use natural meaningful language within the conceptual grasp of the learners. (This implies of course that the content should always be relevant as well.)

6. Where it is at all feasible the child should achieve initial literacy within his own language (in fact within his own home dialect)!

Reading a Second Language

From my study of the reading process here are some implications I see for learning to read a second language:

(a) Learning to read a second language should be easier for someone already literate in another language, regardless of how similar or dissimilar it is.

(b) Reading will be difficult as long as the student does not have some degree of control over the grammatical system.

(c) Strong semantic input will help the acquisition of the reading competence where syntactic control is weak. This suggests that the subject of reading materials should be of high interest and relate to the background of the learners.

(d) Reading materials in early language instruction should probably avoid special language uses such as literature and focus on mundane, situationally related language such as signs, directions, descriptions, transcribed conversations, etc. This would depend, of course, on the background of the learner. Scientists should do very well with materials dealing with their own interests.

(e) It will always be easier for a student to learn to read a language he already speaks. For young learners this clearly suggests a sequence of early focus on oral language and later introduction of reading, even in situations where the second language will be the medium of later education. But the motivation and needs of older highly literate students may suggest that oral and written language receive equal attention even at early stages.

(f) As in learning to read a first language, reading instruction should always involve natural, meaningful language and instruction should avoid the trivial and keep the focus on comprehension strategies.

This article is based on a speech by Dr. Kenneth S. Goodman at the Second International Congress of Applied Linguistics, Cambridge, England, September 1969.

The Genesis of the Russian *Grazhdanskii Shrift* or Civil Type—Part II

Ivan L. Kaldor

Part II of the Kaldor paper is based on the assumption that the first Russian modern type (i.e., Peter I's *grazhdanskii shrift*) was patterned after three basic models: (a) the late seventeenth- and early eighteenth-century Russian civil hands, (b) the outmoded *poluustav* type, and (c) the contemporaneous Western roman types. The impact of Western roman types appears to be the most significant. In his search for a particular work that might have served as a source, the author proposes the hypothesis that the roman type used in Matthias Dögen's *Architectura militaris moderna* and, to some extent, in Peter's favorite *Symbola et emblemata* were the models applied by the designer. A type-by-type analysis of the original three versions of *grazhdanskii shrift* is used to support the basic theory.

Part I of this paper (cf., *The Journal of Typographic Research*, III [October 1969], 315–344) offered a brief, documented history of the creation of *grazhdanskii shrift*, the first modern typeface used in Russia. It also surveyed the transitional types applied by Western typographers in Peter I's service and contemporaneous engraved texts with characters of potential prefigurations—all in search for a possible model used by Kühlenbach, a military engineer and designer of the new type. It was established that the final lines of *grazhdanskii shrift* had been determined by the Tsar himself. The Amsterdam and Moscow printers were given copies of the design and had but little freedom to interpret it creatively. The resulting types indicate that both groups strictly adhered to the pattern set by the designer (Figs. 1–3). Thus, it seems appropriate, that the continuing quest for the model should focus on the basic intellectual tools of the Tsar and his military engineer-designer; i.e., on the Russian hands of the era and on foreign, mainly Dutch, technical and military publications.

The ensuing type-by-type analysis of Figures 1–3 will show that the influence of both the late seventeenth- and early eighteenth-