Understanding reading as a form of language-use: A language game hypothesis

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A B S T R A C T

Reading research and research on conversation have followed different paths: While the research program for reading committed itself to a relatively static view of language, where objective text properties serve to elicit specific effects on cognition and behavior of a reader, research on conversation has embraced a language-use perspective, where language is primarily seen as a dynamic, context dependent process. In this essay I contrast these two perspectives, and argue that in order to reach a unified understanding of natural language — be it reading, talking, or conversing — one needs to adopt a language-use perspective. Furthermore, I describe how reading can be seen as a form of language-use, and how the current landscape of research on reading can be re-interpreted in terms of a dynamic, context-sensitive perspective on language. In particular, I propose that the concept of 'language games' serves as a good starting point to conceive reading as a form of language-use, describe how one can derive first concrete hypotheses by re-interpreting reading in terms of language games, and show how they can be readily operationalized using tools from dynamic systems analysis.

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1. Introduction

Reading is a cultural-cognitive skill that most people exercise on a daily basis. From a psychological perspective, reading is interesting because of this cognitive-cultural aspect: As a cultural skill, reading is of practical relevance for education, economy, and recreation. As a cognitive skill, reading touches many aspects of human cognition and interaction. Reading is a form of natural language-use, just as talking, listening, conversing. It is communication, understanding, thinking, and perception. Reading has evolved for communicative purposes, to pass along messages, but also to extend the mind into the environment, for example to enhance memory by writing notes or to reflect upon one's own thoughts by writing them down. Obviously, reading mandates perception, as text is a property of the environment, and needs to be seen in order to be utilized.

However, the perceptual side of reading has received much more scientific attention than any of its other aspects. The main puzzle that psychologists sought to solve for reading is, how visual contrast gradients in the environment can be identified as words/

language by readers. Language can be written/printed in many diverse and unique ways, and success with extracting language from an environmental sources has been limited to clean print, or isolated letters (Plamondon & Srihari, 2000). Hence, research has taken a half-step back from the straight question of how visual features are recognized by a reader, and settled instead on linguistic features that help a reader to recognize a particular word of written language. Such features, called *lexical variables*, are the centerpiece of the well-developed contemporary theories and models of reading, implemented in computational models of word recognition and models of eye-movement control during reading (e.g., Grainger & Jacobs, 1996; Reichle, Rayner, & Pollatsek, 2003).

Lexical variables are quantifiable aspects of a word, usually based on corpus-linguistic analyses. One of the most prominent lexical variables is called *word frequency*. In order to quantify the frequency of a word, one counts how often that word appears in a representative corpus of texts. The relative number of appearances of that word in the corpus is then an estimator of its frequency. Quantitative measures of word frequency can be correlated with quantitative measures of the reading process (e.g., reaction times, fixation durations …), and further refinements can be made, for example the prominent logarithmic transformation of the frequency values, or theoretical parameterization of a regression model that converts frequencies into gains in terms of reading

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speed in milliseconds. The basic idea is that words exhibit stable linguistic characteristics that are captured by lexical variables, which in turn allow a reader to reliably identify words, the assumed building blocks of written language.

A second strand of research that is also relatively prominent in reading research is concerned with comprehension processes of the reader (e.g., Graesser & McNamara, 2011). Interestingly, the research that focuses on the perceptual front-end of reading and the research that focuses on later-stage comprehension processes is relatively disjoint, with the former focusing heavily on process measures of reading, and the latter focusing on outcome measures of reading (but there are ongoing attempts to bring results from comprehension research into process measures of reading – Reichle, Warren, & McConnell, 2009).

Conceptually, however, comprehension research is well aligned at its meta-theoretical core with the perceptual/process research on reading. Just as the perceptual/process research on reading assumes that a particular word exhibits particular features that lead to particular effects on the side of the reader, comprehension focused research assumes that comprehension of a text implies comprehension of something particular. That is, that there are stable features, for example on the sentence level, that act either as a comprehension-marker of that sentence or that connect two adjacent sentences (e.g., situation model dimensions), and that those features are reliably used by readers to comprehend a particular message (cf. Graesser & McNamara, 2011).

To summarize, reading research – on the level of perception and on the level of comprehension – has thrived on the assumption that the reading process is *specific*. It is specific in the sense that there are specific aspects of texts (e.g., certain lexical characteristics of words) that map onto specific cognitive processes (e.g., word identification processes) and specific cognitive contents (e.g., the meanings of words as prescribed in their representation in the mental lexicon). In order to be specific in this way, there must be a stable relationship between aspects of the text and responses of a reader with regard to the text. One can only establish a link between, say, a word property and a particular mental content that in turn triggers a measureable response (e.g., a reaction time, a fixation duration, an event-related potential) if both sides on this mapping relationship remain stable. Hence, lexical variables such as word frequency are only useful as universal building blocks for theories of reading if the frequency of a word is relatively constant, and if the meaning of a word remains more or less the same across different reading situations. If, for example, the meaning of a word can change radically or instantaneously in different reading situations, then word frequency would not be of any help to link the visual impression of a word to its meaning. The frequency of a word would not be specific any more with regard to the particular mental representation it supposedly helps to index.

The guiding assumption of specific relations between text properties and cognitive processes/contents has let to a fruitful – maybe even the most fruitful – research program in experimental psychology, and has generated practical results that have spilled over in the world of every-day readers, such as the automated readability metrics that are now part of many word processing programs (e.g., the Flesh-Kincaid index), or the design of speed-reading software (e.g., implementation of the optimal viewing position effect in RSVP reading software).

At the same time, however, research on reading has lived a somewhat exclusive life in its own traditional niche, apart from other natural language activities, especially conversation. Some researchers have tried to establish a conceptual link between conversation/spoken language and reading (Chafe & Tannen, 1987), but empirical research on the topic is virtually absent. The main reason why it seems so difficult to reconcile reading with conversation seems to be the diverging conception in these two research traditions with regard to what language is, and how it inherently works. Compared to research on reading, which has focused on perception and the mapping of stable word features to cognition, research on conversation, communication and social interaction stands on the other end of the spectrum. Research on reading might have taken the view of reading as a strongly componential process as a result of mainly dealing with pieces of written language, which seem to convey a static picture of language because that is how texts make language appear, exhibiting its own version of the what has been called the *written language bias* (Linell, 2005) in linguistics.

In contrast, research on conversation has adopted a perspective with different emphasis, namely how its bearers use language. Note that this ontological divergence in the conception of language should strike one as odd, as a naïve perspective on language development would suggest that the two are closely related: After all, reading always develops on the language capabilities that are based on conversation and social interaction in infancy and childhood. So intuitively, these two domains of language should not work according to separate principles, but share a common core.

Compared to the componential/perceptual stance adopted by reading research, research on conversation has adopted a usage-based stance, which offers a strongly contextualized perspective on language – i.e., that it is not a set of (perceptual mapping) rules that structure language, but that language is structured by functional aspects that differ from context to context in which it is used. Among other things, this reserves a fundamental role for the intentions of participants in a communication, for the social context and purpose of the communicative situation, as well as for the dynamics of conversation – that is, that communication is not built out of static components, but that the development of a communicative process is consequential for the outcome of that communication (Fusaroli, Rączaszek-Leonardi, & Tylén, 2014).

Admittedly, all these considerations seem to be fine, if not inevitable, for such a thing as two people standing in the same room, being able to talk to each other, see and hear each other, and interact with each other. However, from the surface, reading seems quite different, where a single person sits or stands still, scanning the environment for patterns. So how does all of this pertain to reading at all? And why should one even bother?

2. Reading is complex, not just complicated

Perhaps the reason why one regards the phenomenon 'conversation' as being appropriately described by an account that allows central roles for intentions, context and dynamics and shies away from an all too strict reductionism is, because conversation is easily seen as a complex phenomenon: Research on language in social interaction (Clark, 1996), as well as common everyday experience suggest that an abundance of interdependent factors play a role for conversation, and that conversation can either go wrong or succeed in unexpected ways, no matter how clear the goals of the interlocutors or their communicative ability, or how seemingly simple the topic. For example in a perceptual identification task, two participants see each the same six striped patterns on a computer monitor, one being slightly different from the other five. They are to decide which of the six is the odd one and individually submit their decision to the experimenter. If the two do not agree, then they are allowed to take a break and discuss which choice they should go with. Interestingly, each pair develops its very own vocabulary to deal with this kind of task (Fusaroli et al., 2012). For example, two participants developed a cheese-confidence-scale, where each participant told the other how confident they were that their choice was correct in ascending orders of cheese-stinkyness ("Cheese. It's