The Psychology of Reading: An Introduction

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The Psychology of Reading: An Introduction

By R. G. Crowder. New York: Oxford University Press, 1982. 269 pp. Cloth, $15.00. Paper, $6.95.

A reviewers' dialogue:

For those teaching courses in reading, Crowder's new book is a godsend, isn't it?

Yes, it's obvious that the book evolved over several years of teaching an undergraduate course on the psychology of reading. The chapter titles alone show that the book has all the right stuff, but more important the book is peppered with very effective explanations and maintains a pleasing style.

I was impressed too — and pleasantly surprised — by the care devoted to skillful pedagogy. For example, remember the way he described the Mc-Conkie and Rayner (1975) window experiment? I thought it was really helpful to start with the hypothetical case of a window size of only one character — with its obvious disruption of reading speed — and to characterize the moving window as a procedure whereby the letters of the "real" text are successively hidden and revealed by the mask of X's. It might have been even more effective if the author had linked the eye-movement studies to Cattell's early research (Venezky, 1977) and to more recent studies of reading letters and words presented at a single location (e.g., Bouma & de Voogd, 1974). It would have not only given the students a better flavor of the history of reading research, but they would also see that one doesn't have to move the eyes across a page to read.

Not only should students appreciate the lucid explanations, but their interest should be maintained by the way Crowder links topics that will strike students as esoteric to those they're already curious about. In the eye-movement chapter you just mentioned — before students have a chance to ask why they should know all about the range of interfixation distances and fixation durations, Crowder uses the optimal values to predict the maximum possible reading speed as a lead-in to the topic of speed reading. He then takes a hard-nosed critical look at many of the claims made by speed-reading programs, but at the same time does not discourage readers from the possibility of improving their own reading speed. The eye-movement chapter could have served as an excellent model for the other chapters.

I think he doesn't return to this technique often enough. The early chapters on visual perception in reading don't establish enough of a link between research and practice, and yet I believe the potential is there. There might be other reasons for this discrepancy. Crowder feels that most of the gold to be mined in reading involves the role of speech processes, a point to which we can return later. For example, the chapter on the role of speech in

reading begins with the promise that this issue will have important practical implications for how reading is taught, how to teach deaf readers, and how to deal with dialect differences.

Rather than getting bogged down in trying to define reading, Crowder sets the goal of the book to discuss what goes on when a normal adult reads a newspaper article silently. However, there's only one chapter on comprehension, and Crowder explicitly states that the book will not take comprehension as even a coequal responsibility next to the process of coping with print. Assuming that most of us understand what we read in the newspaper, does the book achieve its goal?

I suspect Crowder did himself a disservice by writing the disclaimer on comprehension you refer to. Although there is only one chapter titled "Comprehension," relevant material is scattered throughout the book. For instance, the role of prior knowledge and comprehension is central to his critique of speed reading.

Not only do we find comprehension issues raised in several chapters, but the specific chapter devoted to comprehension is one of the densest in terms of specifying particular theories and presenting empirical evidence. His discussion of Kintsch's propositional system maintains the same high level of readability and takes us all the way to the construction of propositions via pragmatic implications. This is surprising, since in his introductory remarks on the balance between encoding and comprehension Crowder asks if we wouldn't be startled to find material on how people make inferences included in a book on Braille. I inferred from this that Crowder's book on reading would also stop short of these more complex aspects of comprehension.

We seem to agree, then, that comprehension receives adequate treatment.

Clearly, although I would have been tempted to go a little further and include a short discussion of story schemas.

I would also have acknowledged that one can read for many purposes and what implications this has for describing the act of reading.

Although the text does seem to discuss all the major components involved in the prototypical activity of reading a newspaper, I am not sure that Gibson and Levin (1975) and Robeck and Wilson (1974) would agree. Those tomes are jampacked full of psychology, and many omissions in Crowder's book could be spotted in a quick comparison.

True, but I think that Crowder made a good choice by narrowing the focus so dramatically relative to the competition. His book is only half the size (and half as expensive), and yet the reader obtains a nice treatment of the psychology of reading from the perspective of a psychologist.

The only glaring omissions seem to be, first, some acknowledgment of general theories of reading and how they differ; next, the role of orthographic structure in word recognition; then, the role of spelling-to-sound regularity in the pronunciation of letter strings; and finally, the establishment of a more complete and formal link between early information-processing stages and comprehension.

Although the book is meant to be process oriented, a chapter devoted to ethnographical, sociological, cultural, and motivational factors in reading would have been very appropriate.

What about the organization of the book? The logic of chapters 3 through 7 is straightforward, taking the student along a bottom-up route from pattern recognition to

the perception of unrelated letters to the perception of words in isolation to the perception of words in context and, finally, to comprehension.

I'm not sure that this "straightforward" organization will be apparent to the student. Although I was not aware of this point as I was reading the book, in retrospect I realize that the parts described in each of these early chapters cannot be put together to form a coherent overall model of reading. The primary mechanism discussed at one stage of processing is often ignored in the following chapter. The first missing link is between pattern recognition and the perception of unrelated letters.

You may have to convince me of that. Let's walk through these two chapters and see how they hang together. His treatment of the pattern recognition area makes the traditional distinction between features and templates, discussing research paradigms that have been used to illuminate feature processing. Selfridge's Pandemonium model is described in detail to provide one "plausible" feature system for character recognition. As an aside, I think he should have pointed out that features are nothing more than mini-templates in the sense that they are the primitives of the system. He might also have used a feature more relevant to the perception of letters, say line orientation rather than color, in the discussion of aftereffects, but these are minor points — continue with your train of thought about the framework provided by this chapter.

The most appealing part of the chapter on pattern recognition is the emphasis on the stages of processing or separate operations involved in the pattern recognition process. Sometimes psychologists talk about pattern recognition without really making clear the memory and decision aspects involved in this skill. Once exposed to memory, however, the role of learning becomes so apparent. I don't understand why the LaBerge and Samuels (1974) research wasn't presented here rather than in the chapter on "words in context." This would have allowed him to discuss the important role of learning and memory in the learning of novel patterns. Be that as it may, students now have a background in the processes involved in pattern recognition and should feel they are prepared to deal with the perception of unrelated letters, the title of the next chapter.

It was reasonable to start with the treatment of iconic memory by Sperling (1963). Notwithstanding Haber's (1983) critique of the role of iconic memory in visual processing, reading must begin with a visual representation of the stimulus, and iconic memory does give more substance to the boiling cauldron that produces an image in Pandemonium. But interest in the problem of perceiving letters quickly gives way to how they are stored — the most emphasized issue from the Sperling studies and model is the type of acoustic confusions that occur when the material is in short-term memory . . .

. . . and the limitations on the recognition buffer and so on. I'm beginning to understand your complaint. The student is led to believe that in terms of the recognition of unrelated letters what seems to be the most central is the maintenance of these letters in some kind of auditory short-term memory. Crowder is extreme in his deemphasis of visual processing. One finds no mention of the abundance of research on visual confusions and lateral masking in letter and word recognition. Consistent with most traditional accounts of the Sperling experiments, one is led to believe that vision is easy and that the only bottleneck exists in maintaining the items in short-term memory. But continue your point, I don't want to steal the stage.

The chapter on word perception follows the chapter on the perception of unrelated let-
ters. Quite likely, the student is primed to believe that the letters held in the auditory store
are used to recognize words. Instead, words are characterized as a collection of features,
with the word-shape feature playing a very prominent role. The acoustic representa-
tion — whether it be a phonological code for the word or the names of the constituent let-
ters — has evaporated.

One reason to justify its absence is that the chapter treats only single words. Crowder might expect the student to infer that short-term auditory memory is still important; it's just that we're not overloading it in these particular experiments.

That's a good point. It's certainly true that Crowder eventually shows the importance
of the auditory store in providing a memory for the comprehension process to operate on,
but don't forget that he doggedly holds onto the plausibility and probable importance of
phonological mediation in lexical access throughout the final chapters of the text. Thus,
it is strange and bothersome that there is not a hint of auditory memory, speech media-
tion, and reading words by spelling-to-sound correspondences in the chapter on word
perception.

By the way, I wouldn't want to leave the impression that if the notion of phonological mediation in word recognition received less emphasis, I would then be happy with the visual-pattern recognition model that remains. Crowder was quite selective with respect to the research he presented. He describes, in detail, two research programs that support the concept of a word-shape feature, but ignores the failures. Adams (1979), for example, in a most convincing study, shows that the word superiority effect (WSE) is the same size in mixed case as in lower case.

I agree that the emphasis on extracting whole-word features is not shared by most cur-
rent theorists in word recognition. I might reinforce your observation about selectivity in
research by noting the detailed account of Johnston and McClelland's (1974) "Seek not
and ye shall find" study. Although the experiment nicely illustrates the importance of at-
tending to the whole word in the WSE, it should be pointed out that the upper case
words provided no distinctive word-shape feature and that Paap and Newsome (1980)
failed to replicate the finding that attending to the target location of a word produces in-
ferior performance relative to attending to the whole word. Furthermore, it was this dis-
ruptive effect of attention on word performance that formed the empirical basis for
Crowder's novel "competition" explanation.

Two other selections also come to mind. In the chapter on words in context, the Tulving and Gold (1963) experiment is presented without refer-ence to the unrepresentative dynamics of their task. The current on-line ap-proaches used by Stanovich and West (1981) and others might have made a valuable contribution.

The word-in-context chapter remains a mystery. It begins appropriately enough with
the logogen model and with recognition of words more easily with contextual con-
straints. But then "for something completely different," Crowder gives his only brief
coverage of learning to recognize novel patterns with practice and formal models of read-
ing.

I do have some reservations about the relationship of the last section to the earlier chapters. When I turned to chapter 8 on writing and spelling, I wondered whether I was reading the same book. It seems odd that the

reader should now be concerned with the history and structure of orthography after having already studied the psychology of letter and word recognition. At some level Crowder must be assuming that the structure in writing and spelling has very little to do with word perception. This opinion is certainly substantiated when one notes that nowhere does Crowder consider the possibility that it's the orthographic structure itself that contributes to the advantage of words over single letters.

Perhaps this also sheds some light on his rather curious claim at the end of the word-perception chapter that the research on word-pseudoword differences "is not a part of the psychology of reading, at least not yet" (p. 96). But let's return to the material from what appeared to you as the "second" book. I found chapter 9, on the role of speech in reading, somewhat confusing — particularly the discussion of systematic phonemes.

Crowder defines a systematic phoneme as abstract spellings that illuminate meaning roots in words in addition to sound values. What's confusing is that no effeort is made to describe how systematic phonemes might mediate word recognition. Previous efforts by Gough (1972) and others in this regard are ignored.

Another possible interpretation would be that Crowder is saying that word recognition leads to the availability of systematic phonemes, thus supplying the phonological code for the auditory store.

There must be more involved than this because he specifically points out that it is a phonetic, not phonological representation that the reader has after word recognition is complete.

To be fair to Crowder, there is substantial evidence for some role of speech in reading. The most impressive evidence is surveyed in chapter 10 on learning how to read. This research supports the view that speech mediation plays a role in comprehension, in constructing the gist of a phrase, but provides no evidence that speech mediates word recognition.

Although Crowder provides an honest assessment of the research on speech mediation in reading, he interprets the negative evidence in an unconvincing manner. To maintain a speech mediation model, he observes that direct lexical access is possible but not usually used. But the whole point of the research is the *ease* of direct lexical access. Why is it so easy if it is seldom used in normal reading?

Since the mechanisms for grapheme-phoneme translation are left unspecified and the possibility of having two separate routes from print to sound (e.g., Coltheart, 1981) is not raised, it might have been better always to stick with the Pandemonium-logogen model for word recognition and reserve the role of speech for postlexical processing. With this decision, there would be no need to introduce the material on auditory short-term memory in a chapter on letter perception — it could be held off until needed for the comprehension process.

But he did hold off in some sense since the chapters on letter and word perception do precede the introduction of systematic phonemes and their possible role in mediating lexical access. As we mentioned previously, the word-perception process conformed to the model of visual pattern recognition. So the student must be somewhat disturbed when faced with the idea that there is a possibility of a phonological mediation in word recognition.

If the reader recognized a word on the basis of whole word shape and other word features, how does speech or phonological mediation play a role in this recognition scheme? If the letters of the words have such a small role in word recognition, then why is the concept of a systematic phoneme so critical to the process?

I don't think the book answers that question.

To wind up, I found much of the book informative. I liked the historical treatment of learning to read, the discussion of methods and experiments concerned with the teaching of reading, the explanation of deaf readers' reading competence in certain tasks in terms of their experience with oral language, and the coverage of the nature-nurture issue in the dyslexia chapter.

So to summarize, we see the book's major shortcoming as a failure to build a coherent overall model of the reading process and we have some quibbles about the specific studies that were selected, but do we still agree that the book offers a nice complete survey of the psychology of reading?

Yes. But I find the balance of its considerable strengths and weaknesses precarious. Will you use it next term?

I plan to use it along with George Miller's Language and Speech *(1982) and additional original readings in my graduate course "Speech Perception and Reading." However, I guess I will have to suppress this review until they have read the book. What about you?*

If I were teaching an undergraduate course on the psychology of reading, I would use it. But before I do so, maybe I will hold out for a better text. Do you know anybody writing one?

No, I don't, but I know a few people who should write one.

Likewise.

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Both authors contributed equally to this review, and the conversational format represents a literary technique rather than an attempt to maintain individual judgments.

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Behavior Genetics: Principles and Applications

Edited by John L. Fuller and Edward C. Simmel. Hillsdale, NJ: Erlbaum,
1983. 498 pp.

As the editors point out in the preface, this volume started its life as a pro-
spective *Handbook of Behavior Genetics* under a different set of editors. Things
happened, as they do, and it wound up as an *Advances*-type volume, with an
assortment of chapters by different authors providing more or less up-to-
date reviews of various topics in behavior genetics, plus discussions of the
relationship of behavior genetics to some of its bordering disciplines. In the
category of reviews, there are four chapters concerned with topics in human
behavior genetics and four having a chiefly lower-animal emphasis. The
chapters mainly on humans include genetics of human nervous system
functioning (Claridge and Mangan); medical genetics (Omenn), genetics
of schizophrenia (Diederen), and genetics and intelligence (Scarr and
Carter-Saltzman). The chapters dealing mainly with animal research en-
compass genetics of exploratory behavior and activity (Simmel and
Bagwell), behavioral pharmacogenetics (Horowitz and Dudek), care-giving
and care-seeking behavior (Gurski), and aggressive and sexual behavior
(Hyde).

The more general discussions include an opening tutorial chapter on
genetics and evolution (Ehrman and Probber), a short introductory review
of social behavior (Scott), and two fine chapters by Fuller relating behavior
genetics to the disciplines of ethology and sociobiology, respectively.

If the book *had* turned out to be a handbook, what additional topics
would one expect to find covered? Some possibilities include a systematic
treatment of behavior genetic methods, the genetics of personality and tem-
perament, mental retardation, psychopathologies other than schizophre-
nia, and genetics and animal learning. Perhaps there will be a *BG II*.