Reading Theory and Foreign Language Reading Comprehension

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This article presents a theory of reading. First, a justification is undertaken for doing this when there are so many other theories already in existence. This justification takes the form of a defence of a highly generalised approach to the different forms of reading, and a lexical approach to receptive grammar; an argument for the unity of nature of knowledge, in contrast to a modularised, “complex” approach; an emphasis on the importance of automatism and capacity; a focus on attention, purpose, and the ever-present option of abandoning reading. These things are not new in the field of reading theories. What is certainly not new is that the theory is interactive-compensatory, after Stanovich 1980; it uses Shallice’s contention scheduling (Norman & Shallice 1980; Shallice 1982, 1988); and it takes a lot from Newell (1990). The question of the usefulness of models in general and this one in particular is also addressed, particularly with relation to foreign language reading.

A central question for researchers into reading in a foreign language is, “What generalisations can usefully be made about it?” Because the answer is “None”, then what constitutes its validity as a field of enquiry? We could have a science whose object of study was all people named John, and we could make a number of generalisations about these people, but more useful generalisations are made by taking males, or human beings, or living things as our object of study. Equally, what generalisations can be made about reading in a foreign language that couldn’t more usefully be made about reading in general?

Reading is after all a form of human cognition, which is the level of generality many researchers are aiming for. A theory of human cognition should encompass reading in all its forms, and presumably find the same processes at work in a variety of cognitive activities. For example, the saccade is a feature of visual activity in general, not just of reading. If the image on the retina is held still for a second or two, it disappears from view. The normal rate of these eye movements is three to four a second (Crick 1995: 122-3). Taking into account Just & Carpenter’s findings on eye fixations (approximately 80% of content words and 40% of function words fixated (1987: 37)), this gives a fair approximation to fluent reading speeds (about 190-260 wpm according to my calculations).

There is also the question of readers and texts. Readers have a wide variety of purposes, come from a Babel of native tongues, with the complete spectrum of proficiency in the foreign language, read texts in an equal number of languages of an equally all-encompassing range of difficulty, type and topic. What generalisations can be usefully made about that?

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One way of testing such questions is to see if there are any viable frameworks, theories or models of FL/L2 reading. In fact, there seem to be none of the reading process in a foreign language in general which could not equally be applied to first-language reading.

It is necessary here to make the distinction between frameworks, theories and models, following Eysenck & Keene (1990: 31-2). A framework is a general set of ideas which is to be thought of as useful or not useful rather than correct or incorrect. An example of this is the information-processing framework common to many cognitive approaches. A theory, on the other hand, should be falsifiable even though it may be couched in such general terms as to make this falsifiability not immediately apparent in a practical sense. A model is an instantiation of a theory which enables it to make predictions about a specific situation. What appears to be a theory may turn out to be a model when someone figures out a way to test it empirically.

Many models (or perhaps theories) of the L1 reading process have been presented (for a review see e.g. Barnett 1989). Some schematic representations of the foreign language reading process have also been attempted, perhaps the best known being those of Bernhardt (1991).

![Diagram](image)

**Figure 1**: The Constructivist Model. A model of the interaction of text-based and extratext-based components in L2 text reconstruction from E.B. Bernhardt, "Reading in a Foreign Language." The figure originally appeared in B.H. Wing (Ed.), (1986). *Listening, Reading and Writing: Analysis and Application*. (p. 103). Northeast Conference REPORTS.

Bernhardt's Constructivist model (Fig. 1) is a good example of a framework. A number of factors are portrayed as interacting with one another - a highly plausible state of affairs, and one extremely unlikely to be falsified. However, there is no indication of process or sequence, or the actual mechanisms which might lead to comprehension. Figure 2 is a graph portraying the same factors as Figure 1, this time plotting error rate in these areas at different levels of proficiency. This graph is actually based on the findings of empirical research, and why the distribution is described as 'theoretical' is unclear, since no theory is presented. There is in fact a notable increase in errors in syntax at a medium to high level of proficiency, but the reasons for this increase can only be speculated about. A number of interesting questions are raised - for example, is this pattern true of FL reading in general? In this case we would have a valuable generalisation about FL reading. Or is it language-specific? The purpose of this article is to assess the value and functions of models or theories of the reading process in general, and their applicability to FL reading, and to justify the presentation of another theory of reading.

![Graph](image)

**Figure 2**: Theoretical distribution of reading factors (from Bernhardt, 1986)

Some of the problems of theories of reading are set forth in Samuels and Kamil (1984), who also provide a useful overview of models of reading that have so far been suggested. They suggest the following criteria for evaluating these models.

Because of the interactive nature of the variables in a study, we must attempt to evaluate the different models in terms of their generalisability... As we investigate and study... models, we ought to be asking questions, such as, Does this model adequately describe both fluent and beginning reading? Does this model describe reading across a variety of tasks and purposes? Does the model describe the word-recognition process as well as the comprehension process? Does the model describe the reading process for different materials as well as different contexts? At the present time... [no model] can do all of the above. (Samuels &; Kamil, 1984: 26)
word recognition, which has tended of necessity to concentrate on a limited area of the reading process and has therefore been unable to build up comprehensive theories; subjective work where readers describe their own mental processes and strategies during and after reading, which suffers from the inevitable limitations of only being able to study conscious processes; and neuropsychological work, mostly on brain-damaged subjects, where data on higher cognitive processes is difficult to obtain. Cognitive Science stands apart as a discipline which happily manufactures theories on a fairly large scale, but is unable to verify them except by running computer programs which may have little or nothing to do with how the brain actually functions. The lack of theory-building gained from the three avenues of empirical verification calls out for a theory-manufacturing department, but we are still left with Searle's (1989) problem of whether such computer programs are actually replicating human cognition or merely going through the motions without actually understanding anything at all.

The theory presented here has six salient characteristics:

(i) It is pitched at a high level of generality
(ii) It is lexically based
(iii) Knowledge is seen as unitary
(iv) It is interactive-compensatory
(v) Automatisation plays a highly significant role
(vi) There is also a focus on purpose, attention, and the ever-present option of abandoning reading.

Each of these will be dealt with in turn.

1. HIGH LEVEL OF GENERALITY
This may at first sight appear to be a disadvantage, but if the criterion is going to be applicability to readers from all cultures, then such a degree of generality may well be necessary. Take for example the findings of Scribner (1977) quoted in Hudson (1980: 222), that many adults from a rural Liberian tribe could not solve the following problem, or if they did, could not explain how they arrived at the answer:

All people who own houses pay a house-tax.
Boima does not pay house-tax.
Does Boima own a house?

Similar results have been obtained in Central Asia and in Mexico. It is easy to make assumptions about what kind of processes might go on in a reader's mind whilst
reading, based on one's own cultural predispositions. However, to suppose the simple syllogism is obvious to any reader, from no matter which culture, would be an unjustifiable assumption (for further evidence in the field of syllogism see Johnson-Laird 1983, Johnson-Laird & Bara 1984). It may well be that a model of reading in a foreign language is more constrained by the differences between different languages and ways of thinking, and therefore has a more general applicability in cognitive terms, than a model of L1 reading, which may include cultural specificities (such as syllogistic reasoning) without distinguishing them from universals. That is to say, we are in need of what Chomsky (e.g. 1965) would call explanatory adequacy - a utopian goal, as Chomsky remarks (p. 26), but nevertheless a goal to be strived after. Bernhardt (1991: 67) remarks:

One area in need of attention is theory development. Future research needs to explore models of reading in general where the bulk of reading research lies. Such explorations will lead towards the development, modification and substantiation of fundamentally sound second language specific reading models.

I agree heartily with the initial statement that theory development is necessary, and that a good place to look is in L1 reading research. It seems highly unlikely, however, that there will ever be a collection of second language specific models, one for each language, if this is what is meant. For such a model to be useful, it would have to be sufficiently generalised to account for all the differences in the speech community the reader comes from, and in the foreign language speech community - quite a high level of generality, unless one writes a different model for each reader in each language (and this is indeed a theoretical possibility). In other words, should one develop separate models for Spanish and Catalan readers of English? Or for Spaniards studying Standard English and Geordie? If, on the other hand, Bernhardt means there would be a number of different models, all referring to second-language reading in general, then it is difficult to see, firstly, in what ways an L2 model should differ from an L1 one. At what point of language proficiency, for example, should one switch from the L2 to the L1 model? Secondly, how would it be possible to substantiate these different models? Here, there is a parallel with Chomsky's descriptive adequacy, which also runs into difficulties with the concept of speech communities, as Chomsky finds it necessary to refer only to an "ideal" speech community in this context (1965: 3) (see e.g Gumperz 1968, Hudson 1980: 7).

Bernhardt continues:

Clearly, this book is the expression of a particular theory of reading in a second language, and is meant to provide a perspective - not the perspective - on reading in a second language.

Again, one is tempted to ask if this theory is able (at some future date) to be substantiated - if so it must at least be part of the perspective which Bernhardt modestly disclaims. Or if it only provides one of many perspectives held by a number of theories, surely it is not possible for all the theories to be right at the same time? In other words, according to the definitions made above, Bernhardt is presenting a framework rather than a theory.

We must then choose between on the one hand a multiplicity of models or theories, each one for a very specific type of reader and a very specific type of text, or each one so vague that it does not contradict the other possible candidate theories, and on the other hand, a model of such a high level of generality that it accounts for all types of reading in all languages.

The need for a high level of generality is indicated by Samuels and Kamil's four questions about models in terms of their generalizability. It is claimed that the theory presented here fulfils those four criteria. But in doing so, it loses the status of a model, that is to say, its testability in a specific case.

2. LEXICALLY BASED

![Figure 1: The Representation of Knowledge in Reading Comprehension.](image)

It will be noticed that in the diagram of the theory presented in Figure 3 there is no box labelled parsing. Surely this is a grave oversight? In fact, there is no contention here that parsing does not occur. The boxes labelled problem spaces can take care of that. What the lack of a parsing box does draw attention to is a belief that “parsing”, in the sense that a phrase-structure or transformational grammar would have it, is not appropriate to reading. For one thing, reading is a linear process that occurs word by word (Just & Carpenter 1987), whereas in phrase-structure grammar we are invited into a hierarchical world of grammar. This is not to say that the kind of hierarchical approach of phrase-structure grammars may not be applicable, particularly in the production of writing or speech, but only that in reception a different type of grammar may be more appropriate. The idea of productive and receptive grammars is not new: a sentence like

*Man go London yesterday.*

or

*Man London go yesterday.*

or

*Go man London yesterday.*

would presumably be comprehensible to varying degrees depending on other considerations such as context, but would not be acceptable as a production by a native speaker (cf. tests done on patients with Broca’s aphasia (Just & Carpenter 1987: 133)). Again, when I read a sentence like “The flowers were watered by Mary.”, do I need to do a passive transformation in my head? (cf. Herriot, 1969; Kimball’s semantic strategies 1973). This has a lot to do with inference. When I produce a sentence, I may want it to be as clear as possible. When I receive it, I may want to make as few reasonable inferences as possible before coming to a subjectively satisfactory conclusion as to its meaning.

As far as reading is concerned, one problem with a phrase-structure grammar is that it does not seem to account subjectively or experimentally for the flow from one word to the next that we experience when reading. Written language also consists of large phrases and clauses that short-term memory, with its ± 2 second capacity (Gathercole & Baddeley 1993), is unable to store. We therefore need a grammar that builds up brick by brick rather than bringing large prefabricated units to the site, and dependency grammar (Tesnière 1959, Hudson 1986) does the job (for a discussion of the usefulness of formal grammars in determining the nature of real language use see Berwick & Weinberg (1983)).

Take a sentence like:

*Many people live in large cities.*

A conventional constituency grammar would provide an analysis in Figure 4.

A dependency grammar, on the other hand, would provide an analysis as shown in Fig. 5.

At least superficially, the dependency model is simpler. As Hudson (1981) points out, a Phrase Structure analysis like the one in Fig. 4 has at least 3 levels of structure between S and the final constituents; the dependency grammar has none. In the latter, as is shown by the arrows in Fig. 5 “many” is governed by “people”. Thus in processing terms, the reader may be seen as having to “hold” “many” until the governor is encountered. Then, since “people” is dependent on the verb, the group “many people” must be held in memory until “live” is processed. From then on, however, most of the processing is from left to right, since “in” is dependent on “live”, “cities” on “in”, and the reader need only hold “large” in store until the processing of the sentence is complete. Thus dependency grammars would seem to require a more-or-less linear processing, which reading is.

With the constituency analysis, on the other hand, the whole of the sentence must first be processed before the sentence can be analysed into its constituent parts, forcing the reader into a ‘wait and see’ strategy. Not only does the constituency model seem to place more load on working memory, as Just & Carpenter (1987: 146) remark, there is no empirical evidence for a wait-and-see strategy, whereas there is considerable evidence for a more immediate interpretation. For example, in ‘Garden Path’ sentences such as:

_The old train the young_

readers are regularly deceived, taking ‘The old train’, for example, as a Noun Phrase, or ‘before the audience’ as a prepositional phrase. If readers were relying on a wait-and-see strategy, they would not make such mistakes.

Thus in terms of simplicity, linear processing, and load on working memory, dependency grammars seem more suited for a model of the reading process than constituency grammars.
3. KNOWLEDGE IS UNITARY
Of great importance in the model is the role of knowledge. All the knowledge that the reader possesses is available to be brought to bear on a text. Knowledge is not therefore compartmentalised. Levels of activation determine what knowledge will be brought to bear on any particular text, then that which is relevant will be included in the representation. According to this view, the words in the text are only labels for nodes in a network. Knowledge is seen as a set of propositions plus a set of processes, the latter including connection, amplification and inhibition, search, calculation, syllogism and various kinds of modelling – causal, conditional. This view of knowledge is not dissimilar to those of McClelland & Rumelhart (1985) and Newell (1990).

4. AUTOMATISATION
The first action to occur in the process of comprehension is word encoding. This theory takes Just & Carpenter's (1987) view (justified on pp.43-4) that this takes place before lexical access, which is direct. It is thus the perpect of the word which is recognised before meaning is accessed.

This is facilitated by automatisation – the more frequently a word is seen, the lower the threshold required to allow lexical access, and therefore the shorter the time. In foreign language reading, this would indicate the importance of practice, and, particularly in the early stages of language learning, a controlled and gradual introduction of new vocabulary, the type of approach advocated by COBUILD and graded readers. By introducing a limited number of frequent words, something resembling fluent reading in the L1 can eventually be achieved. The importance of automatisation in reading was first recognised by Laberge & Samuels (1974). Stanovich made use of the work of Posner & Snyder (1975a, b) in his theory of 1980 (see next section). It was demonstrated in the work of Schneider & Shiffrin (1977). Newell (1990: 136) refers to the establishment of the automatic/controlled distinction as "one of the foremost developments in experimental cognitive psychology over the last decade".

5. INTERACTIVE-COMPENSATORY
This theory is Interactive-compensatory, like that of Stanovich (1980), and capacity-constrained, like that of Carpenter & Just (1992). As an illustration of this, look along the bottom of Figure 3, from left to right. The most efficient form of reading is that with the greatest amount of automatisation, on the left. As one moves to the right, more and more cognitive capacity is taken up in the decipherment of the text's message, leaving less and less capacity for higher-level functions such as interpretation or evaluation. That which constrains capacity (not labelled in Figs 3 and 6 for the sake of clarity) is short-term or working memory. If the difficulties in the text are not simply difficulties with words, a common problem in philosophical texts, for example, the capacity is taken up above the level of word encoding, as the attention tries to make some sense of putting words together.

Following Samuels & Kamil's condition that models of reading should be able to account for reading development as well as the moment-to-moment reading process, now reverse the movement from left to right across Figure 3. As one does so the level of automatisation and therefore fluency increases, tracing a process of reading development, as well as different behaviours in reading dependent on level of reader and difficulty of text.

In fact the terms "level of reader" and "difficulty of text" are not entirely accurate terms to use, as they imply objective scales which are very difficult to establish in isolation from each other. In the model reader and text merge, only the process remains. The reader only appears sporadically as an interruption of the process, deciding for example to stop reading, skip a paragraph, make a mental note of something or monitor comprehension. Reading is a very individual habit, depending on such things as taste, background knowledge, interests, which vary greatly from reader to reader, and texts are equally individual.

Moving from right to left across Figure 3, then, rather than tracing a process of reading development, traces a relationship between reader and text, which changes according to the level of difficulty of a particular text for a particular reader.

6. ATTENTION AND PURPOSE
These have in the past been assumed in some theories, but of course they are absolutely bound up with reading, determining whether it happens at all, and what form it takes if it does. They may also embody some of the affective characteristics of the reader, who is not seen as merely going along with a process. This does happen, but FL reading is more likely to be at the other extreme of the spectrum (on the right of Fig 3), performing something sometimes more akin to problem-solving than to reading. The flow-chart (Fig. 6) draws attention to the constantly present option of abandoning the text.

7. A THEORY OF READING
The theory in Fig. 3 and its accompanying flow-diagram in Fig. 6 (which shows essentially similar information in a different format) was developed to fulfill the conditions of generality set forth above. It owes a lot to Newell (1990) (comprehension operators and problem spaces); Just & Carpenter 1987 (word encoding & lexical access); and Norman & Shallice (1980), Shallice (1982, 1988) (contention scheduling). The concept intended by "chunking" is also essentially Newell's, although it also owes a lot in its turn to Miller (1956). Considerations of
Let us first consider the theory in Fig. 3. The line at the bottom of the diagram represents the dividing line between reader and text. It will be noticed that there are four "words" at the bottom of the diagram. Each one of these represents a different situation, reflected by a different route in the flow-chart. We will consider each of these words in turn, starting from the left.

The first word, then, fires a set of neurons which we will call the word-encoding mechanism (WEM). It is a very familiar word (a function word, perhaps) and it thus gains automatic access to the appropriate body of knowledge in the lexicon – the comprehension operator, which contains semantic, contextual and syntactic information. It then goes directly into the representation of the text by the reader, according to the purpose. This is a straightforward, fast, bottom-up process. There may be some cases where the word, having gone through automatic processing, is ignored, if it has nothing in particular to offer in semantic or syntactic terms.

This may for example sometimes be the case with the infinitive "to".

The second word also fires a word-encoding mechanism, and also goes into automatic processing. This time, however, it is potentially ambiguous, but still very familiar (a word like "bank", say), so it goes through a routinised selection process known as contented scheduling, defined by Shallice (1988: 334) as the "process of routine selection between routine actions or thought operations". This is needed to explain the finding that alternative meanings of ambiguous words are activated for a few hundred milliseconds, although we are not normally aware of this (cf. Just & Carpenter 1987: 80ff.). It could be compared to the automatic choice between braking and changing down whilst driving a car, when a conscious cognitive process, such as listening to the radio, is simultaneously being attended to.

The third word also fires a WEM, but in this case attention is captured. This may be for a variety of reasons. There may be a WEM for a word with no corresponding body of knowledge. This often happens in FL reading, where a word may have been frequently seen and therefore familiar, but its meaning has not yet been learnt. The word may go through automatic processing (perhaps contention scheduling as well) but be rejected from the representation. This might happen when an unusual meaning of a word is intended – "bachelor" in the sense of "young male seal", for example; or where interpretation needs to compensate for imperfections in the message-poor handwriting or poor English – "I sat on the bank" in the writing of a Spanish or Turkish student, for example, would require the intervention of attention before being reinterpreted as "bench". Notice that attention is bracketed as "goals". This means that attention will only be lent to the word in question if the reader feels that it is worthwhile in terms of the purpose of reading. The other option is of course simply to ignore the word. But notice also that, in the flow-chart, attention must be lent to the word in order for it to be ignored – some kind of evaluation must

(from Anderson & Shiffrin 1980: 331)
take place before it is decided not to pursue the word-meaning. The presence of attention means that a problem-space is formed (Newell & Simon 1972, Newell 1990). The problem here is to assess the meaning of a word to a degree of exactness imposed by the purpose or task - enough to continue reading in some cases, complete exactitude in others, as, for example when reading the instructions on how to defuse a bomb. In the problem space, knowledge is brought to bear, both directly and via the constraints of the representation so far. An example of direct knowledge might be that pre- means "before" as an English prefix. Syntactic constraints of previous text are knowledge mediated by the representation of the text so far. A problem-space may lead to the formation of another problem space, where for example pre-X or +VerbX are known quantities, but the rest of the meaning remains unknown; or it may access knowledge which is considered sufficiently relevant in the representation, in the form of a comprehension operator or combination of comprehension operators, in which case the word has been comprehended to the reader's satisfaction.

In the case of the fourth and final word in Fig 3, there is no word-encoding - the word is unfamiliar. It therefore immediately captures attention and follows the same procedure as described above.

In the processes just described, all new combinations of two or more items of information are carried out by the universal agency of chunking, which may be compared to binding in neurophysiological terms. Chunking, according to Newell (1990: 185) is "learning from experience. It is a way of converting goal-based problem-solving into accessible long-term memory...". A feature of chunks is that they can be of varying degrees of complexity. A chunk can be made up of previously-learned chunks, which in themselves may be made of previously learned chunks, and so on.

Fig. 3 is entitled "The Representation of Knowledge in Reading" because the whole process takes place within the representation by the reader of the text so far. The mini-problem-spaces in the diagram are all sub-stations on the route to the fulfilment of the grand design embodied by the reader's purpose. The representation is actually the current state of the reading process. It is changing moment by moment as new information is added and new perspectives are gained on the task in hand. As with the problem-spaces, knowledge (in theory any knowledge that the reader possesses) is available to the representation directly or via the medium of specifically text-accessed bodies of knowledge - the comprehension operators. Much of the directly accessed knowledge provides a background to that provided by the comprehension operators in the form of higher-level schemata - scripts and story-grammars, for example.

Let us compare our theory to the major processing levels in the READER model of Just & Carpenter (1987) (Fig.7).

**Figure 7:** The major processing levels in the READER model that operate as the reader fixates the word engine in the text.

[From Just & Carpenter, 1987]

READER is an artificial intelligence program that performs many of the actions we are thought to perform while reading. As the figure shows, READER works on five major levels simultaneously, so that while fixating on the word "engine", READER is encoding the percept of the word, relating it to a body of knowledge associated with the word (lexical access), analysing its syntactic role (as a noun in a NP), processing its relationships in the context of the text-schema (in this case as an example of where flywheels are found, and establishing its significance in the real world (referential processing).
In our theory, starting at the lowest level, word encoding is taken care of by the WEM. Lexical access is performed by the comprehension operator. Semantic and syntactic analysis occurs through the relationship between the comprehension operators in the representation, according to the expectations embodied in these operators. Text-schema processing is an example of a higher-level schema operating directly from knowledge in the representation. Finally, referential processing is the changing nature of the representation itself according to the relationships expressed in the text.

We have claimed above that this theory succeeds in attaining a high level of generality. In order to vindicate this claim, we shall use Samuels and Kamil's (1984) criterial features (for judging models of the reading process) as a yardstick.

(a) Does this model adequately describe both fluent and beginning reading?

In the theory we are using WEMs, of which there is one for every word that is known, but some words in the text may not be known, and this number increases as the level of the reader becomes more elementary in relation to the level of the text. This account has not yet gone into detail about the processes that are set in train when no WEM is present (feature, letter, cluster and morpheme recognition, phonics) but it is clear that as one moves from left to right at the bottom of diagram 3, one is moving from a fluent, automated process to processes that require more and more chunking, if indeed they have any chance of success at all.

The theory is therefore compensatory in nature, more attention and strategies being used in the beginning reader, and more automatization in the fluent reader, leaving the attention free to concentrate on the semantic representation of the content of the text, or whatever else the reader's purpose might require. Therefore, like Stanovich's (1980) model, this theory accounts for both beginning and fluent reading, but not in a generalised way; at a lexical level. This ties in with the importance of the criterion we are using in this study: that of the reader's level in relation to the text. The theory will account for the difficulties of a normally fluent reader with a specialised text, for example. Not only does it account for lexical problems, it also explains semantic difficulties with texts that contain familiar words, as there is also a route to the reader's attention where automatized processing has failed to provide a satisfactory interpretation.

(b) Does this theory describe reading across a variety of tasks and purposes?

This condition is fulfilled simply by identifying purpose as a precondition to attention. What is attended to will depend on the purpose of the reader, and the knowledge that is brought to bear will also depend upon this purpose.

(c) Does the theory describe the word recognition process as well as the comprehension process?

It needs to in order to account for some word-length and word-frequency effects, and also the results of lexical decision tasks (Just & Carpenter 1987: 44). This has already been largely covered in (a). Word encoding is performed by the WEM. This information is sent to the corresponding comprehension operator (Newell 1990) (there is also one for every word) which accesses a body of knowledge. If there is a match between the comprehension operator and the representation, integration occurs. This is comprehension. If the match is not satisfactory, further chunking needs to be done in new problem spaces before integration occurs or the attempt is abandoned.

(d) Does the theory describe the reading process for different materials as well as different contexts?

The fact that any purpose may be embodied in the attention of the reader, and that any part of the reader's knowledge may be called upon, fulfils this criterion.

8. CONCLUSION

In conclusion let us look at some recent results that this theory may or may not account for. Firstly, the background knowledge threshold effect reported by Ridgway (forthcoming) may fit into a schema like that of Fig. 8 (the upper threshold has not been established, but there are indications that the lower one exists). Fig. 8 could be overlaid onto Fig. 3 quite easily, moving from left to right from ease to difficulty of text as before.

![Figure 8: Reading and difficulty of text.](image)

Reading mainly bottom-up. Background knowledge effect not detectable as all "gaps" in comprehension are filled.

Compensatory strategies used. Background knowledge effect.

Lack of knowledge (linguistic or background) prevents comprehension. A "short-circuit" occurs.

EASY

DIFFICULT
The same pattern in strategy use as we see in Fig. 8 has been noted by Green (1991):

Green reports that his advanced language learners often have significantly lower strategy use than intermediate language learners, and that intermediates use strategies significantly more than do beginners. Thus strategy use in Green's study might appear to be curvilinear, with intermediates using language learning strategies far more than advanced and beginning language learners. One might speculate that advanced learners might have automated their learning behaviours, so they might not use or need language learning strategies as much as do intermediates; and beginners might not yet have developed a large, conscious, and frequently tapped repertoire of strategies.

(Oxford & Cohen 1992)

All this fits in well with the theory described here, with the proviso that we prefer the criterion of level of difficulty of a particular text for a particular reader to a general criterion of level (this would imply that the unlikely event that beginners do not possess strategies is not in fact the case, but that these strategies either are not used or do succeed in bringing about successful comprehension with difficult texts). There seems to be a parallel between knowledge-based processing and strategies. Also there may be an over-generalisation of strategies here. We may indeed discover

that studies of both native-language and foreign-language reading reveal that cloze tests seem to measure different kinds of strategies in better and weaker readers.

(Cohen 1992)

or we may discover that readers select different strategies depending on the level of difficulty of the text.

Finally, we may discover that this theory accounts for the contradictory results found by a number of researchers into the effect of background knowledge on FL comprehension (and this is a specifically FL issue) covered in Ridgway (forthcoming).

The theory presented here pinpoints the difficulties in FL reading for L1 literates (word encoding and access to the appropriate body of knowledge) and identifies the relationship between these and already-existing knowledge structures. So, have any of the big questions posed at the beginning of this article been answered? What generalisations can be made about reading in a foreign language that couldn't more usefully be made about reading in general? The answer is, none at all. The main differences between L1 and FL reading are clearly in the need to learn and automate the encoding of word-percepts, and in the degree of access to knowledge afforded by lexical items. This does not mean to say that different models need to be, or even can be, constructed for L1 and FL reading, but that certain areas of the model will be focused on more, or perhaps distorted, much in the way that certain features of primate skeletons may be accentuated, or distorted, while the basic structure remains the same. This theory surprisingly turns the question about generalisations on its head. No such generalisations can be made, but any generalisations that can be made about reading in general should include all forms of reading in a foreign language. A criterion omitted by Samuels and Kamil was that a model of reading should be able to account for all forms of FL reading, and this kind of omission is one which L1 reading theorists should take seriously if they want their own theories to be generally applicable. By the same token, FL reading researchers should be cognizant of the fact that they may be facing a wider range of cognitive phenomena than L1 researchers, and may therefore have a more balanced perspective on the faculty of reading itself. In case anyone might have thought otherwise, foreign language reading research is not a recherche avenue of enquiry on the margins of reading research, but is quite central to the whole enterprise.

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