

Ehri's model of phases of learning to read: a brief critique

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A theory of how children progress through different phases of reading should be an asset both to reading researchers and teachers alike. The present paper provides a brief review of Ehri's influential four phases of reading development: pre-alphabetic, partial alphabetic, full alphabetic and consolidated alphabetic. The model is flexible enough to acknowledge that children do not necessarily progress through these phases in strict sequence. Such flexibility is perhaps both a strength and a weakness. Despite some minor problems (such as weak operational definition, little attempt to relate to underlying developing cognitive structure, a final phase that seems removed from mature skilled reading) the model has served reasonably well as a flexible framework rather than as a set of falsifiable scientific hypotheses.

For some time in the reading literature there has been considerable interest in the notion that children progress in reading according to defined stages of development. Such a conception not only has a potentially useful practical implication for teachers in that they can monitor and structure the stage of progress of the developing reader, but it also has important ramifications for any theory of reading development. In 1995, a short paper on the phases of such development was published by Linnea C. Ehri, which subsequently became one of the most cited papers so far in *Journal of Research in Reading*. The present paper provides a critique of this work, and as this is not the only paper that Ehri published on the topic (e.g. Ehri, 1994, 1998, 1999, 2002; Ehri & McCormick, 1998) some discussion will be included of these other sources as well.

In her *Journal of Research in Reading* paper, Ehri (1995) starts with the challenge of how to account for the development of word reading, within the context of full comprehension of written materials, up to the adult phase of automaticity. A précis of her arguments will suffice here. Ehri argues for four phases of development (illustrated schematically in Figure 1); but before examining this, she refers to Frith's (1985) influential stage model and explains that the Frith model labels need to be replaced. In labelling her phases in the way she does, she makes the concept of alphabetical processing pivotal to the definition of all four phases. These are Ehri's four phases:

Pre-alphabetic phase

This is so called because it occurs prior to any alphabetic knowledge, in other words, identification does not involve making any letter-to-sound connections. Instead

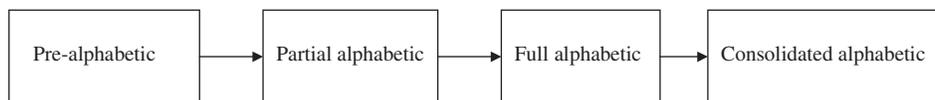


Figure 1. A schematic representation of Ehri's phases of reading.

connections are made between some visual features (called *cues* by Ehri) of the word and their pronunciation or semantic representation. She gives the example of words as part of advertising logos being identified purely by the surrounding context. If a letter were altered, it would not necessarily be noticed, as the child is using few salient letter features. The lack of an alphabetic connection is clearly indicated when children identify the word using context and no alphabet as when they read CREST as 'brush teeth'. Frith called this phase the 'logographic' phase, and Ehri changed the label to 'pre-alphabetic' as she thought 'logographic' sounded as if beginning readers read words like mature readers. Unfortunately, giving it this label is akin to calling it 'not the alphabetic phase' and gives no indication of its functionality, except of course that whatever it is comes before the alphabetic phase. This does not mean that Ehri does not propose a particular form of processing. Later in her conclusion she writes that children in this phase use 'nonalphabetic, visually salient features of words to remember how to read them ...' (1995, p. 122). Perhaps it would have been more appropriate to have called this a 'salient visual feature' phase?

Partial alphabetic phase

In this phase the reader uses a combination of reading some letters in the words and using these to attempt a pronunciation; the first and final letters are usually the most important within this phase. Ehri coined the term 'phonetic cue reading' to characterise the phase. These efforts at generating pronunciations in combination with the visual appearance of the word are stored in memory to be activated on the next encounter. Ehri and Wilce (1985) were able to distinguish readers who were in either of these phases by teaching them words that were either alphabetically similar or dissimilar to the original (e.g. LFT versus WcB for the word 'elephant'). ('WcB' in this example is not only alphabetically dissimilar but was designed also to be more visually distinctive compared to its alphabetically similar counterpart 'LFT'.) Those in the partial alphabetic phase found it easier to learn words with letters congruent to their pronunciation, whereas the pre-alphabetic readers had the same level of difficulty with both.

In subsequent experimental work (obviously not discussed here by Ehri), Stuart, Masterson and Dixon (2000) pre-screened 5-year-old beginning readers into those with or without phonological awareness and alphabetical knowledge and proceeded over the coming months to expose them to a set of words with feedback. The children were not different in age or in visual memory. The children with phonological knowledge were much better at remembering these words and I calculate the effect size between the two groups to be very large, at $d = 1.47$ after 36 exposures and $d = 1.02$ after a delayed recall of one month. Furthermore, there was a significant correlation of 0.79 between visual memory and performance after 36 exposures for the *non*-phonological group compared to low negative correlation of -0.11 for the phonological group. Within the frame of these first two phases, this suggests a strong element of using visual features of words for the

children still in the first phase, contrasting with greater reliance on phonological information for children within the second phase. Furthermore, phonological coding proved to be much more potent in helping children to remember the words (as shown by the large effect sizes) and concurs with previous work by Ehri and Wilce (1985) and by Mason (1980). Ehri explains this difference in memorability in terms of the alphabetic system assisting retrieving connections between written words and their pronunciations in contrast to a less systematic method based on visual connections.

Full alphabetic phase

The reader is now able to form alphabetic connections, but not just alphabetic ones. The developing reader can also map graphemes to phonemes of 'sight words'. Sight words are defined here in terms of words that have been read several times. Readers with this full alphabetic skill are able to achieve more accuracy in their recognition, as they are now processing the constituent letters. These readers are also able to read new words by blending the generated pronunciations. Ehri discusses the way that during this phase there is an integral development towards using 'sight word reading' over decoding individual letters. There is now a particular advantage for irregularly spelled words as there is more focus on their irregularities as an aide-mémoire. Children in this phase adopt strategies to handle such words, for example by noting silent letters (e.g. the *s* in 'island').

This is perhaps the most important phase; Ehri (1999) comments that the development of sight vocabulary is central to her theory, whereas in her view Frith emphasises development in more general terms. Another distinction with Frith is that Ehri regards the formation of connections between graphemes and phonemes to be essential, whereas (according to Ehri) Frith considers sight word reading to be non-phonological. (This does not mean that phonological processing is not in Frith's model – Frith's alphabetic phase involves this.) Indeed, Frith proposes an orthographic strategy (if Ehri is interpreting this as 'sight word' processing) that continues into adulthood; however, Frith does leave the way for an alphabetic strategy to be used, although it '. . . might be less accessible' (Frith, 1985, p. 307).

Consolidated alphabetic phase

This is equivalent to Frith's orthographic stage. With continuing practice at reading in this final phase, recurring letter patterns become consolidated or unitised. Ehri discusses the advantages of this process for reducing memory load, for example, the word 'chest' might be processed only as two units 'ch' '-est' in the consolidated phase compared with four (*ch, e, s, t*) in the full alphabetic phase. As an illustration of this, she cites the work of Ehri and Robbins (1992) of First Graders who had some decoding skills. These were subdivided and one group was taught a set of words followed by a second analogous set with the same rime spellings (e.g. 'need', 'feed'). The second group was given a second set that had the same letter-sound connections but not analogous rime patterns. The first group learned their analogous words faster than the second because the shared letter patterns helped this consolidation process. The inference is that the process of accumulating sight word information is going to make acquiring new words increasingly easy.

Overview and Ehri's other papers on the topic

To summarise and perhaps over-simplify up to this point, in her 1995 paper Ehri has redefined Frith's model of stages of reading by subdividing Frith's alphabetic phase into two parts – partial and full – and has relabelled the first and last stages of Frith's model (Frith's logographic and orthographic stages). In contrast to Frith, Ehri uses the word 'phase' rather 'stage', implying that these processing stages are perhaps fuzzier at the edges and not so clearly defined.

It is interesting to note what she did *not* propose in this paper. She did not explicitly state that there was progression from one phase to the next, nor indeed whether a child could be in two or more phases in parallel. Perhaps her partial alphabetic phase is one such phase where this might happen. (On this same point, Ehri does begin by proposing that reading development is a progression up to the point of automaticity on the part of the mature reader and so there is perhaps an implication of such a progression.) She does not offer strict operational definitions of entry to each phase for researchers to use as criteria for classification. (This is not to say that these could not be developed.) There is no mention here of the teaching style that children might experience and how this would interact with the phases. Similarly, there is no mention of plasticity; in other words, whether there were any developing underlying cognitive structures related to the developing reading process. There do not appear to be any age norms related to these phases (but see later). On this point – perhaps confusingly – when discussing the final consolidated alphabetic phase, a study of First and Second Graders (Leslie & Thimke, 1986) is discussed. Is this final phase really reached by the equivalent of the US Second Grade? Furthermore, is this really the final phase? What about the way in which adults read – is this equivalent to being in the consolidated alphabetic phase?

Does Ehri in her other writings add anything to this basic theoretical framework? Although there are earlier writings on phases of reading than Ehri (1995), let us begin with her paper published three years earlier (Ehri, 1992), which starts with the dual route model of reading (e.g. Coltheart, 1978; Coltheart, Davelaar, Jonasson & Besner, 1977). This proposes dual processing by means of a grapheme-phoneme conversion (GPC) route or by means of direct lexical analysis. Ehri is critical of this model. For example, she dislikes the lexical route as proposed. Instead of a connection between a word's orthography and its semantic representation, she envisages a systematic connection between spellings and their pronunciations. It is not relevant here to look at her arguments too closely, only to note that in offering an alternative conceptualisation to the dual route model, we can see the embryo of her later phases model. In this paper the first phase is, to give it its full circumlocutory title, the 'logographic phase of sight word reading: visual cue reading'. This is followed by the 'rudimentary alphabetic phase of sight word reading: phonetic cue reading'. Lastly, there is the 'mature alphabetic phase of sight word learning: cipher reading'. As in her later 1995 paper, she puts considerable emphasis on the concept of the way that 'sight words' are memorised. She emphasises that this is a not a rote memory process; instead it involves making systematic connections between the spelling of the words and their pronunciation.

The reason why she wanted to dissociate her model from the possibility of rote memorisation was partly because she attributed the proposed use of rote memory to dual route theorists; also, presumably, she implies a degree of active rather than passive coding during the reading process. In addition, Marsh, Friedman, Welch and Desberg (1981) proposed a four-stage theory of reading development in which rote learning

played a significant part in the first linguistic guessing stage – very similar to Frith’s logographic stage. In 1994, Ehri wrote a chapter in Ruddell, Ruddell and Singer’s edited book that describes a phase model that is much closer to the 1995 paper. A useful summary description of the components is given by Ehri (reproduced in Table 1), which adds to the overall picture. It can be seen that the actual labels of the phases are still evolving at this point. The first two phases in the figure are self-explanatory. However, the ‘amalgamated cipher reading’ in the ‘mature alphabetic’ phase needs further explanation. Ehri is referring to the association of a word’s spelling to its pronunciation. Here the term ‘cipher’ presumably refers to the sense of an uncracked code, perhaps as initially encountered by the mature alphabetic reader. It is a little unclear if the term ‘amalgamation’ used here is meant to be referring to the blending of the phonemes produced from the graphemes, or the connecting of letters to sounds or both.

In her 1994 chapter, Ehri connects these four phases to school ages. The logographic phase is pre-school; novice alphabetic reading begins normally at the start of schooling, but may be developed beforehand. Mature alphabetic reading happens in the first two years of school, while the orthographic phase begins during the second or third year of school. Ehri notes the similarities with Chall’s (1983, 1996) theory. There is also some discussion of the reading processes in the mature reader, placing emphasis on those theorists who have advocated the involvement of phonetic codes in mature reading (e.g. Van Orden, 1987; Van Orden, Johnston and Hale, 1988). We have to make allowances for the era of writing, however; Van Orden’s work on mature reading, although very useful, is not within the mainstream of current work on adult word recognition.

Moving to the period after the publication of the 1995 paper there are further papers (e.g. Ehri, 1998, 1999, 2002) that go over similar ground, but do not add too much. In a chapter in a book she co-edited (1998), Ehri emphasises the importance of grapheme-phoneme knowledge and in the closing part re-describes her four-phase model. She then goes on to discuss how reading and spelling have an interactive reciprocal relationship with each other. Thus the process of memorising words in order to read also helps children to spell. Similarly, having to spell out words while writing further helps the development of reading, as illustrated by the work of Ehri and Wilce (1987). In her 2002 paper, Ehri explains why she proposed a theory of phases rather than of stages. This was to introduce flexibility, and she also acknowledges that there is evidence that each stage is not a prerequisite for the following stage. The evidence she alludes to, but does not cite, is from researchers such as Stuart and Coltheart (1988), who demonstrated that beginning readers do not always pass through a logographic type of process. She also states that word reading in the pre-alphabetic phase does not actually make a contribution to later processing through the alphabetic phases. However, she also proposes an element of parallel processing of the alphabetic phases to give it a different form to that depicted in Figure 1.

Ehri (1998) draws implications of her theory of phases of reading development for teachers given here in summary form:

- (1) It is important for beginners to learn all the letters and to use this information to relate to their own speech processes. This will include learning graphemes such as ‘ch’, ‘sh’ and ‘th’.
- (2) Children need to develop awareness of phonemes and relate this to their graphemic knowledge.

Table 1. Ways to read words classified by developmental phase (reproduced from Ehri, 1994).

		Phases of development		
Ways to read words	Logographic	Novice alphabetic	Mature alphabetic	Orthographic
Ways to read words familiar in print	Visual cue reading	Phonetic cue reading	Amalgamated cipher reading	Amalgamated cipher reading (advanced)
By sight	Salient visual cues connected to meanings by rote learning; connections do not involve letter identities, sounds	Salient letters connected to easily detected sounds in pronunciation by letter-name or sound knowledge; spellings partially connected	Letters amalgamated to phonemes in pronunciation by grapheme-phoneme knowledge; spellings fully connected	Single- and multi-letter units amalgamated to phonemes and syllabic units in pronunciations by grapheme-phoneme, morphographic knowledge; spellings fully connected
Lexical access routes	Context dependent; environmental print; variable pronunciations; isolated written words (few recognised, hard to remember, unstable); does not support text reading	Isolated written words can be recognised, remembered; partial letter-based representations; similar spelled words mistaken; text reading supported	Rapid, unitalised word reading possible; complete letter based representations; spellings may influence phonemic analysis; word reading in text made effortless	Easier to store multisyllabic words; representation of word morphology; organised by orthographic neighbourhoods; similarly spelled words read easily
Characteristics of sight-word lexicon				
Ways to read words unfamiliar in print	Wild; constrained by context; constrained by memory for text (pretend-reading)	Constrained by context; constrained by initial letter	Constrained by context; constrained by spelling	Constrained by context; constrained by spelling
By guessing	New word misread as sight word having same visual cues (Not possible)	New word misread as sight word having same letter cues (Not possible)	(Less likely to occur)	(Less likely to occur)
By mistaken lexical access			Sequential decoding	Sequential and hierarchical decoding
By phonological recoding	(Not possible)	(Not possible)	Analysing to specific words	Analysing to specific words, word families, orthographic neighbourhoods
By orthographic recoding				

- (3) By the First Grade, teachers should help all children to achieve the full alphabetic phase. The major grapheme-phoneme connections, particularly those involving vowels, need to be learned.
- (4) Children need practice at learning unfamiliar words both by breaking down their graphemes to form sounds and by the use of analogy. This will be easier for students in the full alphabetic phase.
- (5) Learning to spell is an important part of reading development. The important initial phase is to be able to create appropriate graphemes from the constituent sounds. Memorising word lists should not be started until this is mastered because this will make learning such lists easier.
- (6) Later work should expand to learning morphemes, affixes and families of related words.

Conclusion

The concept of phases of progression in the development of reading has become widely accepted among reading researchers and Linnea Ehri has made a considerable personal contribution to this process both within the academic community and within the teaching community. This is not just through her writings but from her work at national level; for example, from 1998 to 2000 she was one of the fourteen members of the National Reading Panel that had been commissioned by the US congress to sift through and assimilate the evidence concerning the most effective methods for teaching reading.

Her contribution to the work on phases of reading has been to introduce greater flexibility into these phases as well as to break down and define the alphabetic phases more clearly. Ehri is by no means the first researcher to suggest a progression of phases of reading (e.g. Chall, 1983; Frith, 1985; Gough & Juel, 1991; Marsh, Friedman, Welch & Desberg, 1981; Seymour & MacGregor, 1984) and she will not be the last (e.g. Adams, 1990; Jackson & Coltheart, 2001; Morris, Bloodgood & Lomax, 2003; Spear-Swerling & Sternberg, 1998). One aspect of the history of psychology is that successive theorists formulate similar theories dressed in new labels (e.g. 'stages', 'phases' and 'steps' in this instance – but labels within the area of 'short-term memory' perhaps represent the worst case of this in psychology). Theorists developing the concept of reading phases will surely be no different in the future. Amongst these contributors to phase theory, Linnea Ehri has been one of its most influential advocates; but her model has served more as a framework than as a set of falsifiable scientific hypotheses. Given the flexibility of the frame, the 'tent' of the theory is more likely to bend with the winds of evidence rather than be broken. Nevertheless, it should serve researchers well for some time to come.

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