

THE ABC OF READING PERSPECTIVES ON THE ALPHABETIC PRINCIPLE

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Abstract. An alphabetic writing system is a system in which words consist of individual letters that correspond to spoken-language units at a similar level of analysis. The systematic relationships between units of these two systems are collectively referred to as the Alphabetic Principle. This principle has attained the status of one of the most basic and universal assumptions in current research on reading and writing. But although it is thus extensively used, there have been few attempts to determine what restrictions may apply to its appropriate use as a scientific term. A primary aim of the present article is to contribute to the empirical foundation of reading research through a clarification of the scientific status of the Alphabetic Principle. The article analyses a report from the United States National Reading Panel (NRP, 2000), chosen as an example of how the Alphabetic Principle is used in current reading research, and addresses the Alphabetic Principle *qua* principle in order to clarify its scientific status. We argue that the term “principle” creates the incorrect impression that the phenomenon is precisely defined and universally valid. As we see it, the Alphabetic Principle rather refers to regularities or patterns that vary between languages. Phonics, the reading-instruction approach normally defined on the basis of the Alphabetic Principle, is of greatest value for languages with shallow orthographies – but even there, we should be aware that no simple and unambiguous association exists between grapheme and phoneme.

Keywords: phonics, whole language, skill, alphabetic principle, phonemic awareness

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1. INTRODUCTION

Anyone who investigates the role played by the Alphabetic Principle in literacy research over the past few decades will notice that this principle is very often seen as a solid basis for making inferences about reading and writing. The virtual absence of criticism against it in mainstream literacy research has given the Alphabetic Principle the status of a universal basic assumption. As a result, most theoretical and practical approaches to reading and writing base their inferences about the mastery of written language on this principle.

Many of the premises underpinning reading research emanate from the research environment linked to the highly reputed Haskins Laboratories. A 2005 anniversary publication from that institution actually refers explicitly to the Alphabetic Principle as the mainstay of its research programme:

Isabelle Liberman, Shankweiler, and Alvin Liberman team up with Mattingly to study the relation between speech perception and reading, a topic implicit in the Laboratories' research program since the 1940's. They develop the concept of "phonemic awareness," the knowledge that would-be readers must have of the phonemic structure of their language if they are to learn to read. Under the broad rubric of the "Alphabetic Principle," this concept is the core of the Laboratories' program of reading pedagogy today. (Haskins Laboratories, 2005, p. 39)

Researchers at Haskins Laboratories have built large part of the foundation underpinning the ideas about the Alphabetic Principle in reading research. Note that Phonemic Awareness is simply placed under the "broad rubric" of the Alphabetic Principle with no further specification of how these two concepts relate to each other. This may not be particularly remarkable in a succinct historical summary of research, but a similar approach can be found in a key report with implications for a large number of students and teachers which was published in 2000, where Phonemic Awareness and Phonics are placed under the heading "Alphabets" with no further conceptual clarification. This report, entitled *Teaching children to read. An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* (NRP, 2000), was compiled by the United States National Reading Panel (NRP), whose members were deemed to be the top reading researchers in the United States.

Both the Alphabetic Principle and the concept of Phonemic Awareness are based on the same analysis of the phoneme, but there is an important difference: the Alphabetic Principle refers to the relationship between spoken and written language, or more precisely to the relationship between sounds and letters:

"Explicit instruction in the alphabetic principle necessarily includes attention to phonemes because these are the phonological units that match up to letters." (NRP, 2000, Ch. 2, p. 34).

Phonemic Awareness, by contrast, refers to a person's ability to perceive the basis for the alphabetic analysis, i.e. individual sounds in spoken words:

"Phonemic awareness refers to the ability to focus on and manipulate phonemes in spoken words." (NRP, 2000, Ch. 2, p. 1).

In the tradition of reading research, scant attention has been given either to the relatedness of the Alphabetic Principle and Phonemic Awareness or to the difference between them. The consequent absence of scrutiny and criticism has allowed a consensus to form about the mutual usefulness of these two concepts.

The above quotations also reflect commonsensical ideas about the usefulness and validity of the Alphabetic Principle. Our starting point, however, is that no evaluation of its usefulness and validity can be made until it has been clarified what the concept of the Alphabetic Principle actually covers. For this reason, we wish to focus in the present article on the Alphabetic Principle and Phonemic Awareness as basic ideas of reading research, particularly in the framework of the current cognitive approach. The main topic of the article is therefore the scientific status of the Alphabetic Principle. Our analysis starts from the question of what concept of “reading” the NRP uses. This question is highly relevant given the large impact that the NRP’s report has exerted on research and practice alike. We claim that the NRP’s report fails to clarify what reading is and thus also to clarify some other points that should be central to research on reading.

The present article is a contribution within the philosophy of science, based on Kuhn’s concept of the paradigm (Kuhn, 1962). The method used involves the identification of problems in widespread conceptions and the suggestion of alternatives, and we will make use of some examples from the research tradition. According to Popper (1972), one valid objection is sufficient to make a general statement invalid. We do not claim that our examples are clear and unambiguous enough to have that kind of impact. However, we do find them to be illustrative of problems with the purported general validity and fundamental status of the Alphabetic Principle and Phonological Awareness.

In the next section we will focus on fundamental premises in reading research, aiming in particular to point out some central problems with two key concepts of the cognitive paradigm of reading: the Alphabetic Principle and Phonological Awareness. In Section 3 we will briefly discuss two different approaches to reading instruction: Phonics and Whole Language, and we will claim that Whole Language fails to solve the problems of the Alphabetic Principle and Phonological Awareness as they manifest themselves in the Phonics approach. In Section 4 we will suggest – on the basis of the problems associated with those two established approaches to reading instruction – that “reading” should be defined as a skill. Good performance of any skill is characterised by an appropriate combination of “automaticity” and “awareness” (Tønnessen, 1999a). Perspectives on this view are given as regards the acquisition and performance of skills. In the Conclusion, it will be suggested that the proposed definition of “reading” as one of many human skills offers new opportunities for defining a conceptual space for that which is intended to be encompassed by the Alphabetic Principle and Phonological Awareness.

2. TWO CENTRAL PROBLEMS IN READING INSTRUCTION AND READING RESEARCH

Below we will first address the scientific status of the Alphabetic Principle, because that concept constitutes the foundation of research and teaching approaches. In Section 2.2 we will discuss the idea of Phonemic Awareness as the vehicle for the consolidation of the Alphabetic Principle as a fundamental assumption.

2.1 *The Alphabetic Principle*

In his book *Foundations of literacy: The child's acquisition of the Alphabetic Principle*, Brian J. Byrne defines the Alphabetic Principle in line with mainstream reading researchers:

The term alphabetic principle refers to the relatively straightforward idea that the letters that comprise our printed language stand for the individual sounds that comprise our spoken language" (Byrne, 1998, p. 1). It is interesting to note that he also mentions a shortcoming of this definition – i.e. oversimplification – but concludes that this shortcoming does not have any significance: "Others will note that the definition also oversimplifies the nature of one version of an alphabetic writing system, English. [...] Inconsistencies and irregularities in English spelling abound, and we consider some of these later in the book. Nevertheless, English is fundamentally an alphabetic language and thus furnishes proper material for a book about the child's discovery of the alphabetic principle. (Byrne, 1998, p. 2).

According to Byrne's way of thinking, therefore, the Alphabetic Principle is not only a relationship between spoken units and small written units (letters) – a characteristic of languages with alphabetic writing systems – but also fully describes humans' ability to learn written language. This is because, when the Alphabetic Principle goes beyond referring exclusively to the relationship between sounds and letters (as it surely must do when abundant inconsistencies and irregularities in spelling are deemed to be of little consequence), it can actually be construed as encompassing humans' entire ability to discover patterns. This is because the mechanisms used to find patterns in opaque orthographies such as those of English or French will quite quickly make beginning readers depend on orthographic features, including word-specific ones, that are not linked to sound–letter correspondences. And this aspect of learning to read and write is in fact not substantially different from the learning of other, non-alphabetic, writing systems, which is why it is strange to credit the Alphabetic Principle with this type of pattern detection even in a language with an alphabetic writing system. Byrne's position entails that children learning to read and write will strive primarily to break down writing into alphabetic substance even if the orthography of the language in question is opaque. This is hard to accept in light of scientific standards such as Occam's razor, because several more straightforward assumptions can be made – for instance, that children learning written language exploit both auditory and graphic (and orthographic) cues of different magnitudes, such that the Alphabetic Principle will have a more marginal role in helping a large proportion of students (depending on the language involved) to "get on track" to learn written language. The main problem with Byrne's position is that the Alphabetic Principle is both the beginning and the end: it is both the constitutive principle

of alphabetic writing systems and the end state where the student has developed a decoding skill on the basis of various cues, even not necessarily alphabetic cues. By claiming that “English is fundamentally an alphabetic language and thus furnishes proper material for a book about the child’s discovery of the alphabetic principle”, Byrne implicitly equates the Alphabetic Principle with well-developed decoding skills. This forces the Alphabetic Principle to play several different roles in the same conceptual apparatus. To its potential users, for example teachers or researchers, such an apparently all-encompassing, all-explaining theory will immediately come across as very attractive. Its uncritical adoption may, however, give rise to theoretical confusion and a risk of circular reasoning – not to mention, at a more concrete level, less effective reading and writing instruction. If instead the Alphabetic Principle were perceived as one of several useful tools, then teachers and researchers would be more likely to make use of other tools as well, which would probably improve the outcome of their work.

Byrne’s definition of the Alphabetic Principle is not the only one. Many of the others also emphasise *systematic relationships* between written letters and spoken sounds. Typically, the way in which systematicity is conceived of in this context is closely linked to how linguistics has historically focused on the relationship between sounds and letters – not only long ago when writing systems were first developed to record speech, but also in connection with the discovery of the phoneme in modern linguistics. Psychologically, links formed early on to the principle of association (grapheme \leftrightarrow phoneme). This tradition has contributed strongly to the fact that the relationship between sound and letter has been postulated as a “principle”. Here it should be noted that, for example, human dialogue and the linguistic context of the infant are today characterised as systematic (Lacerda & Lindblom 1997) but not described in terms of “principles”. One challenge for the definition of the Alphabetic Principle is indeed the exact meaning ascribed to the concept of “principle”. Historically, a “principle” is something (a) general, (b) fundamental and (c) valid/true; it is a concept mainly used in the natural and physical sciences – cf. Isaac Newton’s work *Philosophiae Naturalis Principia Mathematica* (Newton, 1687). More recent and more vague meanings of “principle” also encompass (a) descriptiveness: laws and (b) normativity: rules. Freud’s “pleasure principle” and G.E. Moore’s *Principia Ethica* from 1903 may serve as examples of newer meanings given to the term “principle”.

However, the appropriateness of the term “principle” to describe the relationship between writing and speech can be questioned. Each language has a great many rules governing “systematic relationships” and those rules vary between languages. The rules also vary over time within each language as a result of changes to both the written and the spoken language. The driving forces behind such variation and such changes represent an interesting issue here in their capacity as creators or preservers of systematicity. Why do Norwegians, say, allow themselves to be so strongly influenced by spoken and written English? What are the criteria according to which this or other language communities will accept new norms and modify old ones? Changes of this type take place mainly as a result of influence from other languages, but the extent of conscious and systematic control over orthography is greater in some languages and cultures than in others. For example, the Académie française has car-

ried out extensive efforts to influence the development of written and spoken French, compiling authoritative dictionaries and collections of spelling rules. These do not primarily reflect how the majority of people pronounce and spell French words; rather, they are guidelines on how words should be spoken and written. The basis for these norms is somewhat unclear as well as variable, but it may be that arguments taken from the history of the French language predominate. Other language communities may allow their orthographic systems to evolve more freely. In fact, there are no simple formulas that are valid for all languages at all times when it comes to systematic relationships between written letters and spoken sounds, and yet a distinction is often made between “shallow orthography” and “deep orthography”, with the former having fewer rules and fewer exceptions. The rationale for this differentiation is the assumption that there exists a universal Alphabetic Principle determining what is “right” (*ortho*) in relation to an ideal. English – both the British and American varieties – is one of the deep-orthography languages with a great many exceptions. In other words, the rules for reading instruction presented by the NRP apply to a very complicated “system”. According to Marylyn Adams (1990, p. 199), “[e]fforts to systematize the relationship have resulted in hundreds of correspondence rules.”

The behaviourist Leon Bloomfield took a simplified view of the relationship between spelling and sound. For example, he made the following claim:

The accomplished reader of English, then, has an overpracticed and ingrained habit of uttering one phoneme of the English language when he sees the letter p, another when he sees the letter i, another when he sees the letter n, still another when he sees the letter m, still another when he sees the letter d, and so on. In this way, he utters the conventionally accepted word when he sees a combination of letters like pin, nip, pit, tip, tin, nit, dip, din, dim, mid. What is more, all readers will agree as to the sounds they utter when they see unconventional combinations such as pid, nin, pim, mip, nid, nim, mim.” (Bloomfield, 1942, p. 26)

However, such “overpractice” is of little use in relation to the large number of pronunciation exceptions (for example as regards the pronunciation of <i>; cf. Venezky, 1999). Their existence will force initial reading and writing instruction to include either the learning of a large number of rules and exceptions or the memorisation of the pronunciation and spelling of a large number of irregular words, or most likely a combination thereof. In the above quotation, Bloomfield probably comes closer to the historical meaning of “principle” (as regards generality and fundamentality) than any other reading researcher, but anyone who recognises the oversimplification inherent in his position must reject the validity of his suggested principle.

Newer meanings of the term “principle” also run into trouble when faced with the many exceptions that follow from the use of the Alphabetic Principle. And the exceptions are in fact not alone in giving rise to problems. Venezky (1999) makes the following claim:

Unlike a phonetic alphabet, present-day English orthography contains both relational units and markers. Relational units map directly into sound. The in bird, the <ch> in much, and the <ou> in mouse are the workhorses of the spelling-sound system. A marker is an instance of a letter that has no pronunciation of its own; instead, it marks

the pronunciation of another letter, indicates the morphemic status of a word, or preserves a graphemic pattern. (p. 7)

Venezky (1999, pp. 83–87) lists 13 rules for the pronunciation of “final <e>”. The number of rules – which hardly cover all cases – in and of itself illustrates the level of complexity. However, a problem at a more general level pertains to the fact that the final letter affects the pronunciation of the previous letters. For example, we need to know the last letters of *not* and *note*, respectively, before we can determine how to pronounce <o> in them. The same is true of the pronunciation of <i> in *sit* and *site*.

Venezky (1999, p. 89) goes on to point out that “[a] considerable number of Greek and Latin borrowings retain <y> in medial position (e.g. *asylum*, *rhythm*).” To succeed in pronouncing <y> correctly in such words, we must first read the word in its entirety and then determine whether it is a Greek or Latin loanword ... This thus goes beyond the simple grapheme–phoneme correspondence and actually calls into question the issue of left-to-right sequential sounding/pronunciation. Analogously, “[p]ronunciations for <ch> are further complicated by classical borrowings that retain <ch> -> /k/, such as *mechanic*, *chorus*, and *chemistry*” (Venezky, 1999, p. 135). Here, too, it is necessary to know the etymology of the words (or, of course, to learn their pronunciation by heart).

Homographs, homophones and homonyms present further problems to the advocates of the Alphabetic Principle. The word *lead* is a homograph: it is pronounced /led/ if it refers to the chemical element Pb but /li:d/ if it is a verb in the present tense, infinitive or imperative, or the corresponding noun with a meaning relating to “guiding” or “conducting”. To determine the correct sense and pronunciation of a homograph, it is necessary to identify more than the word: the context must also be understood. Homophones such as *meet* and *meat* are pronounced the same but spelled differently and have different meanings; here the context must be understood before the correct sense can be identified, even though the difficulty is of course greater in writing than in reading. There may also be problems associated with homonyms, words that are both pronounced and spelled the same but have different meanings, such as *rose* the flower and *rose* the past tense of *rise* – at least if you adopt, explicitly or implicitly, some sort of strong Alphabetic Principle under which each combination of entities representing sound–letter relationships should correspond to exactly one meaning.

As shown above, the meaning of the term “Alphabetic Principle” is not only somewhat unclear but also varies. Moreover, there appear to be several reasons for formulating an “Alphabetic Principle”. If the purpose is educational, then there are good grounds for trying to find alternatives to the Alphabetic Principle, because the pedagogical value is low in deep orthographies. And if the purpose is to produce a scientific description of the “written-language system”, then there are probably also grounds for reconsidering, for several reasons: First, unless a common principle can be formulated, it will be necessary to recognise that there is not *one* Alphabetic Principle, but perhaps as many as there are languages with writing systems. Second, if the Alphabetic Principle is intended as a scientific principle or law, then it must be capable of falsification. As yet, no attempts have been made to clarify how such

falsification could be carried out, i.e. what would have to be the case in order for the principle to be falsified. Third, it is claimed that the Alphabetic Principle is both simple and elegant, meaning that it allegedly meets two standards of good science. However, given that it can also be claimed that there are probably several thousand rules and exceptions, it becomes misleading to refer to *the* Alphabetic Principle (in the singular). It is necessary both to ask whether a single common principle underlies these rules and exceptions, and to search for a more elegant and simpler formulation. Such an alternative formulation should place greater emphasis on the creation of patterns from a starting point which is more flexible than the mechanical principle of association underpinning the Alphabetic Principle. The work to formulate it must be empirical in nature and involve generalisation on the basis of data. (The collection of such data requires a series of methodological issues to be addressed, not least as regards representativeness.)

The purpose of generalisation should not be to identify correlations between distinct and “atomary” phenomena in spoken language (in accordance with widespread definitions of “phoneme”) and letters in written language. The definitions of the various phonemes must have the status of hypotheses. Until now, it has been more or less dogmatically postulated that there exist phonemes – which, like the atoms of the earliest atomic theory, are indivisible and immutable; in spoken language, they are seen as the smallest units capable of distinguishing meaning. The most recent definitions of “phoneme” also seem to have drawn inspiration from more recent atomic theory: as is well known, physicists have found that an atom can be divided into a fairly stable nucleus and a surrounding electron cloud with unclear contours; correspondingly, a phoneme would have a clear and stable nucleus and a cloud of more or less closely related sounds. With such a nucleus–cloud model of the phoneme, it is not possible to draw entirely clear and fixed boundaries between phonemes (Lacerda & Lindblom, 1997). Actually, when it comes to the definition of “phoneme”, we consider it necessary to assume an even more radical starting point. The definition should be treated as an open hypothesis which, through testing against empirical data, will be progressively reformulated. It will never be possible to claim that a given formulation is the best one. It is in fact possible to say that developments in phonology over the past ten years have represented such an approach in that the phoneme has largely been rejected as a “unit of analysis” (cf. Uppstad & Tønnessen, 2010).

One alternative to the idea of a general principle is to formulate principles and models for each individual language. However, such a shift of perspective would entail large changes in how we compare languages and language mastery.

Because we perceive of the phoneme as a less discrete phenomenon, the “phoneme–grapheme correspondence” becomes more problematic. The simple and exception-free associations established by early behaviourism are not very current today. For this reason, we argue in our approach to the Alphabetic Principle that this is in fact not a “principle” in the sense of a law or regularity identified by means of empirical inquiry. We base this claim on the fact that the validity of this “principle” varies strongly across orthographies. In a scientific context, the Alphabetic Principle can be seen only as a hypothesis, but as a hypothesis it is unclear and little operationalised. If, as may be argued, this hypothesis claims only that languages with

more regular orthographies are easier to learn to read, and if the people whose performance is used as the empirical basis for testing the hypothesis have learned to read sound-by-sound (using Phonics), then the hypothesis is self-evident and entirely lacks explanatory value. For example, there is nothing in the hypothesis that might explain why orthography is the way it is in a given society; this primarily requires political and historical explanations. Further, given that the establishment of language standards over the centuries has followed lines other than those of the Alphabetic Principle, the idea of a generally valid principle becomes even less reasonable. In research and practice, therefore, the status of the Alphabetic Principle is highly unclear – and what is more, there is little evidence of any will to clarify that status. Rather, constant extensions have been made to the edifice of the Alphabetic Principle, particularly by means of the concept of “Phonemic Awareness”.

2.2 Phonics and Phonemic Awareness

As mentioned above, there is a close link between Phonemic Awareness and the idea of the Alphabetic Principle. The NRP’s report has been a key reference in reading research over the past decade and remains so to this day. In this section we will take a closer look at how Phonemic Awareness is operationalised in that report, making the claim that the approach in question is representative of the focus generally characterising modern reading research.

At the beginning of the report, Phonemic Awareness is delimited as follows:

Phonemic awareness refers to the ability to focus on and manipulate phonemes in spoken words. The following tasks are commonly used to assess children’s PA [Phonemic Awareness] or to improve their PA through instruction and practice:

1. Phoneme isolation, which requires recognizing individual sounds in words, for example, “Tell me the first sound in paste.” (/p/)
2. Phoneme identity, which requires recognizing the common sound in different words. For example, “Tell me the sound that is the same in bike, boy, and bell.” (/b/)
3. Phoneme categorization, which requires recognizing the word with the odd sound in a sequence of three or four words, for example, “Which word does not belong? bus, bun, rug.” (rug)
4. Phoneme blending, which requires listening to a sequence of separately spoken sounds and combining them to form a recognizable word. For example, “What word is /s/ /k/ /u/ /l/?” (school)
5. Phoneme segmentation, which requires breaking a word into its sounds by tapping out or counting the sounds or by pronouncing and positioning a marker for each sound. For example, “How many phonemes are there in ship?” (three: /ʃ/ /ɪ/ /p/)
6. Phoneme deletion, which requires recognizing what word remains when a specified phoneme is removed. For example, “What is smile without the /s/?” (mile).

(NRP, 2000, Ch. 2, pp. 1–2)

In modern reading research, a great deal of explanatory power is attributed to Phonemic Awareness in terms of the individual’s awareness of the abstract systems traditionally described by phonology (the relationship between Phonemic Awareness

and the concept of “phonology” is addressed in depth in Uppstad & Tønnessen, 2007).

One of the tasks assigned to the NRP was to perform a meta-analysis of international research on Phonemic Awareness. Its findings are summarised as follows:

The NRP examined whether PA [Phonemic Awareness] instruction was significantly better than alternative forms of training in helping children acquire phonemic awareness and enabling them to apply this skill in their reading and spelling. Results were positive. The overall effect size on PA outcomes was large, 0.86. The overall effect size on reading outcomes was moderate, 0.53. The overall effect on spelling was also moderate, 0.59. (NRP, 2000, Ch. 2, p. 3)

In light of the strong recommendations previously made by individual researchers (Lieberman & Shankweiler, 1991; Liberman, Shankweiler & Liberman, 1989; Adams, 1990; Lyon, 1995), it is actually noteworthy that the NRP’s findings are not more convincing. When collecting material for its meta-analysis, the NRP started from a very large number of articles but ended up with 52 studies:

From the various lists of references, the Panel identified and located 78 articles that appeared to meet our criteria. Upon closer inspection, 26 articles did not match all criteria: 5 lacked sufficient information to determine effect size; 5 lacked an adequate control group; 12 did not assess reading as an outcome; and 4 lacked appropriate phonemic awareness training. The final set of studies meeting our criteria numbered 52 (see Appendix A). (NRP, 2000, Ch. 2, p. 15)

It can be called into question how representative this selection is – or, rather, it can be asked what exactly it is representative *of*. In fact, it is unclear whether “Phonemic Awareness” has the same meaning in the various linguistic, educational and scientific contexts. For example, the NRP’s reasoning is predicated upon the assumption that points 1–6 in the above quotation measure the same thing. It is an important question to ask whether this assumption rests on empirical research or whether points 1–6 rather constitute an operational definition of “Phonemic Awareness”.

Let us take a closer look at the selection approach used by the NRP:

An electronic search of two databases, ERIC and PsycINFO, was conducted. Six terms involving phonemic awareness were crossed with 15 terms related to reading performance. The PA terms were: phonemic awareness, phonological awareness, spelling, blending, learning to spell, and invented spelling. The reading terms were: reading, reading ability, reading achievement, reading comprehension, reading development, reading disabilities, reading skills, remedial reading, beginning reading, beginning reading instruction, reading acquisition, word identification, word reading, oral reading, and miscues. The search was limited to articles appearing in journals written in English, but no limit was placed on the year of publication. Using this procedure, the Panel located 637 articles through ERIC, and 1,325 articles through PsycINFO. Abstracts were printed and screened. In addition, the Panel handsearched and screened references cited in the studies located by the electronic search and in several review papers (Apthorp, 1998; Blachman, 2000; Bus & van Ijzendoorn, 1999; Stahl & Murray, 1994; Troia, 1999; Wagner, 1988). To qualify for the analysis, studies had to meet the following criteria:

1. Studies had to adopt an experimental or quasiexperimental design with a control group or a multiple baseline method.
2. Studies had to appear in a refereed journal.

3. Studies had to test the hypothesis that training in phonemic awareness improves reading performance over alternative forms of training or no training.
 4. Studies had to provide training in phonemic awareness that was not confounded with other instructional methods or activities.
 5. Studies had to report statistics permitting the calculation or estimation of effect sizes.
- (NRP, 2000, Ch. 2, p. 15)

The selection of articles studied was thus compiled using the following method: “Six terms involving phonemic awareness were crossed with 15 terms related to reading performance”. It can be observed, first, that there are grounds for questioning how representative the six terms are of “Phonemic Awareness” as well as how representative the fifteen terms relating to “reading performance” are. A second objection to this approach is that there is no requirement for *all* “alternative forms of training” to have been considered. Moreover, it is almost impossible to avoid “confound[ing] with other instructional methods or activities”.

The NRP’s description of its method continues as follows:

The primary statistic used in the Panel’s analysis of performance on outcome measures was effect size, indicating the extent to which performance of the treatment group exceeded performance of the control group, with the difference expressed in standard deviation units. The formula used to calculate raw effect sizes for each treatment-control comparison consisted of the mean of the treatment group minus the mean of the control group divided by a pooled standard deviation.

[...]

From the 52 studies, 96 cases comparing individual treatment and control groups were derived. Because some of the studies included more than one treatment or control group, the cases included comparisons utilizing the same group more than once. There were seven treatment groups appearing twice because they were compared to two different control groups. There were 16 control groups appearing twice because they were compared to 2 different treatment groups. There was one control group appearing three times because it was compared to three treatment groups. In sum, there were 47 independent comparisons and 49 comparisons having a group that overlapped with one or at most two other comparisons.

(NRP, 2000, Ch. 2, pp. 14–15)

As regards results, the NRP claims that “[t]he overall effect size on PA [Phonemic Awareness] outcomes was large, 0.86.” (NRP, 2000, Ch. 2, p. 3). However, it is hardly surprising that Phonemic Awareness training has a positive effect on Phonemic Awareness skills. Indeed, there is much stronger reason to make more of the finding that the effect on reading was only moderate: “The overall effect size on reading outcomes was moderate, 0.53.” (NRP, 2000, Ch. 2, p. 3). And it is also necessary to add that it is unclear (1) how “reading” is defined in the various studies; (2) whether those definitions and the tests used to measure “reading” are comparable; and (3) to what extent those tests measured skills that correspond to the objectives assigned explicitly or implicitly to reading instruction in various societies and cultures.

Even though the report was drawn up by a group called the National *Reading* Panel, there is no clear definition of “reading” available. The focus is on “decod-

ing”: “The process of decoding words never read before involves transforming graphemes into phonemes and then blending the phonemes to form words with recognizable meanings.” (NRP, 2000, Ch. 2, p. 11). In fact, there are several examples to be found in the report of how “decoding” is perceived as a “reading skill”, such as the following: “The impact of these specific conditions on the amount of transfer from [Phonemic Awareness] training to *other reading skills* was also examined.” (NRP, 2000, Ch. 2, p. 4, italics ours). And when awarding skill status to decoding, the NRP fails to distinguish between pseudo-words and comprehensible words – because they share a *similar* structure in relation to the Alphabetic Principle. In that sense, it takes a “reading skill” to deal with pseudo-words and real words alike. However, if a different starting point is used, such that pseudo-words and real words are viewed as *language* – i.e. if it is assumed that any structure will be associated with traces of meaning – then words and pseudo-words will instead have *different* status (Uppstad & Tønnessen, 2010). That starting point makes it possible to circumvent some of the problems created by the Alphabetic Principle, in part because decoding is then assigned a more marginal role. One description of such an alternative view of the relationship between structure and skill is provided by Uppstad (2006). In our opinion, it is therefore doubtful whether Phonemic Awareness can be perceived as anything more than a “sub-skill”, meaning that it is less central to what reading is. This does not amount to claiming that Phonemic Awareness is unimportant, but it does amount to claiming that Phonemic Awareness is not the be-all and end-all of reading. Good grounds for assuming such an alternative position are indeed provided by the NRP’s report itself, particularly its discussion of the measured effect of Phonemic Awareness:

Results showed that the PA [Phonemic Awareness]-trained group spelled more words and decoded many more pseudowords than the two control groups. However, the groups did not differ in reading real words or in reading connected text. These findings indicate that adding PA instruction to a whole language program enhances students’ decoding and spelling skills but not their other reading skills. (NRP, 2000, Ch. 2, p. 40.)

A further valid objection here is that if children have first learned that there is a correspondence between sounds and letters, then it is not all that surprising for them to become quite good at decoding pseudo-words. However, if they constantly keep the correspondence rules in mind when reading, there is a risk that there will be too much awareness and too little automaticity, resulting in poor reading fluency. On a more commonsensical note, moreover, most people would probably say that “reading real words” and “reading connected text” should be central to any definition of “reading”. Not all reading is equally target-oriented, but the comprehension of meaning is almost always absolutely central.

3. COMPLICATING FACTORS IN TEACHING AND LEARNING

Studies of the Phonics approach indicate that this is more effective in shallow than deep orthographies, because shallow orthographies have a more regular pattern of correspondence between graphemes/letters and phonemes, and this pattern of corre-

spondence is the basis for the Phonics approach. However, even in shallow orthographies there exist problems which are often ignored. Let us begin with an example from a different learning task: how does a child learn what the word *dog* means? To do this, the child must learn that some characteristics are insignificant, for example the size of a given dog or the colour of its fur, and identify those properties that are conventionally deemed to be significant. Ever since Aristotle's day philosophers and logicians have differed in their opinions on how we identify the significant characteristics that are part of the definition of a concept such as "dog". This is not simply a case of systematic and empirical generalisation to abstract the features that dogs have in common. In fact, if we do not already know what are the significant features of dogs, we will not know what animals to include in the sample on which we will base our generalisation. Both logically and psychologically, it is very difficult to explain how we find unity in diversity, or indeed diversity in unity.

A similar problem can be identified in the definition of "phoneme" as applied in the Alphabetic Principle. According to structuralist linguistics, the phoneme is the smallest unit capable of changing the meaning of words in a system of opposing values, namely the language competence common to all speakers of a language in a society. When this concept is used in the Alphabetic Principle to evaluate young learners' literacy development and to understand the basis for that development, there arises a question of validity as soon as the phoneme concept is generalised beyond the individual. This is because pronunciation varies between individuals, meaning that the diversity of and realisation of each single phoneme will increase with the level of generalisation. In a given orthography, graphemes may be considered distinct, but the description of phonemes involves a problem of abstractness and diversity – and therefore of validity. In fact, graphemes may not be entirely exempt from such challenges. For instance, how should you define the first letter of the English alphabet? What level of visual similarity exists between an upper-case "A", a lower-case "a" and an italic lower-case "a"? And what about "a"s written in different fonts and sizes?

Which such differences are important, and which ones are significant? In the case of the phoneme (and presumably also the grapheme), structuralist linguistics has applied the criterion of change of meaning in minimal pairs. This is, however, a very simple and abstract way of constituting a system – and it represents no solution to the validity problem. As mentioned above, phoneticians have compared phonemes to atoms, with the significant features of a phoneme corresponding to the nucleus of the atom while its less significant features surround the nucleus like a cloud of electrons. Again, we cannot determine the content of the nucleus by simple generalisation and abstraction.

When it is claimed that the Alphabetic Principle consists of a correspondence between graphemes/letters and phonemes, this does not involve one-to-one correspondences between clearly defined and concrete phenomena. The Phonics approach, which is based on this "principle", most likely involves an oversimplification of the psychology of learning, because the challenge faced by learners is not primarily to associate concrete and distinct phenomena; rather, it is to associate abstract phenomena which are not clearly demarcated. This may create major – though different – problems both for the most and the least reflective students.

Does this mean that the Phonics approach will be more effective if students are taught at greater depth what graphemes/letters and phonemes really are? Only empirical studies could answer this question. Those that have been carried out do not indicate that teachers applying the Phonics approach give their students an explicit and thorough introduction to what graphemes and phonemes are. Rather, they tend to teach implicitly by means of examples, such that their students obtain only an implicit and unclear understanding of what the Alphabetic Principle consists in.

4. WHAT TEACHING METHODS ARE MOST EFFECTIVE?

In her book *Learning to read: The great debate* (1967), Jeanne Chall gives a detailed presentation of the positions taken in the greatest debate on reading instruction of the past century: the Phonics approach versus the Whole Language approach. Since then a series of good overviews and evaluations of good teaching methods have been published, including Marilyn Adams's *Beginning to read* (1995) and Michael Pressley's *Reading instruction that works: the case for balanced teaching* (2006). These books show that Phonics can be interpreted and practised in different ways, and that it is not always the best method to teach reading. What we would also like to see, however, are more comprehensive studies of the effectiveness of this method for different orthographies (cf. Seymour et al., 2003).

The debate about the different approaches – and the studies on which those approaches build – primarily concern teaching methods and the psychological foundation of early literacy education for children without difficulties. If you consider studies based on English orthography, some methods seem to be more effective than others. Still, we must always search for better methods, and we must also keep in mind that a given method may not be as good for poor students as for strong students, and vice versa. In this context there is a need for meta-studies isolating as far as possible the various factors that are assumed to be significant. The existing research findings are not only unclear but also dependent on specific assumptions. Studies do not always give us unambiguous answers, but they can provide us with material enabling us to ask new questions and formulate new hypotheses. Research on reading – including dyslexia research – has put too little emphasis on the falsification of hypotheses, the asking of new questions and the drawing up of new hypotheses. When future historians and sociologists of science pass their judgment, they will probably claim that reading research has been restrained by political debates and by considerations relating to financial support.

In the “Great Debate” (cf. Chall, 1967), Phonics has been defined in different and unclear ways. Studies comparing Phonics with other methods have provided very unclear definitions of the alternatives. For example, it is highly unclear – and also varies – what is meant by Whole Word or Whole Language. It is often claimed that the latter approach emphasises meaning while Phonics emphasises decoding, which is often said to be of particular importance in texts that contain unknown words. But if both the pronunciation and the meaning of a word we encounter in a text are unknown, then decoding according to the Phonics approach is of little relevance. If we have never heard the word *yacht* and do not know what it means, there

is no help to be had from Phonics (which will only lead us astray). And when we encounter a word in reading that we have heard and whose meaning we know but whose spelling is irregular – *yacht* again, say – Phonics is also of little use if we have never seen how it should be written.

The use of “non-words” or nonsense words in tests is problematic. What methodological validity does this have for the testing of real-world reading skills? These tests would have benefited from clearer distinctions in terms of degree of complexity, such that more frequent letter combinations are not lumped together with rarer ones. To some extent, nonsense words can be used to test reading skills in shallow orthographies, but real-life reading also demands the association of context-relevant meaning to single words. To include this perspective, the use of hermeneutic theories of meaning could represent a promising approach, but research on reading has used them to a rather limited extent (cf. Gadamer, 1986). In our view, many leading reading researchers such as Gough and Tunmer (1986) distinguish decoding and comprehension in an artificial way, meaning that their definitions of these concepts are not very fruitful. This might be because reading research has tended mainly to take an exclusively empirical approach and to be centred on English-speaking countries, while hermeneutics has included a stronger philosophical element and had its main practitioners in continental Europe.

It is very often the case that differences or contrasts claimed to exist between the two main schools of teaching are artificial. There are no representatives of the Phonics approach who deny that meaning is the goal of reading, and nor are there any representative of the Whole Language approach who claim that it is unnecessary to learn about the connection between orthography and pronunciation. A computer scanner can neither decode nor read. Both decoding and reading depend on a continuous interplay between part and totality – and between automaticity and awareness. In the context of teaching and learning, however, teachers and psychologists discuss what is the most effective order in which various aspects should be taught or emphasised. This discussion, in our opinion, should take more account of the degree of (ir)regularity characterising individual orthographies. Moreover, we should not only discuss which of the two widespread approaches is better, but we should also use our creativity and our resources of research to develop and test new methods that might yield better results than the existing ones.

Historically, the Whole Word or Whole Language approach was a reaction to the behaviouristic tendencies of the Phonics approach. In our view, however, both of those methods are largely based on behaviouristic associationism, since Phonics has put so much weight on associations between graphemes/letters and phonemes while Whole Word has similarly emphasised associations between word images and meanings. Further research should focus on hypotheses that combine behaviourism and cognitivism to a larger extent. We also propose that the notion of “skill” should be fundamental in this context (cf. Tønnessen, this issue).

5. CONCLUSION

The term “Alphabetic Principle” is misleading because it conveys an impression of precision and universal validity. There is a great deal of variety in what the connections between graphemes/letters and phonemes look like in different languages. What is more, the nature of those connections has been determined, to a large extent, by political decisions and by traditions and conventions in the different language communities. Further research in this field should take account of differences in the degree of regularity of orthographies. Even in the most regular orthographies, we must take into consideration that Phonics does not build on clear and concrete associations. Both the grapheme/letter and the phoneme are unclear and abstract phenomena.

The studies available showing Phonics to be the best method for reading instruction all exhibit shortcomings as regards the precision of and the arguments underpinning the basic ideas of this approach. Meta-analyses should be undertaken, based on as precise definitions and premises as possible. And regardless of what methods yield the best results in such comparisons, we should never stop searching for new methods that may be even more effective.

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