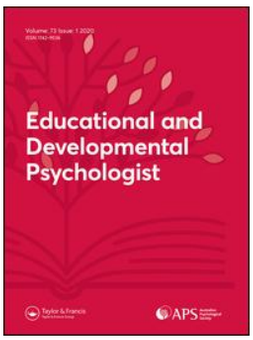

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Systematic phonics instruction belongs in evidence-based reading programs: A response to Bowers

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Abstract

This article is a rejoinder to J.S. Bowers (2020), 'Reconsidering the evidence that systematic phonics is more effective than alternative methods of reading instruction', *Educational Psychology Review* (https://doi.org/10.1007/s10648-019-09515-y). There is strong agreement among reading scientists that learning the phonological connections between speech and print is an essential element of early reading acquisition. Meta-analyses of reading research have consistently found that methods of reading instruction that include systematic phonics instruction are more effective than methods that do not. This article critiques a recent article by Jeffery S. Bowers that attempts to challenge the robustness of the research on systematic phonics instruction. On this basis, Bowers proposes that teachers and researchers consider using alternative methods. This article finds that even with a revisionist and conservative analysis of the research literature, the strongest available evidence shows systematic phonics instruction to be more effective than any existing alternative. While it is fair to argue that researchers should investigate new practices, it is irresponsible to suggest that classroom teachers use anything other than methods based on the best evidence to date, and that evidence favours systematic phonics.

Jeffrey Bowers believes that the strong academic consensus that systematic phonics instruction is effective in early reading instruction is unwarranted. His review of research on systematic phonics was recently published (Bowers, 2020). The objective of Bowers' review article was:

> *. . . I will show that there is little or no evidence that systematic phonics is better than the main alternative methods used in schools, including whole language and balanced literacy. This should not be taken as an argument in support of these alternative methods, but rather, it should be taken as evidence that the current methods used in schools are far from idea [sic]. Once this is understood, my hope is that researchers and politicians will be more motivated to consider alternative methods. (p. 1)*

The notion of an 'ideal' method of instruction is a key concept to be addressed. Bowers intends to make the case that the evidence base for the effectiveness of systematic phonics instruction is weak, and he uses this to advocate for 'alternative methods'.

The main alternative methods to systematic phonics used in schools are whole language and balanced literacy approaches. As can be seen in the above quote, Bowers writes that he does not support these methods either, presumably because they also do not have strong evidence in their favour.

It is not disputed that researchers should be open to the possibility that there is more to know, and continue to investigate new hypotheses and develop new theories using rigorous scientific research principles. However, it is altogether different to propose that teachers and politicians should use unproven 'alternative' methods. Teaching practice and education policy should be based on the best available evidence unless and until it is superseded by new information and new evidence.

The best available evidence is often imperfect. Research in human sciences rarely progresses in a perfect, linear way. There will be unresolved questions and unexplained variance. Educational research is rarely conducted in laboratories under pure experimental conditions. Much of it takes place in schools where there are innumerable uncontrolled and uncontrollable factors. This is desirable — clinical experiments provide valuable information about how the brain learns to read, but until this is translated and tested in classroom practice it is of little practical value for teachers and students. The question therefore is what method(s) have the greatest weight of evidence in their favour.

In his article, Bowers reviews major meta-analyses and systematic reviews of studies of the effect of systematic phonics instruction on various reading outcomes, with Bowers placing a particular emphasis on reading comprehension. A key criticism is that these studies do not directly compare systematic phonics with what he calls 'unsystematic phonics', a category that is imprecisely defined. According to Bowers, the studies do not prove the hypothesis that

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systematic phonics is better, and the strength of the measured effects of systematic phonics is therefore overstated.

This article will argue that Bowers' conclusions are unsupported. There is stronger evidence in favour of using systematic phonics in reading instruction than not using it, and it should remain an essential element of early reading instruction.

What is Systematic Phonics?

The term 'systematic phonics' describes practices for teaching decoding and word reading. It teaches students the correspondences between graphemes (letters and letter clusters) in written words and phonemes (speech sounds) in spoken words, and how to use these grapheme-phoneme correspondences to read and spell. Phonics instruction is systematic when it teaches the major grapheme-phoneme correspondences in a planned sequence.

Evidence-based understandings of systematic phonics place it within a comprehensive program of instruction that includes four additional essential elements — phonemic awareness, fluency, vocabulary, and comprehension.

Reading comprehension assessments measure both word reading and language comprehension factors, as predicted by the Simple View of Reading (Gough & Tunmer, 1986). In the early stages of reading development, word reading is the stronger predictor of reading comprehension, but once decoding is fluent, language comprehension becomes more important (Garcia & Cain, 2014).

This is important to state, as it informs the interpretation of the evidence for systematic phonics instruction. Alone, systematic phonics is not a foolproof guarantee of reading success; its effectiveness is mediated by the quality of the rest of the literacy program.

Bowers' definition of systematic phonics is a serious faultline in his article, with the result that his argument is based on a false premise. According to Bowers (2020):

> *. . . systematic phonics explicitly teaches children grapheme-phoneme correspondences prior to emphasizing the meanings of written words in text (as in whole language or balanced literacy instruction) or the meaning of written words in isolation (as in morphological instruction). (p. 3)*

This definition incorrectly implies that systematic phonics instruction mandates teaching the entire grapho-phonemic code before considering meaning and morphology. Systematic phonics instruction takes place alongside meaning-based instruction, including morphology, vocabulary and comprehension. Bowers' mischaracterisation of systematic phonics permeates the article and perhaps explains why Bowers seems to believe that evidence for the positive effect of nonphonics instruction presents a challenge to the conclusion that systematic phonics is effective. It is a matter of *and*, not *or*.

Bowers quotes from Castles, Rastle, and Nation (2018) to bolster his description of systematic phonics, but he misrepresents their position. Castles et al. (2018) write that evidence supports learning letter-sound relationships before morphology, but Bowers quotes them as an example of support for teaching phonics before 'the meaning of written words in the context of sentences'. The accurate position is that children will have concurrent instruction in all of the five essential elements, including vocabulary and comprehension, and that the phonics component will be systematic and explicit. Explicit instruction is a teacher-directed pedagogy that includes modelling, guided practice, and independent application with immediate corrective feedback.

To grasp the concept of reading, children first need to understand that writing represents speech in an ordered way. Systematic phonics teaching is supported by research showing that for beginning readers, meaning is activated via a phonological pathway in the brain (Castles et al., 2018). Being able to accurately say and/or hear the word they are reading, either aloud or mentally, retrieves its meaning if it is in their vocabulary. Over time, repeated exposure to words and the retention of specific orthographic representations in memory leads to 'sight reading' — the ability to read text instantaneously without the need for phonological cues, except when encountering a novel word (Ehri, 2014).

The common recommendation that morphology instruction begin after a short period of systematic phonics instruction (the optimal time has not yet been determined) is based on this scientific evidence. Logically, a child cannot read morphemes if they cannot read graphemes (since morphemes are subword units composed of graphemes), unless one is willing to make the case for morphemes to be learned as whole logographic units. While implicit morphological understanding is evident in young children's oral language, children's use of morphological knowledge in word reading is demonstrated later (Rastle, 2019).

Bowers includes two types of instruction within his categorisation of systematic phonics — synthetic and analytic. Synthetic and analytic approaches are both based on the fact that writing emerged first as a code for speech, with spelling and writing becoming more complex over time to preserve meaning in the orthographic system as pronunciations of words evolved.

Synthetic and analytic phonics instructional approaches differ in the unit of subword analysis. Synthetic phonics begins with phonemes — the smallest subword level. Children learn the associations between speech sounds (phonemes) and the letters or letter clusters that represent them in writing (graphemes), and that reading and spelling are reversible processes. They learn to synthesise the phonemes and graphemes to read and spell words. Synthetic phonics instruction has a defined sequence for teaching grapheme-phoneme correspondences.

Analytic phonics uses larger subword units such as onset-rime for word analysis. For example, rather than learning to read the word 'rat' as a composition of three letters and sounds, r-a-t, children would learn that the word rat is in a 'word family' with the rime -at, such as r-at, s-at, c-at, and so on.

While both synthetic and analytic phonics can be considered systematic to some extent, learning phonics at the phoneme level is more systematic and efficient than onset-rime families (Vousden, Ellefson, Solity, & Chater, 2011). The vast majority of rimes can be read using their component grapheme-phoneme correspondences (GPCs; Brooks, 2015). Knowledge of phonemes is also a stronger predictor of reading acquisition than knowledge of rimes (Nation & Hulme, 1997.)

As well as conflating synthetic and analytic phonics, there is further blurring of boundaries in the studies of systematic phonics by aggregating whole class initial instruction with interventions, and not having clear criteria for what represents high quality, evidence-informed instruction.

Is Bowers' Reinterpretation of the Meta-Analyses Fair?

In his review of evidence on systematic phonics, Bowers looks at meta-analyses conducted by the National Reading Panel (2000), later published as Ehri, Nunes, Stahl, and Willows (2001), as well as Torgerson, Brooks, and Hall (2006), McArthur et al. (2012),

Galuschka, Ise, Krick, and Schulte-Körne (2014), and Suggate (2010, 2016).

In his summary of the National Reading Panel (NRP) analysis, Bowers argues that the effect sizes do not justify the NRP's recommendation that systematic phonics should be taught in schools. However, the effect sizes are moderate, including for synthetic phonics, and are certainly stronger than the evidence found for any other method, including whole language. It is worth noting that the widely used classifications of what constitutes small, moderate and large effect sizes are relatively arbitrary and were not determined with educational interventions in mind (Bakker et al., 2019).

Bowers presents the findings of two reanalyses of the studies included in the NRP by Camilli, Vargan, and Yurecko (2003) and Camilli, Wolfe, and Smith (2006) that are alleged to dispute the NRP's conclusions. With substantial reorganisation and reanalysis of the data, Camilli et al. (2003) still found that the effect of systematic over nonsystematic phonics instruction was significant, albeit smaller. As reported by Camilli et al. (2006):

> *Using regression analysis to estimate simultaneous effects on reading, Camilli et al. (2003) found that programs using systematic phonics instruction outperformed programs using less systematic phonics (d = .24), and, though this effect was statistically significant, it was substantially smaller than the estimate of the NRP (d = .41). (p. 29)*

Camilli et al. (2006) created a multilevel model that included language-based activities as a moderating variable. It reduced the simple effect (when other aspects of instruction are partialled out) of systematic phonics over nonsystematic phonics to non-significance, which Bowers incorrectly interprets to mean that 'Camilli et al. (2006) failed to show an advantage of systematic over unsystematic phonics' (Bowers, 2020, p. 9). The finding that systematic phonics is more effective when taught along with high quality language activities is what would be predicted from the Simple View of Reading and confirms the additive effect found in the earlier study. Camilli et al. (2006, p. 29) describe the findings of the earlier study in this way: 'Camilli et al. (2003) found that the benefits of systematic phonics, language activities, and tutoring may be additive: their confluence may triple the effect of phonics alone.' That is, the best case scenario is systematic phonics instruction paired with high quality language activities.

Bowers next looks at a meta-analysis by Torgerson et al. (2006) that was limited to randomised controlled trials (RCTs). Torgerson et al. (2006) found moderate effect sizes for systematic phonics on word reading (d = 0.27 to 0.38) and comprehension (d = 0.24 to 0.35), depending on whether fixed or random effects models were used. The word reading effect was statistically significant. After removing one study with a particularly high effect size, the overall result was reduced for word reading accuracy but still of moderate size and still significant.

The authors were apparently concerned that potential publication bias (the tendency for journals to publish studies that find significant results) may have inflated the effect size estimates. This concern applies to all meta-analyses. Torgerson et al. (2006) obtained prima facie evidence of publication bias; however, when they went looking for unpublished studies they found only one, the inclusion of which would have made little difference to the effect size calculated in the meta-analysis.

Torgerson et al. (2006) concluded that: 'Systematic phonics instruction within a broad literacy curriculum appears to have a greater effect on children's progress in reading than whole language or whole word approaches. The effect size is moderate but still important' (p. 10); and further: 'Since there is evidence that systematic phonics teaching benefits children's reading accuracy, it should be part of every literacy teacher's repertoire and a routine part of literacy teaching, in a judicious balance with other elements' (p. 49).

Bowers takes issue with this conclusion, saying it 'greatly exaggerates' the findings and points out that the comparison is between systematic phonics and a combined category of unsystematic phonics and no phonics. His argument is that this does not show that systematic phonics had better outcomes than unsystematic phonics. However, the latter category is so nebulous that it is difficult to see how unsystematic phonics and no phonics could be easily distinguished. And it remains the case that Torgeson et al.'s (2006) findings support the conclusions of the NRP (2000), Camilli et al. (2003), and Camilli et al. (2006) — reading instruction that includes systematic phonics instruction is better than instruction that does not.

A meta-analysis of phonics interventions for children with reading difficulties by McArthur et al. (2012) was updated in 2018, but Bowers reviews only the 2012 study. McArthur et al. (2012) report large effect sizes for nonword reading accuracy, moderate effect sizes for word reading accuracy and fluency, and small to moderate effects on comprehension, spelling and letter-sound knowledge, not all of which had sufficient numbers to be statistically significant.

Bowers argues that the strong results for word reading accuracy were due to very high effect sizes in two studies — Levy and Lysynchuck (1997) and Levy, Bourassa, and Horn (1999) — and that these studies should be excluded. His rationale is that the test items in the studies were closely related to the treatment content and, in addition, the studies involved one-to-one tutoring. It is difficult to understand Bowers' rationale for excluding studies because the outcome measure assessed whether students learned what they had been taught. Further, all of the studies in this meta-analysis were small-group or one-to-one interventions. There is no good reason to exclude these two particular studies, apparently because the interventions were found to be particularly effective. Nonetheless, Bowers' removes the studies by Levy and Lysynchuck (1997) and Levy et al. (1999), and comes to the spurious conclusion that the McArthur et al. (2012) meta-analysis found 'no evidence' that systematic phonics instruction was effective.

McArthur et al. (2012) are also criticised by Bowers for not comparing systematic with unsystematic phonics instruction. Bowers writes 'this analysis should not be used to make any claims that systematic phonics is better than standard alternative methods, such as whole language that do include unsystematic phonics' (Bowers, 2020, p. 12). Here we start to see Bowers' distinction between unsystematic phonics and whole language unravel. Furthermore, the McArthur et al. systematic reviews were not designed to compare systematic versus nonsystematic methods; rather, the objective was to look at the effects of phonics-based interventions.

McArthur et al. (2018; not reviewed by Bowers) included several more studies in their updated meta-analysis. They found that for poor readers, 'Phonics training appears to be effective for improving literacy-related skills, particularly reading fluency of words and non-words, and accuracy of reading irregular words' (p. 2).

It is worth noting the types of interventions included in the McArthur et al. (2018) meta-analyses. The analyses combined 'phonics only' interventions with 'phonics plus phonological awareness', and 'phonics plus sight words'. The 'phonics only'

interventions were very limited in duration and/or scope and might be more accurately described as GPC training. The 'phonics plus phonological awareness' interventions appear to be more comprehensive, but McArthur et al. did not analyse the effects of the different types of intervention separately. Given the circumscribed nature of some of the instructional methods tested, and the fact that the participants are struggling readers who will often be resistant to instruction, it is unsurprising that the effect sizes are not routinely large, especially on comprehension assessments, which measure more than decoding. The effects on more proximal reading outcomes like word reading accuracy are, however, significant and important.

Galuschka et al.'s (2014) meta-analysis also focused on the effect of a wide range of interventions for children with reading difficulties, including systematic phonics interventions of various kinds. Bowers reports the authors' finding that only the phonics interventions produced a significant result, along with their conclusion that:

> *This finding is consistent with those reported in previous meta-analyses. At the current state of knowledge, it is adequate to conclude that the systematic instruction of letter-sound correspondences and decoding strategies, and the application of these skills in reading and writing activities, is the most effective method for improving literacy skills of children and adolescents with reading disabilities. (Galuschka et al., 2014, p. 9)*

Bowers attempts to dismiss Galuschka et al.'s (2014) conclusions by stating that the only reason phonics was statistically significant is because of the larger number of studies and therefore participants than the other interventions in analysis. His implication is that since the effect sizes for other interventions are of similar magnitude (albeit not statistically significant), this challenges the conclusion that phonics interventions are more effective.

Bowers' reasoning here is flawed for a number of reasons. First, Galuschka et al. (2014) have not overstated the case for systematic phonics interventions. Based on statistical significance, they say that 'At the current state of knowledge', their conclusion about the relative effectiveness of systematic phonics instruction is sound. This simply means that at this point in time we can have more confidence in this finding than in the effect sizes found for the other treatment conditions. Second, it is inconsistent with his criticisms of Torgerson et al. (2006) and Suggate (2010), where he dismisses effects based on their lack of statistical significance. One might argue whether statistical significance is important or not, but not change position within one paper based on a preferred interpretation of the results.

Suggate (2010) looked at the effects of a number of interventions on the reading outcomes of children 'at risk of reading difficulties'. Suggate (2010) calculated effect sizes for phonological awareness, phonics, and comprehension-based and 'mixed' interventions. Similar effect sizes were found for each, but with a significant interaction between age and intervention type: phonics interventions were stronger for younger children and comprehension or mixed interventions were stronger for older children.

Bowers describes comprehension and mixed interventions as 'alternative' interventions, as though they are an alternative to, or in conflict with, phonics interventions. As explained earlier, instruction in phonics and comprehension are complementary. The finding that code-based interventions, including phonics, had a stronger impact in the early years, and comprehension interventions had greater effects in the upper years of primary, is consistent with the well-validated model of reading that once decoding is established, the largest variance in reading comprehension is accounted for by language comprehension.

Suggate (2016) looked at the effects of phonemic awareness, phonics, fluency, and comprehension interventions and found them all to be effective in the short term and less so in the longer term. Phonics interventions had relatively small long-term effects on reading comprehension. As already noted, this can be explained by the constrained nature of phonics: once children have mastered decoding, other aspects of reading instruction become stronger variables in their reading ability. Furthermore, the more distal the measure is to the treatment, the lower the effect. Phonics interventions will have stronger effects on proximal decoding outcomes than on more distal comprehension assessments.

A number of other studies are mentioned in Bowers' article (Adesope, Lavin, Thompson, & Ungerleider, 2011; Hammill & Swanson, 2006; Han, 2010; Sherman, 2007; Torgerson, Brooks, Gascoine, & Higgins, 2018). In each case, positive findings for systematic phonics are downplayed, irrespective of the actual findings and the conclusions of the authors.

Bowers' key criticism, beyond the relative effect sizes, is what he regards to be weak evidence directly comparing systematic phonics with unsystematic phonics. The problem with this premise is that unsystematic phonics is imprecise, and almost all forms of instruction include phonics broadly defined to some extent, on a continuum from highly systematic to on-demand. According to Bowers himself, whole language methods can contain unsystematic phonics. Given the difficulty of categorising the comparison conditions into unsystematic phonics, whole language (with or without unsystematic phonics), balanced literacy, and an apparently rare 'no phonics' teaching, it seems reasonable and practical to do what almost all studies and meta-analyses have done — compare systematic phonics instruction with the absence of systematic phonics instruction.

The available evidence from multiple studies shows that reading instruction that includes systematic phonics is more effective than instruction that does not. Subsequent studies to those reviewed by Bowers have added to this evidence (e.g., Hjetland et al., 2019). There are many more studies showing superior outcomes when children are systematically and explicitly taught letter-sound correspondences and how to blend and segment them to read and spell words, than there are studies showing a negligible or negative effect. The range of effect sizes is due to numerous factors, including the duration, level of systematicity, intensity, age of students, beginning level of students, group size, instructional fidelity, and the quality of classroom instruction. Nevertheless, the overall effect size is invariably positive and usually statistically significant. Subsequent reviews and meta-analyses may benefit from including the normative standard test scores as well as effect sizes, to provide additional information about magnitude of improvement in the treatment and control groups, as well as the magnitude of the differences between them (Kilpatrick & O'Brien, 2019).

According to Stanovich (2000): 'That direct instruction in alphabetic coding facilitates early reading acquisition is one of the most well established conclusions in all of behavioural science.' (p. 415). And, more recently, Seidenberg (2017): 'For reading scientists the evidence that the phonological pathway is used in reading and especially important in beginning reading is about as close to conclusive as research on complex human behavior can get' (p. 124).

Bowers' case would have been more strongly and credibly made by conducting his own systematic review or meta-analysis, rather than deconstructing those done by others. As Bowers says,

evidence may accumulate for other approaches that rivals phonics at some point in future. However, right now it has not.

What are the Potential 'Alternatives' to Systematic Phonics Instruction?

All children need to be taught to read, and teachers need to make choices about how they are going to do it. What are the potential alternative methods to systematic phonics, and what is the likelihood they will be more effective? Whole language and balanced literacy — the boundaries between which are blurry — are not recommended by Bowers.

Bowers (2020) introduces the idea that instruction 'should focus more on the role that meaning plays in organizing spellings (via morphology) and that English spelling system makes sense once the interrelation between phonology, morphology, and etymology are considered' (p. 23).

Jeffrey Bowers' brother Peter Bowers has developed a program called Structured Word Inquiry (SWI; Bowers & Bowers, 2008) based on this theory. Jeffrey Bowers has co-authored papers with Peter Bowers on the rationale for the program (Bowers & Bowers, 2017) and has participated in evaluations of the program (Colenbrander et al., 2018). This direct connection to a specific program is not mentioned in Bowers (2020).

It is not uncommon or problematic for reading researchers to develop programs designed to accelerate the quality of reading instruction in schools. These reading programs would naturally be informed by the developers' understanding of the best available evidence. It is also reasonable to place more confidence in programs that have been subjected to multiple high quality evaluations and can show evidence of effectiveness.

The problem with positing SWI as a superior alternative to systematic phonics is first that there is insufficient information to assess whether it is an effective method for teaching beginning readers, and particularly for the acquisition for essential knowledge about GPCs.

Official unit outlines or teaching manuals for SWI are not publicly available, so information about instructional methods is anecdotal. Students are encouraged to 'spell words out' using letter names rather than sound them out using GPCs. This contradicts any claim that SWI teaches GPCs, given that GPCs by definition involve the speech sounds associated with the letters, not their names.

Furthermore, and more importantly, there are no studies showing that SWI is effective for teaching beginning reading, either with or without the sort of comparison group that Bowers (2020) says is necessary to adequately prove efficacy. Evaluations of SWI do not compare it with systematic phonics for initial instruction. Videos of SWI do not show how it teaches children 'from the start', when children have little or no knowledge of the alphabetic principle or concept of print.

A study of SWI with Years 4 and 5 students found that it improved learning of vocabulary for new words using taught morphemes but did not transfer to words from other morphological families (Bowers & Kirby, 2010). Devonshire and Fluck (2010) compared the effect on spelling of SWI with an alternative method (not systematic phonics) among 7- to 9-year-olds, and found significant improvements. Devonshire, Morris, and Fluck (2013) found significant benefits for SWI on reading and spelling among 5- to 7-year-olds in one school, but the students in the study already had one or two years of reading instruction. The comparison condition was a 'business as usual' combination of letter-sound teaching and a whole word reading scheme. These studies show that children may benefit from instruction in morphology and etymology after one or more years of initial reading instruction that includes phonics.

A recent study conducted from 2015 to 2018 by a research group at Bristol University, including Jeffrey Bowers, compared SWI with a program called Motivated Reading (Colenbrander et al., 2018). Children in the study were in Years 3 and 5, and had poor reading and spelling skills. A slide presentation of the results on the study, which have not yet been published in detail, shows that it found: 'No evidence that Structured Word Inquiry is more effective than Motivated Reading for improving reading, spelling, vocabulary or reading comprehension'; and 'Motivated Reading instruction led to greater reading gains than Structured Word Inquiry for the weakest readers (also true for Year 5 spelling)' (Colenbrander et al., 2018, Slide 42).

None of these studies of SWI looked at its effectiveness for initial reading instruction with whole classes of beginning readers. This is a critical point — the studies and examples of SWI involve children who have already had a year or more of reading instruction, usually including some phonics. Even then, the results are mixed.

It is easy to see on a theoretical basis why the sort of word analysis prescribed in SWI would be helpful for reading and spelling. However, while there is some evidence of benefits in spelling and vocabulary for older children (but certainly not to the high standards Bowers holds other research to), there is no research showing it is beneficial for beginning readers — that is, children who have had no previous reading instruction or who cannot already read some words.

Irrespective of the theoretical merits or otherwise of SWI, it is illogical to argue against the use of systematic phonics on the basis that the evidence supporting it does not quite meet sufficiently high standards, and then suggest using an alternative teaching method that has no evidence of effectiveness at all.

Synthetic Phonics and the Phonics Screening Check in England

Policy changes in England since 2007 provide a natural experiment in the effectiveness of systematic phonics, but we must remember that natural experiments are not pure experiments. Just because a government decrees that schools must teach synthetic phonics does not guarantee that they will do it willingly and well. Policy changes take place in a context in which multiple other changes are occurring, and isolating the effect of one policy is rarely exact. However, against those caveats, if the policy change does not move the targeted educational outcome in the intended direction within a reasonable period of time, then the policy needs to be reviewed and, on the basis of thorough analysis, either strengthened or replaced.

Bowers (2020) argues that the implementation of synthetic phonics and the Year 1 Phonics Screening Check in England have not led to improvements in reading outcomes. He points to trends in scores on the English national tests (Key Stage 1 and Key Stage 2) and two international assessments — the Progress in Reading Literacy Study (PIRLS) and the Program for International Student Assessment (PISA).

Machin, McNally, and Viarengo (2018) used the phased introduction of systematic synthetic phonics instruction to look at the impact of the policy. They compared Year 2 (age 7) and Year 6 (age 11) reading outcomes of students in three successive

cohorts — a pilot (ERDp) group of schools who were the first to have teachers trained in synthetic phonics, a Phase 1 (CLLD) group of schools who were the second to have teachers trained, and the national rollout to all schools.

> *Our empirical analysis shows that intensive training in the use of a 'new pedagogy' produced strong effects for early literacy acquisition amongst young school children . . . The most interesting finding here is that there are long-term effects at age 11 for those with a high probability of starting their school education as struggling readers. Specifically, the results suggest that there is a persistent effect for those classified as non-native English speakers and economically disadvantaged (as measured by free school meal status). (Machin et al., 2018, p. 239)*

Bowers (2020) is strongly critical of this conclusion. Bowers' interpretation of the data suggests that the between-group comparisons were stable throughout the study, which is not the case. At the immediate post-test stage, the reported effect sizes are comparisons between the pilot group and the control group, who had not had the synthetic phonics training at that point. However, by the time Key Stage 2 (KS2) data were collected there was no longer a 'control group' per se — at this time, all schools had had synthetic phonics training, including the original control group.

The KS2 (age 11) results compare schools that have all been part of the national phonics program, but for differing amounts of time, so it is incorrect to interpret the KS2 results as though there was a control group that had no synthetic phonics. Machin et al. (2018) found that many children who had not been part of the pilot or first phase of synthetic phonics training (notably the more socio-economically and educationally advantaged native English speaking students) and who had lower scores than their pilot school peers at age 7, closed the gap with their peers at KS2 after their schools had joined the program. However, for some groups of at-risk children, especially those from non-English-speaking backgrounds and low income (Free School Meals), the effect of being in the pilot or first phase — that is, having longer exposure to phonics instruction — was persistent to age 11. As Machin et al. (2018) put it:

> *We are able to provide convincing evidence of causal effects from the introduction of synthetic phonics in English primary schools because of the way in which training was staggered across different local authorities (and hence different schools). Indeed, we show similar effects from a pilot and the first phase of the national rollout which followed. Moreover, effects of the interventions become much smaller or cease completely in subsequent waves of the national rollout, suggesting that the targeted and large-scale rollout had beneficial effects on the literacy of primary age school children. (p. 239)*

The control condition in the Machin et al. (2018) study was 'business as usual'. This is inherent to natural experiments. They make no assumptions about the characteristics of instruction in comparison schools. As each group of schools was provided with training, the differences between them dissipated, with the exception of the most disadvantaged students, for whom a positive impact of earlier participation in the phonics program remained.

Bowers (2020) next turns his attention to England's performance in PIRLS and PISA. There is little point discussing the PISA results in detail. The cohort of 15-year-old English students who participated in the latest PISA tests in 2018 were in Year 1 during the phased implementation of synthetic phonics policies a decade before. They may or may not have had teachers who were part of the Phase 1 training group. At that time, the quality of phonics instruction was variable and this remained the case for several years: the pilot of the Phonics Screening Check (PSC) in 2011 found that one in three students achieved the expected standard of phonic decoding, indicating that phonics instruction was not strong in all schools even at that stage (Department for Education, 2011). It was not until 2014 that PSC scores reached an average of around 75% students achieving the expected standard. The 3-year PISA cycles mean that the first cohort of Year 1 students to have achieved a relatively good standard in the PSC will take the PISA tests in 2024.

The Year 4 PIRLS results are more relevant. The students who participated in PIRLS in 2016 were in Year 1 in 2013, although at that time the PSC results still indicated that the quality of phonics instruction was not universally high. The PIRLS scores for England in 2016 increased steadily over the cycles from 2006 (mean score 539), to 2011 (mean score 552), and 2016 (mean score 559). England has also climbed in the PIRLS country rankings, but because the number of participating countries changes from cycle to cycle, rankings are not very informative. However, the mean score in 2001 was also relatively high at 553 — virtually the same as in 2011. Bowers asks how this can be explained.

One answer might be differences in the sampling of students to participate in the PIRLS tests. Questions were raised about the sample of students in the English 2001 PIRLS assessment in an article by Hilton (2006), in which she argues 'the sampling and the test itself to have been advantageously organised' (p. 817). A report by McGrane, Stiff, Baird, Lenkiet, and Hopfenbeck (2017) for Oxford University Centre for Educational Assessment says that there was a 'relatively large error for the average score in 2001' (p. 33), so comparisons of 2001 with 2016 should be made cautiously. Both authors point to under-sampling of students who would normally be among the low achievers in 2001.

While Bowers (2020) mentions a theory put by Jonathan Solity that there may have also been a sampling issue with the 2016 test, the reference he provides is not to a published source.

Bowers points to the relatively strong performance of Northern Ireland in PIRLS assessments, referring to the Northern Ireland Education and Library Board's reading guidance for Key Stage 1 (KS1) and pointing out it does not mention systematic phonics, implying that Northern Ireland provides a counterfactual example to England.

However, systematic phonics is mentioned in the current literacy strategy published by the Northern Ireland Department for Education (2011), which is not mentioned by Bowers. The Northern Ireland literacy strategy document 'Count, Read, Succeed' contains guidance on systematic phonics, including: 'To support pupils' development of literacy and numeracy skills the principal, in particular, must ensure that: . . . (j) in primary schools, there is a systematic programme of high-quality phonics' (p. 25).

The PIRLS report on Northern Ireland refers to the Count, Read, Succeed strategy (Mullis, Martin, Goh, & Prendergast, 2017). This is not to say that the presence or absence of systematic phonics instruction in curriculum documents proves its presence or absence in classrooms, or whether it has contributed to Northern Ireland's high PIRLS scores. However, it is not the case that systematic phonics is a notable absence from reading policy in Northern Ireland.

As mentioned above, the Year 1 PSC is also discussed by Bowers. The PSC was introduced to monitor whether students had an adequate level of decoding ability at the end of Year 1 — their second year of school. Low average PSC scores would indicate that phonics teaching was not effective and prompt improvements, and this was indeed the finding in the pilot and the first few years of the national PSC.

A team of researchers at the National Foundation for Educational Research (NFER) undertook a review of the PSC and evaluated its impacts after three years. The review by Walker, Sainsbury, Worth, Bamforth, and Betts (2015) found that 'the national results show an improvement in performance in phonics, as measured by the Check, which would be consistent with adjustments to teaching methods reported' (p. 11).

Buckingham (2016) provides graphs showing that KS1 (Year 2) test scores in reading and writing increased over the period following the introduction of the PSC, up until the KS1 tests changed in 2016, breaking the trend line and making further trend analysis impossible.

Bowers incorrectly claims that the Walker et al. (2015) evaluation report contradicts this finding. First, Walker et al.'s evaluation finished in 2014. The addition of 2015 data in Buckingham (2016) makes the trend clearer. Second, Walker et al. conducted a different analysis. They calculated a value-add measure from EYFSP (Early Years Foundation Stage Profile) scores at the end of Reception and KS1 reading scores (Year 2). They compared the value add score from 2011 and 2012 (the year of the pilot PSC and the national PSC implementation) with the value add score in 2013 and 2014 and found no difference in growth between the two measures. There are some clear methodological issues and ambiguity in this method of assessing the impact of the PSC on KS1 scores that Bowers seems willing to ignore, including those acknowledged by Walker et al., who say:

> *The EYFSP points represent children's attainment at the end of the Reception year of school. During this time they are very likely to have made a start in learning phonics; and thus it cannot be regarded as a true baseline measure in determining the subsequent impact that the PSC makes in improving children's literacy skills. (p. 26)*

This means that the Walker et al. (2015) analysis is not comparable to the description of the KS1 scores in Buckingham (2016) and therefore they cannot be regarded as 'inconsistent'.

Double, McGrane, Stiff, and Hopfenbeck (2019) used results for the cohort of students who have done the Phonics Screening Check (Year 1), Key Stage 1 assessments (Year 2), and PIRLS (age 11) to explore the longitudinal predictive validity of the PSC. They found moderate to large correlations between PSC scores and KS1 reading scores, and also between PSC scores and PIRLS reading comprehension scores, indicating that success in the PSC is a significant predictor of later reading comprehension. The authors also compared the subgroups of students who failed to achieve the criterion level of the PSC in Year 1 but passed it in Year 2 (*fail-pass*) with students who failed to achieve the criterion level in both years (*fail-fail*), while controlling for baseline scores in the initial PSC. They found that even though the fail-pass group did not close the gap with students who passed the PSC in Year 1, they nonetheless had higher KS1 and PIRLS scores than the fail-fail group, who still exhibited poor phonic decoding in Year 2. The authors interpret this as showing that 'ameliorating early phonics difficulties predicts better reading comprehension up to 4 years later' (Double et al., 2019, p. 1232), and conclude that the PSC is a valuable formative assessment tool for intervention and support.

The graphs of KS1 and KS2 scores from 2006 to 2018 in Bowers (2020) clearly show an upward trend in reading and writing from 2011 to 2015 that is greater than the upward trend for maths and science. It is not surprising that maths and science would also improve slightly as reading improves because maths and science tests require children to be able to read the questions proficiently. There have also been significant curriculum and teaching reforms in maths and science in the period since the PSC was introduced. Neither the graphs themselves nor the descriptions of the graphs in Bowers (2020) make it clear that the drop in KS1 and KS2 results in 2016 are due to a dramatic change in the tests themselves that year. There is no mention of this in the text either — just a footnote to one of the graphs that would give any reader who was not already in possession of that fact the mistaken impression that there was a real drop in scores. The change in the tests significantly affects the validity of any test score analysis post 2018, which is not acknowledged by Bowers.

Conclusion

Bowers' interpretation of the evidence base on systematic phonics does not support his assertions. Systematic phonics has one of the largest and most consistent evidence bases in education. Synthetic phonics, which is the most systematic form of phonics instruction, has been specifically investigated in a number of randomised control trials (e.g., Christensen & Bowey, 2005; Hatcher, Hulme, & Snowling, 2004; Johnston, McGeown, & Watson, 2011) and has been found to be a common factor in high performing schools (Joseph, 2019; Louden, 2015; UK Office for Standards in Education, Children's Services and Skills [OFSTED], 2010). Synthetic phonics is strongly aligned with cognitive scientific research and models of reading that have been found to be highly predictive — in particular, the Dual Route Cascading Model (word reading) and the Simple View of Reading (reading comprehension; Castles et al., 2018). The same cannot be said for the usual alternatives: whole language, balanced literacy, and analytic phonics.

While there is some validity to the argument that meta-analyses provide a more accurate estimate of the true effect of an intervention, they include interventions that are short in duration, with small numbers, and restricted instructional scope and depth. There is therefore a good argument to be made for giving strong consideration to the findings of individual studies with rigorous methodologies that investigate a higher quality version of the intervention of interest, such as the Clackmannanshire study (Johnston et al., 2011).

Bowers (2020) goes on to say:

> *The conclusion should not be that we should be satisfied with either systematic phonics or whole language, but rather teachers and researchers should consider alternative methods of reading instruction. For example, one possibility is that reading instruction in English should focus more on the role that meaning plays in organizing spellings (via morphology) and that English spelling system makes sense once the interrelation between phonology, morphology, and etymology are considered (Bowers & Bowers 2017, 2018). Of course, other possibilities need to be considered as well, but the first step in motivating more research into alternative forms of instruction is to realize that there is a problem with the current approach. (p. 23)*

Bowers' entire thesis rests on his argument that when held up to the highest possible standards of evidence, systematic phonics falls short. It is therefore illogical to suggest using 'alternative teaching methods' that have either much weaker supporting evidence or no evidence base whatsoever.

The danger in Bowers' article is its potential to undermine hard-won gains in evidence-based reading instruction. It is one thing to say that researchers should consider investigating as yet unproven alternative methods, but it is irresponsible to make the same recommendation for practitioners.

Teachers and educational psychologists working with schools and in private practice with children learning to read should should

continue to use the methods with the strongest available evidence base, and right now that is undeniably systematic phonics.

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