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**Title**

So was it worth it? A commentary on Fricke et al. and Hagen et al. (2017).

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**Abstract**

Fricke et al. and Hagen et al. (2017) each report on large-scale pragmatic randomised controlled trials delivered in schools or nurseries, investigating language interventions for vulnerable children and showing moderate positive effect sizes. Such research is part of a recent development of 'what works' research in England, and the number of 'what works' trials continues to increase, largely through funding from the Sutton Trust, who are concerned with disadvantaged children, to the Educational Endowment Foundation (EEF). 'What works' research is not firmly accepted by all educationalists, however results of trials are now available quickly and presented in a manner intended to be accessible to practitioners. This development may facilitate principled decisions on the adoption of interventions by schools, as trials and their outcomes may be interrogated to support decisions on whether the anticipated impact is worth the cost of implementation.

**Title**

A commentary on Fricke et al. and Hagen et al. (2017).

Fricke et al. and Hagen et al. (2017) each report on large-scale pragmatic randomised controlled trials delivered in schools or nurseries investigating language interventions for vulnerable children. This research field has recently expanded. The commentary will briefly summarise key aspects of the papers' methodologies and

findings, and discuss the background to the increase in the number of such trials in England, what they cumulatively suggest at present about language interventions, and their impact on school-based language research.

Both Fricke et al. and Hagen et al. (2017) researched outcomes of promising language interventions for children aged around five years within pre/school settings: participants were therefore clustered in schools. Fricke et al. delivered the Nuffield Early Language Intervention (Nuffield Foundation, no date) disseminated via the UK charity I-CAN, offering a longer intervention compared with a shorter version used in a previous trial. Hagen et al. constructed and delivered an intervention package using language learning approaches of demonstrated efficacy to develop listening skills, vocabulary and narrative. Fricke et al. also hoped to develop early literacy, via developing letter-sound knowledge and phonemic awareness. Both interventions were additional to school instruction, with control children continuing with their usual curriculum. Intervention was delivered within the child's pre/school by trained staff (Fricke et al. by school assistants, Hagen et al. by pre-school teachers). Fricke et al. delivered a pre-planned programme, Hagen et al. a scripted, manualised intervention, so both teams were able to report high treatment fidelity. Both interventions were planned to be fairly long - around 37.5 hours of intervention - although child attendance at sessions turned out to be lower.

Pupils in both studies were selected as showing lower language skills compared to their classmates, and so participation was influenced by the language attainments within classes. Fricke et al. selected the 15 children with lowest language scores from participating classes in schools in disadvantaged areas. Standardised measures placed this cohort in the low average range of the normal distribution, with mean scale scores for CELF Sentence Structure 78; CELF Expressive Vocabulary 87 and BPVS 86. Scores were skewed towards the lower end, with 38% of children at or below the 10th centile on all three measures. Such children may have met WHO-ICD 10 criteria for language disorder, although it is not known if they had the difficulties in communicating with their families and peers associated with clinical case status. Some participating children however scored highly, with top scale scores in the study ranging to CELF Sentence Structure 120; CELF Expressive Vocabulary 145 and BPVS 118. Hagen et al. did not prioritise social disadvantage

and also selected pupils in comparison to their classmates, based on lower vocabulary scores, selecting over a third of children (35%). This study did not use complete standardised tests and does not report standard scores.

Participating children in these studies thus show a mixed picture of language attainment at the start of intervention, with lower scores in relation to others in their class but not necessarily to the whole child population, and with language difficulties apparently ranging from severe to negligible as assessed by standardised measures. Results in both studies showed moderate effect sizes on taught language skills compared to 'business as usual' control children, maintained at follow-up, although Fricke et al. did not show differences on reading measures. Crucially, in both studies pre-intervention language levels did not relate to intervention gains. In other words, children who started with lower language levels made as much progress as children who began at a higher level, but did not 'catch-up' and maintained their relative deficit.

These studies are examples of a (re)turn in recent years to evidence-based 'what works' research in education in England, aiming to develop effective educational interventions for 'real life' classroom contexts. Leat et al. (2015) contributed to an enquiry commissioned by the British Educational Research Association (BERA) and the Royal Society for the Encouragement of the Arts, Manufacturing and Commerce (RSA) into school research and noted both an increase in examples of 'what works' approaches and their relationship to a comparative school improvement agenda in England:

*'... school improvement - has evolved in conjunction with a political desire for evidence-based practice with a focus on [pupil] outcomes. Given increased emphasis on accountability, it seems likely that [this] last mentioned purpose has increased in importance. As a result the most prominent face of educational research involving teachers is the school effectiveness paradigm - related to the aphorism 'what works'. This is reflected in the popularity of meta-analyses of evidence relating to the impact of interventions on [pupil] outcomes.'* (Leat et al., 2015, p. 272).

The procedures leading to such meta-analyses are familiar in medicine and psychology. Intervention trials are assessed against specified quality standards, for example using PEDro-P (Murray et al., 2013), to protect against bias and spurious findings. Interventions are developed and tested via a trial sequence (CEBM, 2009) from exploration of underlying theoretical constructs, through case histories and case history series, to randomised controlled efficacy trials in ideal conditions and effectiveness studies in real-life settings, with all the complexity entailed. Further stages involve replication and efficiency studies. Outcomes may be combined via systematic review and meta-analysis to identify 'best bet' interventions, and findings disseminated to practitioners. English language evaluations of the quality of speech, language and communication trials are reported by SpeechBITE (<http://speechbite.com>), and the UK Communication Trust 'What Works' website (<http://www.thecommunicationtrust.org.uk/whatworks>) publishes evidence levels for such interventions. The US Institute of Education Sciences WhatWorks Clearinghouse (IES-WWC: <https://ies.ed.gov/ncee/wwc>) reviews a wide range of educational interventions, and the Education Endowment Foundation (EEF: <https://educationendowmentfoundation.org.uk/>) evaluates school-based trials in England (and in future in Scotland). EEF is specifically funded by the Sutton Trust to evaluate educational interventions that aim to raise educational attainment and close the achievement gap between rich and poor children. EEF funded the Fricke et al. trial and also an independent evaluation of their study by the Institute of Fiscal Studies (IFS) which included costs ([https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation\\_Reports/EEF\\_Project\\_Report\\_Nuffield\\_Early\\_Language\\_Intervention](https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Reports/EEF_Project_Report_Nuffield_Early_Language_Intervention)).

One conclusion of the BERA/RSA enquiry was that teachers should become discerning consumers of, and engage with, research (BERA, 2014: 5), developing skills to interpret research evidence and apply it to their working context in order to inform their practice. However, unlike medicine and psychology, 'what works' approaches to accumulating evidence have not been universally accepted within UK education, perhaps due to the links with hard-headed school improvement policies identified by Leat et al. (2015). Indeed, Connolly (2014) suggests an underlying philosophical resistance to and fundamental mistrust of 'what works' research amongst some educationalists, where those who oppose 'what works' research

suggest than in contrast to practitioner research, 'what works' research is against practitioners; undermines professional autonomy by using large-scale surveys, randomized controlled trials, and quantitative analyses; and is oppressive, dictatorial, descriptive and theoretically naïve, stifling reflective practitioner practice. If so, this is a difficult context in which to conduct educational trials.

To moderate such judgments, research funders have recently made serious attempts to explain how clinical trials are set up and to support interpretation of their findings, to make them more palatable and useful to practitioners. This includes explaining the benefits that might reasonably be anticipated from an intervention and the costs of achieving these using metrics interpretable by non-specialists. EEF publish a 'Teaching and Learning Toolkit' which relates the costs of an intervention to the amount of additional 'pupil premium' money available to English schools for socially deprived children, and translates mean effect sizes into months of child progress (EEF Technical Appendices 2 and 3, [https://v1.educationendowmentfoundation.org.uk/uploads/pdf/Technical\\_Appendices\\_\(July\\_2012\).pdf](https://v1.educationendowmentfoundation.org.uk/uploads/pdf/Technical_Appendices_(July_2012).pdf)). These metrics are intended to be intelligible to non-expert audiences, although whether the 'months progress' metaphor is in fact more comprehensible than effect sizes is not known. Fricke et al.'s EEF funding partly explains their recruitment in schools in areas of social deprivation and their concentration on vulnerable children rather than those with identified language disorders. The outcomes for this trial are translated in the 'Teaching and Learning Toolkit' as a gain of about 4 months for the longer intervention. Costs and process issues in delivering the intervention and qualitative participant responses are also reported by the IFS evaluation which was published online in February 2016, some 20 months before this journal publication: speedy dissemination of findings is also a key aim of the Foundation.

Fricke et al. and Hagan et al.'s moderate effects are a little lower than the progress found in other oral language interventions reported by EEF, where average gains post-intervention of 'around 6 months' are noted, slightly higher for children from disadvantaged backgrounds. Fricke et al. had anticipated that literacy skills would also improve as a result of the predominately oral language intervention. This did not happen, and other studies suggest that a clear focus on reading might be more

successful. The fact that there was little 'catching up' within the cohort - children who began with lower language scores also finished near the lower end of the participant cohort and higher functioning children nearer the top - suggests at least that no children were wasting their time, but also that 'narrowing the gap' between high and low achievers is not easy (for similar findings on reading comprehension instruction see McCartney et al., 2016).

The advantage of presenting trial results in such a transparent, timely, and intelligible manner is that it becomes possible for practitioners to interrogate research. In principle, pre/schools can decide whether or not to spend money on delivering named interventions (Ebbels et al., 2017). Just over half of the schools in the Fricke et al. study continued or were intending to continue with the intervention. Whether the moderate effect sizes achieved were worth the cost becomes an answerable question, and whether energies and funds should be devoted to children with more or less severe language difficulties and/or social deprivation on the basis of predicted language gains can be debated. If 'what works' research becomes associated with 'what's it worth' research, educationalists' mistrust might continue to be aroused. But at least the answers would be measurable within probable parameters.

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