The role of parents in young people's education – a critical review of the causal evidence

Beng Huat See and Stephen Gorard
School of Education
Durham University
b.h.see@durham.ac.uk

Abstract

There is currently a considerable body of research suggesting that parental involvement is linked to young people's attainment at school. It is also generally agreed that a number of factors such as parental background, attention, warmth, and parenting style are associated with children's later life outcomes. However, although widely assumed on the basis of these associations, the nature of this causal link has not yet been established. This paper summarises what would be needed to demonstrate that enhanced parental involvement produced better attainment and other outcomes, based on establishing an association, the correct sequence of events, sensitivity to intervention and an explanatory mechanism. It then reports on the findings of a systematic review of available and relevant studies, based on this approach. The search for evidence on the impact of attitudes, expectations and behaviour on attainment yielded 1,008 distinct reports. Of these, 77 were directly about the impact of parental involvement. These confirm that parental involvement and attainment are linked, and in the correct sequence for a causal model. There are several plausible mechanisms to explain why parental involvement might have an impact. And most crucially and unlike all other areas linking attitudes and behaviour to attainment, there is promising evidence that intervening to improve parental involvement can be effective.

Keywords: *parental involvement, overcoming disadvantage, causal model, attainment, participation, systematic review*

Background

The aim of this paper is to consider whether parental behaviours and attitudes have a causal role in the educational outcomes with which they are associated. Is it also possible that attainment at school leads to positive parental behaviour? Or is there some third factor, such as parental education, that accounts for both parental behaviour and educational outcomes? As a first step, we established what would be needed for a robust causal model in social science, based a simple set of general criteria requiring evidence from different types of studies. It is hoped that using this causal model to gain a better understanding of the causal nature of parental behaviours and attitudes and the mechanism explaining the link will enable us to identify those aspects of parental behaviours that are most likely to make a difference to young people's educational attainment. Strategies to improve parental involvement can then be targeted at those behaviours. In addition to researchers, the findings of the paper will be of particular relevance and interest to policy makers and practitioners not only in the UK, but also in other developed countries.

For example, closing the social class achievement gap is a prominent policy reform issue in recent years in the UK, as in many developed countries. Some studies have shown that such gaps are apparent even before the child starts school (Rouse et al. 2005; Phillips et al. 1998; Rock and Stenner, 2005 and Duncan et al. 2007), and evidence like this has led to a number of pre-school interventions. Head Start, Sure Start and other pre-school intervention programmes are examples of initiatives to

try and ensure that children from low-income families begin school on a level playing field. What is not clear is whether these initiatives are justified by the best available evidence.

The background to this current study was a much larger review commissioned by the Joseph Rowntree Foundation to find out whether the links between measures like parent or individual aspirations, attitudes and behaviour (AABs), and outcomes like attainment, were causal (Gorard 2012). In the review, we examined 13 measures of AAB: parental expectations, parenting styles, parent substance abuse, parental involvement, individual aspirations, individual attitudes, individual motivation, self-concept/self-esteem, self-efficacy, participation in extra-curricular activities and paid work, individual poor behaviour and substance abuse (Gorard et al. 2011). Of these, the only measure with sufficient evidence suggesting a causal influence on school readiness and subsequent attainment was parental involvement. All of the other measures fell short of what would be needed to assume causality because of the lack of evidence of an appropriate sequence or the absence of robust evaluations.

The claim that parental involvement is a cause of better attainment at school is a very strong one. Many successive large scale, longitudinal studies tracking students from birth to adulthood, have shown a strong association between parental involvement and children's school outcomes across all age ranges (e.g. Bates 2009; Crosnoe et al. 2010; Desforges with Abouchaar 2003; Gfellner et al. 2008; Hango 2007; Orthner et al. 2009). However, the associations are based on passive and *post hoc* datasets which are not suitable for establishing, rather than speculating on, causal mechanisms (Gorard 2013).

Establishing a causal model

The requirements that we propose are needed to establish a plausible causal model build on prior work by Hume (1962), Mill (1882) and Bradford-Hill (1966). Since no one study and no one type of study individually can be expected to prove causality, our model states that evidence for a causal relationship is shown when the relevant studies taken together can demonstrate:

- repeatedly and clearly that there is strong association between the variables under study, in this case parental involvement (PI), and an educational outcome (evidence for this comes from correlational studies);
- improvement in the causal variable X (PI) comes before any change in the effect variable (school outcomes) and the sequence must be clear (evidence for this comes from longitudinal studies);
- an intervention/strategy to change the level or presence of the cause will lead to a change in the effect (evidence for this comes from robust evaluations of interventions, such as randomised controlled trials or regression discontinuity designs) and
- there is a coherent and simple mechanism to explain the causal link.

Any study that relates to at least one of these criteria can provide evidence for causal mechanisms, through the falsification principle. A cross-sectional study that finds no association between X and Y reduces the likelihood that there is a causal path from X to Y, and so on. The purpose of this new review is to consider the existing evidence in light of causal descriptors like these, to see whether and to what extent the associations already uncovered are causally linked. For example, it is slightly premature to say (Goodman and Gregg 2010, p.6) that AABs 'account for' around 12% of the total age 11 attainment gap. There is a long way to go from establishing the important association that they report to producing a causal model that can 'account' for it.

Methods

For the systematic review that follows, we consider educational attainment as school readiness, such as the ability to read the letters of the alphabet and count to ten, school attendance, school adjustment, likelihood of staying on or being excluded from school, cognitive development and standardised tests (such as GPAs, Key Stage tests), and post-compulsory education participation. The review considers the behaviour of parents/carers, from pre-school (interaction with toddlers) to school and beyond. In this paper we refer to parental involvement (PI) as any strategies or behaviour that involved parents in their child's formal education.

To identify all potentially relevant studies, we searched eight electronic databases: ASSIA, Australian Education Index, British Educational Index, ERIC, PsycInfo, Research Papers in Economics (RePEc), Social Services Abstracts and Sociological Abstracts. Reports gleaned from hand searches, recommendations and personal expertise were also considered. All the evidence found is used in the synthesis. We rejected evidence only on the basis of its relevance or the incomprehensibility of the report. This is in contrast to less complete 'systematic' reviews that exclude studies on the basis of their design, scale, or method of data collection. It means that the efforts of all researchers working in this area are recognised as far as possible.

The search was for any published or unpublished research material that mentioned attainment at school (or a synonym) or educational participation after school-age (or a synonym), plus any of the AABs or an SES background term such as parental education (by name or a synonym), plus any causal term (or a synonym) or any research design (such as regression discontinuity) that would be appropriate for testing a causal model. The keywords used in the search were: attainment, test score, school outcome, qualification, exam, proficiency, achievement, British Ability Scales, Key Stag, NEET, sixth form, college, post-16, post-compulsory, postcompulsory AND attitude, expectation, aspiration, behaviour, intention, motivation, self-efficacy, locus of control, family background, home background, SES, socio-economic status, socioeconomic status, poverty, disadvantage, low income, deprivation AND child, school AND cause, effect, determinant, regression discontinuity, instrumental variables, experiment, longitudinal, randomised control, controlled trial, cohort study, meta-analysis, or systematic review.

The search was limited to materials that mentioned these key words, reported in English from 2000 to January 2011. A total of 166,491 research reports were identified and deemed possibly relevant. These were exported to the Endnote library and their titles were screened for relevance. Duplicated reports and those not meeting the inclusion criteria were removed. We excluded those that were published prior to 2000 unless they were mentioned in a number of studies and were judged to be of significance to the review. Also excluded were those specifically concerning children with special needs or adult and professional learning beyond the age of 21. Initial screening reduced the number of studies to 3,651. It is possible that this search may have missed some relevant studies, and a few key reports may have been deleted from the database on title alone. So although comprehensive and extensive, this review is by no means completely exhaustive.

The next level of screening involved reading the abstracts and this led to further studies being deleted that were found to be not relevant to the topic, not having attainment as an outcome measure, or otherwise did not meet the inclusion criteria. To be relevant to the review, a report had to link AABs to educational outcomes. Therefore, interventions to improve learning via better teaching strategies, or to enhance parental involvement or child behaviour without considering the impact on educational outcomes, for example, were ignored. This process reduced the database to

1,827 study reports. Full reports of the retained studies were then read and further studies were removed where it was now clear that they did not meet the inclusion criteria or where the reporting was so deficient that the research was unclear. The remaining 1,008 studies were synthesised using the criteria for establishing a causal model.

Synthesis

The studies relevant to each AAB were grouped together, and then classified in terms of their contribution to each of the four causal criteria (above). Our experience suggests that the major problem with poor quality lies in its unwarranted conclusions rather than with the evidence it presents (Gorard et al. 2007). Therefore, we ignored the conclusions of the researchers themselves, and instead used their evidence, as presented in their report, for the eventual synthesis. In this respect, this is not a traditional systematic review (See et al. 2011).

The following two sections describe the kind of studies found and how they contributed to the causal evidence

Findings

The review confirmed the association between children's expectations/aspirations, attitudes, motivation and behaviour and their attainment. The link between AABs and later participation in education was much weaker, partly because less rigorous work had been done in this area. The remainder of this paper focuses only on AABs and attainment. However, even for attainment there was not enough evidence to suggest a causal link with most AABs largely because no rigorous evaluations of interventions were found (the third element of the causal model).

Although there were a few interventions showing that extrinsic motivation in the form of financial rewards and improving behaviour can produce results, there was no clear evidence of association and sequence. Similarly, there was no clear evidence of association or sequence between pupils' attitudes in general and educational outcomes, although several studies have attempted to provide explanations for the link. The review confirmed an association between parental expectations and their child's attainment, and three of the four causal criteria were met at least in part. However, the evidence falls short of that needed to assume that it is a causal influence, because no relevant rigorous evaluations of interventions (such as randomised controlled trials) were found.

The only AAB reviewed that produced sufficient evidence to meet anywhere near the four pre-set criteria for a robust causal model was parental involvement in their child's learning - the subject of this paper. A total of 77 studies was found. Space only permits discussion of sub-set of these here. These were selected for discussion as being the most complete in description of their methods, or the most focussed on attainment as an outcome. A list of further relevant studies, not referenced in this paper, appears in the Appendix.

Influence of early parental involvement on pre-school children's school outcomes

Two kinds of early parental behaviour were found to be positively associated with school readiness and successful school outcomes. One of these is parents' reading to their children in the early years and the related quality of early parent-child (particularly mother) interaction. For example, using observational data on mothers' reading with their child, Korat (2009) reported that mothers with a higher level of education had a more sophisticated way of interacting with their child, and this in

turn had a positive influence on the child's reading level. How mothers interact with their child in problem-solving activities also has a positive link with the child's school performance. A study of 122 mother-child pairs found a positive association between the quality of mother–child interaction and the child's social and academic success in early adolescence even after controlling for demographic variables, such as maternal education, family's ethnicity, estimated child IQ, and child's gender (Morrison et al. 2003). Another parental behaviour shown to be positively related to school readiness is parents' support for learning in the early years. Feinstein and Symons (1999) found that early parental interest in their child's education had a stronger link to their child's school progress than the parent's own education.

Other studies have shown that parental involvement can mediate the influence of family poverty on children's maths and reading achievement through the provision of learning resources (such as books) and learning activities (Cooper et al. 2010). A number of longitudinal studies also suggested that early parental interaction with their children was related to successful outcomes in the correct sequence for a causal model. Interestingly no studies reporting the absence of such a link were found. Therefore, there is some basis for a causal model here, especially in relation to the quality of mother-child interaction.

Studies that established association and sequence

Dearing et al. (2006) studied a sample of 329 kindergarten children and found that early parental involvement was associated with children's literacy improvement. The association was stronger for mothers with a lower level of education. Parents' support for language development (e.g. through parents reading to their child) and 'maternal supportiveness' in problem solving activities at age 14 months and 24 months were found to be associated with the child's performance on developmental and behaviour scales when aged 42 months. In another study involving 1,500 children from low income families, a positive association was also detected between parents' (particularly mother's) early support for language development (e.g. through reading) and engagement in problem solving activities at 14 months and child's performance at 42 months (Mistry et al. 2008). Using the Early Childhood Longitudinal Study birth cohort, Bronte-Tinkew et al. (2008) found that the more fathers interacted with their babies such as talking to them, the less delay there was in infant babbling and exploring.

Longitudinal studies also suggested positive associations between early parental support for learning and school readiness. Bates (2009) tracked one cohort of kindergarten class children from kindergarten through to 5th grade. They found that parents' interest and their support for their children's education was positively associated with children's reading and maths scores not only in kindergarten but also over time. Parental interest and support were measured as parents' educational expectations, frequency of reading at home and the number of children's books in the home.

In a large scale, longitudinal study, Crosnoe et al. (2010) examined the effects of early child care on young children's cognitive development from birth through to age six. A total of 1,364 mothers aged 18 or older were enrolled for the Study of Early Child Care Youth Development. The children were exposed to cognitive stimulation in three settings: at home, in pre-school child care and in 1st grade classrooms. Their cognitive development was assessed at 54 months and in grades 1, 3 and 5 using two Woodcock-Johnson Psycho-Educational Battery-Revised subtests. Reading skills were assessed using Letter-Word Identification, while maths skill was gauged using Applied Problems. Family SES measures were also collected. Cognitive stimulation in the home at 54 months was measured using the Home Observation of Measurement of the Environment scale which summed up the learning materials, academic stimulation and variety subscales. Cognitive stimulation in child care at 54

months was based on the Observational Rating of the Care Environment. Cognitive stimulation in the 1st grade classroom was based on the Classroom Observation System. Control variables, such as gender, race and mother's employment and school readiness (based on the Basic Concept Scale), were included as dummy variables. It was found that children exposed to a consistent stimulating environment had higher subsequent maths and reading achievement. Children from lower income homes appeared to benefit more from this consistent environmental stimulation across settings.

A longitudinal study (Evangelou et al. 2007) of the Peers' Early Education Partnership programme (PEEP), involving children and parents from areas considered as at-risk of underachievement, found that PEEP children achieved subsequent higher scores for language learning than a control group, suggesting that changes in parents' behaviour had an impact on outcomes. Kiernan and Mensah (2011) analysed data from the UK Millennium Cohort Study, and reported that positive parenting (measured using a parenting index score) was linked to children's achievement at foundation stage, regardless of poverty or other disadvantage.

Some studies have suggested that early parental involvement can also minimise the role of SES (Social Economic Status). Dearing et al. (2009) tracked a sample of 1,398 and found that higher levels of participation in early childcare were followed by a weakened link between social class and subsequent educational achievement. Johnson et al. (2007) using a set of adopted children found that although the association between SES and outcomes was largely explained by prior IQs, differences in parental involvement explained about 13% of the remaining variation.

It is clear that parental involvement is associated with higher educational attainment. The key question is whether intervening to alter parental involvement (for those not involved 'naturally') changes the attainment of the child. This is the third and probably the toughest element of our causal model.

Intervention studies of early parental involvement

The review found a small number of intervention studies that provided a slight basis for a causal relationship at pre-school age, especially in the quality of mother-child interaction and the home environment. These included interventions to encourage parent-child interaction and those that aimed at enhancing a supportive learning home environment.

One of these interventions was the Tandem Project in Wales (UK), a Sure Start Initiative, aimed at encouraging parents from low SES backgrounds to take a greater role in preparing their children for school (Ford et al. 2003). Parents were given and trained to use games to play with their children to develop children's pre-reading and numerical skills. This was a six-week programme involving 128 children aged 33 months to 46 months from socially and economically deprived backgrounds. Children were assessed on letter and number recognition. The study reported that Tandem Project children made greater gains in these skills than a non-randomised comparator.

A US study conducted by Levenstein et al. (1998) investigated the long-term effect of the Parent-Child Home Program which involved giving families toys and books designed to encourage parent-toddler verbal interaction. Parents were shown by trained facilitators how to play with and read to their children. The study reported a long term effect on high school performance 16 to 20 years later. 77% of those intervention children identified as being at-risk of not graduating from high school did graduate compared to only 54% of control children and 84% for middle income families. This programme was evaluated again 10 years later (Gfellner et al. 2008) and improvements in the quality of parent-child interaction and child learning behaviour were also reported among intervention children. Three standardised instruments were used to measure the performance

outcomes (Levenstein 1988). Only children with all three measures were included in the analysis, meaning that attrition is considerable. The authors reported an improvement in the quality of home environment, parent-child interaction and child behaviour conducive to learning.

Reynolds et al. (2004) looked at 1,404 children from low income families who took part in the Chicago Longitudinal Study of the Chicago Child-Parent Centres (CPC). The study aimed at improving educational attainment and delinquency. The original sample included those who entered the CPC pre-school and completed kindergarten, and those who participated in government-funded kindergarten programmes without CPC pre-school experience. Pre-school participation was strongly linked to higher rates of high school completion by age 20, and significantly lower rates of juvenile arrest by age 18. CPC is a multi-dimensional programme which includes special classroom instruction, health advice for parents and other enrichment activities, but one of its key features is the involvement of parents in the classroom. In a quasi-experiment like this it is hard to rule out the threats to validity. As the intervention involved multiple strategies including parental involvement it was hard to identify the key ingredient.

Magnuson (2003) used an instrumental variables approach with data from the random-assignment National Evaluation of Welfare to Work Child Outcome Study to estimate the effect of maternal education on young children's school readiness. Further analyses were conducted with two sets of nationally representative data from the National Longitudinal Survey of Youth Child Supplement (NLSY-CS). These suggest that when mothers themselves returned to school on their own initiation, their children's reading, but not maths achievement, improved. This was true regardless of their prior educational level. Return to school also predicted improvements in the quality of home learning environments for the children. The suggestion is that the home learning environment may be related to improvement in children's reading. But because there is considerable self-selection involved here, this study does not imply that non-volunteering parents would have produced the same kind of improvement if required to return to school.

These studies together offer some promise that the quality of parental interaction with their children at a very young age in a supportive learning home environment may have a positive and long term impact on children's subsequent academic performance.

Effects of parental involvement on school-age children

For school-age children, two kinds of parental behaviour were shown to have positive associations with children's school outcomes: home-school partnership and parental interest in children's academic activities, which is often manifested in the way they support their children's achievement during their schooling.

Studies establishing association and sequence

Using a subset of data from the UK National Child Development Study (NCDS), Hango (2007) followed 2,658 children born one week in 1958 from birth through to age 43, and found that children whose fathers showed an interest in their education (as reported by teachers) and whose mothers took them on frequent outings were more likely to gain qualifications by age 33. Including all of the control variables from birth, age 7 and 11 cancelled out the association of disadvantage with later educational attainment. The authors claim that fathers' interest in school had the biggest impact on reducing the effect of economic hardship. However, individual attributes like behaviour, gender and reading ability as well as family background continue to matter.

Again using a subset of the UK NCDS 1958 data (n=7,259), Flouri and Buchanan (2004) reported an association between father's involvement in child's education at age 7 and school outcomes at age 16. Four indicators of parental behaviour were used, as reported by parents when the child was aged seven: reading with the child, taking outings with the child, interested in the child's education and 'father manages the child'. In a similar study, Flouri (2006), using the UK British Cohort Study (BCS) 1970 data, reported a strong association between parental interest in their child's education at age 10 and educational outcomes at age 26 when controlling for other factors. The 'parental interest' item was completed by teachers, which is not ideal and may itself be influenced by teachers' knowledge of the students' attainment.

Topor et al. (2010) showed that parental involvement (defined as parents' positive attitude towards their child' education) had a stronger link to children's academic performance than the impact of cognitive ability. Their study, which involved 158 seven-year olds, looked at the influence of parental involvement as well as the quality of student-teacher relationship on children's academic achievement. Martin and Martin (2007) described the Williamson Project which involved parents, community leaders and school personnel in a comprehensive effort to improve the achievement of African American students at one urban elementary school. The results indicate improvement in academic achievement in standardised achievement tests, and a decrease in behavioural problems. One suggestion emerging from this study is that school environments should be restructured to resemble more closely the family environments and cultures of all children. The problem with this study is that the multi-faceted 'comprehensive' effort at improvement means that the results for parental involvement specifically are hard to isolate.

Schvaneveldt (2000) examined parental involvement in children's academic activities and parental regulation of adolescents' behaviours in 8th grade and their links to academic achievement in 10th grade. This US study used data drawn from the National Educational Longitudinal Study (NELS) which included 13,116 participants. Participants were compared by gender, ethnicity and SES. The study claimed strong evidence that for all gender, ethnicity and SES groups, post-secondary educational attainment can be enhanced through greater parental discussion of academic activities with their child during early adolescence. Greater parental discussion was significantly and positively associated with greater academic achievement during middle adolescence, which was then linked to greater post-secondary attainment. This was true for all groups, but particularly so for (East) Asian or Caucasian, and higher SES children. In a similar study, Stewart (2006) used data from the 1988 National Educational Longitudinal Study to look at the link between parental education, income and involvement, individual motivation, extracurricular involvement and school engagement, and academic achievement. Results of the study showed that parental engagement with their children's school activities was related to children's 12th grade achievement even after controlling for prior attainment.

Another US study analysed data from the NLSY97 (National Longitudinal Survey of Youth), a nationally representative sample of adolescents followed into adulthood. The study suggests that children's capacity for development is enhanced by supportive family relationships that encourage human capital development (Orthner et al. 2009), and that the quality of the parent-child relationship can have a strong and positive links with participation in postsecondary education among those who graduate from high school.

Intervention studies of parental involvement on school-age children

Thus, as with pre-school, there is evidence of an association between PI and a child's attainment at school, so again the key question is whether intervening to increase parental involvement leads to changes in attainment.

One parental intervention shown to have a small to medium effect on school-age children was the Power Lunch Program, a paired intergenerational reading aloud intervention (Portillo Pena 2009). The programme emphasised reading as an interaction and collaborative process between a child and a caring adult. Participants were taken from 12 public schools in the US, involving four cohorts (ranging from 1st grade to 3rd grade, aged 6-9). All were African Americans. Of the initial 1,866 students, only 866 were included. This study used a quasi-experimental design and examined results up to four years after the intervention. It showed that the intervention had a small to medium positive effect on students' reading attitudes, motivation and achievement up to four years later.

Another school-age intervention that has shown to have a long-term positive effect on attainment was the Iowa Strengthening Families Program (Spoth et al. 2008). The aim of the programme was to get parents more engaged with their children's school activities. Sessions were conducted for two hours once a week for seven consecutive weeks, involving both parent and child. This study involved 6th grade girls from 446 disadvantaged families (defined as eligible for free lunch) who were randomly allocated to treatment (receiving training sessions, n=238) and control (no training, n=208). Outcomes were school engagement in 8th grade assessed by questionnaire about attitudes to school, and academic success in the 12th grade measured using parent and child response to a question about the child's usual grades at school. The intervention appeared to have a positive effect on school engagement in the 8th grade, and a slight positive effect on reported academic performance in the 12th grade.

Bradshaw et al. (2009) evaluated the Family-School Partnership programme, another family intervention to encourage parental involvement in educational activities and also to bolster parents' behaviour management strategies. The intervention involved training teachers and other school staff in building partnership with parents, plus weekly home-school learning and communication activities, and nine workshops for parents. A total of 678 African American children in the first grade participated. They were followed through to high school and age 19, after randomising half to the treatment and half to the control. The teachers were also randomised to treatment or control. Grade 12 reading and maths scores were measured using standardised Kaufman Test of Educational Achievement (KTEA) scores. Grades 6 to 12 classroom behaviour and academic performance were assessed using teacher reports. High school graduation rates were obtained from school records. The intervention showed a small effect on KTEA maths performance, but no discernible effect on teacher-rated academic performance, KTEA (Kaufman Test of Educational Achievement) reading performance, special education use, high school graduation or college attendance. Because of attrition, only 574 students were eventually tracked through to grade 12, meaning that the results for over 15% of the cases were missing or refused. Since these cases cannot be assumed to be a random sub-set of the original cohort, there must be some doubt about the meaning of the 'significant' improvement in maths.

A ~~similar~~ small-scale study of a parent-school partnership programme ~~was~~ conducted in Cyprus (Kyriakides 2005)~~. This programme~~ involved getting parents to work with their children in the classroom while teaching was going on ~~. The intention was~~ to encourage close communication with parents to help them to understand and value the purpose of school activities. ~~In collaboration with teachers, parents acted as advisors, learners and teacher aids. The study participants were 92 Year 5 pupils in one primary compared with 95 Year 5 pupils in a similar school in another village. Post-intervention results showed that pupils in the intervention group achieved higher grades than those~~

~~in the comparator school in both teacher and external assessments in the three core subjects.~~ The intervention was reported to be effective for all socio-economic groups.

Evaluation of FAST (Families and Schools Together), a programme to get parents to be more engaged with their children's education also reported beneficial effects. Kratochwill et al. (2004) matched 50 pairs of Native American children aged 4-9, and each was randomly assigned to treatment and control. Teacher ratings indicated that FAST students showed greater improvement in academic competence after one year, while immediate post-test results showed improvement in behaviour measured on the teacher-rated Aggressive Behaviour Scale and Child Behaviour Checklist. FAST had been tried in the UK and early signs were encouraging, but in both US and UK, the evaluations have been weak in terms of actual attainment results (Crozier et al. 2010).

Topping et al. (2004) evaluated a math tutoring method which trained parents to co-operate with their children at home on their school work. Thirty children aged 9-10 years of below average mathematical ability were randomly allocated to experimental or control conditions. Experimental tutees (n=17) were tutored in mathematical problem-solving at home by their parent using the method, while control children (n=13) received traditional maths problem homework. Pre- and post-test comparisons of both groups showed that experimental tutees made greater gains on the attainment test than the control group.

The START programme (Support to Affirm Rising Talent) which involved parental involvement among other things like mentoring reported a programme 'effect' on at-risk children who reached grade level at the end of the project, but not on the academic achievement of school children in general (Moon and Callahan 2001).

Overall, therefore, the evidence for the effectiveness of PI at school is less than that for pre-school. It is promising, but no more than that at this stage. The findings can only indicate the potential causal impact of parental involvement (especially in the early years), but not a definitive causal effect. This is primarily because of the serious design flaws in a number of studies.

Explanatory mechanism

There were two mechanisms referred to directly or implied in the literature (for example, Topor et al., 2010) which attempted to explain the causal effect of parents' behaviour on their child's school outcomes:

- 'the parent as teacher', where parents' instructional behaviours, such as having additional resources in the home, reading to the child, and going on outings may have a pedagogic impact or even a long-term impact on cognitive ability;
- 'parent-school alignment', which is the extent to which the cultural norms of communication and behaviour in the home are similar or different to those expected in school. Children who come from homes where the rules of communication and behaviour are very different to those they experience in school may experience difficulties in interpreting expectations at school. This can be a source of frustration for children, making it difficult for them to interact with teachers.

Either mechanism may initiate a reinforcing cycle. For instance, when teachers encounter children who are 'less ready for school', their expectations of the progress these children can make and their perceptions of their ability may be influenced. Teachers may behave differently in the way they interact with them, or in the way they organise the seating arrangements in the classroom. The child

may sense this differential treatment, and begin to compare their own achievement with that of their peers. There is a potential for the reinforcement of disadvantage through the mechanism suggested by self-efficacy theorists.

Both mechanisms operate not only in the pre-school years, but also as the child progresses through school. The 'parent as teacher' mechanism, for example, may affect the quantity and quality of instructional support throughout the child's school life. A parent who is knowledgeable about the education and assessment system, or becomes knowledgeable as a result of an intervention, may be in a better position to assist their child with homework, coursework, revision and choice of appropriate subjects. The 'parent/school alignment' mechanism may be more noticeable during critical moments during a child's time at school (such as when the school is unhappy with a child's behaviour or motivation, or when there are important choices to be made about curriculum pathways to follow).

Limitations of the review

We should mention that although this was an extensive and comprehensive review, it was not necessarily complete. Some key studies may be missed, as the search only included some databases. Also, because the search necessarily focused on causal claims it meant that a substantial number of cross-sectional studies of association may have been missed where they correctly avoided using terms like 'effect', and hence the full body of evidence on simple associations may be under-represented. However, this is not a major problem as the large number of longitudinal studies also provided evidence of associations. It is clear that parental involvement and child attainment are linked. The question is simply whether the parental involvement was a *cause* of the attainment.

Resource constraints also meant that the review focused on work that was electronically available, reported in the English language between January 2000 and January 2011, that was not exclusively about SEN pupils, and not deemed too culturally specific where the work was done outside the UK. Occasionally, the electronic databases are inaccurate in detail (such as the spelling of authors' names) or even in citation. In addition, all of the classifications used here are the judgements of the reviewers, and there will inevitably be a few omissions or mis-classifications of some kind in an undertaking of this scale.

Nevertheless, this was at the time the largest existing review for the UK, looking at the evidence for a causal model linking parental aspirations, attitudes and behaviour to school attainment and subsequent educational participation. The key point is not whether any studies have been missed in the search and exclusion activities of this review (since they almost certainly have), but whether any new study would alter the substantive findings summarised here.

Limitations of the studies in this review

Another issue relating to the review relates to the quality of the studies found. The review, being based on the four-element causal model presented at the start, was more inclusive and therefore more respectful of prior work of all kinds than a traditional systematic review. Partly for this reason it was necessary to highlight the factors arising in each study that could lead to bias or unfounded claims. This was done on the basis of a now widely-publicised approach to judging the trustworthiness of findings, devised by the authors, and now adopted by government and near-government organisations (Gorard 2014).

Although the review suggests a causal influence of some measures of parental involvement and school outcomes, it is premature to make any recommendations about the kind of parenting programmes or interventions to be introduced. This is largely because many of the intervention studies in this review were either not properly, independently and robustly evaluated or had important flaws or weaknesses. This weakens their evidence for effectiveness. In some cases, positive findings may be exaggerated or may even be the result of manipulations of data or flaws in design and analysis (e.g. non-random samples, attrition, absence of comparators and missing data or confounding variables).

There are studies suggesting a positive impact, but which involved multiple strategies making it hard to identify the key ingredient. As stated, the Williamson Project (Martin and Martin 2007) engaged parents, school personnel and community leaders in a comprehensive effort to improve achievement. This means that the results for parental involvement specifically are hard to isolate. Then there are interventions which target multiple outcomes. The Power Lunch Programme (Portillo-Pena 2009), for example, examined the effects of the programme on reading attitudes, reading motivation and reading achievement. Because of the multiple components targeted, it is not clear what the direction of any effect was. The Topping et al. (2004) study did not take into account confounding variables such as additional time spent on homework by experimental students, and extra attention given to intervention children.

In other studies, measurements of school achievements were based on pupils' self-report rather than standardised tests. For example, Spoth et al. (2008) evaluated the Iowa Strengthening Families Program (ISFP) using parents' and child's reported grades at school as a measure of academic success. Flouri (2006) measured parental interest by asking teachers for their perception about parents. These are imperfect proxies for actual attainment.

Small samples and non-random allocations were other limitations in some intervention studies. For example, the Sure Start study (Ford et al. 2003) had only 128 children which were further divided into four groups. This meant that there were only 32 in each category of children. In this study only 10% of parents invited responded. The school-partnership programme evaluated by Kyriakides (2005) had only 185 children, in one treatment school. There was also no control for possible confounding variables. There is also the possibility of a Hawthorne-like effect as the intervention school was a volunteer, with an enthusiastic teacher.

The most common problem was high attrition. This is to be expected with longitudinal studies, but the samples can no longer be considered random as dropouts and missing data are not random events. Therefore, any reports of 'significant' results have to be interpreted with caution. In the ISFP study (Spoth et al. 2008) only 51% of families initially recruited completed the pre-test (n=446). Attrition in the 6-year follow up was 31%. The fact that parents who participated were those who agreed to take part in the scheme suggests that the sample might be self-selected, and represent those with greater tenacity or motivation.

However, such issues are not specific to the reports in this review. These are widespread problems in social science research in general, and are likely to be the same or worse in those studies not selected for inclusion.

Conclusion

Given the paucity of robust evaluations of interventions, this review should be regarded as indicative rather than 'definitive'. Nonetheless, it is clear that despite some doubts about the quality and rigour of some of these studies, there is considerable evidence that parental interest and involvement in their child's education are associated with, and appear in the correct sequence to cause, educational outcomes. This is true from pre-school upwards. The evidence is less clear about the third element of our causal model. There is sufficient evidence here to proceed to the next phase of development. What is needed is more evidence about where any intervention should take place, and in what phase of education. This will be the subject of a future paper.

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