The impact of Teacher Aides/Assistants on pupils' 'positive approaches to learning' and their academic progress

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Abstract

In recent years there has been an unprecedented increase in support staff ion schools. There were widespread expectations this will be of benefit to teachers and pupils but there has been little systematic research to address the impact of support staff. This study used a naturalistic longitudinal design to investigate the relationship between the amount of support (measured by teacher estimates and systematic observation) and pupils' 'Positive approaches to learning' (PAL) and academic progress. There were nearly 5000 pupils across two cohorts and seven age groups. Results on PAL were not straightforward by there was a consistent trend for those with most support to make less academic progress than similar pupils with less support, and this was not explained by characteristics of the pupils such as prior attainment or level of Special Educational Needs.

Key words

Teacher assistant, Teacher aides, Academic attainment, Pupil dependence, Multilevel modelling

Recently there has been massive investment in extra support staff in schools in England and Wales and this has led to a huge increase in Teaching Assistants (TAs) who now constitute one quarter of the total school workforce (DCSF, 2009). There has been an accompanying huge increase in the amount of contact between all support staff, especially TAs, and teachers and also pupils (Blatchford *et al*., 2009a). This article is concerned with the impact of Teaching Assistants on pupils. In line with common usage, the generic term 'teaching assistant' is used to cover similar classroom based post titles which engage in similar activities (e.g., classroom assistant, higher level teaching assistant, learning support assistant, and nursery nurse).

There are several main reasons for the growth in support staff. These include the introduction of the national literacy and numeracy strategies and the introduction in January 2003 by the English and Welsh Governments, local government employers and the majority of school workforce unions of the National Agreement (NA) (DfES, 2003) which set out to raise pupil standards, tackle teacher workload, and create new support roles. In addition, there has been an increase in numbers of children with special educational needs (SEN) being taught in mainstream schools, and an accompanying increase in funds available for staff to support them. In the UK, TAs have become an essential component of the inclusion of pupils with SEN in mainstream schools. However, TAs also interact with other pupils in classrooms, and this study is not restricted to pupils with SEN, on School Action or School Action Plus, but covers all pupils in mainstream classes who receive support.

Research on support staff

The increase in the number of TAs has been accompanied by a growing number of studies, e.g., on the appropriate role of support staff in relation to teachers and teaching (in the UK – Bach, Kessler & Heron, 2004; Beeson *et al*., 2003; Cremin *et al*., 2005; Farrell *et al*., 1999; Mistry *et al*., 2004; Moran & Abbott, 2002; and Schlapp *et al*., 2003; and overseas – see, Finn *et al*., 2000;

Takala, 2007; and Angelides *et al*, 2009, for debates in the USA, Finland and Cyprus respectively); the role of support staff in relation to inclusion and supporting pupils with SEN (in the UK Mistry *et al*.2004; Moran and Abbott, 2002; in the USA Giangreco et al., 1997; Giangreco et al, 2005; Giangreco and Doyle, 2007); characteristics of support staff, in terms of gender, ethnicity, class and qualifications (Teeman *et al*., 2008); and the role of support staff in relation to workforce remodelling and the impact of the National Agreement (Butt and Gunter, 2005; Gunter & Rayner, 2005; Thomas *et al*., 2004). A useful overview of research and thought on support staff in the UK is provided by Burgess (2008). Whilst these papers offer valuable insights into the nature of TAs' work and their position in relation to teachers, research to date provides only limited information on the impact of TAs on pupil outcomes.

Impact of support staff

There have been different messages from English and Welsh Governments and other bodies about the impact of support staff in schools. Concern about recruitment and retention in the teaching profession were a main reason for the NA and the proposal that support staff should release teachers from routine and clerical tasks so teachers could focus on core teaching tasks. In this sense, support staff are seen to have an *indirect* effect on pupil standards through helping teachers, not pupils directly.

But the Government has also proposed that support staff should have a *direct* impact on pupil attainment (DfES, 2002). In line with this aim the Deployment and Impact of Support Staff (DISS) project has shown conclusively that classroom based support staff spend much of their time in a direct pedagogical role, supporting and interacting with pupils, and this exceeds time assisting the teacher or the school. The presence of support staff seemed to have a beneficial effect on pupils in terms of increasing the amount of classroom engagement, and allowing pupils to have a more active role in interactions with adults (Blatchford *et al*., 2009b), but individual attention was mainly

provided by support staff instead of teachers (Blatchford *et al*., 2009b). Contrary to the notion that support staff provide 'additional' support, this suggests they provide an alternative form of support.

These findings on impact on pupils are useful but do not fundamentally address effects on learning and academic progress. This paper reports on a formal study which obtained evidence on the relationships between support provided on the one hand, and measures of pupil learning and academic progress on the other. There were two types of pupil 'outcomes'.

1. Academic progress

There is a general recognition that there is little systematic data on the impact of support staff on pupils (Alborz, Pearson, Farrell & Howes, 2009). Such studies as have been published are not conclusive. Positive findings have come from studies of the effectiveness of specific curriculum interventions given by support staff (Alborz *et al*., 2009; Savage & Carless, 2008). But other studies report negative results: for example, Finn, Gerber, Farber & Achilles (2000), on the basis of data from the often-cited Tennessee STAR project, found that there was no compensatory effect of having extra staff in larger ('regular') classes, a result similar to that of Reynolds and Muijs (2003). Klassen (2001) found that students with SEN who were assigned additional support for literacy made less progress than their unsupported peers. Giangreco *et al.,* in a series of publications, have argued that overreliance on one-to-one paraprofessional support leads to a wide range of detrimental effects on pupils (e.g., Giangreco *et al.,* 2005). Ofsted (2008) report that some schools believed they could make causal links between effective support staff deployment and training and improved end-of-year test results, but this was not based on systematic evidence.

A main limitation of research in this field, and a key reason for the proposed study, is the lack of rigorous empirical studies of the impact of support staff on pupils working in everyday classroom conditions (Howes *et al*., 2003). The DISS Project was the first large scale naturalistic

study to measure in a systematic way support staff impact on pupil outcomes, and to therefore allow testing of assumptions made about positive or negative effects. The study has wide significance in the context of concern with the lack of progress made by some pupils in school. Given that lower attaining pupils are more likely to be given extra support in schools more knowledge is needed on its effect on pupils.

2. Positive approaches to learning

It would seem to follow from reports of teachers (Blatchford *et al*., 2009a) that assigning support staff to particular pupils, usually those with problems of learning, behaviour or attention, would give the pupils more individual attention and help them develop confidence and motivation in their work, good working habits and the willingness to finish off tasks. Schlapp *et al.* (2003) identify the benefits of classroom assistants more in terms of the range of learning experiences provided and effects on pupil motivation, confidence and self esteem, and found less effect on pupil progress. On the other hand there is a well established concern that TAs can encourage dependency, e.g., because they prioritise outcomes of activities rather than encouraging pupils to think for themselves (Moyles and Suschitsky, 1997). There are also concerns that support staff can have negative effects on pupils' learning identity, e.g., in terms of interference with ownership and responsibility, and separation from classmates (Giangreco *et al*., 1997). Ofsted (2004) suggest that TAs may be less likely to stress understanding and skills and: "This was a common reason why a significant number of pupils with SEN made too little progress, despite good teaching to the majority of the class" (2004, p16).

In this study a set of dimensions were developed that school visits and previous research suggested might be an important part of 'positive approaches to learning' (PAL). There were eight different dimensions, measured on the basis of teacher ratings near the end of the school year:

distractibility, task confidence, motivation, disruptiveness, independence, relationships with other pupils, completion of assigned work, and follows instructions from adults.

Age and pupil differences

Differences in deployment of TAs at primary and secondary stages, and between pupils with different levels of SEN (Blatchford *et al.*, 2009a), might be expected to be reflected in different educational experiences and different effects on pupil educational progress, and so this study addressed differences between school sector (primary vs. secondary) and also level of pupil need (SEN, School Action Plus, School Action and non-SEN) in the relationships between support and educational attainment. It is though difficult to predict the direction of differences in results. The more likelihood of individual support at secondary might suggest there would be a more marked effect on attainment, but on the other hand effects might be expected to be strongest with the younger pupils, during more formative years. There is also an expectation that individual attention will be of benefit to pupils with SEN, yet Klassen's (2001) results do not support this view, finding relatively less progress made by such supported pupils.

There were therefore two main research questions:

(1) What is the impact of the amount of additional support (provided by support staff) on a. attainment outcomes, and b. pupil attitudes to learning, controlling for other pupil characteristics like prior attainment and SEN status?

(2) To what extent are results different for primary vs. secondary, and for pupils with different levels of SEN?

Research approach

In this study the key research task was to establish the causal role of support in relation to pupils' attainment and PAL. A traditional approach would be to use an experimental design,

contrasting groups with and without support, but experimental manipulations can have a narrow range of applicability and do not capture the range of ways that support staff are used and deployed in schools (Goldstein & Blatchford, 1998).

In this study an alternative naturalistic design was used that sought to measure support received by pupils under normal circumstances and then examine relationships with academic and behaviour outcomes. The well established difficulty with this sort of design is that it results in correlations between the main predictor variable (in this case, support) and outcomes, which are then difficult to longitudinal design within which effects of support on outcomes can be assessed while controlling for other factors, including pupil characteristics like prior attainment and SEN status that might confound the relationship. interpret in terms of causal direction. To overcome this problem requires a When controlling for prior attainment one is essentially looking at effects of support on academic progress, a much more useful approach than simple a cross sectional studies of attainment at one point in time.

Method

Research design

The overall DISS project combined numerical data on connections with pupil and teacher outcomes, with qualitative, interpretive analysis to obtain a detailed and integrated account of the deployment and impact of support staff. Results are shown in a series of reports (e.g., Blatchford *et al*., 2009a; Blatchford *et al*., 2009c; Blatchford *et al*., 2009d). This paper reports on one component of the study, the systematic, quantitative study of whether support provided for pupils affected pupil attitudes to learning and attainment. The approach adopted was a short term longitudinal study over a school year for seven different age groups, and it examined pupil measures at the end of the school in relation to the amount of support they received, controlling for other factors likely

to influence this relationship, including prior attainment. The study covered primary and secondary school stages. There were two cohorts. Wave 1 took place in 2005/06 and focused on pupils in 76 schools in Years 1, 3, 7 and 10[1]. Wave 2 took place in 2007/08 and involved an increased sample of pupils in 77 schools in Years 2, 6 and 9[2]. The reason for the change in year groups was because of lengthy delays in Wave 1 in getting information back from schools; this was speeded up by collecting end of Key Stage test data from Government agencies.

Information on pupils

Data on pupil characteristics at Waves 1 and 2 was obtained through the School Census (formerly PLASC - Pupil Level Annual School Census) supplemented by information from schools. Information was collected on:

- Baseline attainment in English
- SEN status (grouped as non-SEN, some SEN)[3]
- Gender
- Eligibility for free school meals (FSM)

[1] Year 1= 5/6 years; Year 3 = 7/8 years; Year 7 = 11/12 years; Year 10 = 14/15 years
[2] Year 2 = 6/7 years; Year 6 = 10/11 years; Year 9 = 13/14 years
[3] Numbers in the School Action, School Action Plus and SEN statemented categories were not large and so they were combined into one group.

- Ethnic group (grouped as white, or other than white)[4]
- IDACI (Income Deprivation Affecting Children Index) (Wave 2 and England only)
- English as an Additional Language (EAL) (Wave 2 and England only)
- Pupil age (Wave 2, Year 2 only)

A summary of the main characteristics of the pupils in the study is given in Table 1. Figures are restricted only to pupils with a measure of support.

>>>>>***Table 1. Characteristics of pupils included in the analyses for Waves 1 and 2***

Percentages of pupils with SEN (includes School Action and School Action Plus) is high for Wave 1, relative to Wave 2, largely because Wave 1 was restricted to a sub sample of pupils in each class, around half of whom would have been supported, and therefore with a correspondingly high percentage with SEN. There were differences between year groups and with national figures in terms of the other characteristics but these were taken into account by including information in statistical models when analysing relationships between support and pupil outcomes.

Amount of support

a. Hours support – teacher ratings (Waves 1 and 2)

The first, main measure was teacher estimates of the amount of support received from support staff in English (in and away from the classroom), expressed as a percentage of time. They were given six categories denoting the amount of support: 0%, 1-10%, 11-25%, 26-50%, 51-75%,

[4] Numbers in separate ethnic group categories were not large and so were combined into two groups. The 'white' group included White British, Irish, Traveller of Irish heritage, Gypsy/Roma and Any other white background. The White British group made up the vast majority of this group. The 'other than white' group comprised: White and Black Caribbean, White and Black African, White and Asian, Any other Mixed background, Indian, Pakistani, Bangladeshi, Any other Asian background, Black Caribbean, Black African, Any other Black background, Chinese and Any other ethnic group. All categories and data were supplied by the DCSF.

and 75+. Due to the relatively small sample size in Wave 1, for the purposes of analysis, three measures of the amount of support were used. These were a low support (supported 0-10% of time), medium support (11-50%) and high support (over 50% of time supported). At Wave 2, five categories of support were used for the analysis (0%, 1-10%, 11-25%, 26-50%, 51%+).

b) Level of Support – Systematic Observations (Wave 1)

In addition to the main measure, there were four other measures of the amount of additional support received by a pupil, taken from the systematic observation data (see Blatchford *et al*., 2009, for a full account of the methods and data):

Support staff presence: the percentage of time in which a member of support staff was present in the classroom during observations

Support staff proximity: when 'pupil supervision' was either one-to-one or group, and a member of support staff was doing the supervising.

Support staff interaction: when the pupil was interacting with an adult and that adult was a member of support staff.

Support staff attention: when there was support staff interaction, and in addition the pupil was the focus of the adult's attention.

These measures of support represented an hierarchy with different levels closer or further away from the pupil. They range from a simple tally of hours of support; through the presence of support staff in the classroom; through proximity to the pupil; to direct interaction between support staff and pupil; and finally to individual attention toward the pupil.

The majority of these measures had highly skewed distributions and so for most analyses pupils were divided into two groups, those with high occurrence of each measure, and those with a lower occurrence.

Pupil outcomes

Academic attainment

The effect of support staff on pupils' attainment was assessed in relation to progress over the school year. Progress was assessed by analysing effects on end of year attainment controlling for start of year scores. For Wave 1, start of year attainment scores came from Foundation Stage Profiles (for start of Year 1) or end of previous year Key Stage test scores (SATs) (for Year 3, 7 and 10). Attainment scores at the end of year came from assessments already being used in schools and for the most part were teacher rated National Curriculum levels, but for Year 10 were predicted GCSE grades.

Wave 2 involved Years 2, 6 and 9. Beginning of each year (baseline) scores came from assessments at the end of the previous school year. Where possible these data came from optional tests, but if they were not available then teacher assessments were used. Again the data collected was in terms of National Curriculum levels which were subsequently converted to a numerical score. Pupil attainment at the end of the school year came from end of year Key Stage tests and took a variety of forms. In Year 2, attainment took the form of National Curriculum levels, which were reported as a main level and a sublevel (split into three categories A, B and C: e.g. 1C, 2B, etc) for English schools. For Wales, only the main numeric levels were available (e.g. 1, 2), and for Welsh data it was assumed that each pupil took the middle sublevel within each category. The main National Curriculum levels were also used in Year 6, as were fine grade levels which gave a greater distinction between pupils. Raw attainment scores were also analysed in Year 6. End of year attainment in Year 9 took the form of National Curriculum levels for all subjects, and also raw scores for English only.

Using guidelines from the DCSF, National Curriculum levels were converted into a numerical score. One whole level represents 6 points on this numerical scale, whilst a sublevel represents 2 points on this numerical scale. The exception was for Year 10 in Wave 1, where the predicted GCSE scores were also converted to numerical scores, with one point representing one GCSE grade.

Positive approaches to learning (PAL)

Teacher completed rating scales were developed, based on an amended version of the Pupil Behaviour Rating Scale, as developed in the CSPAR (Blatchford, Edmonds & Martin, 2003). For the purposes of the DISS project the form was adapted to produce one item and scale for each dimension. Dimensions were representative of those previously developed, which had proven reliability.

- Distracted – "Pupil was easily distracted"
- Confident – "Pupil was confident about doing the tasks they are set"
- Motivated – "Pupil was motivated to learn"
- Disruptive – "Pupil was disruptive"
- Independent – "Pupil worked independently"
- Relationship – "Pupil had good relationships with other pupils"
- Completed – "Pupil completed assigned work"
- Instructions – "Pupil followed instructions from adults"

For each dimension teachers were asked near the end of the school year to say whether the pupil's behaviour had 'improved', 'stayed the same', or 'deteriorated' over the year. For the

purposes of analysis the scales of the two negative phrased items (distracted, disruptive) were reversed so that they were positively phrased. In both waves there were few responses (2-3%) that indicated that the pupil's attitude to learning had deteriorated over the year and so the deteriorated and no change categories were combined. As a result the outcome was a two point scale.

Statistical methods

In order to control for possibly confounding factors, additional pupil characteristics from the School Census, listed above, were included in the analyses.

For PAL results, for Wave 1, Year 1, there was insufficient data on FSM and ethnic group for these variables to be included in the analysis.

It is recognised that within the SEN group and within the 'other than white' group there will be several sub-categories but the numbers of these pupils in these groups was too small to treat each sub-category separately.

Two level multilevel statistical models were used, with pupils nested within schools. For the PAL analyses the outcome was a two point scale so multi-level logistic regression was used. For the attainment analyses, the attainment scores were continuous, so multilevel linear regression was used.

A series of different models were used to examine the impact of additional support on attainment, both in terms of raw attainment and then sequentially adjusting for potentially confounding factors. The following models were fitted:

- Model 1: No adjustments
- Model 2: Adjustments for baseline attainment
- Model 3: Additional adjustment for pupils characteristics measured in all schools (SEN

status, gender, free schools meals and ethnic group)

- Model 4: Additional adjustment for pupils characteristics measured in English schools only (IDACI and EAL) (Wave 2 only)
- Model 5: Additional interaction between SEN status and level of support

In the interests of brevity only results from Model 3 are presented as this was the most complete and adjusted for the most number of potentially confounding variables. The size of the interaction between SEN status and level of additional support was examined (Model 5) and results are presented only when significant.

For Years 6 and 9 in Wave 2 there were different measures of academic outcomes. In the interests of brevity, only results from the outcome using National Curriculum levels are presented. The results from all outcomes were fairly consistent and the results from other outcomes are discussed below.

The effect of support on PAL scores was again performed in a number of stages, starting with an unadjusted analysis of the effect of support, followed by an examination of the effect of support after adjustments for potentially confounding factors. For the PAL analyses there were four models:

- Model 1: No adjustments
- Model 2: Adjustment for baseline attainment, SEN status, gender, FSM and ethnic group (and pupil age for Wave 2, Year 2)
- Model 3: Additional adjustment for IDACI score and English as an Additional Language (Wave 2 and English schools only)
- Model 4: Additional interaction between SEN status & support

In the interests of brevity only results from Model 2 are presented here, as this was the most complete and adjusted for the greater number of potentially confounding variables. The possible interaction between SEN status and level of additional support was also examined (Model 4) and results presented where significant.

The focus of the research was on the effects of additional support, so the regression models (both fixed and random effects) are not presented in full.

Results

The effect of support staff on pupil academic progress

Teacher rating of support

Wave 1: As described in the Methods section, support was divided into three groups: low (<10% of time supported), medium (11-50% of time supported) and high (>50% of time supported). Results for all four years groups in Wave 1 are shown in Table 2.

>>>>>Table 2. Associations between combined staff ratings of total additional pupil support and pupil attainment (controlling for pupil characteristics: baseline attainment, SEN status, gender, eligibility for FSM, ethnic group). Wave 1

There was significant effect of support on pupil attainment in English and mathematics in Years 1, 3, and 7 and for English in Year 10. In every case the higher the level of support, the lower the level of attainment. To take English in Year 1 as an example, it can be seen in Table 2 that those pupils with a medium level of support obtained attainment scores that were almost two points less than those with a low level of support. Two points equate to one sublevel of the main National Curriculum levels (e.g., the difference between level 1B and 1C). There was a difference of roughly three units between the pupils with most and least support, about one and a half sublevels.

Overall, for English at Wave 1 those with most support (51% or more) scored 3-4 points lower than those with least support (0-10%), which equates to one and a half to two National Curriculum sublevels. For mathematics the differences between most and least support were 2-4 points, which equates to 1-2 sub levels. There was no effect of additional support on progress in science at any age at Wave 1.

For Year 10 there was no effect of support on attainment in mathematics and science and no interaction between SEN status and level of support for these two subjects. There was an overall effect for English but this time there was also a significant interaction between SEN status and level of support for English attainment. For pupils both with and without SEN, a higher level of support was associated with a lower level of progress in English, though this effect was stronger for non-SEN pupils.

The effect of support on attainment in all three subjects did not vary between pupils with and without SEN at Years 1, 3 and 7.

For ease of reference, Table 3 summarises effects for Waves 1 and 2 in terms of National Curriculum sub levels.

>>>>>Table 3. Size of effects of support on progress quantified in terms of National Curriculum sublevels

Wave 2: Results for Wave 2 are shown in Table 4. This shows results for the three year groups, for all pupils combined, and also separately by SEN status where a significant interaction was found.

>>>>>Table 4. Associations between combined staff ratings of total additional pupil support and pupil attainment (controlling for pupil characteristics: baseline attainment, SEN status, gender, eligibility for FSM, ethnic group, income deprivation, EAL, pupil age). (Wave 2, Years 2, 6 & 9)

There were significant effects of the amount of support on pupil progress in maths, English and this time for science as well at each of the three age levels in Wave 2. Differences between those with the most and least support varied from 1.3-2.9 points, about 1- 1.5 National Curriculum sub levels, as can be seen in Table 3.

Across both waves there was a tendency for a linear stepped increase in effects with each level of support though this was less clear in some cases.

It can be seen in Table 4 that there were significant interactions with SEN status for maths in Year 2, all three subjects in Year 6 and English in Year 9. Generally, the effect of support on progress was in a similar, negative, significant direction for each of the three pupil groups, with the effects generally less strong for the Non-SEN groups. The exceptions were non significant results for School Action pupils in maths in Year 6 and School Action Plus/SEN statemented in English in Year 9.

Observation measures of support (Wave 1)

Table 5 gives significant results for all four variables used at each of the four year groups.

>>>>>Table 5. Associations between systematic observation support measures and pupil attainment (controlling for pupil characteristics, baseline attainment, SEN status, gender, eligibility for FSM, ethnic group) Wave 1

Analyses compared those with high and lower support (see notes at foot of Table 5 for exact definitions for each type of measure). Overall there was a trend for a negative relationship between

the amount of support and pupil progress, though this was less marked than for the teacher rating of support over the year.

Overall significant negative effects varied from 1-4 points, around a half to two National Curriculum sublevels.

Overall, when there was an interaction with SEN status it was the non-SEN group that showed most marked results.

The effect of the amount of support on pupils' 'positive approaches to learning'

As mentioned in the methods section, support was divided into three groups, low (<10% of time supported), medium (11-50% of time supported) and high (>50% of time supported). The figures reported (odds ratios) are a measure of the difference between the medium and high support groups relative to the low support group. The odds ratios indicate the odds of a pupil showing improved attitudes to learning over the year for medium and high support groups relative to the low support group. An odds ratio of above 1 would mean that an improved attitude to learning is more likely in the medium/high support group relative to the low support group, whilst an odds ratio of below 1 would imply that an improved attitude to learning is less likely in the medium/high support groups relative to the low support group.

In addition to the odds ratios, the corresponding 95% confidence intervals are also reported. Also reported are the number of pupils included in the analysis and the p-values indicating if there is a significant effect of support.

Statistical analyses showed few effects for Wave 1 Year 1 and 3 and no effects at all for Wave 1 Years 7 and 10. There were also no effects for Years 2 and 6 in Wave 2. The most consistent effects were at Year 9 in Wave 2, and results are displayed in Table 6.

>>>>>Table 6. Effect of amount of support on Wave 2 Year 9 PAL measures (controlling for baseline attainment in English, SEN status, gender, eligibility for FSM, ethnic group, income deprivation, EAL)

There was a highly significant effect of the level of additional support on all eight of the positive approaches to learning outcomes. With the exception of pupil motivation and independence, there was little evidence of a statistically significant difference between pupils with a low and medium level of additional support, the main effects being between the pupils with a high level of support and those with a lower level of support. These were very marked effects; e.g., the odds ratios shown in Table 6 mean that the largest effect was a change toward being less distracted which was 11 times more likely with high levels of support compared to low levels of support.

There was no evidence for any age group or wave that the effect of support on the PAL scores varied for those with and without SEN.

Discussion

Impact of support staff on pupils' 'positive approaches to learning' (PAL)

As discussed in the Introduction, some research has indicated that one consequence of TA support may be that pupils become reliant on the TA and less willing to engage in independent work (e.g., Giangreco *et al.*, 1997; Moyles and Suschitsky, 1997). The study addressed the impact of support staff on pupils' approaches to learning on eight dimensions: distractibility; task confidence; motivation; disruptiveness; independence; relationships with other pupils; completion of assigned work; and following instructions from adults. The only consistent results were in Year 9 in Wave 2, when highly significant effects of the level of 'additional' support on all eight of the

positive approaches to learning outcomes were found. These results were found even when potentially confounding factors like prior attainment, SEN status and gender were accounted for. That this effect is found in Wave 2 at secondary only, suggests that the explanatory processes at work differ between primary and secondary sectors. In one respect these results are unexpected because in Wave 1 found little evidence of any effect on the nearest equivalent age level – Year 10. The disparity in results between Year 10 and Year 9 is not easy to explain, but may be connected to the larger sample in Year 9 (in Wave 2), and hence a greater likelihood of showing effects of support, should they be there.

The strong positive result for Year 9 in Wave 2 may also be connected to other findings from the study. While support staff in primary schools were more likely to be classroom based and interact with other pupils in a group, as well as those they were supporting, in secondary schools support staff tended to interact more exclusively with the pupil they were supporting (Blatchford *et al*., 2009d). It may therefore come as no surprise if the supported pupils showed most effects in terms of the PAL dimensions. Though it is not possible to be sure, it may be also be that the results are picking up something connected to Year 9 being the end of Key Stage 3 and the first year in the secondary years when pupils had to take end of Key Stage tests. It is possible that targeted support in this year is specifically directed at ensuring that each pupil learns to work independently, with confidence and motivation, to help the students do well in their end of year tests, and this may be having a beneficial effect, in terms of teachers' judgements about pupils' attitudes to learning.

Impact of support staff on pupil attainment

In general there was a negative relationship between the amount of additional support provided by support staff and the academic progress of pupils. For Wave 1 the strongest effect was found for the overall measure of additional support, provided by support staff. In Years 1, 3 and 7

in English and mathematics there was a consistent negative relationship between the amount of such support a pupil received and the progress they made; the more support, the less progress made, even when the other potentially confounding factors were taken into account. Given the important nature of these findings on attainment, the study was repeated on a separate and larger sample (Wave 2). This was conducted at the end of Key Stages 1, 2 and 3, with end of year assessments in Year 2, 6 and 9, and this again showed a negative relationship between the amount of support and progress in English and mathematics, and this time for science as well, even after carefully controlling for eight potentially confounding factors like SEN status. The negative relationship between support and academic progress was therefore replicated across two waves and seven different year groups, across both primary and secondary education stages, and so the finding seems to be a clear one. There was some evidence that the effect was more marked for pupils with a higher level of SEN, but it was still generally evident for pupils with no SEN.

The other four measures of support used at Wave 1 were drawn from the systematic observation study. These had the advantage of being a more precise account of the contact between pupils and support staff, though in contrast to the main teacher rating, were a relatively small window on pupils' classroom experiences over a school year (between two and four days). Once again there was a general trend towards a negative relationship between support staff contact and pupils' academic progress over the year, though the results varied to some extent according to the level of SEN.

The study was longitudinal and not just cross sectional, and it can therefore be said that the statistical analysis examined relationships between the amount of support and pupils' educational *progress* (rather than just attainment at the end of year) which might be expected to be connected to difficulties shown by pupils, but an independent effect of the amount of support was still found.

Explanations of the findings on pupil academic progress: pupil explanations

What might explain this negative result? Perhaps the most obvious explanation is that results are attributable to the pupil rather than the support they receive; that is, pupils are likely to receive support because they are performing less well or have a particular learning or behavioural problem, and it is this that explains the relationship between support and attainment. The extra support therefore reflects the underlying correlation between pupil characteristics and progress, but does not itself affect progress. Unsurprisingly, the data do suggest that pupils with lower attainment or SEN tended to have more support than those with higher baseline attainment. This was expected, as both case studies and questionnaires from the DISS study (Blatchford *et al*., 2008) indicated that the allocation of support is usually on the basis of how well the pupil is doing academically or because they have a SEN. However, it is unlikely that this explanation accounts for the relationship between support and pupil attainment because the pupil characteristics that are likely to be the basis for the provision of extra support were included in the statistical analysis. The following variables were included: prior attainment (collected at the beginning of the year), SEN status, gender, pupil family income, income deprivation, ethnic group, pupil age, and English as an additional language. The study therefore examined as far as possible the *independent* effect of additional support over and above these pupil characteristics.

It is important to realise that in order to explain the relationship between support and attainment, additional pupil characteristics would need to be related not only to progress but also to extra support; they would need, therefore, to inform (or at least be related to) the decision to give additional support and this would need to be over and above anything captured by the eight included measures. As part of the systematic observation study, SENCOs and teachers filled in a form asking them to indicate the main reason for support. The responses suggested that almost

always this was due to learning difficulties, problems with literacy or numeracy, low attainment or SEN status, most of which would have been captured in the variables included in the statistical analysis.

Nevertheless, the measures of SEN status (SEN statemented, School Action and School Action Plus) were relatively strict and might have excluded some pupils who had behavioural or learning difficulties, for which they were assigned extra support, not revealed in these categories. To address this, pupils identified in this way on the SENCO forms (there were 50 such pupils across the four age groups) were included with the SEN pupils but even when the analysis was redone with this larger group the relationship between support and attainment was very largely unchanged. The results therefore suggest that the negative effect of support cannot easily be explained by the fact that there are pupils over and above those previously identified as making less progress (especially those with SEN) who were picked out for extra support for a particular reason related to their likely progress.

Another approach to the possibility that it is pupil characteristics which account for the relationship between support and progress is to see whether the relationship holds for other pupil outcomes, as described above, the effect of support on pupil 'positive approaches to learning' (PAL) generally showed either no effect of support on these measures over the year, or, in the case of Wave 2 Year 9 a clear positive effect. If there were underlying constructs which were somehow biasing the results in the direction of less progress for the most supported pupils, then it would be expected that the PAL results would mirror those of the attainment outcomes. The fact that this was not the case, gives further validity to the attainment results.

One last way of viewing the relationship between support and attainment, couched in terms of pupil characteristics, might be that a pupil's difficulties begin in a school year and slow up

progress, for reasons unknown, and which were not shown in previous years (they would then have been picked up in the other measures included), and extra support is then allocated to such pupils. But even this does not seem to explain the results. Further statistical analyses, presented in the results section, showed that the introduction of a measure of change in support over the year did not affect the relationship between support received and progress over the year. Moreover, the DISS Strand 2 Wave 1 case studies (Blatchford *et al*., 2008) and the CSPAR study (Blatchford *et al*., 2004) indicate that change in support over the year tends not to happen with any frequency.

The longitudinal design adopted here has therefore gone a long way with a naturalistic, non-experimental design to establish grounds for the effect of the amount of support on pupil attainment. It is possible that there is other information about pupils, used by teachers and schools, which is not captured by the variables listed above, and which explains the systemic relationship between support and attainment, but it is very difficult to think what these might be.

Other explanations for effect on attainment

The discussion so far suggests characteristics of the pupils themselves do not seem to account fully for the negative relationship between the amount of support and academic progress. Elsewhere (Blatchford *et al*., 2009a; Webster *et al*., in preparation) the concept of the 'Wider Pedagogical Role' (WPR) of support staff has been developed both to summarise other findings from the project and to also suggest possible explanations for the results on academic progress. In line with the model, it is argued that a consideration of the effectiveness of support should not be personalised or individualised just to characteristics of individual classroom based support staff, e.g., in terms of their experience or practice, because this would be to seriously underplay the situational and structural factors within which TAs have to work. The WPR model suggests that the *practice* of support staff needs to be seen in the context of

decisions made about their *deployment* by teachers and headteachers, which are outside their control, and also in the context of their '*preparedness*' e.g., in terms of their training for the role (which will influence pedagogical and subject understanding) and the amount of planning, preparation and debriefing/feedback time with teachers. The effect of decisions about deployment and preparedness is that support staff can often support pupils in most need who then become separated from the class teacher and the curriculum. It is our view, on the basis of the results presented here, that the current use of teaching assistants in mainstream schools is in need of serious attention, and that widespread changes are required if the problems identified here are to be overcome. In line with the WPR model, there is an urgent need to reconsider the common ways TAs are deployed, e.g., to ensure that they do not routinely support lower attaining pupils and pupils with SEN. Moreover, teachers also need more preparation in working with and managing TAs. More information on recommendations arising from the study can be found in Blatchford et al (2009d).

In reality it is likely that individual characteristics and situational and structural factors will all be important and that there will be a complex interplay of relationships between the various components. It has not been possible in the DISS study to exactly test the possible influence of these factors on the effectiveness of TAs and on pupil outcomes and this requires further research. There is a strong case for further research which would seek to examine effects not just of the amount of support (as in the DISS project) but particular facets of the Wider Pedagogical Role of support staff on pupil learning, behaviour and attitudes to learning. Such a study could also attend to alternative forms of assessment, which could provide a more detailed assessment and perhaps address smaller periods of learning (in comparison to beginning and end of year attainment measures).

Summing up the impact of support staff

One possible way of reconciling the positive picture that emerges, particularly from the teachers' positive experience of the effect of support staff, with the PAL and attainment results, is that from the teacher's point of view extra support can free them up to devote more attention to the rest of the class while support staff give individual attention to children, often, but not always, in most need. It seems a sensible solution because the teacher can then attend to the rest of the class without interruption. This is a productive arrangement for them and seems also to be having a positive effect in terms of pupil engagement, classroom control and (at secondary level) in terms of the PAL measures of confidence, motivation, independence, and good relationships with other pupils (though other results, not presented here (see Blatchford et al., 2009a), did not find a positive academic benefit for non-supported pupils in classes where some pupils received support). On the other hand it seems that this may be at some cost to supported pupils' academic progress, probably, in part at least, through the resulting reduction of teacher input.

The negative results are consistent with a number of other studies of support staff (Finn *et al*., 2000; Klassen, 2001). However, a recent systematic review by Alborz *et al.* (2009) shows that studies that have examined the effect of support staff when they are prepared and trained for specific curricular interventions (most studies have been in the area of literacy), with support and guidance from the teacher and school about practice, tend to show positive effects on pupil progress. One way of reconciling these different findings is in terms of the kinds of conditions under which support staff were studied. In contrast to the studies reviewed by Alborz *et al.*, the DISS project examined the effect of the amount of support as it occurred under everyday conditions and there are concerns about their lack of preparedness and the way pupils can be separated from the teacher and the curriculum as a result of being supported by support staff. The DISS study is

therefore assessing the effect of support staff under different conditions. The DISS results suggest that this is the way support staff are usually deployed in schools, but the research on targeted interventions also suggest that with appropriate training and guidance support staff can have a positive role to play in pupils' academic progress.

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DISS Attainment Paper for BERJ

Tables

Table 1. Characteristics of pupils included in the analyses for Waves 1 and 2

Characteristic	Wave 1				Wave 2		
	Year 1	Year 3	Year 7	Year 10	Year 2	Year 6	Year 9
Number	363	285	220	290	1036	1148	1374
Male gender	53%	55%	59%	53%	54%	52%	45%
SEN (*)	31%	31%	40%	49%	23%	23%	22%
EAL(**)	-	16%	11%	6%	9%	14%	2%
FSM (***)	-	23%	28%	16%	13%	15%	11%
White Ethnicity	-	77%	86%	91%	91%	83%	96%

(*) Pupils with any special education needs (School Action, School Action Plus or SEN Statement)
(**) English as an additional language. Information not available for schools in Wales
(***) Eligible for free school meals

Table 2. Associations between combined staff ratings of total additional pupil support and pupil attainment (controlling for pupil characteristics: baseline attainment, SEN status, gender, eligibility for FSM, ethnic group). Wave 1

Year	Amount of support	English Estimate (95% CI)	Maths Estimate (95% CI)	Science Estimate (95% CI)
1	0% - 10%	0	0	0
	11% - 50%	-1.8 (-3.0, -0.7)	-0.3 (-1.5, 0.8)	-1.7 (-3.6, 0.2)
	51% +	-2.8 (-4.6, -1.0)	-2.3 (-4.0, -0.6)	-2.1 (-4.6, 0.4)
	p-value	0.002	0.02	0.13
3	0% - 10%	0	0	0
	11% - 50%	-2.6 (-3.9, -1.4)	-2.1 (-3.2, -1.1)	-1.1 (-2.4, 0.2)
	51% +	-3.8 (-5.9, -1.7)	-3.5 (-5.1, -1.8)	-1.4 (-3.7, 0.8)
	p-value	0.002	<0.001	0.20
7	0% - 10%	0	0	0
	11% - 50%	-1.6 (-3.4, 0.2)	-0.4 (-2.2, 1.3)	-0.7 (-3.0, 1.6)
	51% +	-4.2 (-6.2, -2.2)	-3.0 (-4.9, -1.1)	-2.6 (-5.4, 0.2)
	p-value	<0.001	0.007	0.19
10	0% - 10%	0	0	0
	11% - 50%	-1.6 (-3.4, 0.2)	0.0 (-0.5, 0.6)	0.4 (-0.4, 1.1)
	51% +	-4.2 (-6.2, -2.2)	-0.4 (-1.0, 0.1)	-0.3 (-1.0, 0.5)
	p-value	<0.001	0.19	0.35

Estimates represent the difference in attainment between each support group and those receiving the lowest amount of support

Table 3. Size of effects of support on progress quantified in terms of National Curriculum sublevels

		National Curriculum sublevel		
Wave	**Year**	**English**	**Maths**	**Science**
1	**1**	**1.5**	**1**	
	3	**2**	**2**	
	7	**2**	**1.5**	
	10	**1***		
2	**2**	**1.5**	**1**	**1**
	6	**1**	**0.75**	**1**
	9	**1**	**0.75**	**1**

* for Y10, expressed as 1 GCSE grade
Figures are the difference in attainment between pupils with least and most support

Table 4. Associations between combined staff ratings of total additional pupil support and pupil attainment (controlling for pupil characteristics: baseline attainment, SEN status, gender, eligibility for FSM, ethnic group, income deprivation, EAL, pupil age). (Wave 2, Years 2, 6 & 9)

Year/ Subject	Amount of support	All pupils Estimate (95% CI)	Non-SEN Estimate (95% CI)	School Action Estimate (95% CI)	SA+/Statement Estimate (95% CI)
Year 2 English	0%	0			
	1% - 10%	-0.9 (-1.3, -0.4)			
	11% - 25%	-1.3 (-1.7, -0.8)			
	26% - 50%	-1.4 (-2.0, -0.9)			
	51% +	-2.9 (-3.5, -2.3)			
		<0.001			
Year 2 Maths	0%	0	0	0	0
	1% - 10%	-0.1 (-0.7, 0.5)	-0.5 (-1.0 , 0.0)	1.3 (-0.3, 2.9)	0.2 (-2.0, 2.4)
	11% - 25%	-0.4 (-1.0, 0.2)	-0.4 (-0.9, 0.2)	-1.7 (-3.2, -0.2)	-0.4 (-2.5, 1.8)
	26% - 50%	-1.5 (-2.2, -0.8)	-1.9 (-2.7, -1.2)	-0.4 (-1.7, 1.0)	-1.7 (-3.8, 0.4)
	51% +	-2.0 (-2.9, -1.2)	-1.9 (-2.9, -0.9)	-1.2 (-2.6, 0.2)	-4.3 (-6.0, -2.5)
	p-value	**<0.001**	**<0.001**	**0.001**	**<0.001**
Year 2 Science	0%	0			
	1% - 10%	-0.0 (-0.8, 0.8)			
	11% - 25%	-0.2 (-1.0 , 0.6)			
	26% - 50%	-0.5 (-1.4, 0.4)			
	51% +	-1.6 (-2.7, -0.5)			
	p-value	**0.01**			

Year 6 English	0%	0	0	0	0
	1% - 10%	-0.5 (-0.9, -0.2)	-0.5 (-.0, -0.1)	-0.1 (-1.1, 1.0)	-1.7 (-3.1, -0.5)
	11% - 25%	-1.1 (-1.5, -0.6)	-0.9 (-1.4, -0.3)	-0.6 (-1.7, 0.5)	-3.1 (-4.4, -1.8)
	26% - 50%	-1.5 (-2.0, -1.0)	-1.6 (-2.4, -0.8)	-1.0 (-2.0, 0.0)	-3.6 (-4.9, -2.2)
	51% +	-1.7 (-2.3, -1.1)	-1.1 (-2.1, -0.1)	-2.6 (-3.9, -1.3)	-2.9 (-4.3, -1.5)
	p-value	<**0.001**	<**0.001**	**0.002**	<**0.001**
Year 6 Maths	0%	0	0	0	0
	1% - 10%	0.0 (-0.5, 0.4)	-0.3 (-0.8, 0.3)	-0.3 (-1.5, 0.8)	2.1 (0.4, 3.7)
	11% - 25%	-0.9 (-1.5, -0.4)	-0.9 (-1.5, -0.2)	-0.7 (-1.9, 0.5)	-1.2 (-2.8, 0.4)
	26% - 50%	-1.4 (-2.1, -0.7)	-1.1 (-2.1, -0.2)	-1.1 (-2.3, 0.1)	-2.3 (-4.0, -0.7)
	51% +	-1.3 (-2.2, -0.4)	-0.6 (-1.7, 0.5)	-1.7 (-3.2, -0.1)	-1.8 (-3.5, 0.0)
	p-value	<**0.001**	**0.03**	0.21	<**0.001**
Year 6 Science	0%	0	0	0	0
	1% - 10%	-0.2 (-0.9, 0.6)	-0.1 (-0.9, 0.6)	-0.5 (-2.6, 1.7)	-0.8 (-3.2, 1.6)
	11% - 25%	-0.5 (-1.2, 0.2)	0.0 (-0.7, 0.8)	-1.2 (-2.9, 0.5)	-3.3 (-5.5, -1.1)
	26% - 50%	-1.3 (-2.2, -0.4)	-1.3 (-2.5, -0.1)	-2.5 (-4.1, -0.8)	-0.3 (-2.6, 2.0)
	51% +	-1.9 (-3.4, -0.4)	-9.6 (-14.2, -4.9)	-0.2 (-2.4, 2.1)	-3.6 (-5.9, -1.2)
	p-value	**0.03**	<**0.001**	**0.04**	**0.003**
Year 9 English	0%	0	0	0	0
	1% - 10%	-2.4 (-3.3, -1.5)	-2.4 (-3.5, -1.3)	-4.3 (-6.4, -2.2)	-1.0 (-3.1, 1.1)
	11% - 50%	-1.7 (-2.8, -0.7)	-4.0 (-5.4, -2.6)	0.0 (-1.7, 1.7)	0.8 (-1.5, 3.2)
	51% +	-1.7 (-2.8, -0.6)	-1.5 (-3.2, 0.2)	-1.1 (-2.9, 0.7)	-1.6 (-3.5, 0.3)
	p-value	<**0.001**	<**0.001**	**0.008**	0.16
Year 9 Maths	0%	0			
	1% - 10%	-1.3 (-2.2, -0.4)			
	11% -	-0.5 (-1.7,			

	50%	0.5)			
	51% +	-1.5 (-2.6, -0.5)			
	p-value	**0.003**			
Year 9 Science	0%	0			
	1% - 10%	-1.6 (-2.5, -0.7)			
	11% - 50%	-1.2 (-2.2, -0.3)			
	51% +	-2.3 (-3.2, -1.3)			
	p-value	**<0.001**			

Estimates represent the difference in attainment between each support group and those receiving the lowest amount of support.

Results only presented for each SEN group where a significant interaction with level of support was found.

Table 5. Associations between systematic observation support measures and pupil attainment (controlling for pupil characteristics, baseline attainment, SEN status, gender, eligibility for FSM, ethnic group) Wave 1

Year	Support measure	Subject	Pupil group	Estimate (95% CI)	P-value
1	Presence [1]	English	SEN	-3.6 (-6.2, -0.9)	0.008
	Presence [1]	Science	All	6.6 (2.7, 10.6)	0.002
3	Presence [2]	Science	Non-SEN	0.31 (0.01, 0.61)	0.04
	Proximity [3]	English	All	-2.7 (-4.2, -1.2)	<0.001
	Proximity [3]	Maths	All	-2.3 (-3.5, -1.0)	<0.001
	Proximity [3]	Science	All	-2.1 (-3.6, -0.6)	0.006
	Interaction [3]	English	Non-SEN	-5.1 (-7.3, -3.0)	<0.001
	Interaction [3]	Maths	All	-2.4 (-3.8, -1.1)	<0.001
	Interaction [3]	Science	All	-2.2 (-3.8, -0.6)	0.006
	Attention [4]	English	Non-SEN	-3.0 (-4.7, -1.3)	0.001
7	Presence [3]	English	All	-0.32 (-0.57, -0.08)	0.01
	Interaction [4]	English	Non-SEN	-4.1 (-7.2, -1.0)	0.009
10	Proximity [4]	English	All	-1.2 (-2.0, -0.4)	0.005

1) Estimate is difference between pupils supported >80% of time compared to <80% of time
2) Estimate is effect of increasing percentage of support staff presence by10%
3) Estimate is difference between pupils supported >10% of time compared to <10% of time
4) Estimate is difference between pupils supported some of time compared to not at all

Table 6. Effect of amount of support on Wave 2 Year 9 PAL measures (controlling for baseline attainment in English, SEN status, gender, eligibility for FSM, ethnic group, income deprivation, EAL)

Outcome	N	Support (M- L) Odds Ratio (95% CI)	Support (H- L) Odds Ratio (95% CI)	P-value
Less distracted	329	0.72 (0.17, 2.99)	11.2 (3.55, 35.4)	<0.001
Confident	329	1.65 (0.61, 4.45)	6.70 (2.49, 18.0)	<0.001
Motivated	323	3.05 (1.12, 8.35)	4.22 (1.70, 10.5)	0.002
Not disruptive	328	0.91 (0.23, 3.66)	8.61 (3.09, 24.0)	<0.001
Independent	322	2.46 (0.84, 7.24)	8.42 (3.08, 23.0)	<0.001
Relationships	327	0.80 (0.20, 3.21)	8.89 (3.16, 25.0)	<0.001
Completes work	326	1.40 (0.52, 3.75)	3.40 (1.40, 8.24)	0.007
Instructions	326	1.43 (0.42, 4.84)	5.56 (2.11, 14.6)	0.001

Odds ratios represent the odds of increase in PAL for pupils with high and medium support relative to those with low support

Odds ratio > 1 $\Rightarrow$ Improved attitude in medium/high support group

Odds ratio < 1 $\Rightarrow$ Improved attitude in low support group