

**Project Title:** Research on the impact of school closures in key stage 1

**Evaluation Study Plan**

**Evaluator (institution):** NFER

**Principal investigator(s):** Pippa Lord



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<b>PROJECT TITLE</b>	Impact of school closures and subsequent support strategies on attainment and socio-emotional wellbeing in Key Stage 1
<b>EVALUATOR (INSTITUTION)</b>	National Foundation for Educational Research
<b>PRINCIPAL INVESTIGATOR(S)</b>	Pippa Lord
<b>STUDY PLAN AUTHOR(S)</b>	Simon Rutt & Sally Bradshaw
<b>STUDY DESIGN</b>	Observational study
<b>PUPIL AGE RANGE AND KEY STAGE</b>	5 to 7 years, Key Stage 1
<b>NUMBER OF SCHOOLS</b>	158
<b>NUMBER OF PUPILS</b>	12 500
<b>PRIMARY OUTCOME MEASURE AND SOURCE</b>	NFER Assessments in reading and maths. Year 1 spring and summer 2021, Year 2 autumn 2020 and Spring 2021, Y2 NCT data.
<b>SECONDARY OUTCOME MEASURE AND SOURCE</b>	Social skills outcomes. CSBQ (Child Self-Regulation and Social Behaviour Questionnaire)

**Study Plan version history**

<b>VERSION</b>	<b>DATE</b>	<b>REASON FOR REVISION</b>
1.2 [ <i>latest</i> ] v.3	14/01/2021	To be published
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## Background and study rationale

In response to rising levels of Covid-19 infections, schools in England were closed to the majority of children from March 2020. From June 2020 selected year groups were allowed to return, if this could be achieved safely adhering to guidelines aimed at reducing spread of infections. These events have created a set of unique circumstances for schools where pupils' opportunities for formal learning and social interaction were reduced for a significant part of the school year.

Alongside other work commissioned by EEF looking at the impact of Covid-19 across other key stages, this work will enable a deeper understanding of the impact of school closures on pupil attainment. We believe that a focus on KS1 is of considerable significance, particularly as the youngest pupils had not completed their reception year before schools closed. At this stage, pupils learn school routines and expectations; crucially, for reception children moving into Year 1, Covid-19 has disrupted this transition phase which is usually carefully managed by schools (Children's Commissioner, 2020). Children also begin to develop skills, both academic and social, that will be the foundation of future learning (Sylva *et al.*, 2004).

Existing research shows schools' choice of support strategies during the lockdown varied according to levels of disadvantage, with access to technology, links with parents, provision of food boxes (Cullinane and Montacute, 2020) and physical resources contributing to the home learning environment (UCL, 2020). Such factors, alongside a rapid evidence assessment examining the potential impact of school closures on the attainment gap (EEF, Coe *et al.*, 2020), point to the importance of establishing targeted and effective catch-up strategies and provision across the next academic year (AY). Researchers warn that future contributions to the field should take into account absences beyond September, patterns of recovery over time (Kuhfeld *et al.*, 2020) and assumptions about different support strategies, such as the weight given to online learning (Moss, 2020).

## Overview of the study

This research aims to provide evidence of the impact of school closures, and subsequent re-opening strategies and support, on attainment and any differential impact on subgroups, on subjects/specific domains within subjects, and on schools with specific characteristics<sup>1</sup> with a particular focus of the impact on the disadvantage gap. With an emphasis on KS1, the study will be a combination of quantitative research looking at pupil attainment derived from NFER test and national curriculum test data, supplemented with qualitative evidence of school practices and teachers' perspectives.

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<sup>1</sup> Characteristics would be geographical location, proportion of pupils eligible for free school meals, proportion of pupils with English as an additional language and academy status.

## Research Design

### Research questions

Research question	Data source <sup>2</sup>
1. To what extent has pupils' attainment in reading and maths been impacted by school closures in 2020? This is the Covid-19 Gap.	NFER Tests reading and maths standardised scores, November 2020 (for Year 2 pupils) and Spring 2021 (for Year 1 pupils). Compared to standardisation data (2019).
2. How does any attainment gap (i.e. any Covid-19 gap) change over the 2020/21 academic year?	NFER Tests reading and maths, standardised score data over two timepoints. Individual models for maths and reading.
3. Are different groups disproportionately affected? This is the disadvantaged gap for pupils who are eligible and not eligible for free school meals.	NFER Tests reading and maths matched to pupil background data from school. Groups to be identified by gender, EAL and free school meal eligibility.
4. How well do these groups recover over the 2020/21 academic year? (e.g. does any disadvantage gap change over time?)	NFER Tests reading and maths matched to pupil background data from school. Groups to be identified by gender, EAL and free school meal eligibility.
5. How has attainment in certain curriculum domains changed over the 2020/21 academic year?	NFER Tests reading and maths item-level data
6. What practices have been adopted and learning opportunities provided by schools during school closures and after reopening and can effective practices be identified?	School-level support survey and pupil-level activity/support record.
7. Is there an association between pupil-level support activities and progress? Does this differ for subgroups?	Repeated measures attainment data; pupil background data from pupil-level activity/support record. Pupil data identifying gender, EAL and free school meals eligibility.
8. Have school closures affected children's social skills? How does this change over the 2020/21 academic year?	Child Self-Regulation & Behaviour Questionnaire (CSBQ) in November 2020 and Summer 2021 with a sample of 12 pupils from each year in each school (teacher-completed). As long as cell count allows CSBQ scores will be analysed by pupil characteristics; gender, EAL and free school meals eligibility

### Design overview

The evaluation design is to use Year 1 and Year 2 test data from primary schools purchasing NFER reading and maths assessments in the autumn term of 2020 and the spring and summer terms of 2021. The Year 1 assessments will be collected in the spring and summer terms and the Year 2 data will be collected in the autumn and spring terms. Comparisons will be made to the 2019 standardised mean of 100 to identify the impact of school closures. This is the **Covid-19 gap** and will be referred to as such throughout the study plan.

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<sup>2</sup> Note, Y2 National Curriculum test data obtained from schools will also be used as a data source, converted to a standardised score in the repeated measures models.

Further analysis will make comparisons between pupils eligible for free school meals and those not eligible and will further identify whether the gap between these two groups is narrowing, remaining stable or increasing. This will be referred to as the **disadvantage gap**.

A teacher-completed pupil-level social skills development survey will also be administered to a sub-sample of pupils within each school. Additional information will be collected to identify school practices and any catch-up activities being undertaken with the pupils to test whether there is an association between certain support activities and progress.

**Table 1: Design**

<b>Design</b>	<b>Observational study</b>
<b>Unit of analysis (school, pupils)</b>	Pupils and schools
<b>Number of Units to be included in analysis</b>	158 schools and all pupils in Years 1 and 2, approximately 12500 pupils <sup>3</sup> .
<b>Outcome 1</b>	<b>Maths attainment</b>
variable measure (instrument, scale, source)	NFER standardised test scores
<b>Outcome 2</b>	<b>Reading attainment</b>
variable(s) measure(s) (instrument, scale, source)	NFER standardised test scores

## Participants

This project will use the data that can be gathered from the cohort of primary schools that are planning to use NFER assessments in the 2020/21 academic year (AY). It was decided to use this cohort of schools as it would not require further contact with schools. Contact with schools is something NFER had considered very carefully during these times when school management are under additional pressures to ensure they remain open.

NFER supplies tests to approximately 3,000 primary schools. All schools ordering tests for Years 1 and 2 will be invited to participate<sup>4</sup>. Communications will highlight the importance of the research and benefits to schools.

We will schedule reminder strategies where completed tests are not forthcoming, however, we anticipate the following factors will incentivise participation:

- provision of free marking

<sup>3</sup> 766 schools have ordered KS1 papers. Following inclusion of KS2 customers, a total of 1775 schools have been invited to take part.

<sup>4</sup>To increase the sample of schools, a decision was made in October 2020 to approach schools that had purchased from the KS2 suite of assessments.

- testing in October/November (not September with its inherent logistical challenges)
- leaflets showing implications for teaching from item-level diagnostic analysis
- use of progress tool (NFER will input total test scores and provide schools with item level data which they can choose to upload to the tool)

At the time of writing, 766 schools had ordered a Year 1 or Year 2 assessment for use in the 2020/21 academic year.

Participating schools will receive a set of NFER tests (maths and reading) to be used at three time points in the 2020/2021 AY. To reduce burden, we will pre-populate with pupil details and collect scripts for marking by NFER. Assessment results will be shared with schools and all data will be transferred through NFER's secure data portal.

### Sample size calculations

When estimating national population parameters of attainment, such as the Covid-19 gap, representativeness is critical. Checks on the representativeness of orders currently received for this academic year 2020/21 have been carried out. Initial analysis found that 39 per cent of primary schools in England have a greater than average percentage of pupils eligible for FSM<sup>5</sup> (as the distribution has strong right-hand skew). Of the 766<sup>6</sup> schools that have ordered at least one year group's worth of NFER tests for use in the academic year 2020/21, 298 (also 39 per cent) have a greater-than-average FSM percentage and the distribution shape is very similar to that of England. Given the nature of free school meal eligibility and its association with academic performance a decision was made to identify eligibility prior to school closure. This is due to the very likely effect that eligibility rates will increase as a direct consequence of increased financial problems that families will face in the summer of 2020.

When assessing the attainment gap between disadvantaged and non-disadvantaged pupils (i.e. disadvantaged gap)<sup>7</sup>, representativeness of the sample is less critical as it is a relative measure and we are interested in seeing how this gap changes between the two time points of assessment. It will still be important to check the representativeness of our achieved sample of schools for KS2<sup>8</sup> performance in particular. Other school level variables will also be investigated at this point including characteristics such as school type, geographical location and academy status. A high response rate for invited schools will be critical to obtaining estimates of both Covid-19 and disadvantage gaps.

Here we summarise sample size calculations for the chosen design:

We are looking to detect changes in the disadvantage gap of the order of three percentage points. Assuming the Covid-19 gap is larger, the disadvantage gap should drive sample size. A sample of 158 schools, where all of Years 1 and 2 sit the test, is required to detect a 3.4 percentage point change in the disadvantage gap for separate Year 1 and Year 2 analysis, and a point estimate of the Covid-19 gap to also within 3.4 percentage points. These sample size calculations<sup>9</sup> assume no design effect for the disadvantage gap and an intra-cluster correlation of 0.15 for the Covid-19 gap (as measured by percentage achieving expected standard, for example).

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<sup>5</sup>Free school meals used here is the proportion of pupils eligible for free school meals in 2020.

<sup>6</sup> At time of writing this document 13/11/2020

<sup>7</sup> Disadvantage will be determined by the collection of free school meal eligibility data directly from the schools and the difference in attainment outcomes between these two groups is known as the disadvantage gap.

<sup>8</sup> KS2 is to be used here as the Department do not release school level KS1 data. KS2 therefore remains the best way to differentiate schools by the performance of pupils in those schools.

<sup>9</sup> Other assumptions required for calculations include a school year group size of 38 pupils in year 1 and 39 pupils in year 2 with six and seven of these pupils respectively to be eligible for free school meals.

## Outcome measures and other data

### OUTCOME MEASURES

The outcome measures will be attainment data from NFER tests in reading and maths for individual pupils<sup>10</sup>. Test data will be collected in November 2020 and spring 2021 for year 2 pupils and in the spring and summer terms of 2021 for year 1 pupils. Tests will be administered by the schools following the usual NFER guidance in how to administer the assessments and, once returned to NFER, will be marked by NFER markers. The markers will use coding to enable diagnostic information to be produced and disseminated to schools to inform teaching. The following table identifies the time required to complete these assessments.

Assessment	Duration of paper 1 (mins)	Duration of paper 2 (mins)	Total (mins)
Maths Year 1 spring	30	20	50
Reading Year 1 spring	60	30	90
Maths Year 1 summer	30	20	50
Reading Year 1 summer	60	30	90
Maths Year 2 autumn	20 (arithmetic)	30 (reasoning)	50
Reading Year 2 autumn	50	30	80
Maths Year 2 spring	20 (arithmetic)	35 (reasoning)	55
Reading Year 2 spring	40	50	90

These tests have a strong alignment to the English national curriculum in reading and mathematics and have robust technical properties; outcomes include standardised scores and age standardised scores (i.e. scores based on a large, nationally representative samples). Schools use the tests to monitor termly and yearly progress of their pupils and to identify gaps in learning and misconceptions.

This study focuses on autumn 2020 onwards since the historical data on NFER tests is not available for use due to GDPR restrictions. Our historical reference points will instead be:

- (i) the 2017 standardisation samples upon which present standardised scores are based (to assess the Covid-19 gap)
- (ii) the 2019 summer Key Stage 2<sup>11</sup> national curriculum reading and maths tests (to assess the disadvantaged gap)

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<sup>10</sup> Information on NFER assessments can be found in the following location <https://www.nfer.ac.uk/for-schools/products-services/nfer-tests/key-stage-1-assessments/>

<sup>11</sup> KS2 is to be used here as the Department do not produce a similar analysis for KS1.

By collecting termly standardised scores from a sample of schools, we will obtain two data points per year group<sup>12</sup> based on the same individuals as they progress through Years 1 and 2 in the 2020/21 academic year. At the time of writing the study plan, all schools are open and maintaining normal teaching practices. We will review the sample of schools and the completion of tests if any local restrictions affect school closure or how tests might be administered.

### SURVEY DATA – CONTEXTUAL FACTORS

In addition to attainment outcomes, we will collect data around support strategies used at both school level and individual pupil level. The school-level survey and pupil-level activity/support record are described briefly below, for more detail see the IPE section.

#### School-level survey

The school-level survey will take place in November 2020 and will ask schools about provision during the initial school closure period from March 2020 as well as strategies used to support pupils on their return to school (see IPE section for more details). Some contextual school level factors will be explored in the analysis. These factors will include geographical location, school type, the proportion of pupils on free school meals, school size and academy status. This is explained further in the ‘Representativeness and weighting’ section.

#### Pupil-level activity/support record

The school-level survey will inform the development of a pupil-level activity/support record to be completed by teachers. This instrument will provide pupil-level data on activities completed and support received by individual pupils for the 2020/21 academic year, allowing for contextual factors around participation in a particular provision to be included in the analysis of changing attainment gaps. Schools will be sent an online collection tool in December 2020.

### NON ATTAINMENT OUTCOMES

#### Survey of social skills development

Alongside attainment outcomes, pupils’ social skills and wellbeing surrounding their return to school and learning recovery are important to capture. This is particularly relevant for KS1 pupils, as they may have missed opportunities for communication, social skills and emotional development due to school closures.

To explore these non-attainment outcomes, we will collect data on pupil wellbeing via the school level survey in November 2020. We will also collect data on pupil social skills via a pupil-level survey completed by teachers in November 2020 and summer 2021 using a validated instrument. To minimise burden, we propose a sub-sample of around 12 pupils per year group, sampled by NFER from pupil data to include disadvantaged pupils. Pupils will be randomly selected using SPSS syntax and descriptive analysis will be run to ensure disadvantaged pupils are captured in this group. The instrument that will be used to measure social skills is the Child Self-Regulation & Behaviour Questionnaire (CSBQ). This is a 34 item teacher completed questionnaire that captures a child’s ability to manage their feelings and demonstrate appropriate social behaviours in the school environment. Other possibilities considered were the Strengths and Difficulties Questionnaire (SDQ) and the Teacher Observation of Classroom Adaptation Checklist (TOCA-C). The SDQ has UK norms for 5-10 year olds but is limited to a 3-point scale which may not be sensitive enough to detect changes over the academic year. The TOCA-C is measured on a 6-point scale but does not have age appropriate norms. The CSBQ uses a 5-point scale and has suitable questions for this age group, however, there are no available UK norms for this questionnaire. There are available norms based on a sample of 414 Australian children aged between 2 years 6 months and 5 years 11 months. Although this is younger than some of the Year 2 pupils, these norms were felt to be more appropriate than the large range of the SDQ. Although

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<sup>12</sup> A third data point will be obtained for Year 2 pupils through the NCT



it would be preferable to use a study with UK norms, the Australian school system is relatively similar to that of the UK. The study will also be mainly focusing on the progress of social skill development between the two points at which the questionnaire will be completed. Though there is no perfect instrument to measure social skills for this group, the CSBQ offers the best compromise between sensitivity and useful norms.

### ADDITIONAL DATA COLLECTIONS

#### Pupil background data

Schools will be asked to provide basic pupil background data which will include; name, DOB, UPN, gender, year group, class name, school name, FSM, EAL, KS1 attainment and Year 2 NC test data.

The variable used to indicate EAL will indicate whether a pupil has English as an additional language or if they do not. The status of this information means we will not be able to collect the level of fluency in English and so will not be able to identify differences between those who are bilingual and those pupils who are new to English. However, it is a variable that is pragmatic to collect from schools, and pertains to personal (rather than special category) data.

The proportion of pupils eligible for FSM will likely increase next AY due to Covid-19-induced job losses. This will affect analysis of the disadvantage gap and how it begins to close as the characteristics of the disadvantaged children may change. Schools will, therefore, be asked to provide the FSM status of the pupils in the January census before lockdown i.e. January 2020 as well as when schools reopen (i.e. September 2020). Pupils who are identified as eligible for free school meals are likely to change due to Covid-19 with families facing increased financial difficulties. The aim of the planned analysis on the disadvantage gap is to identify the impact of school closure on those pupils who were considered disadvantaged prior to school closure. It is, therefore, necessary to collect free school meal information from January 2020 and from when pupils returned in September 2020 so we are able to control for the newly eligible pupils within all analysis. Data on eligibility will be collected prior to each assessment point. Analysis will therefore be able to identify the performance of pupils who were not eligible for free schools meals prior to lockdown, the performance of pupils who were eligible for free schools meals prior to lockdown, and importantly are still eligible for free schools meals at time of testing, and pupils who were not eligible prior to lockdown but are eligible at time of testing.

#### School background data

School background characteristics such as the proportion of children eligible for FSM will be obtained from the DFE website where data is freely available to be downloaded.

#### Representativeness and Weighting

As indicated above, schools which have ordered NFER tests for this academic year appear representative in terms of the proportion of pupils eligible for FSM in 2020. For the proposed analysis, we will carry out a full representativeness analysis on the final sample of participating schools. As well as FSM, this analysis will include looking at school characteristics that identify KS2 performance in reading and maths from 2019, school type, geographical location, proportion of pupils with SEN, proportion of pupils with English as an additional language and academy status. If required<sup>13</sup>, we will weight our analysis accordingly, particularly for the analysis that will estimate the Covid-19 gap. It is proposed that we will ensure the sample of participating schools is representative based on school level performance at Key Stage 2 in 2019. We will use the variable KS2rwmExp\_19, the proportion of pupils meeting the expected standard in reading, writing and maths available from DFE website to determine representativeness of the sample to the population of primary schools<sup>14</sup>. To address the issue of analysis being undertaken at pupil level but information on the sample is at school level the analysis to

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<sup>13</sup> A crosstabulation with a Chi-Square test for independence will be used to determine if the sample of responding schools is representative of the population of all schools.

<sup>14</sup> The KS2 variable has been put into quintiles of school performance with a further category that identifies schools with missing data.

determine representativeness will be weighted by the number of pupils in the school. Therefore for Year 2 the population will be ~~weighted~~ by the number of pupils on roll in Year 2 in the spring census of 2019 and the schools in our sample will be weighted by the number of pupils who took the test within each school. Whilst not producing analysis ensuring the sample of pupils is representative of pupil population characteristics, it will ensure the sample is not introducing bias because we have too many pupils from schools with particular characteristics, for example, too many pupils from high performing schools. This procedure will be replicated for the year 1 assessments and any limitations of this method will be discussed in the final report.

## Main Analysis

Numbers of pupils and schools included in each stage of the analysis will be reported and we will carry out a full representativeness analysis on the final sample of participating schools.

## Measuring the Covid-19 and Disadvantage gaps

### The Covid-19 Gap

Our counterfactual for the Covid-19 gap (RQ1) is the standardisation sample for the relevant test. Each test was standardised on a representative sample<sup>15</sup> of pupils following the introduction of the new National Curriculum and at the same time of the academic year as the present tests are scheduled. This analysis will address RQ1 and, by taking the weighted mean standardised score for our sample along with its standard error (see section on Representativeness and weighting above), we will be able to determine if the sample mean is different from the population mean of 100. This will be undertaken on the autumn tests for Year 2 pupils and the spring tests for Year 1 pupils.

Clearly there are a number of different reasons why the sample mean and/or distribution shape may be different to the standardisation sample, aside from school closures. For example the sawtooth effect<sup>16</sup>, genuine changes in attainment over time or a biased sample might all lead to differences. Each of these will be explored and discussed when interpreting any differences. For example we will look at whether disadvantaged pupils are more or less likely to drop out of the testing process, so potentially introducing biased results. We also acknowledge the limitation that this will not be conceptually pure indication of the Covid-19 gap as schools will clearly have implemented some support activities prior to the pupils sitting these tests. We will use the school-level survey and pupil-level activity/support record to help interpret the results. Note that we are unable to look at trends over time in NFER assessments beyond the timepoints proposed in this study.

### The Disadvantage Gap

In terms of the disadvantage gap (RQ3), better-researched predictions of this, such as by EEF (2020), summarise it in terms of growth (in standard deviation units) per month of school lost. We will be able to calculate the gap in terms of SD units for our sample and compare it with KS2 reading and maths tests in 2019. We will also use the DfE approach to calculation<sup>17</sup> (i.e. ranking all pupils and comparing ranks between disadvantaged and non-disadvantaged). This will be undertaken on the autumn tests for Y2 pupils and the spring tests for Year 1 pupils and will be achieved by obtaining the mean performance scores for the two groups of pupils; those eligible for free school meals and those not eligible.

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<sup>15</sup> Links to Y1 and Y2 2017 standardisations, 2019 standardisations will be uploaded to NFER website shortly; <https://www.nfer.ac.uk/for-schools/products-services/nfer-tests/nfer-tests-development/>

<sup>16</sup> <https://www.gov.uk/government/publications/investigation-into-the-sawtooth-effect-in-gcses-as-and-a-levels>

<sup>17</sup>DfE calculation;

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/398657/SFR\\_40\\_2014\\_Measuring\\_disadvantaged\\_pupils\\_attainment\\_gaps\\_over\\_time\\_\\_updated\\_.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/398657/SFR_40_2014_Measuring_disadvantaged_pupils_attainment_gaps_over_time__updated_.pdf)

## The Covid-19 and Disadvantage Gap Over Time

As we are proposing termly data collection sweeps, both the Covid-19 and disadvantage gaps will be tracked over the AY (RQ2 & RQ4). For both reading and maths gaps will be measured in Spring 2021 and Summer 2021 for Year 1 and in Autumn 2020 and Spring 2021 for Year 2. In order to monitor change over these time periods we propose using a multi level structure to the models and a repeated-measures design. The models will have three levels; test occurrence<sup>18</sup>, pupil and schools and will be run separately for each year group and subject, resulting in four individual models. These will identify how any Covid-19 gap at the first time point is changing over the academic year (RQ2). The dependent variable will be the reading or maths outcome score. The only independent variable entered into the model will be a time<sup>19</sup> variable to identify if there is a significant difference in the change in outcome score between the two timepoints. Y2 NCT will be converted into a standardised score and included in the repeated measures models<sup>20</sup> i.e. a third time point<sup>21</sup>.

Further analyses will incorporate pupil and school level characteristics that will identify any further associations with variations in outcome. This analysis addresses issues from RQ4 and whether rates of change between the two time points for Year 1 and three time points for Year 2 are different and associated with other characteristics. The same models run for RQ2 will be run again but with the addition of a number of other covariates, such as, gender, EAL status, free school meal eligibility<sup>22</sup>, geographical location, academy status. An interaction term for time\*free school meal eligibility will identify whether any gap between disadvantaged and advantaged pupils has changed between the two testing time points.

Analysis on identifying the Covid-19 gap will be reliant on a representative distribution of nationally standardised scores for Years 1 and 2 in the relevant terms. This has a number of advantages:

- by comparing the mean score to 100 (mean for national standardisation) we can estimate Covid-19 gap in standard deviation units
- by comparing the mean score between disadvantaged and non-disadvantaged pupils, we can estimate disadvantage gap in standard deviation units, and through using DfE method of calculation
- by analysing distribution shape, we can discern how school closures have affected all parts of the attainment distribution
- by using repeated-measures multilevel models, we can track the closing of both the Covid-19 and disadvantage gaps over the year, and how gaps change for different subgroups
- the Covid-19 and disadvantage gaps will be calculated in Autumn 2020 and Spring 2021 for Year 2 pupils and in Spring 2021 and Summer 2021 for Year 1 pupils in English and maths.

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<sup>18</sup> Autumn, spring or summer.

<sup>19</sup> A normal explanatory variable in a repeated measures model is to use pupil age at the time of taking the test. As schools have the opportunity to take the tests at different times within a certain window an alternative time variable will be developed that identifies the number of weeks inbetween the different testing timepoints. If this proves unsuitable then a time variable will identify the different testing points with an assumption that all pupils were tested at the same time.

<sup>20</sup> A standardisation exercise will be carried out by NFER statisticians following the same process to that used for the standardisation of the Y1 and Y2 assessments. KS1 raw scores will be collected directly from the schools to allow this process to be undertaken.

<sup>21</sup> At the time of writing the DfE had only recently announced that there would be no KS1 tests in 2021. NFER have made a proposal to EEF for alternative testing and this was being discussed with EEF. The plan will be updated when a final decision has been made.

<sup>22</sup> Free school meal eligibility will be identified by two separate variables; one that identifies FSM eligibility prior to school closure and an additional variable that identifies those pupils who have become eligible since school closure, i.e. from September 2020 onwards.

### Analysis of contextual data (RQ7)

As mentioned above, we will explore if any pupil-level factors are associated with the degree of impact Covid-19 disruption has had on a child's performance, and on their recovery over the academic year 2020/21, including for example, participation in 1:1/small group tuition/catch-up intervention(s), etc. This will be possible by including such data within the repeated-measures multi-level models described above. For example, through interacting participation in tuition with time<sup>23</sup>, we will see whether children experiencing this form of catch-up/support improve faster than their peers. This analysis will address RQ7.

Further analysis will also investigate whether the effect of catch-up/support activities varies within subgroups of pupils. If the sample is large enough we will include interactions in the models between the testing time points, catch-up/support activities and FSM. If data allows interactions for gender and EAL will also be investigated.

Separate models will be fitted for Year 1 and Year 2 using standardised scores in maths and reading as the dependent variables. Each will have three levels, level 1 will be test occurrence, level 2 pupil and level 3 school. For each model the null or variance components model (no explanatory variables) will be fitted to assess the size of the group affects as measured by the intra-class correlation coefficient.

The following explanatory variables will be added to the models at the pupil level; time, FSM, EAL, catch-up/support activities and other background variables such as gender and age. At the school level we will add background characteristics such as %FSM, %EAL, region and school type, i.e. academy status. These school characteristics are within the model to ensure we are controlling for their possible association with the outcome of interest.

### Analysis of social skills development (RQ8).

Social skills development will be assessed using the Child Self-Regulation & Behaviour Questionnaire (CSBQ). As previously discussed this data collection will be from a sub sample of approximately 12 pupils from Year 1 and 12 pupils from Year 2 in each school. The main analysis, run separately for Year 1 and Year 2 pupils, will compare overall outcome scores with the Australian norms. Although these norms are not perfect, Australian pupils are similar in their schooling to UK pupils and so this will be able to offer a useful comparison. Similarly the age norms may not be fully suitable for Year 2 pupils as the norms go up to age 6. However, these norms are preferable to the wide norms of the SDQ, aged 5–10 years, and so offer a more useful analysis.

The social skills data will also be analysed in terms of progression, comparing scores from the autumn term of 2020 to the summer term of 2021, to evaluate how these skills might have recovered. This analysis, a repeated measures design, will match that undertaken using test scores but replacing test scores with the CSBQ score. Additional analysis will look at the associations between catch-up/support activities and changes to social skills scores, for the sub sample of 12 pupils in each year group, and any specific interaction with FSM eligibility. There will be a commentary on the overall relationship between interventions carried out and social skills.

### Analysis of test domains (RQ5)

As NFER will be marking assessments, this will provide access to individual item level data. To provide greater information back to teachers, items will be grouped within particular domains. Each domain contains a number of individual items that can provide greater information on a particular area of learning than trying to assess performance across many individual items.

Analysis will look to identify differences between domains as well as within domains. Analysis will look to see if pupil factors (i.e. background characteristics) are associated with variation in domain scores. For example, do girls perform better than boys across particular domains? Do pupils eligible for free

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<sup>23</sup> This will be three testing time points in the year 2 model, autumn, spring and summer, and two time points for year 1, spring and summer.

school meals perform differently across the domains? This will be assessed with the running of ANOVA analyses to identify differences between groups.

As assessments are occurring at two timepoints, analysis on domains can look at how domain scores change over time. The main analysis is looking at changes in overall test scores by using standardised scores. Domain analysis can only use domain raw scores as these domains have not been assessed with the standardisation sample of pupils. Analysis will look at how domain scores have changed between the two timepoints to determine if particular domains have seen a bigger change than other domains. This analysis will run paired sample t-tests to assess any changes in domain scores.

## Implementation and process evaluation (IPE)<sup>24</sup>

### IPE research questions

The IPE will provide understanding around what has happened at a school level during school closures as well as any support strategies in place to aid return to school and effective learning. Through the pupil-level activity/support record we will collect data around the specific activities undertaken or support received by individual pupils. This data will be reported as described below and it will be used to allow analysis of associations between recovery strategies and attainment. The main research question for the IPE is RQ6 but data will feed into RQ7.

RQ 6 What practices have been adopted and learning opportunities provided by schools (at school-level and at pupil-level) during school closures and after reopening and can effective practices be identified?

RQ 7 Is there an association between catch-up/support activities and progress? Does this differ for subgroups?

### IPE research methods

In the exploration of pupil-level and school-level factors that are associated with attainment, and subsequent progress or recovery, we believe teacher-rated measures will give the most accurate contextual data for this age group. Firstly we will collect data on the strategies implemented by schools to aid transition/return to school and learning recovery via a school-level survey in November 2020. Subsequent data collection will use a teacher-completed top-level record of pupil-level participation in recovery/catch-up support activities, combined with a small number of follow-up telephone interviews. Together, these will enable us to gain understanding with regard to what measures were in place as well as assess the relationship between practices, pupil-level support and attainment and non-attainment outcomes.

We will use our online survey software Questback (QB) for developing and hosting the school-level survey along with collecting the teacher-completed pupil-level record. This method allows for any pre-collected information to be included (i.e. teachers will be able to include information on support/catch-up activities for their pupils from earlier in the term).

### School-level survey (November 2020)

The online school-level survey (November 2020) will gather key stage specific responses on summer/autumn 2020 return provision, with routing for differing Year 1/2 recovery responses. This will enable teachers to reflect on children's attainment and the strategies implemented across the first half of the autumn term, as well as support during summer 2020, where known. This collection will include:

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<sup>24</sup> Please follow the principles detailed in the [Implementation and Process Evaluation Guidance \(2019\)](#). If no IPE is to be undertaken, delete this section.

- teacher views on their class's/year group's social skills/wellbeing surrounding the return to school, for whole year group/specific groups of pupils (FSM and EAL)
- teacher-reported support strategies for learning/wellbeing, implemented during school closure and throughout return to school
- information on parental engagement
- information on the return to school in June 2020 (i.e. amount of face to face provision)
- future plans for support strategies.

### Pupil-level activity/support record (ongoing, summer 2021)

Responses to the school-level survey will help refine categories for the pupil-level activity/support record below. This will be provided to class teachers in spring term 2021 and submitted online in summer 2021 as a record of activities and support individual pupils have accessed over the academic year 2020-21. Importantly, the record will record data on activities between each testing window. These individual pupil data can be used to facilitate analysis of association between recovery strategies and outcomes by including them as factors in the repeated measures models (see analysis section).

The pupil-level record will consist of online<sup>25</sup> teacher-completed pupil-level activity records to provide data about pupil participation in pre-specified categories such as the NTP/1:1/small group tuition, reading intervention, maths intervention, and other categories emerging from the school-level survey.

### Teacher interviews (summer 2021)

We will conduct up to ten follow-up telephone interviews with teachers in summer 2021 to understand in detail strategies identified in pupil-level activity record. The interviews will allow us to better understand the context around the return-to-school experience and in particular attainment of disadvantaged pupils and those from other specific groups. These interviews will be used to explore areas of interest arising from the surveys, particularly around both school-level and pupil-level interventions. Interviewees will be selected based on responses from both the surveys and pupil records, to ensure a spread of catch up activities and issues are covered.

### IPE analysis

Table 3 outlines how the IPE data will be analysed. Survey responses will be analysed using descriptive statistics and tables included in the report. These responses will also enable the contextual analysis of attainment as described in the analysis section. Themes arising from the coded responses to the school-level survey will feed into the development of the pupil-level activity record.

The qualitative data from the interviews will be triangulated with survey responses.

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<sup>25</sup> Teachers will be provided with a link to a prepopulated document in the form of a questionnaire-style record.

**Table 3: IPE methods overview**

<b>Research methods</b>	<b>Data collection methods</b>	<b>Participants/ data sources (type, number)</b>	<b>Data analysis methods</b>	<b>Research questions addressed</b>
<b>School Survey</b>	Online school-level survey – routed by year group	158 (completed by HT or KS1 lead)	Descriptive analysis	RQ 6, RQ 7
<b>Pupil-level activity/ support record</b>	Online pupil-level record	All Y1 and Y2 pupils in 158 schools (teacher completed)	Descriptive analysis	RQ 6, RQ 7
<b>Teacher interviews</b>	Telephone interviews	KS1 teachers across Y1 and Y2 (up to 10) selected to cover a range of catch up activities and contexts outlined in the school and pupil records	Inductive coding, triangulation	RQ 6

## Data protection

The legal basis for processing personal data is covered by GDPR Article 6 (1) (f):

*Legitimate interests: the processing is necessary for your (or a third party's) legitimate interests unless there is a good reason to protect the individual's personal data which overrides those legitimate interests.*

We have carried out a legitimate interest assessment, which demonstrates that the research fulfils one of our core business purposes (undertaking research, evaluation and information activities). The research project has broader societal benefits and will contribute to improving the lives of learners by identifying if any pupil level factors are associated with the degree of impact of the Covid-19 school closures on pupils' attainment and their recovery over the academic year. Personal data is required for the research and its processing will not cause damage or distress to the data subjects.

NFER will provide a memorandum of understanding to schools, explaining the nature of the data being requested of schools and children, how it will be collected, and how it will be passed to and shared with NFER. For the purpose of research, UPN and test outcome data for all pupils taking NFER assessments will be linked with information about pupils, including EAL status, free school meal eligibility and, for Year 2 pupils, their Key Stage 1 outcomes in reading and maths assessments (obtained from their school). This data will be shared with NFER, EEF and EEF's data archive contractor FFT Education, and potentially, in an anonymised form to the UK Data Archive. Pupil data will be treated with the strictest confidence. Neither we, nor any of the named parties, will use pupil names or the name of any school in any report arising from the research.

On conclusion of our project, the Fischer Family Trust (see <http://www.fft.org.uk/>) will collate and de-identify the data for upload to the EEF data archive. The archived data will be available in a de-identified form with restricted access for research purposes only. NFER handles personal data in accordance with the rights given to individuals under data protection legislation. Individual rights are respected.

For further information, please see the Privacy Notice for parents at:

[https://www.nfer.ac.uk/media/4149/lent\\_parent\\_privacy\\_notice.pdf](https://www.nfer.ac.uk/media/4149/lent_parent_privacy_notice.pdf) and for schools at

[https://www.nfer.ac.uk/media/4152/lent\\_school\\_privacy\\_notice.pdf](https://www.nfer.ac.uk/media/4152/lent_school_privacy_notice.pdf)

## Personnel

Name	Institute	Roles and responsibilities
Pippa Lord (PL)	NFER	Project Director, responsible for directing the NFER team and quality of delivery.
Susan Rose (SR)	NFER	Project manager, responsible for overseeing the day to day running of the project.
Sarah Tang (ST)	NFER	Process evaluation lead, responsible for managing the process evaluation activities and analysis
Kathryn Hurd (KH)	NFER	Test and Schools administration lead, responsible for overseeing recruitment, school contact and testing
Chris Hope (SB)	NFER	Psychometrician, responsible for statistical analysis



## Timeline

Date	Activity
<b>August/Sept 2020</b>	Set up Data sharing agreement Draft study plan Preparation of school communications
<b>October</b>	Draft and finalise study plan School communications / engagement Instrument design
<b>November</b>	Instruments (Y2 test, school-level survey) in schools W1 Teacher-completed pupil-level social skills and wellbeing reports online Marking and diagnostic coding
<b>December</b>	Template for pupil-level participation support record finalised and in schools
<b>January 2021</b>	Feedback to schools W1 Interim headlines to EEF W1
<b>February</b>	
<b>March</b>	Tests in schools (Y1 and Y2) W2
<b>April</b>	Marking and diagnostic coding
<b>May</b>	Feedback to schools W2 Interim headlines W2
<b>June</b>	Y2 NCT data Tests in school (Y1) Marking Follow-up telephone interviews Teacher-completed pupil-level social skills and wellbeing reports online Teacher-completed pupil-level participation support record
<b>July</b>	Marking Follow-up telephone interviews
<b>August</b>	Analysis
<b>September</b>	Feedback to schools W3 Reporting
<b>October</b>	Peer review, report finalisation Submit data to archive

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All errors and omission are solely EEF responsibility.