

Is there an association between child work and cognitive ability? Evidence from Peru

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The views expressed here are those of the author. They are not necessarily those of the Young Lives project, the University of Oxford, DFID or other funders.



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Abstract

Background and Objectives

Child work is assumed to negatively affect children's health and development [11] including cognitive development. This paper explores the relationship between the daily hours a child spends working at age 11-12 years and their cognitive abilities at age 11-12 and 14-15. It considers an inclusive and a narrow definition of child work in order to compare the results that each produces.

Methods

The main outcome variables were PPVT score in round 2 (cross-sectional analyses) and PPVT score in round 3 (prospective analyses). The main exposure variables were hours spent in all types of work, and hours spent in economic work in round 2.

Linear regression techniques were used to explore the associations between daily hours spent working at age 11-12, and cognitive test score at age 11-12 and 14-15. Crude analyses were carried out, before being adjusted for covariates identified from existing literature.

Results

Crude models suggested a negative association between the hours spent in both economic work and all work at age 11-12 years, and cognitive abilities at ages 11-12 and 14-15. However once adjusted for all covariates these associations become non-significant in three of the regression models, with the exception of the observed negative association between spending 1-2 hours per day in economic work in round 2 and PPVT score in round 3.

Conclusions

In general, the relationship between work and PPVT score exists because the children who work greater hours are poorer, and are therefore more likely to suffer from lower PPVT regardless of their work. Poverty therefore seems to be the driver of both child work and lower cognitive ability. However the observed association between spending 1-2 hours in economic work and lower PPVT suggests that there is some association between economic work and PPVT score that is not explained by socioeconomic covariates.

Acknowledgements

Acknowledgment of academic support

Project development: The idea for this project stemmed from my interest in socioeconomic and educational differentials in Latin America. The project was approved by the Young Lives team.

Contact, input and support: I met with my supervisor once at an early stage to discuss my analysis plan. We then met twice more throughout the project, to go through a draft. I was also in contact with my supervisor via email on a regular basis.

Main research work: All references were identified through my own literature search, and the background of the paper was researched independently. I received advice on the statistical analysis from my supervisor after a first draft.

Writing-up: As mentioned above, my supervisor read and commented on a rough first draft and a full draft of this project.

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Thank you to my supervisor for always being helpful and prompt, and for encouraging me to try and work things out myself before approaching you.

Thank you also to the staff at Young Lives. The data used in this publication come from Young Lives, a 15-year study of the changing nature of childhood poverty in Ethiopia, India (Andhra Pradesh), Peru and Vietnam (www.younglives.org.uk). Young Lives is funded by UK aid from the Department for International Development (DFID) and co-funded from 2010 to 2014 by the Netherlands Ministry of Foreign Affairs. The views expressed here are those of the author. They are not necessarily those of Young Lives, the University of Oxford, DFID or other funders.

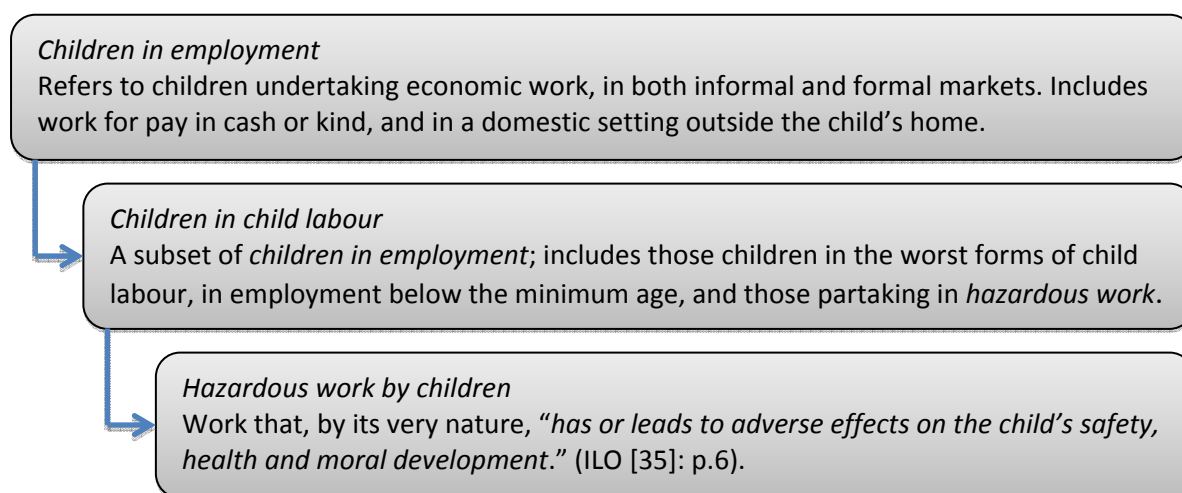
Introduction

Background

What is child work?

Millions of children are engaged in work, particularly, but by no means exclusively, in the developing world. Recent estimates suggest that of the 1.59 billion children aged 5-17 in the world, 306 million (19.3%) are in some form of employment; of these 215 million are engaged in child labour and a further 115 million in hazardous work [35]. Figure 1 outlines the differences between these three categories of working children, as defined by the International Labour Organisation (ILO).

Figure 1: ILO definitions of children engaged in work, adapted from ILO [35].



Some kinds of child work are permitted in accordance with ILO Conventions No. 138 and No. 182 [27, 31]; this includes ‘light work’ which is thought to be harmless to a child’s development after a certain age. While the negative consequences of a child partaking in the worst forms of child labour¹ are agreed upon, there is debate about the amount and type of work that can be carried out without causing harm to a child, and subsequent variation in, and overlap of, the use of the terms ‘child work’ and ‘child labour’ in the literature.

Non-economic activities – including domestic chores within a child’s own household and childcare – are excluded from the above ILO definitions of working children, and subsequently from most studies of child work [27, 31]. This restricted definition of work has a number of implications; in particular it serves to underestimate the amount of work done by girls, and therefore the impact of work on their lives [40]. When a broader definition of child work is used, the negative effects of the

¹ Worst forms of child labour refers to those forms which are “hazardous, detrimental to children, and/or morally repugnant” [35] including their use in hazardous work, slavery, armed conflict and the sex trade, together with the sale and trafficking of children.

high burden of housework carried out by girls become more apparent on their school attendance [1] and achievement [40].

In order to capture the contribution of domestic chores and caring to the hours a child spends working, this project considers a definition of child work that includes the economic and non-economic tasks that they carry out. It allows that housework and caring for others might be as much of a deterrent to schooling, and could have as negative an influence on cognitive development, as economic work might [39]. However, for consistency with the literature, analyses are also undertaken with a more restricted definition of child work as economic work. This has the benefit of allowing a comparison of the effects of a narrow and broad definition of work on the findings.

Child work and cognitive development

In both the theoretical literature and political debate, child work or labour is assumed to negatively affect children's development [11, 31] particularly through affecting their ability to attend, and thrive in, school. This in turn has negative consequences for human capital accumulation and socioeconomic development. The ILO suggest that working can interfere with a child's schooling in three ways; through lowering school attendance, encouraging premature drop-out from school, and as a result of the difficulties of balancing work with schooling [31, 35].

Numerous empirical studies have confirmed a negative association between child work and school attendance. School and work may compete for a child's time [45] and families often face a stark choice between schooling their children and sending them out to work [38]. Child work is negatively associated with school attainment as well as attendance. The fact that a child works is associated with both lower educational attainment and more grade repetition in Bolivia and Venezuela [48] and in Vietnam [3]², and with discontinuation to secondary school [49]. Working during childhood can have a negative influence on health, with subsequent effects on the ability to attend school and study. The percentage of children in a population who work is positively associated with adolescent mortality, poor nutrition and a higher burden of infectious disease [50] while work undertaken during childhood may have a negative effect on illness later in life, with the effect increasing with duration of work [44].

Studies of enrolment and attendance do however have a number of limitations. Neither is a measure of the actual outcome of education, namely the development of certain skills and abilities. While a number of studies do look at test scores as a measure of educational success [25, 28, 29]

² Although a different analysis of Vietnamese data found that labour had a negative effect on mathematical scores only in urban areas [41] suggesting differences by locality.

there is a paucity of research that looks at the associations between working and cognitive abilities [41]. Research that considers school enrolment and attendance rarely has the capacity to consider that child work might have a number of positive effects on a child's ability; since practical and vocational skills can be learnt and practised during some types of work, and it may be a part of the socialisation process, it could help develop a child's cognitive abilities [46]. Furthermore, studies that focus on enrolment, attendance or whether a child has been held back are generally unable to take into consideration that different schools have very different rules about how they register children, for what reasons they hold them back a year, and regarding the tests that are administered and the marking of these [35].

Using cognitive test scores can address some of the above issues. They are also of interest because of their association with later-life employment status and labour force potential. Cognitive test scores taken as early as seven are predictive of labour market potential, and of related outcomes including the highest level of education achieved and earnings [4, 55], and social and economic success [30]. They are therefore an early predictor of individual success, and of population-level human capital accumulation. Finally, cognitive ability is a relevant outcome in the context of this study because there is little variation in school enrolment and attendance amongst the Young Lives children; in round 2 only 6 children (0.88%) were not enrolled in school, and 54 (7.98%) had missed a week of school in the past year.

It is important to mention that previous studies have consistently found socioeconomic status to be an important determinant of a child's educational success, and also of their partaking in work. Low socioeconomic status is associated with lower IQ and poor achievement in school [42] and has negative effects on a child's cognitive development and general ability [9, 16]. Furthermore, those who work are more likely to come from a lower socioeconomic background than those who don't work [19, 51, 56, 57].

Child work in Peru

Peru has one of the highest rates of child work in Latin America. In 2008 an estimated 22.3% of Peruvian children aged 6-14 years undertook some form of economic work, with the vast majority of these (73.2%) working in agriculture [33, 37, 58]. The type of work undertaken differs between urban and rural children; agriculture, gold mining and firework production dominate in rural areas, while children in urban areas are more likely to work in street vending, begging, shoe shining and car washing [33, 35].

ILO Convention No. 182 on the worst forms of child labour was ratified by the Peruvian Government in January 2002 [33, 36]. The legal minimum age for employment is 14 years³, although this increases for more hazardous work in the industrial, commercial, fishing and mining sectors [33]. There are statutory limits to the number of hours a child can work, and rules which govern minimum rates of pay, but these are rarely enforced and particularly not in the informal sector where the majority of children work [31, 33].

Education in Peru

Pre-primary, primary and secondary education is compulsory and free in public (government) schools across Peru; enrolment is near-universal at the primary level and increasing at the pre-primary and secondary levels [12]. The lack of bilingual education places indigenous children at a disadvantage from the start of their time at school. Being held back a year is common practice and initial reports from Young Lives show that children in poor and rural households, as well as those with less educated and non-Spanish speaking mothers, are most likely to be held back [12].

Aims and Objectives

This paper has three main objectives. First, it explores the association between the number of hours a child works at age 11-12 years, and their cognitive abilities. The longitudinal nature of the data allows both a cross-sectional and a prospective perspective to be taken, and cognitive test scores achieved in round 2 and round 3 are modelled separately. This paper is particularly interested in whether an association is found between child work and PPVT score after the socioeconomic status of the child and their household has been adjusted for, and the implications of these findings.

Secondly, by considering a definition of child work as economic work, as is consistent with ILO legislature (see Figure 1), as well as a more inclusive definition that includes domestic and caring work, this project aims to contribute to understandings of the implications of using a definition of child work that is restricted to economic work. And finally, by modelling both 'economic' and 'all' work as categorical variables this study aims to go beyond the usual definition of a child as simply 'working' or 'not working'⁴, and to consider how the number of hours spent in work might have been associated with cognitive ability. Categorisation has the added benefit that it allows the relationship between child work and PPVT score to be modelled as non-linear, allowing for the possibility that working little might be positively associated with cognitive ability, while long work hours are associated with lower cognitive ability.

³ Therefore none of the children in Young Lives round 2 should be engaged in economic work.

⁴ Most research considers either a binary description of child work consisting of 'workers' and 'non-workers', or looks at the proportion of children in a region who are in work [1, 11, 28, 29, 49, 50, 52].

Measures and Methods

Study Design

This project uses data from the 1st, 2nd and 3rd rounds of the Young Lives Longitudinal Surveys. Young Lives is an international study of childhood poverty, which follows approximately 12,000 children living in poverty in four countries around the world. In every round an older and younger cohort of children are surveyed. This research project uses data from the older cohort in Peru, who are aged 7-8 years in the 1st round (carried out in 2002) 11-12 years in the 2nd round (2006/7) and 14-15 years old in the 3rd round (2009).

The sampling strategy involved first selecting 20 districts using multi-stage, cluster-stratified, random sampling techniques. Poor areas were over-sampled at this stage. Next, a sampling framework of *manzanas* (blocks of housing) and *centros poblados* (clusters of housing) was drawn up for each of the 20 selected districts and one was randomly selected for each (see map of sentinel sites, Appendix 4). Finally, fieldworkers visited each household in every selected *manzana* or *centro poblado* and identified and enrolled children of the right age; neighbouring *manzanas* and *centros poblados* were visited if there were not enough children in those selected [21]. The children were tracked for subsequent follow-up survey rounds, and high rates of migration in Peru mean that children were dispersed across at least 74 different communities by the third survey.

The data were not weighted as Young Lives was designed to be a study of children living in poverty; the focus of this paper is therefore on the associations found within the group, and findings are not expected to be representative of the general population of Peru

Measures

Independent Variable: Hours Worked

The number of hours spent in various tasks daily is reported by both the child and caregiver; the decision was made to use hours worked as reported by the child since, at age 12, they were deemed old enough to report accurately and may have been partaking in work outside of their parents consideration or knowledge⁵. Two variables representing hours spent in 'all work' and in 'economic work' were created (Table 1).

⁵ Discrepancies between child and adult reporting are found in particular when domestic tasks are under consideration [1].

Table 1: Composition of the independent variables

Variable	Composition
Daily hours spent in all work "All work"	Daily hours spent in: Paid work Unpaid work Chores Caring
Daily hours spent in economic work "Economic work"	Daily hours spent in: Paid work Unpaid work

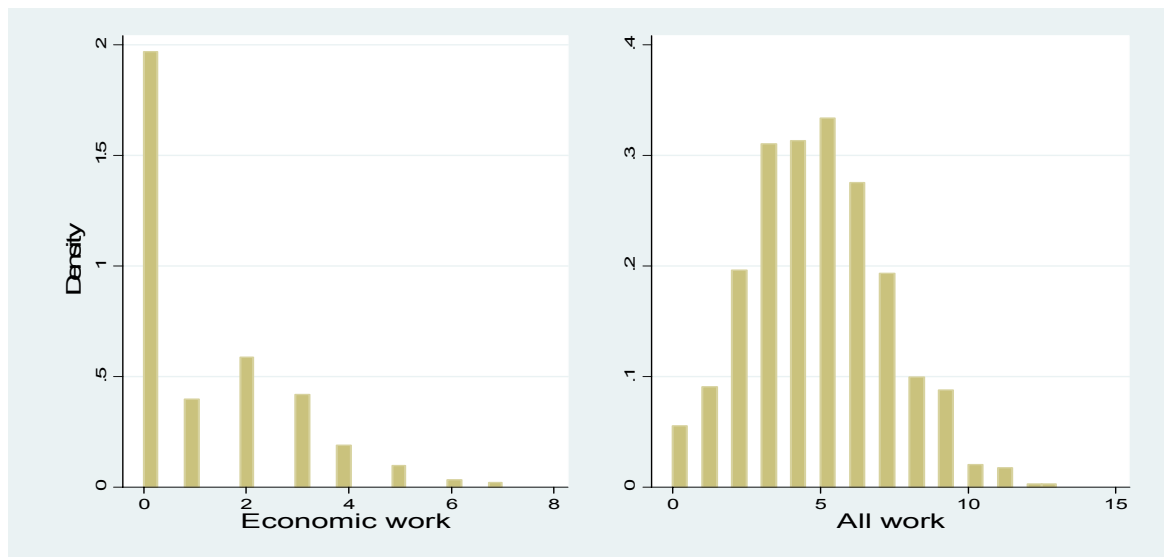
The all work and economic work variables were categorised; this decision was made due to the skewed distribution of the economic work variable, and because previous research leaves us unclear as to the nature of the association between all work and cognitive test score. After experimenting with different numbers of categories and different cut-off points for each variable, three categories were created for the 'economic work' variable, and four for the 'all work' variable (Table 2).

These categories were chosen for a number of reasons. In both cases, five categories did not provide enough power to regression models as the number of children in the higher categories was fairly low. The problem of low power persisted with the economic work variable if four categories were used, principally because of the high proportion of children (53%) who did not partake in any economic work. However with the all work variable it was possible to use four categories without having low numbers in any group. Having more categories was preferential because of the additional information that it might provide about the nature of the relationship between work and PPVT score. Furthermore, since the cut-off points of the variables would be different even if three categories were used, this decision was deemed not to further reduce the comparability of results and was therefore preferred. Analyses which treated all work as a continuous variable found similar results to those found with the four categories denoted in Table 2.

Table 2: Categorisation and distribution of independent variables

Daily hours of economic work			Daily hours of all work		
Category	Frequency	Percent (%)	Category	Frequency	Percent
0 hours	362	53.00	0-2 hours	117	17.13
1-2 hours	181	26.50	3-4 hour	213	31.19
3+ hours	140	20.50	5-6 hours	208	30.45
-	-	-	7+ hours	145	21.23
Total	683	100	Total	683	100

Figure 2: Distribution of daily hours spent in economic and all work



Dependent Variable: PPVT score

Each round of the Young Lives survey incorporates a series of cognitive and ability-based tests, outlined in Table 3. Several of the tests changed between round 2 and round 3. Results from round 2 suggested a ceiling effect in the mathematics test for children in the older cohort, and therefore the mathematics test was updated for round 3 to ensure variability in results [13]. The Cloze test was introduced amongst the older cohort in round 3 since previous tests of reading and writing ability were deemed too easy, therefore unsuitable for describing the variability in children’s scores [13].

Table 3: Tests of ability and achievement administered to the older cohort in Young Lives Peru.

Round	Cognitive	Reading	Mathematics
1	Raven’s Progressive matrices for children	One item on reading and one on writing	One multiplication item
2	PPVT	One item on reading and one on writing	One multiplication item Maths test
3	PPVT	Cloze test of reading and comprehension	Maths test

Adapted from Cueto et al[13].

Only the Peabody Picture Vocabulary Test (PPVT) was administered to the older cohort in rounds 2 and 3. The PPVT is a test of receptive vocabulary that is strongly correlated with several measures of intelligence [9, 13, 32] and has been used as a general test of cognitive ability in various studies [47, 54]. In Young Lives Peru the PPVT was administered in either Spanish or Quecha according to the child’s preferences. Psychometric testing deemed the tests administered in both rounds to be

reliable and valid measures of the children's abilities and development [13, 14]. Corrected raw PPVT scores were used for analyses in this study.

Covariates

Existing literature was used to guide the identification of potential confounders and mediators, which would be explored for inclusion in the models as covariates. These were divided into child, household and school characteristics:

Child covariates

This group consists of variables that describe the child's characteristics; their *gender* and *first language* (Spanish or other), their *health* compared to others of their age (better, same or worse), and the numbers of hours of *sleep* they get. Their score in the *Ravens test* in round 1 is included as a basic proxy of innate cognitive ability, while their *height* in round 1 is used as a proxy for the presence of early stunting, which is associated with lower cognitive ability at a later age [6, 26, 43]. For prospective analyses, *PPVT score* in round 2 was also included in models⁶.

Household covariates

This third group of covariates includes various background characteristics including the *household size*, *type of site*, *region* and *wealth*. *Caregivers education*, the highest level of education achieved by the primary caregiver, was explored for inclusion as both a proxy for innate ability and because of the positive associations between caregiver education and the cognitive and educational outcomes of their children that are found in the literature [55].

School covariates

This final group of covariates includes the *time to school* and the *type of school* attended by the child in round 2. The daily number of hours spent in school and in private study was combined to create a new variable, *time spent studying*. Current enrolment was not included as there was little variation in enrolment, with only 6 (0.88%) of the children not enrolled in round 2.

Methods of Analysis

All analyses were performed using STATA SE. Selected data from the round 1 child level dataset, the round 2 child and household level datasets, and the round 3 child level dataset were merged, matching on *child id*. Any unavailable data was recoded as missing.

⁶ Round 2 PPVT score was also checked for correlation with Ravens score; it was found to have a correlation coefficient of 0.41 and therefore included in prospective analyses.

Descriptive Analysis

Descriptive summary statistics were first generated to show the distribution of covariates amongst the children taking part in Young Lives. Cross-tabulations, scatter plots and bar charts were then used to explore the distribution of PPVT score by a number of socio-demographic variables.

To avoid collinearity, the associations between potential covariates were explored using bivariate regressions. In the case of a high R-squared value, the correlation between the two covariates was calculated and one of the covariates excluded from further analyses if the correlation was >0.5 (see Appendix 4 for a table of the R-square values arising from bivariate regressions).

Regression Analyses

Linear regression techniques were used to assess the association between the daily number of hours worked and PPVT score, on both a cross-sectional and a prospective basis. Dummy variables were created as needed to enable the inclusion of categorical variables in the model, and in order for the relationship between these variables and PPVT score to be modelled as non-linear. A forward step-wise approach was taken; each block of covariates was added to the model separately so that the effect of each block on the association between hours worked and PPVT score could be described. The final model includes each block of covariates. Separate models were built for the daily hours spent in 'economic work' and in 'all work' in order for the results to be compared. Unless otherwise stated, a confidence level of 95% was considered significant.

Results

Descriptive Analysis

Caregiver's education and the rural/urban location of the child's household were both strongly associated with wealth (correlation = 0.57 and -0.72 respectively) and therefore excluded from further analyses to avoid collinearity⁷. Tables 4 and 5 show the distribution of categorical and continuous covariates in the study; they highlight that the vast majority of children speak Spanish as a first language (88%), rate their health as better than or the same as their peers (93%) and attend a public (governmental) school (89%). Similar numbers of girls and boys are enrolled in the study.

Table 4: Summary statistics showing the distribution of categorical covariates

Variable	Number	Frequency (%)	Variable	Number	Frequency (%)
All work (n=683)			Comparative health (n=685)		
0-2 hours	117	17.13	Better	207	30.22
3-4 hours	213	31.19	Same	427	62.34
5-6 hours	208	30.45	Worse	51	7.45
7+ hours	145	21.23	Region (n=685)		
Economic work (n=683)			Costa	283	41.31
0 hours	362	53.00	Sierra	297	43.36
1-2 hours	181	26.50	Selva	105	15.33
3+ hours	140	20.50	School type (n=678)		
Sex (n=685)			Public (gov.)	603	88.94
Male	368	53.72	Private	75	11.06
Female	317	46.28	Time to school (n=677)		
First language (n=685)			Under 10 mins	258	38.11
Spanish	604	88.18	10-19 mins	241	35.60
Other	81	11.82	20-29 mins	69	10.19
-	-	-	30+ mins	109	16.10

Table 5: Summary statistics of continuous covariates

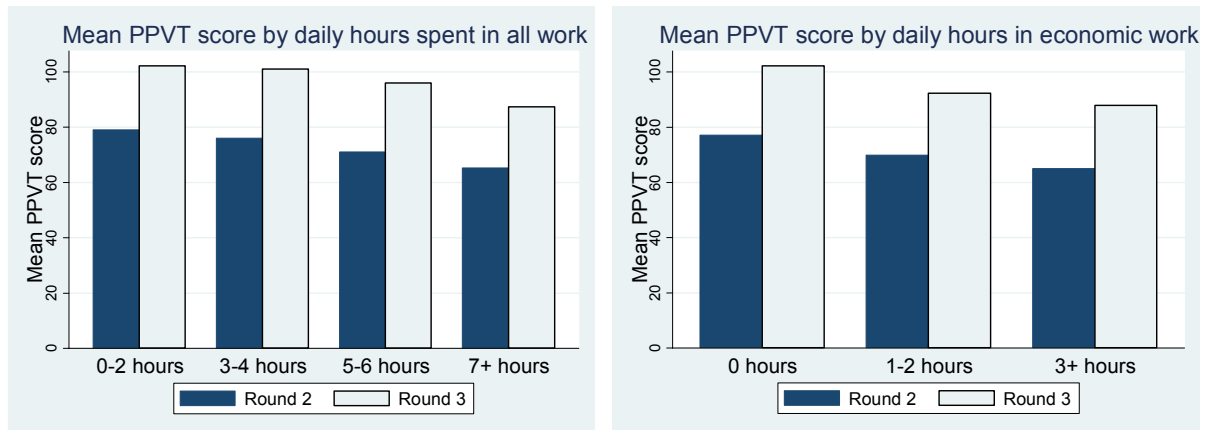
Variable	Number	Mean	SD	Minimum	Maximum
Round 2 PPVT score	672.00	72.62	15.47	10.00	106.00
Round 3 PPVT score	652.00	96.73	17.29	13.00	125.00
Height-for-age score	710.00	-1.41	1.01	-5.60	2.18
Ravens score	707.00	20.82	8.06	0.00	36.00
Household size	685.00	5.58	1.99	2.00	17.00
Wealth index score	685.00	0.52	0.23	0.00	0.98
Hours spent studying	683.00	7.73	2.04	0.00	15.00

SD=Standard Deviation

⁷ This high correlation of caregiver's education and wealth was unexpected since the primary caregiver was the mother in the majority of cases, whose educational status tends to be less strongly associated with household wealth compared to the father's.

Figure 3 shows mean PPVT score achieved, categorised by the number of hours spent in all work and in economic work per day. The graphs show a clear pattern of lower mean PPVT score as the hours a child spent in work increases. Across all categories of hours worked the mean PPVT score achieved in round 3 is higher than the mean score achieved in round 2.

Figure 3: Mean PPVT score by hours spent in all work and economic work



Figures 4 and 5 show PPVT scores by all covariates included in analyses. Scatter plots (Figure 4) suggest a positive relationship between PPVT score in both rounds and; wealth, ravens score from round 1, time spent studying per day, and height for age. They show a negative relationship between PPVT scores and household size. Round 2 and round 3 PPVT score are positively associated.

Bar charts (Figure 5) show the mean PPVT scores achieved in round 2 and round 3 by the categories included in analyses. In all cases, mean PPVT scores are higher in round 3 compared to round 2. Those children who speak a language other than Spanish as their first language, who have poorer health than their peers, who live further from school and who attend a public (governmental) school attain lower PPVT scores on average compared to their peers. Those who live in the Sierra or Selva also achieve lower average PPVT scores compared to those living in the Costa region. There do not appear to be large differences by sex, or between children who live less than 30 minutes away from school. The results of bivariate regressions of each of the covariates and the outcome variables are summarised in Appendix 5.

Figure 4: Scatter plots showing round 2 and round 3 PPVT score by covariates

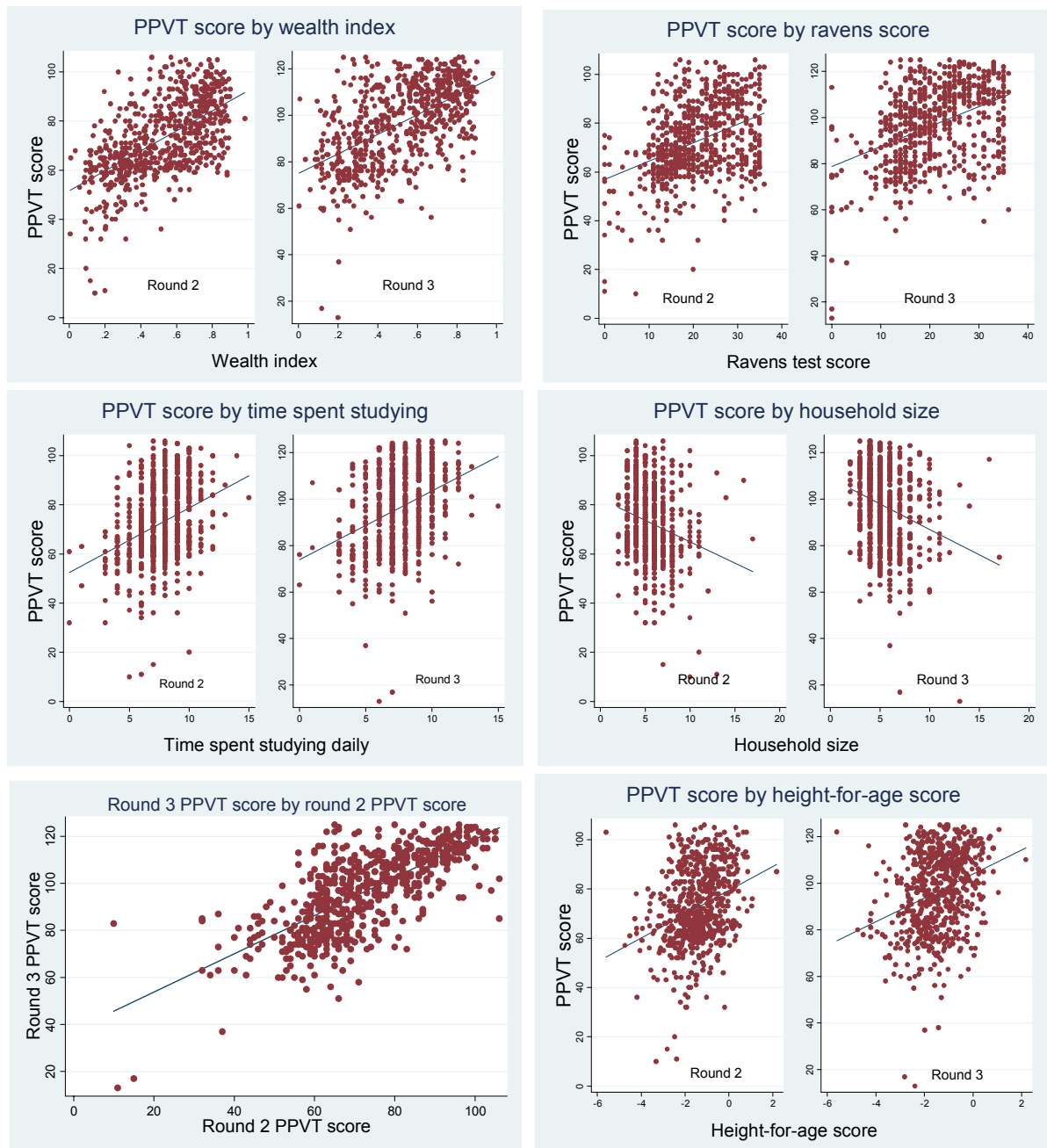
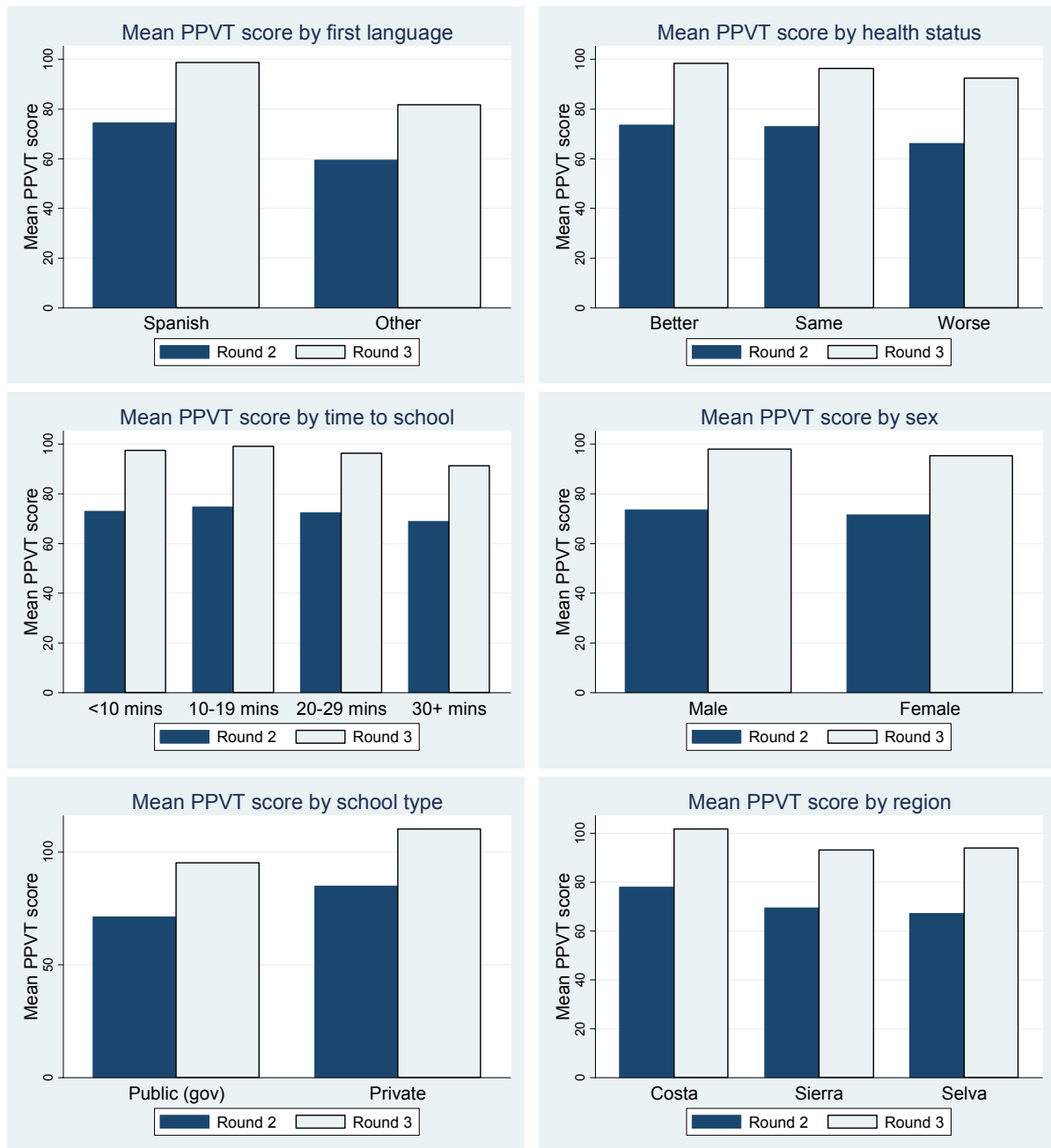


Figure 5: Bar charts showing mean round 2 and round 3 PPVT scores by covariates

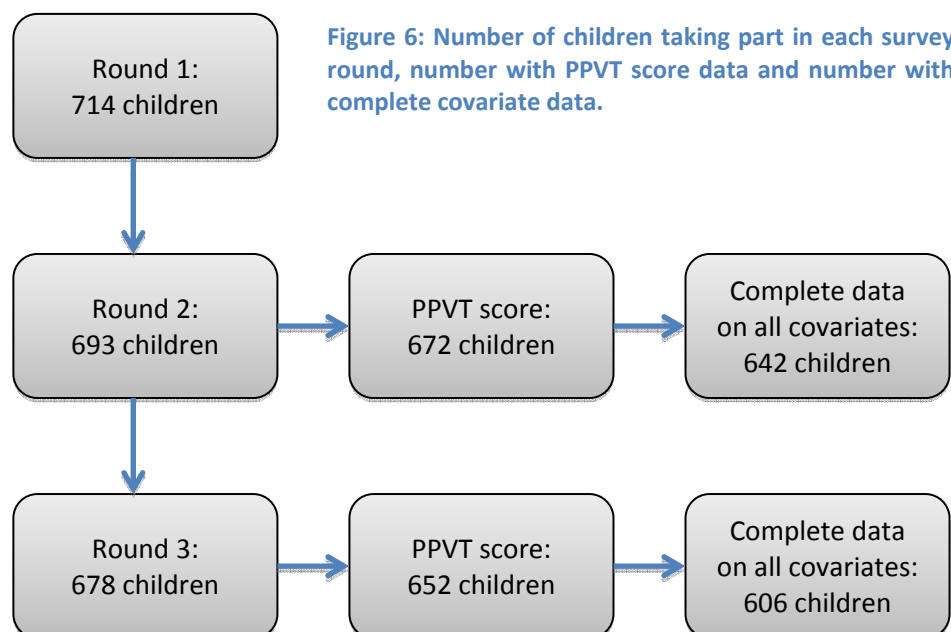


Missing Values

A number of records had missing data on certain variables. In order to explore the missing data further, new variables were created which recoded data on round 2 and round 3 PPVT scores, and both work variables, as either 'missing' or 'not missing'. Cross-tabulations and χ^2 tests suggest that there is no difference between the number of hours spent in work by whether PPVT score data was missing from round 2 (all work: $p=0.397$; economic work: $p=0.618$) or round 3 (all work: $p=0.163$; economic work: $p=0.709$).

Further cross-tabulations and bivariate regressions between each covariate and the 'missing/non-missing' PPVT variables indicate no significant difference ($p>0.05$) between those missing PPVT score and those not, with the exception of the amount of time spent studying and health. There was a statistically significant association between the time spent studying and whether PPVT score was missing in round 2 ($p=0.031$) and round 3 ($p=0.042$). Health status was also significantly associated with PPVT missing/non-missing status in round 3 ($p=0.010$).

Similarly no systematic differences were found between those children missing data on the amount of work done, and those not missing this data, with respect to each covariate. The sole exception is in the case of health, where cross-tabulations suggest that health is associated with missing data on economic and all work ($p<0.001$ in both cases). However this result is based on only two children who provided information on their health status, but not on the amount of work carried out.



Cross-Sectional Analyses

All Work

Crude analysis (Table 5, Model 1) suggests an association between the daily number of hours spent in all work and PPVT score in round 2, with children who worked 5-6 and 7+ hours having lower PPVT test scores than those who worked 0-2 hours, significant at the 99% confidence level. There is also weak evidence of an association between working 3-4 hours and cognitive score, although this is significant only at the 90% confidence level ($p=0.084$). After adjusting for child covariates (Model 2), working both 5-6 and 7+ hours per day remain significantly associated with PPVT score ($p<0.001$ in both cases). A number of child covariates are also significantly associated with PPVT score, including the hours of sleep per night, first language, height-for-age score and raven's score from round 1. Language has a particularly large effect size, with a regression coefficient of -10.69 suggesting that PPVT score that is on average 10 points lower amongst those whose first language is not Spanish ($p<0.001$).

The associations between working and PPVT score become non-significant at the 95% confidence level when household covariates are adjusted for in Model 3. There is some very weak evidence ($p=0.096$) that working 7+ hours is associated with PPVT score. There is strong evidence that both household size and wealth index score are associated with PPVT score, with wealth index score having a large effect size ($RC=35.90$). Adjusting for school covariates in Model 4 also leads to the association between work and PPVT score becoming non-significant at the 95% confidence level; once again, there is only very weak evidence ($p=0.069$) that working 7+ hours is associated with PPVT score. The type of school attended and hours spent studying are both found to be associated with PPVT score.

The final model (Model 5) provides insufficient evidence to suggest an association between the hours spent in all types of work and round 2 PPVT score. Language, raven's score, household size and wealth index are all associated with PPVT at the 95% confidence level. The large effect sizes of both language and wealth suggest that non-Spanish speakers score on average 6 points lower in the PPVT than Spanish speakers, and that there is a 22 point increase in the PPVT for every one-unit higher a household scores on the wealth index.

The adjusted R^2 value is 0.09 in the crude model, and highest in the final model, at 0.43. Adjusting for both child and household covariates in Model 2 and Model 3 increases the adjusted R^2 considerably, to 0.33 and 0.36 respectively, whereas adjusting for school covariates in Model 4 increases R^2 to just

0.16, suggesting that school covariates are less important in accounting for the observed variance than child and household covariates are.

Economic Work

Crude analyses show that spending either 1-2 or 3+ hours per day in economic work is associated with a reduction in PPVT score, compared to those who carry out no economic work (Table 6, Model 1; $p < 0.001$ in both cases). These associations remain significant at the 95% confidence level after adjusting for child covariates. Hours of sleep, language, height-for-age and raven's score all show significant associations with PPVT score in Model 2, with language having a particularly large effect size, as in Table 5. Following adjustment for household covariates in Model 3, neither 1-2 nor 3+ hours of economic work remain significantly associated with PPVT score. Both household size and wealth are associated with PPVT score at the 95% confidence level, and the large regression coefficient ($RC=36.26$) of the wealth index once again suggests that living in a higher-wealth household is associated with having a higher PPVT score on average.

After adjusting for school covariates (Model 4) the associations between economic work and PPVT score are significant at the 95% confidence level and suggest that working for 1-2, and 3+, hours per day is associated with an average PPVT score that is 4.20 and 5.84 points lower than amongst those children who partake in no economic work. The number of hours spent studying, and school type, are both significantly associated with PPVT score and school type in particular has a large effect size ($RC=10.44$). In the final covariate-adjusted model (Model 5) no significant association is found between economic work and PPVT score in round 2. As in Table 5 the first language, raven's score, household size and wealth are all found to be significantly associated with PPVT score. Both language and wealth index have large effect sizes ($RC=-6.03$ and 22.64 respectively).

The adjusted R^2 is 0.10 in the crude model (Model 1), and increases to 0.32 and 0.36 in Model 2 and Model 3 respectively, after adjusting for child and household covariates. As with all work, the school covariates (Model 4) explain less of the observed variance in PPVT score and the adjusted R^2 is just 0.17. The adjusted R^2 for the final model (Model 5) is 0.43.

Table 6: Cross-sectional linear regression models, showing associations between all work and round 2 PPVT score, adjusted for various covariates.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	RC	SE	RC	SE	RC	SE	RC	SE	RC	SE
Hours spent in all work (ref=0-2)										
3 - 4	-2.96 [^]	1.71	-1.70	1.50	0.47	1.46	-0.83	1.74	0.83	1.48
5 - 6	-7.87 ^{**}	1.72	-5.90 ^{**}	1.52	-1.67	1.50	-2.79	2.05	-0.74	1.76
7+	-13.78 ^{**}	1.84	-8.10 ^{**}	1.69	-2.86 [^]	1.71	-5.09 [^]	2.80	0.10	2.42
Sex 'Female' (ref=Male)										
			-0.48	1.00					-0.75	0.93
Hours of sleep per night										
			-1.35 [*]	0.45					-0.76 [^]	0.43
First language 'Other' (ref=Spanish)										
			-10.69 ^{**}	1.63					-5.99 ^{**}	1.62
Comparative health (ref=Better)										
Same			0.19	1.09					0.02	1.01
Worse			-1.87	2.09					-0.80	1.95
Height-for-age score										
			2.42 ^{**}	0.52					0.81	0.51
Ravens score										
			0.69 ^{**}	0.06					0.46 ^{**}	0.06
Household size										
					-0.73 [*]	0.25			-0.66 [*]	0.24
Region (ref=Costa)										
Sierra					-0.65	1.14			-1.05	1.13
Selva					-1.58	1.54			-2.08	1.50
Wealth index										
					35.90 ^{**}	2.56			22.41 ^{**}	2.89
Time to school in minutes										
							-0.79	0.52	-0.20	0.44
Hours spent studying										
							1.53 [*]	0.47	0.69 [^]	0.39
School type 'Private' (ref=Public (gov.))										
							10.99 ^{**}	1.75	2.79 [^]	1.55
Constant	78.96	1.38	80.31	4.95	59.70	2.78	62.85	4.78	60.51	6.61
Adjusted R ²		0.09		0.33		0.36		0.16		0.43

RC= Regression Coefficient; SE= Standard Error; [^]<0.1, ^{*}<0.05, ^{**}<0.001

Table 7: Cross-sectional linear regression models, showing associations between economic work and round 2 PPVT score, adjusted for various covariates.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	RC	SE	RC	SE	RC	SE	RC	SE	RC	SE
Hours spent in economic work (ref=0)										
1 - 2	-7.20**	1.34	-4.21*	1.21	-0.63	1.22	-4.20*	1.37	0.11	1.21
3+	-11.99**	1.47	-6.30**	1.39	-2.25	1.41	-5.84*	1.72	0.55	1.56
Sex 'Female' (ref=Male)			-0.99	1.01					-0.79	0.93
Hours of sleep per night			-1.51*	0.45					-0.73^	0.43
First language 'Other' (ref=Spanish)			-10.71**	1.65					-6.03**	1.62
Comparative health (ref=Better)										
Same			0.19	1.10					0.07	1.01
Worse			-1.67	2.11					-0.88	1.95
Height-for-age score			2.42**	0.53					0.81	0.51
Ravens score			0.66**	0.06					0.46**	0.06
Household size					-0.75*	0.25			-0.65*	0.24
Region (ref=Costa)										
Sierra					-0.80	1.16			-1.11	1.13
Selva					-1.51	1.55			-2.04	1.50
Wealth index					36.26**	2.59			22.65**	2.92
Time to school in minutes							-0.76	0.51	-0.16	0.43
Hours spent studying							1.55**	0.34	0.81*	0.29
School type 'Private' (ref=Public (gov.))							10.44**	1.75	2.89^	1.55
Constant	77.06	0.78	81.59	4.94	59.35	2.50	62.78	3.09	59.25	6.08
Adjusted R ²			0.10	0.32		0.36		0.17		0.43

RC= Regression Coefficient; SE= Standard Error; ^<0.1, *<0.05, **<0.001

Prospective Analyses

All Work

Crude analyses suggest that partaking in all work for either 5-6 or 7+ hours per day in round 2 is negatively associated with round 3 PPVT score (Table 7, Model 1). Spending 3-4 hours in all work is not associated with a different PPVT score relative to those working 1-2 hours. Upon adjusting for child covariates (Model 2) the association between working 5-6 hours a day and PPVT score becomes non-significant ($p=0.326$), although working 7+ hours remains negatively associated with PPVT score at the 95% confidence level ($p=0.015$). First language, raven's score and round 2 PPVT score are all significantly associated with round 3 PPVT score ($p<0.001$ in all cases). Adjusting for household covariates causes the associations between work and PPVT to become non-significant at the 95% confidence level, although there is still weak evidence of an association between working 7+ hours and PPVT score ($p=0.052$). Household size and wealth index score are strongly associated with PPVT score ($p<0.001$ in both cases) and wealth has a large effect size ($RC=37.75$).

Upon adjusting for school covariates (Model 4), associations between all work and round 3 PPVT score remain non-significant. The time taken to get to school, hours spent studying and school type are significantly associated with round 3 PPVT. Adjusting for all covariates in the final model (Model 5) provides no evidence for an association between hours spent in all work in round 2 and PPVT score in round 3. First language, raven's score, round 2 PPVT score, household size, wealth and travel time to school in round 2 are associated with PPVT score in round 3 at the 95% confidence level.

The adjusted R^2 of the crude model (Model 1) is 0.10. Both Model 2 and Model 5 have relatively high adjusted R^2 values of 0.57 and 0.58 respectively, suggesting that child covariates account for a large proportion of the variance observed in round 3 PPVT score. Both Model 3 and Model 4 have considerably lower adjusted R^2 values of 0.33 and 0.18 respectively.

Economic Work

In crude analyses (Table 8, Model 1) spending either 1-2 or 3+ hours in economic work in round 2 is strongly associated with a lower PPVT score in round 3 ($p<0.001$ in both cases). These associations remain significant at the 95% confidence level after adjusting for child covariates (Model 2), while language, raven's score and round 2 PPVT are also found to be significantly associated with PPVT. Strong evidence for an association between economic work and PPVT score remains after adjusting for household covariates in Model 3. As in Table 7, there is very strong evidence of an association between both household size and wealth and PPVT score ($p<0.001$ in both cases). The large regression coefficient of wealth ($RC=36.56$) suggests that living in a household that is one-unit higher

on the wealth index is associated with a PPVT score that is on average 36.56 points higher than someone whose household is one unit lower on the wealth index.

Partaking in both 1-2 and 3+ hours of economic work is strongly associated with PPVT score after adjusting for school covariates (Model 4). The time taken to travel to school, hours spent studying and type of school attended in round 2 are all significantly associated with PPVT score in round 3. The final model (Model 5) provides evidence of an association between spending 1-2 hours per day in economic work in round 2 and PPVT score in round 3 ($p=0.012$), however there is no evidence of an association between working 3+ hours and PPVT score ($p=0.111$). First language, raven's score and round 2 PPVT score, household size, living in the Selva region and wealth are all significantly associated with round 2 PPVT score ($p<0.05$ in all cases).

The adjusted R^2 of the crude model is 0.12; this rises to 0.20 upon adjusting for school covariates (Model 4), 0.33 after adjusting for household covariates (Model 3), 0.57 with child covariates (Model 2) and 0.58 in the final model (Model 5) in which all covariates are included.

Comparison of All Work and Economic Work

The crude cross-sectional analyses (Model 1, Tables 5 and 6) show that lower durations of economic work are associated with PPVT score compared to all work. Spending just 1-2 hours in economic work is associated⁸ with a lower PPVT score, whereas children have to spend 5-6 hours in all work before an association is observed. Furthermore, a negative association is observed between economic work and PPVT score in Models 2 and 4, whereas it is only found in Model 2 for all work. The results from the prospective analyses are similar. In the crude models (Tables 7 and 8, Model 1) spending even 1-2 hours in economic work is negatively associated with PPVT score three years later, whereas an association is only found when a child spends 5-6 hours in all work. After adjusting for the different covariates (Table 7, Models 2-4) only 7+ hours spent in all work remains associated with PPVT score, and only in Model 2. No associations are found in the final model (Model 5). On the other hand both categories of economic work are associated with PPVT score in Models 2-4, and working 1-2 hours remains associated with PPVT score in Model 5.⁹

⁸ If the 95% confidence level is used to indicate a statistically significant association.

⁹ Findings were similarly non-significant when three categories of the 'all work' variable were tried out, indicating that the lack of associations is not simply a matter of there being lower power to detect associations with all work compared to economic work due to it having more categories.

Table 8: Prospective linear regression models, showing associations between all work and round 3 PPVT score, adjusted for various covariates.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	RC	SE	RC	SE	RC	SE	RC	SE	RC	SE
Hours spent in all work (ref=0-2)										
3 - 4	-1.16	1.94	0.28	1.38	1.76	1.69	1.80	1.96	1.73	1.44
5 - 6	-6.18*	1.96	-1.39	1.42	-0.52	1.74	0.14	2.32	1.44	1.71
7+	-14.79**	2.08	-3.83*	1.57	-3.84^	1.97	-3.62	3.16	1.13	2.35
Sex 'Female' (ref=Male)			-0.92	0.91					-1.22	0.91
Hours of sleep per night			0.28	0.42					0.39	0.42
First language 'Other' (ref=Spanish)			-5.50**	1.53					-3.60*	1.59
Comparative health (ref=Better)										
Same			-1.17	0.99					-1.06	0.98
Worse			0.50	1.94					0.83	1.93
Height-for-age score			0.90^	0.48					0.31	0.50
Ravens score			0.32**	0.06					0.26**	0.06
R2 PPVT score			0.66**	0.04					0.60**	0.04
Household size					-1.08**	0.29			-0.71*	0.24
Region (ref=Costa)										
Sierra					0.05	1.34			0.16	1.10
Selva					2.00	1.78			2.80^	1.47
Wealth index					37.75**	2.95			8.33*	2.94
Time to school in minutes									-1.51*	0.58
Hours spent studying									2.03**	0.53
School type 'Private' (ref=Public (gov.))									12.36**	1.99
Constant	102.18	1.57	44.16	5.38	83.33	3.18	81.52	5.45	40.07	6.88
Adjusted R²		0.10		0.57		0.33		0.18		0.58

RC= Regression Coefficient; SE= Standard Error; ^<0.1, *<0.05, **<0.001

Table 9: Prospective linear regression models, showing associations between economic work and round 3 PPVT score, adjusted for various covariates.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	RC	SE	RC	SE	RC	SE	RC	SE	RC	SE
Hours spent in economic work (ref=0)										
1 - 2	-9.89**	1.51	-4.28**	1.10	-3.70*	1.41	-6.65**	1.54	-2.96*	1.17
3+	-14.29**	1.66	-4.35*	1.28	-5.28*	1.62	-7.78**	1.94	-2.42	1.52
Sex 'Female' (ref=Male)			-1.24	0.91					-1.29	0.90
Hours of sleep per night			0.16	0.41					0.28	0.42
First language 'Other' (ref=Spanish)			-5.08*	1.53					-3.49*	1.58
Comparative health (ref=Better)										
Same			-1.21	0.98					-1.05	0.97
Worse			0.74	1.93					1.06	1.93
Height-for-age score			0.78	0.48					0.31	0.50
Ravens score			0.31**	0.06					0.27**	0.06
R2 PPVT score			0.66**	0.04					0.60**	0.04
Household size					-1.11**	0.29			-0.71*	0.24
Region (ref=Costa)										
Sierra					0.39	1.35			0.56	1.11
Selva					2.23	1.78			2.94*	1.46
Wealth index					36.56**	2.97			6.72*	2.95
Time to school in minutes							-1.42*	0.57	-0.85	0.42
Hours spent studying							1.70**	0.38	0.46	0.29
School type 'Private' (ref=Public (gov.))							11.44**	1.97	2.70^	1.51
Constant	102.24	0.87	47.14	5.30	85.51	2.88	87.29	3.48	46.48	6.30
Adjusted R ²		0.12		0.57		0.33		0.20		0.59

RC= Regression Coefficient; SE= Standard Error; ^<0.1, *<0.05, **<0.001

Discussion

Main Findings

The purpose of this study was to explore the relationship between the number of hours a child worked at age 11-12 years and their cognitive ability both contemporaneously and three years later at age 14-15. Crude results suggest that spending time in both economic work and all work is negatively associated with contemporary and future PPVT score. However after adjusting for covariates, cross-sectional regression models provide no evidence for an association between the time spent in all work or economic work at age 11-12 years and cognitive ability at the same age. Prospective models also provide no evidence of an association between the number of hours spent in all work at age 11-12 and cognitive test score three years later. Only in one model is an association between work and PPVT score found after adjusting for covariates; those children who worked 1-2 hours per day achieved a round 3 PPVT score that was 2.96 points lower on average than those who took part in no economic work.

The results show that a number of the covariates included in analysis are more important than the hours spent in work in terms of their association with both contemporary and future PPVT score. In particular the child's first language, their round 1 raven's score, and their household size and wealth are associated with PPVT score in both the cross-sectional and the prospective final models. Being a non-Spanish speaker and having a larger household are associated with lower PPVT score, while household wealth and round 1 raven's score are associated with a higher PPVT score. Raven's score was included in analyses as a proxy for innate ability; however it is possible that its association with PPVT score in rounds 2 and 3 also reflects the fact that background characteristics such as household wealth and first language are associated with cognitive ability from as early as 7-8 years. In prospective analyses round 2 PPVT score is associated with round 3 PPVT score, as expected [14].

These results suggest that for the main part it is not partaking in work that is associated with a lower PPVT score, but instead that the duration of work a child does (and whether or not they work) is associated with certain background characteristics which are themselves associated with lower PPVT score. This is similar to research findings from the Young Lives Vietnam survey, where urban/rural location was also found to be an important determinant of both working and cognitive ability [41, 59]. Children with the lowest PPVT scores are more likely to work, and to work longer hours, than those with higher test scores. However these same children are also the ones who experience the personal and background characteristics which make them more likely to have a lower PPVT score regardless of whether they work. They are more likely to be native non-Spanish speakers, to have achieved a lower raven's test score in round 1 of the survey, and to live in larger and less wealthy

households¹⁰. These socioeconomic characteristics in and of themselves make these children more likely to achieve lower PPVT scores; they are the underlying driver of children having to work, and of their low PPVT tests scores. While it is beyond the scope of this study, it would be interesting to explore the relationships between work, socioeconomic status and PPVT score and to determine whether work is serving to mediate the relationship between wealth and PPVT score.

The fact that a negative association is found between spending 1-2 hours in economic work and PPVT score three years later does however suggest that partaking in small amounts of economic work is independently associated with a lower PPVT score, regardless of the background characteristics of the child. The nature of economic work in particular may make it less compatible with studying or with carrying out other activities that are beneficial to cognitive development.

A further objective of this study was to explore how the definition of work affects the results obtained by analyses, by comparing analyses with a more and a less restricted definition of work. Unfortunately the findings do not facilitate such a comparison, since three out of the four covariate-adjusted regression models find no association between work and PPVT score. As discussed in the results section, in crude models an association is found between economic work and PPVT at lower durations of time spent in work than it is for all work, perhaps suggesting that only spending a considerable number of hours per day in all work is associated with PPVT score, whereas shorter durations spent in economic work can be associated with PPVT score. This however may simply reflect the fact that the distributions of the two variables are very different. The fact that crude associations become largely non-significant upon adjusting for covariates perhaps provides some support for defining child work in terms of economic work¹¹ since spending time in all work is not associated with PPVT score in either cross-sectional or prospective analyses and may therefore be regarded as relatively unimportant compared to other covariates in determining PPVT score. However the interpretation of these findings, and implications for the definition of work, remain uncertain.

The scarcity of associations observed in the final models also hinders the ability to draw many conclusions about the relationships between work and PPVT score. In crude models for both economic and all work, the regression coefficient increases with the number of hours worked. However in all cases the confidence intervals for the regression coefficient overlap across the

¹⁰ Wealth was found to be associated with first language, household size and ravens score in round 1. However in all cases the correlation was <0.5 and therefore each was included in analyses.

¹¹ However the fact that no relationship was observed between economic work and PPVT score in the final covariate-adjusted cross-sectional model may suggest that we have insufficient evidence to determine the effects of using an inclusive vs a narrow definition of child work.

different categories, and so we are unable to conclusively state that working for more hours is associated with a lower PPVT score. The only association observed in the final models was between spending 1-2 hours in economic work and a lower PPVT score (Table 8, Model5). The lack of an association in the same model between working for 3+ hours and PPVT score might imply that the relationship between economic work and PPVT score three years later is not linear. However this could also be due to a lack of power in the study to detect an association in this smaller group, or might reflect the fact that this last group of children working more than 3 hours per day is likely to be very heterogeneous in their background characteristics.

It is necessary to stress that this paper serves only to look at the association between being 'in employment' as a child (according to ILO definitions, see Figure 1) and cognitive ability. Extreme forms of child work, and in particular the ILO's 'child labour', 'the worst forms of child labour, and 'hazardous work' (Figure 1), are likely to have very different associations with cognitive test score to those seen in this paper and are, by their very definition, detrimental to the development of a child.

Limitations and Strengths

A key strength of this study is the ability to consider not only the contemporaneous association between work and cognitive ability, but also the association between working at age 11-12 and cognitive ability three years later. The relatively low dropout rates - only 2.94% were lost to follow-up between round 1 and 2, and 2.16% between rounds 2 and 3 – should serve to reduce selection bias in the survey.

Selection bias is a potential problem in any longitudinal study. While the proportion of children who took part in all three rounds is relatively high, the number who provided complete information for this analysis was considerably lower. Only 672 of the 693 children who took part in round 2 took the PPVT test, while 652 of the 678 children partaking in round 3 did so. Of these, 642 and 606 children respectively had complete data on all covariates of interest. This study could only investigate the associations between working and PPVT score on these sub-samples of children. If those who did not take the PPVT were systematically different with regards to the outcome to those who did take it, then the results of the linear regression models will be prone to selection bias. Similarly, bias will have been introduced into the study if those who were missing data on the exposure variables were likely to be different to those who did provide this information.

Another potential source of bias in the study is introduced through the 'all work' and 'economic work' variables, which may be subject to measurement error. The round 2 survey asked the child to allocate pebbles to various tasks, indicating how many hours were spent on each task on a daily

basis, while in round 3 they were asked how many hours were spent in each task; these are relatively inaccurate measures of time spent in any task¹². Furthermore, the children's responses are dependent on their recollection, and are therefore a possible source of recall bias. Responses may be influenced by the activities carried out recently more than those carried out on a daily basis throughout the year, and are likely to vary with time; for instance children may work more in a particular season or in school holidays.

The choice of dependent variable may also have introduced some bias to the study. The PPVT has limitations, including the fact that it was developed in the U.S. to be taken in English. Translating it to another language is likely to introduce some bias, as is the fact that it is administered in both Spanish and Quechua in the Young Lives study. The use of the PPVT amongst bilingual children is also somewhat contentious since bilingual children may have accelerated development in language processing [5] and therefore a 'bilingual advantage' in the tests, which has not been considered in this study [8, 15]. Creating a composite measure of cognition including perhaps mathematical and reasoning skills¹³ may have helped minimise any bilingual effects, however there was no other test undertaken by the older cohort in both round 2 and round 3 from which a composite score could be created. Adjusting for earlier Ravens score was the best solution in this study, however it is imperfect since the outcome itself remains purely language-based and it is measured through the PPVT at a much later date than the round 1 Ravens test.

Causality cannot be established from this study. The observed relationship between partaking in 1-2 hours of economic work and having a lower PPVT score three years later does not indicate that work causes lower PPVT score, merely that they are associated. For instance children who are perceived to be less able may be put to work for longer hours if they are not considered able to make the most of education. The effect of working on the change in PPVT score between rounds could be explored in this dataset by carrying out a repeated-measures analysis, however that was beyond the scope of this current study.

The adjusted R-squared values achieved in the final models show that these models only explain 42.5% (all work) and 42.5% (economic work) of the variance in round 2 PPVT scores, and 58.1% (all work) and 58.5% (economic work) of the variance in round 3 PPVT scores. This suggests the existence of a number of important characteristics that have not been included in the regression

¹² For instance it reduces accuracy by only allowing integer estimates of time spent in tasks. It also necessitates a stark choice between tasks, excluding the possibility that various tasks may overlap.

¹³ Other work using Young Lives has used test score in the Cognitive Developmental Assessment as a measure of quantitative cognitive ability [54] in cross-sectional analyses.

models but which contribute to the observed variance in PPVT scores. One area in which data is lacking is on school covariates, including a measure of the quality of education a child is receiving. While attendance of either private or public school is included in analyses as a proxy for school quality, it presumably over-simplifies what might be large differentials in school quality within the 'Private' and 'Public (government)' categories.

Conclusions and Recommendations

This study provides some evidence that working at age 11-12, and specifically carrying out 1-2 hours of economic work, is associated with a lower PPVT score three years later. Nevertheless in the majority of covariate-adjusted analyses the daily hours spent in work by a child is not associated with their contemporaneous PPVT score or their score three years later. Instead, results suggest that a range of background and socioeconomic characteristics - in particular household wealth and size, first language and raven's score in round 1 – are associated with PPVT score in round 2 and round 3.

The implication is that working as a child is associated with the same adverse characteristics that are associated with lower PPVT scores, particularly the socioeconomic position of their household. The majority of working children are performing worse on PPVT tests not because they work, but because of their lower socioeconomic status and the negative association that this has with PPVT scores. In a sense, working can be seen as another symptom of low socioeconomic status, alongside lower PPVT score; or poverty as a driver of both working as a child and lower cognitive ability¹⁴.

Children's work both within and outside of the home is likely to be contributing to their household income and economic stability¹⁵ [2], and therefore eliminating their ability to work may well have negative effects on the socioeconomic situation of their entire household [7]. These children are unlikely to stop working until their household economic situation is stable enough to not require their contributions [7] and I would suggest that there are two courses of action which are likely to serve them better than enforcing bans on child work might. The root cause of their working – household economic poverty – could be alleviated through, for instance, cash transfer programmes. Cash transfers have been found to increase school attendance and to reduce the number of children who are working in a number of studies¹⁶. Preliminary results from previous Young Lives research suggests that Peru's *Juntos* conditional cash transfer programme introduced in 2005 is leading to

¹⁴ This agrees with previous findings that in rural areas of Peru in particular, poverty is driving both work and schooling decisions [19].

¹⁵ Particularly since the majority of work carried out by the children in Young Lives Peru is based on the family farm or business, rather than in paid employment outside of the family home.

¹⁶ For instance see Skoufias and Parker [52] for their analysis of the effects of the PROGRESA programme in Mexico.

reductions in the incidence of child workers in Peru [22, 24, 53], however rigorous evaluations of the efficacy of *Juntos*, and its effect on educational attainment, are still lacking. An alternative solution might be to make school hours more flexible; shift schooling and flexible systems can allow more children to combine work and school [23].

Young Lives round 4 is currently being implemented with children who have reached the ages of 17-18 years, opening up new opportunities for research and a more long-term look at the effects of working at an early age. Future analyses that explore the change in PPVT score would be a valuable contribution to this area of research, as would research into the nature of the interactions between cognitive ability, work and socioeconomic status. Further work is also needed on the effects of the *Juntos* programme in Peru, including its effects on cognitive ability and other test scores.

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Appendices

Appendix 1: Questions used to assess the children's time use

Round 2

The time spent in daily activities was assessed through the child questionnaire in the following way. Children were first asked the question:

“Can you tell me how many hours you spend asleep on a typical night?”

They were asked to think about the rest of the day and what they had spent their time doing. They were then given 15 pebbles and a board with 7 circles on it, each of which represented one of the following categories:

- Looking after others (younger siblings, sick people, other household members)
- Domestic tasks (fetching water, firewood, cleaning, cooking, washing, shopping)
- Tasks on family farm, cattle herding, other family business, shepherding (not just farming)
- Activities for pay outside of the household or for someone not in the household
- At school
- Studying at home
- Play time/general leisure

The child was then asked to distribute all of the pebbles amongst the circles on the board according to the time spent in each task that day. If the child was ill that day they were asked to consider a typical day when they were not ill.

Adapted from: Young Lives Study Child Questionnaire – 12yr old - Version 07 (August 2006); p.5. UK Data Archive Study Number 6852 - Young Lives: an International Study of Childhood Poverty: Round 2, 2006

Round 3

The child's time use was assessed in round 3 in the following way. Children were told “I want to know how you spent your time on a typical day in the last week.” and reminded that they were talking about a typical weekday, not a weekend or holiday.

They were given 24 stones and asked to distribute them according to the time they spent in the following activities on a typical day:

- Sleep
- Care for others (younger children, ill household members)
- Domestic tasks (fetching water, firewood, cleaning, cooking, washing, shopping)
- Tasks on family farm, cattle herding (household and/or community) other family business, shepherding, piecework or handicraft done at home (not just farming)
- Activities for pay or for money outside of household or for someone not in household
- At school (including play time)
- Studying at home/ Extra tuition outside the home
- Leisure (playing, seeing friends, using the internet etc)

Adapted from: Young Lives Study - Child Questionnaire – 15yr old; p.4. UK Data Archive Study Number 6853 - Young Lives: an International Study of Childhood Poverty: Round 3, 2009

Appendix 2: The Peabody Picture Vocabulary Test

The Peabody Picture Vocabulary Test is a test of receptive vocabulary; it “measures an individual’s receptive (hearing) vocabulary for Standard American English and provides, at the same time, a quick estimate of verbal ability or scholastic aptitude” [18]. It is administered verbally and requires no reading by the individual being tested. It was originally developed in English in 1959 and has been updated since; PPVT-III (version three) was used in both round 2 and round 3 of the Young Lives study. The test works in the following way; the administrator states a stimulus word and presents the test taker with a set of four pictures from which they must choose the one which best represents the stimulus word. A ceiling and a baseline ability are established based upon the correct and incorrect answers given, after which scores are calculated with one point given for correct answers and another point given for all unanswered questions below the established baseline. It is assumed that the test taker would correctly answer anything below baseline, whereas words above the ceiling are assumed to be too difficult and no marks are awarded.

In Peru the Young Lives investigators used a Spanish version of the PPVT-R (revised) that had been adapted for Latin-America [13, 17] and consisted of 125 test items. Children were offered the opportunity to take the PPVT test translated into Quechua. Translation was carried out individually by two translators who then met and agreed upon the best translation for the test [13]. Tests were administered in the home in as quiet an area as possible, and children were given instructions and examples of the test to ensure that they understood the procedure [13]. Items with poor psychometric indicators – for instance if the correlation between a specific item and test total was low, or the item showed gender bias – were discarded from the dataset and a set of corrected raw scores created [13].

Appendix 3: Map of Young Lives Peru sentinel study sites



1: Reproduced from Cueto *et al* [12]

Appendix 4: Table showing the R-squared values produced by bivariate regressions between potential covariates

	Wealth	All work	Economic work	Sex	Hours of sleep	Language	Health	Height-for-age	Ravens score	Caregiver education	Household size	Region	Rural/urban site	Time to school	Time spent studying
All work	0.160														
Economic work	0.198	0.377													
Sex	0.000	0.003	0.001												
Hours of sleep	0.018	0.002	0.000	0.003											
First language	0.158	0.077	0.089	0.003	0.002										
Health	0.014	0.011	0.014	0.002	0.005	0.004									
Height-for-age	0.176	0.045	0.063	0.001	0.001	0.062	0.018								
Ravens score	0.101	0.001	0.013	0.009	0.006	0.001	0.000	0.023							
Caregiver education	0.315	0.089	0.116	0.000	0.001	0.204	0.002	0.093	0.055						
Household size	0.052	0.012	0.018	0.000	0.002	0.021	0.000	0.028	0.015	0.066					
Region	0.196	0.097	0.125	0.001	0.002	0.100	0.010	0.089	0.011	0.062	0.004				
Rural/urban	0.521	0.134	0.204	0.000	0.002	0.143	0.013	0.150	0.066	0.196	0.029	0.393			
Time to school	0.018	0.007	0.006	0.003	0.002	0.008	0.002	0.004	0.000	0.000	0.002	0.004	0.007		
Time studying	0.151	0.595	0.321	0.001	0.004	0.051	0.006	0.044	0.005	0.090	0.024	0.065	0.097	0.002	
School type	0.108	0.022	0.026	0.000	0.019	0.017	0.004	0.042	0.033	0.093	0.012	0.024	0.066	0.002	0.023

Appendix 5: Table of bivariate regressions showing the associations between each covariate and the outcome variables

	R2 PPVT score		R3 PPVT score	
	R.C.	R-squared	R.C.	R-squared
All work	-4.706	0.095	-5.128	0.091
Economic work	-6.158	0.101	-7.528	0.120
Sex	-2.009*	0.004	-2.593*	0.006
First language	-14.936	0.099	-17.027	0.105
Health	-2.335	0.007	-2.516	0.007
Region (ref=Costa)				
Sierra	-8.412	0.085	-8.645	0.058
Selva	-10.821	0.085	-7.783	0.058
School type	13.601	0.077	15.057	0.076
Time to school	-1.196	0.007	-1.882	0.014
Height-for-age	4.829	0.099	5.117	0.088
Ravens score	0.755	0.154	0.866	0.164
Household size	-1.737	0.050	-2.193	0.064
Wealth	40.600	0.351	42.123	0.306
Time spent studying	2.620	0.120	2.968	0.123
R2 PPVT score			0.812	0.528

*= Association **not** significant at 95% confidence level; $p>0.05$

R.C = Regression Coefficient

R2/R3 = Round 2/Round 3



This form must be completed electronically. For detailed guidance, please refer to the **Project Handbook for your course.*

SECTION 1 – STUDENT AND COURSE INFORMATION

MSc DETAILS AND DEADLINES (deadlines to be communicated by Course Director)

Academic Year	2012-2013
MSc course (and stream, where applicable)	Demography and Health
Deadline for Supervisor approval	
Deadline for Course Director approval	
Deadline for submission to Ethics Committee	
Target for approved form to be passed to TSO	

STUDENT AND SUPERVISOR DETAILS (to be completed by student)

Full name of student	xxx
Student email address	xxx
Year of study (part-time students only)	<input checked="" type="checkbox"/> First Year <input type="checkbox"/> Second Year
Supervisor name	Sanna Read
Supervisor email address	Sanna.read@lshtm.ac.uk
Supervisor institution/organisation	LSHTM
Supervisor status (at time of this version of the form being completed)	<input checked="" type="checkbox"/> Confirmed <input type="checkbox"/> Provisional <input type="checkbox"/> Still to be identified
Name of personal tutor (where Supervisor is still to be identified)	Emma Slaymaker

SECTION 2 – APPROVAL AND SUBMISSION STATUS

***Students please note:** It is a requirement of your LSHTM degree that you obtain all required approvals before beginning your project work. Your Supervisor and Course Director must specifically give Risk Assessment approval. Ethics approval must also be obtained where necessary (answers in Section 5 will help determine if this is required or not).

STUDENT DECLARATION (to be completed for all projects)

I agree to conduct my project on the basis set out in this form, and to consult staff (initially, my Supervisor) if making any subsequent changes – especially any that would affect the information given with respect to ethics approval.	<input checked="" type="checkbox"/>
I agree to comply with the relevant safety requirements, and will submit a separate request for LSHTM travel insurance where relevant.	<input checked="" type="checkbox"/>

**Where seeking ethics approval for a study involving human subjects, please also attach copies of any information sheets, consent forms, and other relevant documents.*

Date of declaration

19th March 2013

Please save the electronic file of this CARE form in the format

“[MSc title]_[Year of Submission]_[Surname]_[Forename]_CARE”

You will also be required to submit a copy of this CARE form with your final written-up project. This should be anonymised, i.e. with your name and email address removed.

STAFF APPROVAL	
<p>*Staff please note: Sections 3 and 4 of the form should be completed by the student before you give approval. Rather than 'sign' this form, you should email the student and explicitly confirm approval, e.g. stating "In my role as supervisor, I approve the attached form". The student is then responsible for updating the form and passing it on to any other staff.</p> <p>However if you would answer 'no' to any of the 'Yes/No' questions below, or disagree with any of the statements given, or have any other concerns, then you should not give approval. Instead, please contact the student immediately to inform them of your concerns and discuss changes which they may need to make before you may be willing to give approval.</p> <p>Please also be aware that in the exceptional case of a request to undertake a project in a country or region to which the Foreign & Commonwealth Office advise against travel, the student would need to fill out a separate form which will then need further School-level approval by the Safety Manager and Secretary & Registrar.</p>	

SUPERVISOR'S APPROVAL (required for all projects – this approval should be given first)	
Supervisor has agreed that Section 3 of this form is a reasonable summary of the proposed project.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Supervisor has agreed that responses in Section 4 of this form address the main risks connected with a project of this nature.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Supervisor has agreed that responses in Section 5 of this form correctly indicate whether or not ethics approval will be required.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Name of Supervisor (if not yet identified, personal tutor or Course Director should approve)	Sanna Read
Date of approval	20 March 2013

COURSE DIRECTOR'S APPROVAL (required for all projects – should follow Supervisor approval)	
Course Director has agreed that the proposed project's academic content, set out at Section 3 of this form, is suitable for this MSc.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Course Director has agreed that responses in Section 4 of this form address the main risks connected with a project of this nature.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Name of Course Director (or nominee)	Lynda Clarke
Date of approval	2 April 2013

FACULTY SAFETY SUPERVISOR'S APPROVAL (only required if project involves working with pathogenic organisms, human blood or radiochemicals – should follow Supervisor approval)	
Faculty Safety Supervisor has agreed that the proposed project, as set out in this form and particularly Section 4, may proceed.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Name of Faculty Safety Supervisor (or nominee)	N/A
Date of approval	N/A

ETHICS APPROVAL (required for all projects involving human subjects or human data, except for public domain data that cannot enable the identification of living people – NB that Supervisor approval must have been received before the application is submitted to the Ethics Committee)	
The Ethics Committee has approved the project proposal set out on this form.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Date of approval	16 April 2011
Ethics Committee application number assigned	#####

SECTION 3 – APPLICATION FOR ACADEMIC APPROVAL

**All students should complete all sub-sections (3.1, 3.2 and 3.3). If particular questions are not applicable to you then please write 'N/A'.*

3.1 PROJECT OUTLINE (should not normally exceed 750 words total)

Proposed project title: (should not normally exceed 20 words)

Parental education and children's cognitive attainment: experiences over the life-course

Proposed project type:

**See course-specific section of Project Handbook for details of project types permitted for each MSc. Be aware that restrictions may apply for individual courses.*

Quantitative analysis of an existing dataset

Proposed project length:

**For almost all students, this will be 'Standard'. Extended projects are only available for MSc IID; they have a different schedule and allow a slightly greater word count.*

Standard Extended

Background: (about 200 words)

**Indicate why this topic is of interest or relevance.*

**If the project involves work with a specific organisation please give details.*

**Please give any other details specifically relevant for consideration by the Ethics Committee, e.g. related to purpose.*

It is well established that maternal education has positive effects on the educational outcomes of children. However, few studies have considered the independent influences of both maternal and paternal education on children's cognitive attainment. Analysis over the life-course allows the dynamic relationships between parental education and child's cognitive level to be explored and understood in more detail.

Hypothesis: (about 30 words, where applicable)

Maternal and paternal education will be independently associated with children's school attendance and cognitive outcomes.

Overall aim of project: (about 30 words)

To test the hypothesis.

Specific objectives of project: (about 70 words)

- To investigate the associations between maternal and paternal education and children's attendance in school at ages 7/8, 11/12 and 14/15 years.
- To examine the independent effects of maternal and paternal educational status on the cognitive test scores of children at ages 7/8, 11/12 and 14/15 years.

Proposed methods: (about 200 words)

Please summarise methods, and include **any relevant details for consideration by the Ethics Committee such as numbers of participants and procedures to be performed.*

Data from the first three survey rounds of the Young Lives longitudinal study will be used for analysis. Young Lives is a 15-year study of the changing nature of childhood poverty in Ethiopia, India (Andhra Pradesh), Peru and Vietnam. Each survey round consists of a child questionnaire, household questionnaire and community questionnaire.

Children's cognitive test scores will also be used for analysis.

References: (max 150 words)

**List any key references which will shape the project, including for methods to be used. It should not normally be necessary to quote more than 5 references.*

- Flouri, E., & Buchanan, A. (2004). Early father's and mother's involvement and child's later educational outcomes. *The British journal of educational psychology*, 74(Pt 2), 141–53. doi:10.1348/000709904773839806
- Moestue, H., & Huttly, S. (2008). Adult education and child nutrition: the role of family and community. *Journal of epidemiology and community health*, 62(2), 153–9. doi:10.1136/jech.2006.058578

Prior work: (only where relevant; max 100 words)

**Indicate any previous work you have done related to this project topic, including student work, professional work, or publications.*

N/A

3.2 FEASIBILITY (about 100 words total – but can write more or write less if appropriate)

What could stop this project from succeeding, or prevent you from achieving your objectives?

**Please indicate any aspects of your proposed approach which could potentially experience difficulties, e.g. delays with permissions, data collection or storage problems, lack of sufficient comparable information, etc. You may also wish to mention any wider matters which could affect your project, e.g. civil unrest, natural disasters, transport availability.*

None as data is publicly available.

What alternative plans do you have in case you encounter any of the potential problems you have identified?

N/A

3.3 DATA SOURCES, INTELLECTUAL PROPERTY AND PERMISSIONS

If you expect to use existing data, how will you obtain it?

**Indicate who holds the data, who specifically you will contact, and by when. Any contact so far, especially anything confirmed in writing, should be mentioned.*

The Young Lives data is on an open-access and available through the UK Public Data Archive.

If you expect to use any public domain data, please give further details.

**Make clear who owns the data and how you will gain access (giving a link if possible). Public domain data must be available to any member of the public, without any restrictions or requirement for special permission, and must not enable the identification of living people.*

The data are accessed through the UK Public Data Archive and available to download here: <http://www.esds.ac.uk/findingData/yITitles.asp>.

Will any specific data rights permissions or usage limitations be required regarding data to be used or collected in the project?

- Yes
 No

If 'Yes', please describe further. *Remember that local ethics or research governance requirements (see Section 5.2) may entail specific data rights limitations.

N/A

Will any copyright agreements or intellectual property rights (IPR) agreements be required regarding data to be used or collected in the project?

*Please tick all boxes that apply, and attach copies of any forms/agreements (even if in draft).

- No specific IPR, copyright or permissions issues should apply to this project (student retains copyright and a claim to related IPR)
- IPR to be retained by LSHTM (specific LSHTM form to be completed)
- Copyright to be transferred to LSHTM (specific LSHTM form to be completed)
- IPR, copyright or other agreements/permissions required with external parties/organisations

Please give any further relevant details about IPR, copyright or other permissions.

N/A

SECTION 4 – APPLICATION FOR RISK ASSESSMENT APPROVAL

*All students should answer all questions in sub-section 4.1; this will make clear which of the subsequent sub-sections you need to complete.

Ensuring safety during project work is the responsibility of each individual student, and not of LSHTM or LSHTM staff. *Please see the Project Handbook for further guidance.

4.1 TYPE OF RISK (to be completed by all students)

Where will the project be carried out? (please tick all that apply)

*Note that work away from LSHTM or outside the UK means any form of work for your project, not just primary data collection. Some courses may have specific restrictions on this.

- All work will take place either at LSHTM, in libraries in the UK, or at my personal residence in the UK.** [If so, you do not need to complete either section 4.2 or section 4.3]
- Some work will take place in the UK that is away from LSHTM sites in London, is non-Library-based, and is not at my personal residence.** [If so, section 4.2 on 'Work away from LSHTM' must be completed]
- Some work will take place at my personal residence outside the UK** [If so, section 4.3 on 'Work outside the UK' must be completed]
- Some work will take place outside the UK that is not at my personal residence** [If so, both sections 4.2 and 4.3 on 'Work away from LSHTM' and 'Work outside the UK' must be completed]

Will the project involve working with or handling any of the following materials?

- Pathogenic organisms** Yes No
- Human blood** Yes No
- Radiochemicals** Yes No

[If 'Yes' to any of the above, Sections 4.4 and 4.5 must be completed]

Are any other potentially hazardous activities likely to be carried out during the project?

Yes No

[If 'Yes', Section 4.5 must be completed]

Do any special requirements (e.g. disability-related issues) or other concerns need to be taken into account for either you as a student, study participants or colleagues?

Yes No

[If 'Yes', Section 4.6 must be completed]

4.2 WORK AWAY FROM LSHTM (to be completed if any work will be done away from LSHTM, other than at your home or at libraries elsewhere in the UK)

Will the project be based in an established hospital, college, research institute, NGO headquarters, field station or other institutional site? If 'Yes', please give the name and location of the site(s); describe approximately what proportions of your project will be spent there; and state name and role of person who has confirmed willingness to support you at each site (indicating extent of correspondence, especially what they have confirmed in writing).

Yes
 No

N/A

Will you have an 'external supervisor', co-supervisor or other main advisor, or be working with any specific organisation(s), during your work away from LSHTM? If 'Yes', please indicate the name, role, contact details, and level of support that any such external advisors are expected to provide, and give details about any organisations you will be working with.

Yes
 No

N/A

Will the project involve personal visits, interviews or interactions with people in their homes, workplaces, community settings or similar? If 'Yes', please give details, including approximately what proportion of your project this will involve.

Yes
 No

N/A

Will the project involve lone/isolated work or significant travel? If 'Yes', please give details, including approximately what proportion of your project this will involve, and state how you can be contacted while working or travelling.

Yes
 No

N/A

What arrangements are proposed for contact with your main supervisor while you are away from LSHTM? Indicate expected ease and frequency of contact, and communication methods to be used.

N/A

Please tick to confirm:

I have read the [LSHTM Code of Practice on off-site work](#).

4.3 WORK OUTSIDE THE UK (to be completed if any work will be done outside the UK)

What form of project work will be undertaken outside the UK? (please tick all that apply)

- Work at my family home or personal residence only**
- Work at an established hospital, college, research institute, NGO headquarters, field station or other institutional site**

Work away from my personal residence or an established site
**Note that for either the second or third options, you should also have completed Section 4.2.*

Name the country/countries and region(s) in which work will be undertaken:

Country or countries: N/A Region(s) : N/A

Do the Foreign & Commonwealth Office's (FCO) Travel Advice Notices (www.fco.gov.uk/en/travelling-and-living-overseas/travel-advice-by-country) advise against travel to the regions(s), country or countries involved? Yes
 No
**Note that if 'Yes', the School will not normally permit such travel for project work. In exceptional circumstances only, requests may be considered by the Safety Committee and require approval by the Safety Manager and Secretary & Registrar.*

Please tick to confirm: **I will seek specific travel health advice before any international travel as part of my project.**
**Free travel health advice is available, along with anti-malarials, vaccinations and medication, from the School's approved providers – please see details in the project handbook.*

Please tick to confirm: **I understand that travel insurance is required when travelling internationally for project purposes.**
**Free LSHTM travel insurance can be applied for using a separate form – provided the travel is for location-specific project purposes.*

4.4 WORK WITH HAZARDOUS SUBSTANCES (to be completed if the project involves any work with pathogenic organisms, human blood or radiochemicals – NB that this will require approval by the Faculty Safety Supervisor)

Name the organism or organisms to be used:

N/A

Identify all potential routes of infection:

N/A

Name the radiochemical or radiochemicals to be used:

N/A

List laboratories where work with pathogens or radioisotopes will be carried out:

N/A

List disinfectants to be used, and describe arrangements for disposal of used material:

N/A

Will or might Health Surveillance be required for you or any staff working with you? If 'Yes', please give details. Yes
 No

N/A

4.5 PRECAUTIONS AGAINST HAZARDS (to be completed if any potentially hazardous activities are likely to be carried out during the project. Refer to Project Handbook and School safety documentation for further information. Faculty Safety Supervisor's approval may be further requested where felt appropriate by project Supervisor.)

Indicate any procedures, activities or aspects of the proposed project which may entail hazards (including work with hazardous substances as per Section 4.4, or anything else relevant). Please set distinct hazards out separately, in a numbered list.

N/A

Indicate the precautions you will take to prevent or mitigate such potential hazards. Please number these to refer to the specific hazards identified in the preceding question.

N/A

4.6 SPECIAL REQUIREMENTS (to be completed if the project involves any special requirements, e.g. disability-related issues, or other concerns that need to be taken into account for either you as a student, study participants or colleagues)

What special requirements or concerns need to be taken into account?

N/A

Do these need to be considered in planning arrangements?

If 'Yes', please give details.

Yes

No

Do these impact on supervision arrangements?

If 'Yes', please give details.

Yes

No

Does the project location need to be considered in relation to these?

If 'Yes', please give details.

Yes

No

Do arrangements for access to specialist medical treatment need to be considered?

If 'Yes', please give details.

Yes

No

SECTION 5 – APPLICATION FOR ETHICS APPROVAL

All students should **answer all questions in sub-sections 5.1 and 5.2. Answers to 5.1 will make clear whether approval by the LSHTM Ethics Committee is necessary, and which later sub-sections you may need to complete. Section 5.2 covers any external approvals required.*

Further detailed guidance about completing this section, and what to do next if formal LSHTM ethics approval is required, is given in **Chapter 6 of your Project Handbook.*

NB that supervisor approval must be obtained **before an application is submitted to the Ethics Committee.*

5.1 SCOPE OF STUDY (to be completed by all students)

Which of the following applies to your project? (please tick one option only)

**Note – the term 'human data' includes any documentary data, datasets or biological samples.*

Project does not involve any human subjects or any human data. [If so, formal LSHTM ethics approval is not required and you do not need to complete Sections 5.3 or

5.4]

Project involves human data, but all this human data is fully in the public domain. [If so, formal LSHTM ethics approval is not required and you do not need to complete Sections 5.3 or 5.4]

**Public domain human data must be: available to any member of the public without special permission; to which access is not restricted in any way; and which does not enable the identification of living people, either directly or by linking to other data.*

Project involves some non-public-domain human data, all of which was previously collected in another study or studies. [If so, formal LSHTM ethics approval is required and Section 5.3 must be completed]

Project involves some additional collection of data, further to an ongoing or previously completed study or studies. [If so, formal LSHTM ethics approval is required and Section 5.4 must be completed]

Project is a completely new study which will involve human subjects or human data. [If so, formal LSHTM ethics approval is required and Section 5.4 must be completed]

5.2 LOCAL ETHICS APPROVAL OR RESEARCH GOVERNANCE APPROVAL (to be completed by all students)

As well as approval from the LSHTM Ethics Committee, projects may require specific approval from other involved or responsible bodies. For example, in the UK you may need specific authorisation to work in an NHS facility, or to work with vulnerable groups such as patients or children. Outside the UK a wide range of requirements may apply e.g. from local or national Ethics Committees, government departments etc. **Students must investigate all potential local approval required for your project work. Failure to check or gain any necessary external approval may invalidate LSHTM approval.*

Is local approval required for the work being done (whether this approval is still to be obtained, or has already been granted)?

Yes
 No

**This should include any forms of ethics approval, research governance approval or other specific permissions that may apply.*

If 'Yes', give details of local approval to be obtained (this must be in place before commencing fieldwork) or which has already been granted.

**Please name all bodies whose approval is required, or indicate where work is expected to take place using permissions already granted for a 'parent' project. Where approval has already been granted, quote approval reference numbers and if possible give web links to documents.*

If 'No', explain why formal local approval is not required, and describe any less formal permissions, invitations or support you are being given for this work.

**If you will be working away from LSHTM with human subjects or human data, but cannot identify a local Ethics Committee or believe that no formal approval is required, then please give details and explain what you have done to check this. In such cases, if you do not have formal approval you should always demonstrate appropriate local support, such as correspondence with local government officials or an involved Non-Governmental Organisation.*

Data collected is in public archive.

**If any specific data rights permissions or usage limitations will be required regarding data to be used or collected in the project (e.g. as a result of local ethics or research governance requirements), this should be spelt out in Section 3.3 earlier.*

5.3 PROJECTS USING ONLY PREVIOUSLY-COLLECTED HUMAN DATA (to be

completed if project involves non-public-domain human data, datasets or biological samples previously collected in another study or studies; if collecting any new data, complete Section 5.4 instead)

Summary of purpose and methods of the original study or studies: (max 100 words)

N/A

Give details of all approvals under which the original study or studies took place:

**Please quote names of Ethics Committees and approval reference numbers (required if previous approval was from LSHTM); if possible give web link to original study application.*

N/A

Proposed study: Ensure that the project outline given in Section 3.1 states the purpose, methods and procedures of the new work to be done in your project, and describes how this builds on the previous study or studies (for which participants will already have been recruited, data or samples collected, and procedures performed). Do not reproduce here.

Will your analyses be for purposes not covered by the original application detailed above? If 'Yes', indicate how you will obtain (i) permission to use the data from the principal investigator responsible for each original study; and (ii) retrospective consent, where appropriate, from the participants in each original study.

Yes
 No

N/A

Does the project involve analysis of documentary information and/or data already collected from or about human subjects? If 'Yes', specify analyses briefly.

Yes
 No

N/A

Does the project involve laboratory analysis of human biological samples already collected, or new or additional analysis of stored samples? If 'Yes', specify the laboratory analyses or tests to be performed.

Yes
 No

N/A

Specify how confidentiality will be maintained. Where data will be anonymised, specify how this will be done. When small numbers are involved, indicate how possible identification of individuals will be avoided.

N/A

State how your data will be stored and what will be done with it at the end of the study.

N/A

5.4 PROJECTS COLLECTING ANY NEW HUMAN DATA (to be completed if project involves collection of human data, datasets or human biological samples – either as a completely new study, or collecting additional data further to an ongoing or previously completed study)

Proposed study: Ensure that the project outline given in Section 3.1 contains sufficient detail (inc. purpose, methods, procedures for both new data collection and any work building on previous studies), so as to allow the Ethics Committee to make an informed decision without reference to other documents. Do not reproduce here.

<p>Is your project an intervention study?</p> <p>For LSHTM ethics approval purposes, 'interventional studies' include all trials based on random allocation of interventions, and also non-randomised interventions where participants or groups of participants are given treatments (of whatever nature) that they would not otherwise be receiving in the ordinary course of events and which are allocated by the investigators.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Will any human biological samples be collected? If 'Yes', specify details.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>N/A</p>	
<p>Will any human biological material be stored at LSHTM for more than 24 hours? If 'Yes', specify which samples and how and where they will be stored.</p> <p><i>*Further guidance is given at http://intra.lshtm.ac.uk/support/research/humantissueact.html</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>N/A</p>	
<p>Specify the number - with scientific justification for sample size – age, gender, source and method of recruiting subjects for the study.</p>	
<p>N/A</p>	
<p>State the location and likely duration of new or additional human data collection, and the extent to which this will be carried out by you alone, or in collaboration with others, or by others.</p>	
<p>N/A</p>	
<p>State the potential distress, discomfort or hazards, and their likelihood, to which research subjects may be exposed (these may include physical, biological and/or psychological hazards). What precautions are being taken to control and modify these hazards?</p>	
<p>N/A</p>	
<p>Specify how confidentiality will be maintained. Where data will be anonymised, specify how this will be done. When small numbers are involved, indicate how possible identification of individuals will be avoided.</p>	
<p>N/A</p>	
<p>State how your data will be stored and what will be done with it at the end of the study.</p>	
<p>N/A</p>	
<p>State the manner in which consent will be obtained from subjects.</p> <ul style="list-style-type: none"> - Written consent is normally required. Where not possible, explain why and confirm that a record of those giving verbal consent will be kept. - Where appropriate, please state if and how the information and consent form will be translated into local language(s). 	
<p>N/A</p>	
<p>Please tick to confirm:</p>	<input type="checkbox"/> I have attached copies of the information sheet(s), consent form(s), and other relevant documents related to work with human subjects.
<p>As well as collecting new data, will your project also make use of any human data or biological samples collected in a previous study or studies? If 'Yes', summarise the purpose and methods of the original study or</p>	<input type="checkbox"/> Yes

studies – for which participants will already have been recruited, data or samples collected, and procedures performed. (max 100 words)	<input type="checkbox"/> No
N/A	
<p>Give details of all approvals under which the <u>original study or studies</u> took place:</p> <p><i>*Please quote names of Ethics Committees and approval reference numbers (required if previous approval was from LSHTM); if possible give web link to original study application.</i></p>	
N/A	
<p>Will your analyses be for purposes <u>not covered</u> by the original ethics approval detailed above? If 'Yes', indicate how you will obtain (i) permission to use the data from the principal investigator responsible for each original study; and (ii) retrospective consent, where appropriate, from the participants in each original study.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
N/A	