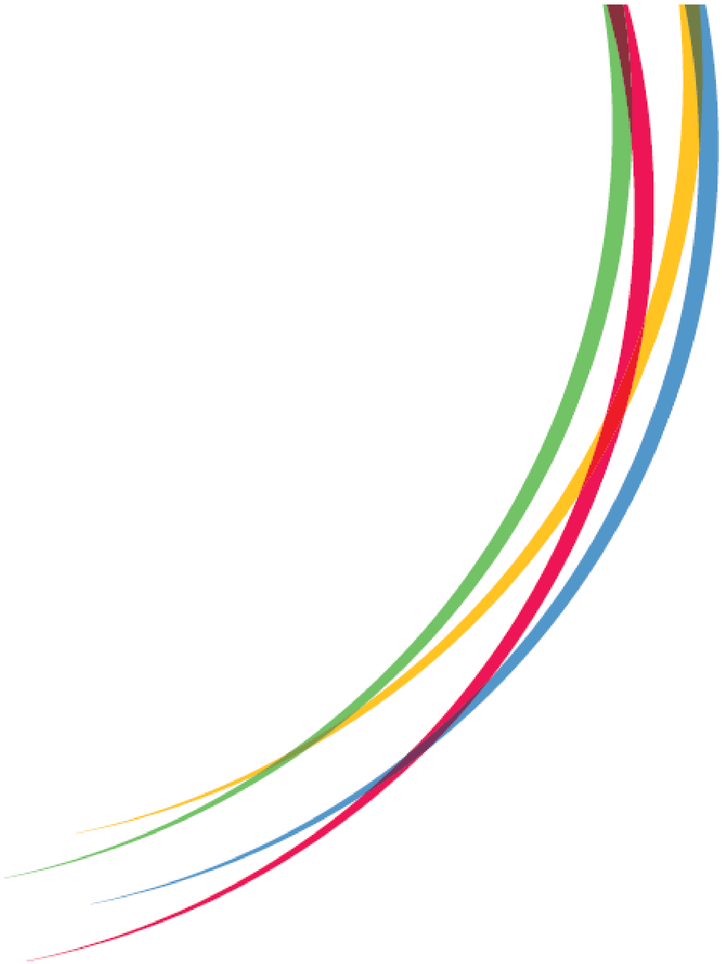

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Obtaining Data Linkage Consent for Children: Factors Influencing Outcomes and Potential Biases

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Non-technical Summary

Fewer people are responding to surveys than ever before. At the same time, there has been an increased demand for the production and availability of data. The linking of administrative records to survey data is seen as an important additional tool to conduct research. Linking data from a person's administrative records to their survey responses has several possible benefits. This data linkage requires informed consent, and as with survey participation, a number of people decline to participate. Studies have examined potential biases in obtained records when consent is not obtained for the whole sample. More recent studies have begun to examine the possible mechanisms that lead people to consent to data linkage and possible methodologies to improve consent rates.

Much less research has been done on consent for children in the survey context, particularly in examination of possible mechanisms for consent. Consent for minors must be obtained for by a responsible adult, rather than through the child directly. This research is among the first to systematically examine consent by mothers for their child in a nationally representative social survey. Potential mechanisms, including respondent characteristics, respondent environment, survey environment, and interviewer characteristics are examined. Possible biases are identified, and methodologies proposed that may improve consent rates for children.

Analyses of consent outcomes show that ethnic minorities are generally less likely to consent for either their children or themselves. Mothers who were harder-to-contact (and possibly more resistant to taking the survey) are more likely to refuse all consent requests. These respondents may feel that accepting the survey request is the extent of their willingness to participate. Improving strategies for reducing survey resistance and increasing willingness to share further may be possible through interviewer strategies developed while interacting with the respondent.[2] Building a rapport with the respondent may also lead to higher consent rates, suggested by the finding in this data that that longer interviews led to higher consent rates.

There was little impact of interviewer demographics, overall experience, and interviewer's achieved response rate and experience within *Understanding Society*, with no significant effects identified for mother or children health records. Why one consent request is apparently not affected by these interviewer success measures is unclear. Further exploration of which, when, and why interviewer traits are important is needed, which can then be used in interviewer recruitment and training.

In addition to identifying the factors related to consent, this study examined characteristics of children based on whether they were consented for or not to identify potential biases. There are a number of important demographic differences across children, with records less likely to be obtained among ethnic minorities and those in Southeast England and London. Responses to the youth survey of 10-15 year olds in *Understanding Society*, however, suggest little differences across several behaviours and attitudes, except for internet usage. While the lack of differences may be somewhat encouraging to users of linked data, the best way to minimise bias is increase consent rates. For example, the differences in consent across ethnicities raise other concerns when the linked data are correlated with these demographics as many health outcomes may be.

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This research uses a large nationally representative survey asking mothers to consent for both themselves and their children for two sets of records. Nearly all mothers give the same consent outcome for all their children. Consent is higher for education records than for health records and higher for mothers than children. Multivariate analyses suggest that minorities are generally less likely to consent, while more trust increases chances of consent. Several survey environment factors are also important. Findings suggest potential methodologies to improve consent rates, important given significant demographic differences found. However, data from 10-15 year olds in the study shows fewer differences for several important behaviours and attitudes.

Key words: data linkage**,** consent decision, children

JEL classifications: C81, C83

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Introduction

A growing number of survey practitioners see linking administrative data to survey responses as an opportunity to improve data quality while reducing costs and easing interviewer and respondent burden (Korbmacher & Schroeder 2013; Sakshaug & Kreuter 2012; Sakshaug, Tutz & Kreuter 2013; Sala, Burton & Knies 2012; Sala, Knies & Burton 2014). Studies examining data linkage within surveys have largely focused on direct consent requests to the respondent. However, parents may also be asked to link their children's administrative records, which may be of particular interest in longitudinal studies. Inclusion of children's records allow for studying changes and outcomes over time for familial units, including intergenerational change (Lightfoot & Dibben 2013). The results using these records may lack generalizability and may be biased if consent is low and/or those who consented are different to those that did not (Bohensky et al. 2010; Sakshaug et al. 2012).

Understanding the mechanisms of consent is important in determining and potentially minimising the extent of bias. The present study examines consent for children, where the literature on mechanisms is the sparsest. Additionally, rather than studies focusing on more restricted populations frequently used in studying consent for children (e.g. new-borns, those hospitalized, school-based), the current research employs a large, nationally representative study. The decision to consent to data linkage on behalf of children is examined systematically for two consent requests as well as the consent outcomes for both the parent and child jointly.

These analyses shed light on the factors affecting consent outcomes, including possible influences of the respondent's environment, interview process and interviewer effects. Where research on children's consent exists, these areas have not been examined. By supplementing these data using a separate survey administered to 10-15 year olds in the study, this research also begins examination of demographic, behavioural and attitudinal differences among those consented for or not, identifying potential biases. It concludes with a discussion about what the results suggest about data linkage in the survey context, generally and for children specifically, and possible paths for improvement

Data Linkage Consent for Children

Consent for children may present new challenges and issues compared to gaining consent for adults only. Parents are required to provide consent rather than the children themselves. Parents may be less likely to give consent for their children than they would for themselves, possibly fearing risk to their children or that it is not their place to provide their consent for their children's records. Conversely, parents may have little issue in consenting to link their children's records due to perceptions that there is "nothing to hide" or of interest in their children's data.

A number of surveys have asked for consent to link children's administrative records (see descriptions for examples in Lightfoot & Dibben 2013). However, few studies have systematically examined consent for children and its possible correlates, and these studies have examined somewhat limited populations. McKinney et al. (2005) sought consent from parents who had children admitted into a paediatric intensive care unit. Tate, Calderwood, Dezateaux & Joshi (2006) asked for birth register and maternity data from a cross-section of mothers of new-borns, but as a single request. Klassen, Lee, Barer, & Raina (2005) asked for consent from caregivers of a cohort of children born in three hospitals, aged 42 months at the time of the survey. Consent for data linkage was asked for both the caregiver's and the child's administrative records.

Consent rates for children in the surveys identified ranged from 43% (McKinney et al. 2005) to 92% (Tate et al. 2006). All of these studies find differences in respondent characteristics, similar to other consent studies (see Kho et al. (2009) and Sakshaug et al. (2012) for reviews). Generally, minority groups provided lower consent rates (McKinney et al. 2005; Tate et al. 2006), with some evidence that higher socioeconomic status related to higher rates of consent (Klassen et al. 2005; Tate et al. 2006). The Klassen et al. (2005) study is the only one identified examining separate consent for adult and child, finding that higher consent was obtained for children than adults (7.1% higher). Given the younger age of the child at the time consent, this difference may be related to the concept that there is relatively less information to share. This difference was only found among families with a baby born in the NICU, however, and the authors speculate that parents may have felt that consent would benefit these less healthy babies more.

These findings are consistent with school-based studies of parental consent. These studies find demographic differences (such as minority and socioeconomic status) between consenters and non-consenters, raising questions of generalizability (Bergstrom et al. 2009; Esbensen et al. 2008). This research also finds that children in studies requiring active consent (i.e. the need to opt-in) are significantly different from those requiring only passive consent (i.e. the need to opt-out). Active consent participants have a lower prevalence of smoking (Anderman et al 1995; Unger et al. 2004), have higher grades and better school attendance (Henry et al. 2002), are less likely to report drug use or delinquent behaviour (Esbensen et al. 1999), and self-report better health (Anderman et al. 1995).

While studies of consent for children have examined feasibility and possible biases, few have focused on possible mechanisms of consent. There is a growing understanding of the mechanisms of consent in a framework similar to understanding the decision to participate in surveys generally (Groves & Couper 1998; Korbmacher & Schroeder 2013). This framework suggests that multiple factors influence the consent decision, including the respondent, the respondent’s environment, the interview process and the interviewer. Beyond respondent demographics, respondents’ who express greater trust in people or support for left-leaning parties are more likely to consent (Sala et al. 2012). Conversely those that express concerns about privacy and those located in urban areas are less likely to consent for data linkage (Korbmacher & Schroeder 2013; Sakshaug et al. 2012;).

Survey features and interviewer characteristics are also potentially important factors in consent outcomes, but have yet to be examined in the context of consent for children. In studies of adults, those harder-to-contact initially are also less likely to consent to link their administrative records (Sakshaug et al. 2012; Sala et al. 2012). Conversely, greater levels of interviewer-respondent rapport boost consents rates (Jenkins et al. 2006). Rapport can encourage consent through it increasing respondent motivation and the desire to gain interviewer approval (Cannell, Miller and Oksenberg 1981; Dijkstra 1987).

The effect of interviewer characteristics, like other findings in consent studies, is mixed. For example, Korbmacher & Schroeder (2013) find effects of interviewer age and experience, with older and more experienced having greater success, while Sakshaug et al. (2012) find no interviewer effects. Interviewer sex has not been identified as an important factor, but studies examining survey participation find when both the interviewer and respondent are female, survey cooperation is higher (Durrant et al. 2010). Interviewers’ experience with the survey has been significant in some studies (Sala et al. 2012), but not in others (Sakshaug et al. 2012). These factors have not been explored in the context of consent for children, and this study takes the first step to fill these gaps.

Data and Methods

Sample

Understanding Society: The United Kingdom Longitudinal Household Study is a large (~40,000 households at Wave 1) annual longitudinal survey intended to collect quality data about a variety of issues in order to understand long-term effects of social and economic change in the UK. The design is such that each wave of the survey is conducted over a two-year period. The first wave of the survey was conducted over 2009 and 2010.

There are two samples used from the first wave of *Understanding Society*, a large General Population Sample (GP) plus the Ethnic Minority Boost (EMB). The EMB sample was designed to provide at least 1,000 interviewed adults from each of five groups: Indian, Pakistani, Bangladeshi, Caribbean, and Africans. Understanding Society employs a complex survey sample, employing a stratified-clustered design selected through probability proportionate to size (PPS) methods. More information of the sample design can be found in Lynn (2009) and in Knies (2014).

The survey was conducted using face-to-face computer-assisted personal interviewing (CAPI). An interviewer had to make a minimum of six calls before a household could be classified as a non-contact, including calls at evenings and weekends (interviewers could do more than six). Interviews were attempted for all members of the household aged 16 and over. The household response rate for the GP sample (including households providing at least one survey) is 57.3% (AAPOR RR3). The individual response rate conditional on household acceptance is 81.8%. The EMB sample had lower response rates: a 39.9% household response rate and a 72.4% conditional individual response rate.

The Consent Request

At the end of the survey, respondents were told the study would like to link administrative health records to their survey responses. Respondents were given information leaflets and asked to sign consent forms. Separate forms were handed out for health and education, with separate forms for adults and children.[1] For requests to link children's records, one adult in the household was deemed responsible. All respondents were first asked about linking their own health records from the National Health Service (NHS), immediately followed by the consent request for their children's NHS records. Due to the nature of the records maintained at the administrative level, education record-linkage consent was then asked to those born after 1981 and attended school in the UK. Regardless of whether they were asked to consent for linking their own education records, adults responsible for children aged 4-15 years old were asked for consent to link their children's education records to the survey.

If the mother was part of the household, she was listed as responsible. If she was not, then the father was listed, if neither, then the closest adult relation was listed. The vast majority of consenting adults (95.6%) was the biological mothers. Biological fathers made up

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[1] Information leaflets and consent forms can be found at https://www.understandingsociety.ac.uk/documentation/mainstage/fieldwork-documents

3.0%, with the remaining 1.4% of consenting adults includes adoptive mothers, grandmothers, adoptive fathers, grandfathers, stepmothers, stepfathers, older siblings, and other caretakers. Given that all other adults were asked for consent only in cases when the biological mother was not available, sex effects may be confounded with effects relating to the absence of the mother. Due to this possible confounding and that most responsible adults were biological mothers, analyses are restricted to these mothers to ensure comparability.

Consent to link records was asked for 14,570 children under the age of 15 from 8,309 mothers. However, almost every mother either consented for all of their children or none of their children for a given request. This consistency suggests that consent is due to parental factors, rather than specific characteristics of the child, effectively making the decision for children a single one. Only 37 adults gave different consent decisions for either their children's health or education records, representing 96 children.

All of these inconsistencies occurred where an adult gave only one child a different consent outcome of all other children. That is, in instances of three or more children, 1 child had one outcome and the others all had the other outcome. Of the 37 adults, 22 were inconsistent for health records only, 9 for education records only, and 6 inconsistent to both. While these are a potentially interesting subgroup, for statistical analysis the number is too small to reliably examine child-level factors, and these cases are set aside in the following analysis. Dropping the small number of inconsistent cases leaves 14,493 children and 8,272 mothers, leading to 8,272 unique child health record consent decisions and 6,439 education record decisions.

Variables Possibly Related to the Consent Outcome

Several variables collected in the survey are included as potentially important relationships with consent. Variables both of theoretical and empirical interest are included (complete description of variables is included in Appendix A). Sociodemographic variables include: sex, ethnicity, age, employment status, educational attainment, whether they currently cohabit with a partner or not, whether they have and one child or more. Whether or not they receive any benefits includes any benefits except a child benefit, which is provided to most families.

Besides sociodemographics, several other respondent factors may impact the likelihood to consent. One factor is the respondent's risk aversion and trust levels. Variables are therefore included regarding the respondent's general inclination to take or avoid risks and the respondent's attitude towards trusting others (both on 11-point scales). Health status has been shown to impact consent rates, although not always in a consistent direction (Kho et al. 2009). As such, SF-12 physical health scores are included as a covariate, scaled from 0 for the lowest level of health to 100 for the highest level of health. Following the partisanship findings of Sala et al. (2012), an indicator of support for left-leaning parties support is also included.[2]

Given the importance of household factors in consent, several household level variables are included. Home ownership and monthly household income (in thousands of GBP) are included, as is the total number of members in the household (capped at 10 to control outliers), which may indicate differences in household composition and environment. Given the noted relationship between urbanicity and consent (Korbmacher & Schroeder 2013) and following Jenkins et al. (2006) and Sala et al. (2012), London and the southeast of England are compared to the remainder of the UK.

The last set of variables is related to the interview process and the interviewer. The number of calls to the household is included, which may indicate survey resistance (e.g. Sakshaug et al. 2012). The length of the interview not including the time for consent questions (as those who consent may take more time to read and sign forms) is used as a possible indicator of respondent-interviewer rapport (e.g. Jenkins et al. 2006). An error in survey led to 45 cases having no interview times recorded. An indicator of whether others are present (recorded by the interviewer) during the interview is included as other may influence decisions (e.g. Sala et al. 2012).

There were 916 interviewers who asked at least one adult for consent to link children's administrative records to their survey responses. The interviewer demographics available from the field agency include age, sex, and ethnicity. However, a large number of the interviewers refused to disclose their ethnicity (21.8%), and so interviewer ethnicity will not be considered further. Experience as an interviewer at the research company is also included. Sex, age, and experience at the research agency are all missing for 17 interviewers, but these account for only five of the 8,272 unique consent requests examined here.

Two additional derived measures regarding interviewers' intra-survey experience are included. One is interviewer experience on *Understanding Society* survey indicated by the number of interviews completed up to the point that a given interview is taking place. The other is the interviewer's achieved response rate in *Understanding Society*, used an as indicator of interviewer ability.

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[2] Labour, Liberal-Democrat, Scottish National Party, Plaid Cymru, Green Party, SDLP, Alliance, and Sinn Fein

The Youth Survey

Interviewers also attempted to hand out paper self-administered questionnaires to all 10-15 year old household members. Verbal consent was sought from the parent or responsible adult before giving the surveys to these youths. These surveys were handed out with a plain envelope to protect the confidentiality of their answers. Youth questionnaires included questions about health, behaviours, school, neighbourhood, families, and other beliefs.[3] Within productive households there were 6,607 youths aged 10-15 eligible for the survey; 4,895 (74.1%) of these completed it.

Several measures are used to compare youths with and without obtained consent for data linkage. Self-reported behavioural categorical measures include: frequency arguing with mother ("hardly" or more); use the internet daily or not; having a social media account; having their own mobile phone; whether they eat 3+ fruits and/or vegetables per day or fewer; whether they are ever bullied or not; and whether they smoke or not. The number of friends was recorded as an open-ended response where any positive number was acceptable.

The self-assessment/attitude questions include three satisfaction questions, all measured on a 7-point scale where 7 is coded most satisfied and 1 is least satisfied. These are satisfaction with school, family, and life overall. Feeling of family support is indicated by comparing those they feel supported by their family in most or all things to those saying they feel supported in some things or do not feel supported. Two questions are included about how youths see themselves as people. Respondents were asked to assess the level of truth on a 3-point scale ("Not True", "Somewhat True", "Certainly True") for the statements "I get a lot of headaches, stomach-aches or sickness" and "I am usually on my own. I generally play alone or keep to myself". The response options "Somewhat True" and "Certainly True" are combined to compare against those for whom the statements were assessed to have no truth. The effect of separating truth categories was tested, with no effect found.

Results

Table 1 presents the characteristics of mothers, their households, the survey environment, and interviewers. The final column shows that for some measures, particularly for risk, trust, and party support, there is more missing data than for others. Somewhat less

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[3] Full questionnaires can be found at https://www.understandingsociety.ac.uk/documentation/mainstage/questionnaires

than half were responsible for one child. Respondents on average picked the midpoint on their propensity to take risks generally, but expressed lower a propensity to trust in strangers (on 0-10 scales) While the majority of respondents asked to consent for a child were British or Irish white, because of the ethnic minority boost there were significant numbers of minorities asked as well.

Table 1. Mother Sample Characteristics

	Mean/Proportion of Sample	n
Respondent Characteristics		
Receive a Benefit	0.691	8220
Partner	0.719	8271
Age	36.29	8272
One Child	0.449	8272
Two or More Children	0.551	8272
SF-12 Physical	52.01	8235
Risk Taking	5.00	6731
Trust Strangers	3.31	6734
Left-Leaning Party Supporter	0.478	7447
Employed	0.557	8272
Unemployed	0.066	8272
Not in Labour Force	0.377	8272
British/Irish White	0.677	8270
Black	0.096	8270
South Asian	0.133	8270
Other Ethnicity	0.021	8270
University Degree	0.230	8268
Professional Degree	0.136	8268
Less than Professional Degree	0.644	8268
Household Characteristics		
Household Size	3.90	8272
Southeast/London	0.317	8272
Monthly Household Income	3479.03	8260
Own Home	0.567	8254
Survey Environment		
Number of Calls	4.92	8265
Others Present	0.485	8267
Interview Length in Minutes	36.99	8227
Interviewer Characteristics		
Interviewer-Age	57.35	749
Interviewer-Female	0.518	749
Years as Interviewer	5.49	749
Number of UKHLS Interviews Completed	77.93	753
Interviewer Response Rate	0.608	753

Examining survey factors, on average it took nearly 5 calls per household to complete the survey. Almost half of the mothers had someone else present while answering the questionnaire, which took slightly more a half-hour on average. The interviewers skew somewhat older, with slightly more female than males. These interviewers achieved nearly a 61% response rate to the survey and on average completed about 78 interviews.

Table 2 presents the consent rates to link administrative records for mothers and their children. There is missing data for the health records consent request for one mother, explaining the difference in achieved sample size. Consent rates for health records are lower than consent for education records, although this difference is higher for children. Health records may be perceived as more private than education records; greater concerns about privacy can lead to lower consent rates (Sakshaug et al. 2012). Further, mother consent rates are higher than for children, although this difference is also more pronounced for health records.

Table 2: Consent for Record Linkage for Mothers and Children, by Request

Request	**Health Mother**	**Health Child**	**Education Mother**	**Education Child**
% Consent	67.1% (n=8271)	61.1% (n=8272)	69.9% (n=624)	68.4% (n=6439)

Of the 6,439 mothers responding for both their children's education and health records, 88.6% gave the same consent outcome to both requests. Of the total, 59.4% of mothers said yes to both, 29.2% said no to both, while 11.4% said yes to one and no to the other. Reflecting figures in Table 2, more said yes to education only than to health only: 9.1% yes to education/no to health, 2.3% yes to health/no to education. The general overall consistency suggests a possible similarity in factors which relate to consent outcomes.

To examine these relationships and possible biases among all respondents, separate multilevel logistic regression (random intercepts) models for children's health and education consent are estimated (consent or not). Respondents are nested within interviewers. As a first step, random-intercepts only (null) models are estimated for the initial interviewer intraclass correlations (ICC). The null models include only cases used in the full models for comparability. For children's health consents, the interviewer ICC is 0.105, while for children's education consents it is 0.159. These moderate-sized ICCs indicate that the influence of interviewers explain 10.5% of the variance for health consent outcomes and 15.9% of the variance for education consent outcomes.

Variables included predicting consent outcomes use the respondent, household, survey environment, and interviewer measures contained in Table 1. Those not in the labour force are used as the baseline to compare those employed or unemployed and those with less than a professional degree is the baseline educational category. While the effect of ethnicity on consent has been mixed in general (Kho et al. 2009), the few children's consent studies have found minorities tend to consent at lower rates (McKinney et al. 2005; Tate et al. 2006). As such, British/Irish whites are used as the baseline ethnicity category for comparison with minority groups. The number of completions by an interviewer prior to the particular interview is used to measure interviewer experience with *Understanding Society* to date. Both full models significantly improve fit over the respective null models (for health $\chi^2_{27} = 153.87$, p<0.01; for education $\chi^2_{27} = 143.95$, p<0.01). The results of the full models are presented in Table 3.

Table 3. Odds Ratios for Children's Health and Education Records Consent Outcome

	Health	Education
Respondent Characteristics		
No Benefits	1.102	1.179
Partner	1.011	1.185
Age	1.002	1.003
One Child	1.057	1.029
SF-12 Physical	0.999	0.995
Risk Taking	0.990	0.980
Trust in People	1.072*	1.077*
Left-Leaning Party Supporter	1.273*	1.277*
Employment Status (Not in Labour Force)		
Employed	1.063	1.094
Unemployed	1.058	0.976
Ethnicity (British/Irish White)		
Black	0.603*	0.592*
South Asian	0.773*	0.687*
Other Ethnicity	0.530*	0.631
Education (Less than professional)		
University Degree	0.783*	0.824
Professional	1.077	1.137
Household Characteristics		
Household Size	1.039	0.940
Southeast/London	0.875	0.949
Household Income	1.000	1.000
Own Home	0.746*	0.720*
Survey Environment		
Number of Calls	0.967*	0.952*
Others Present	1.131*	1.189*
Interview Length in Minutes	1.012*	1.017*
Interviewer Characteristics		
Interviewer-Age	1.002	1.001
Interviewer-Female	0.957	1.087
Years as Interviewer	1.002	1.008
Number of UKHLS Interviews Completed	1.001	1.002*
Interviewer Response Rate	1.492	1.845*
Interviewer ICC	0.094	0.145
n Respondents	6018	4705
n Interviewers	720	703

*p<.05

The significant effects, presented as odds ratios, are largely consistent across children's health and education consent outcomes. This consistency suggests that certain types of circumstances may explain consent decisions, rather than the specific records included in the consent request. For both consent requests, minority ethnicities generally have lower predicted odds than British or Irish whites. The only non-significant comparison group is for other ethnicities the education model, which may be in part due to power. The estimate for other ethnicities in the education is otherwise consistent in direction and magnitude with the health model. The impact of minority-status is not related to being born in the UK or not; when grouping respondents based on place of birth (UK or internationally) and including this in the health consent model rather than ethnicity (not shown), no effect is found (p=0.21). These racial differences suggest possible biases in the obtained administrative records.

Those owning their home have lower predicted odds of consent for either children's health or education records, as is having a university degree. Taken together, there is some evidence that those with higher socioeconomic status are less likely to consent for children, again possibly introducing some bias. However, other measures of SES, such as employment status and household income show no significant impact.

Importantly, attitudinal factors relating to party support and trust in strangers are significant in predicting consent outcomes, with both effects being consistent with past UK research (Sala et al. 2012). Those supporting left-leaning political parties are more likely to consent to linkage of children's administrative records, as are those expressing a greater propensity to trusting strangers. Attitudes have a similarly important effect in children's consent decisions as these do for adults, with those more socially-oriented more inclined to consent (e.g. Sala et al. 2012).

The survey environment also has an important impact on consent rates for linking children's administrative records. More calls required to obtain a survey completion is negatively related to consent, consistent with a survey resistance explanation (Sakshaug et al. 2012). Estimated interview length, a potential measure of interviewer-respondent rapport, is also significant in the expected direction, with longer interviews (greater rapport) related to higher odds of consent. Those who had others present during the survey are also more likely to consent to education records linkage, all else being equal. These findings contrast with Sala et al. (2012), which found no effect for the presence of others on consent.

The reasons for this effect are unclear, based on interviewer observations. If the interviewer indicated the presence of another in their observation (n=4011), they were asked about what influence the other person appeared to have on the respondent. Interviewers indicated that in the large majority (80.8%) of cases the additional other(s) has no influence at all on responses. Another 14.0% were noted as having a little influence, 3.7% having a fair amount of influence, and 1.5% having a lot of influence. If the interviewer indicated any influence at all, they were then asked to record in what way the respondent was influenced.

Of the 768 cases where any influence was recorded, the most reported form of influence was the respondent sought help from others (26.7%), although the form of this help is not specified. The next highest reported form of influence is that others answered some survey questions for the respondent (26.6%), then with help with recall of information (e.g. dates and amounts) (19.7%). Which questions these took place for and in what manner the help took is not recorded; however, interviewers indicated that the other(s) disapproved of respondents' answers in only 1.8% (n=14) cases where others influenced the respondent. Of these 14 cases, only 4 consented to link children's health records and 3 consented for education records.

None of the interviewer characteristics have a significant effect on children's health records consent rates. Interviewer demographics, including years as interviewer, do not have a significant effect in either model. Given that only mothers are considered, the lack of significance of interviewer sex suggests no effect of female interviewer-respondent pairings on consent. The lack of an interaction varies from the finding that women respondents are more likely to consent to an interview when approached by a female interviewer (Durrant et al. 2010). The lack of interviewer effects in the children's health records model is in part reflected in the relatively minor reductions in interviewer ICC from the null to full models, acknowledging the limitations in comparing variance components in multilevel models using categorical outcomes (Bauer 2009, Hox 2010). There is only a 10.5% relative decrease in the ICC for the health consent model (i.e. 0.105-0.094/0.105).

The higher initial estimated ICC for children's education records suggests a greater impact of interviewers on this outcome, and is reflected in significant effects for intra-survey experience and response. More completed interviews and a higher response rate in the *Understanding Society* survey are related to higher probabilities of consent to link education records. Interviewer experience and success appear to have an effect, but evidently for only some types of requests. Constraining the health model to only sample members who are also included in the education model still produces no significant effects for interviewer variables. It appears that the effect is related to specific requests rather than specific respondents. Even with these significant effects there is only an 8.8% relative decrease in the ICC for the education model. In combination with the lack of effects for the health model, there are apparently additional interviewer effects of importance that are currently not measured.

This analysis shows factors that are related to consent decisions made by mothers for their children. If the goal is also to examine the administrative records and linked survey responses for mothers and their children jointly, however, consent must be obtained for both. An adult may not consent for either, consent for themselves but not their children, for their children but not themselves, or for both their children and themselves. Little research has examined this joint outcome in a systematic manner, but the current data contains consent decisions for both mothers and their children. Given the age restriction (ages 16-25), only 154 mothers that were asked for access to their education records also had eligible school-age children at Wave 1. However, everyone was asked for health record linkage, and given the similarities found in consent for children's health and education records, joint health consent is analysed. Table 4 presents the joint outcomes for consent requests of mothers and their children.

Table 4: Joint Consent Decisions for Mother-Child Health Record Linkage

Mother-Child Health	**Neither**	**Mother Only**	**Child Only**	**Both Mother and Child**
% Consent	30.0% (n=2483)	8.9% (n=736)	2.8% (n=235)	58.2% (n=4817)

The majority of mothers consent for both themselves and their children, with the second largest category being those who consent for neither children nor themselves. These consistent outcomes account for 88.2% of decisions; however, a sizable number of mothers consent for one health record request but not the other. Most of these inconsistencies occur where the mother consents for themselves only (8.9%), but 2.8% consent for their children only. The only study identified comparing parents and children found that mothers were more likely to consent for their children than themselves, but only among babies born in the NICU (Klassen et al. 2006). The authors suggest that the differences in their sample may be related to issues of health concerns for the NICU-born children.

To examine the differences more deeply in this representative sample, analyses estimate the relationships between the various factors identified and the joint health records consent outcome. One of the main goals of the analysis is to identify possible reasons why a mother consents for only one of the requests, but not both. As such, a multilevel multinomial logistic regression (random intercepts) model is estimated using consent to both requests as the baseline. The null model interviewer ICC is 0.099, suggesting some interviewer influence. The full model uses same the independent variables in Tables 1 and 3. The full model significantly improves fit over the null ($\chi^2_{27} = 153.87$, p<0.01) and reduces the interviewer ICC by 12.9%. Table 5 presents the results in terms of odds ratios.

Table 5. Odds Ratios for Joint Mother-Child Consent Outcomes

	Neither	Mother Only	Child Only
Respondent Characteristics			
No Benefits	0.842*	1.155	1.065
Partner	0.981	1.000	1.053
Age	1.000	0.992	1.005
One Child	0.922	1.010	0.994
SF-12 Physical	1.001	1.003	0.998
Risk Taking	1.010	1.010	0.992
Trust in People	0.925*	0.955*	1.005
Left-Leaning Party Supporter	0.767*	0.858	1.082
Employment Status (Not in Labour Force)			
Employed	0.898	1.112	1.257
Unemployed	0.879	1.210	1.560
Ethnicity (British/Irish White)			
Black	1.912*	1.199	2.137*
South Asian	1.604*	0.770	2.801*
Other Ethnicity	2.105*	2.006*	4.258*
Education (Less than professional)			
University Degree	1.301*	1.248	1.148
Professional	0.913	0.923	0.792
Household Characteristics			
Household Size	0.949	0.983	0.974
Southeast/London	1.180	1.109	1.079
Household Income	1.000	1.000	1.000
Own Home	1.324*	1.428*	1.246
Survey Environment			
Number of Calls	1.047*	1.005	1.022
Others Present	0.886	0.931	1.254
Interview Length in Minutes	0.987*	0.991	0.993
Interviewer Characteristics			
Interviewer-Age	0.999	1.002	1.006
Interviewer-Female	1.072	1.057	1.308
Years as Interviewer	0.992	1.005	0.976
Number of UKHLS Interviews Completed	0.999	0.999	1.002
Interviewer Response Rate	0.671	0.581	0.632
Interviewer ICC		0.086	
n Respondents		6018	
n Interviewers		720	

*p<.05

Comparing those who consent to linking neither their own nor their children's health records to those that consent to link both produces results similar to the above analyses examining only consent for children's health records (with inverted odds ratios). The only significant difference that arises is the impact of benefit receipt. Benefit recipients are more likely to consent to both than refuse both, consistent with the argument of reciprocity (e.g. Sakshaug et al. 2012). Like the children's records-only analyses, ethnic minority respondents are more likely to refuse the consent request for both themselves and their children than are British or Irish whites. Those with university degrees and own their home are more likely to refuse both consent requests relative to those consenting to both. Socioeconomic status again appears to have some effect, with some evidence that higher SES respondents are less likely to consent to all requests and more likely to refuse all requests.

Those with higher reported levels of trust in strangers and those supporting left-leaning parties are more likely to consent to both requests than refuse both, suggesting that those more socially-oriented are more likely to consent to both requests. The survey environment also continues to show an important effect on respondents consenting or refusing to both requests. Longer interviews are related to higher odds of consenting to both relative to refusing both, while more calls are related to higher rates of refusals to both requests than consents to both. These findings suggest that those with more rapport with their interviewer are more likely to accept both requests while those harder-to-contact are more likely to refuse both requests.

Examining the cases where the mother only consented for herself but not her children shows only two significant effects. Relative to British and Irish whites, mothers included in "other" racial and ethnic categories are significantly more likely to consent for just themselves than for both requests. Across the model, these respondents show an increased likelihood to decline at least one of the requests compared to British and Irish.

The other differentiating factor is the measure of trust. Those with lower levels of trust are more likely to consent for only themselves relative to those who consent to requests for both themselves and their children. Changing the model's baseline (not shown) shows that no significant effect of trust comparing mothers consenting only for them relative to refusing both requests. Taken together, these findings suggests that higher levels of trust are important in differentiating those who are more likely to consent to any request, rather than differentiating among those who choose to refuse any or all.

Trust does not significantly differentiate those who consent for their children only and not themselves. Rather, the only significant factor is ethnicity. Minority ethnicities and ethnicities are significantly more likely to only consent for their children than those consenting for both themselves and their children alike. In combination with the children consent models, results suggest that minorities are significantly less likely to consent to requests for data linkage generally and in particular less likely to consent for themselves. This difference in consent rates has raised the concern about possible biases in linked records, both among mothers and children (Tate et al. 2006).

The goal of this research has been to identify consent mechanisms when asking mothers to link their children's administrative records to a nationally representative survey. Results also indicate possible biases among mothers, but do not speak to children characteristics specifically. To identify how the children consented for differ than those who were not consented for and potential biases, Table 6 compares measures considering all children of the included mothers. Health consent outcomes are considered as it was asked of everyone. The top portion of the table includes children's demographic data collected from mothers. Even if these differences were not significant in prediction of consent, differences may arise due to distributions in numbers of children. The bottom portion of the table displays responses from selected questions in the separate 10-15 year old youth survey, the only directly collected data from children under 15 in the study.

Table 6. Children Characteristics, by Consent Outcome

	Consent (n=8791)	No Consent (n=5683)	Difference
Demographics, All Children			
Female	0.486	0.494	-0.008
Age	7.37	7.19	0.018*
Monthly Household Income	3449.42	3509.69	-60.27
Only Child	0.279	0.271	0.008
Mother Has University Degree	0.205	0.241	-0.036*
Southeast/London	0.289	0.378	-0.089*
British/Irish White	0.702	0.570	0.132*
Black	0.071	0.121	-0.050*
South Asian	0.140	0.188	-0.048*
Other Ethnicity	0.016	0.028	-0.012*

	Consent (n=2772)	Consent (n=1311)	Difference
10-15 Year Old Survey			
Hardly Argue w/Mother	0.466	0.473	-0.007
Use Internet Daily	0.553	0.500	0.053*
Has a Social Media Account	0.706	0.665	0.041*
Smoke	0.062	0.056	0.006
Have Own Mobile Phone	0.846	0.822	0.024
Ever Bullied	0.197	0.206	-0.009
3+ Plus Fruit/Veg Per Day	0.547	0.552	0.005
Number of Friends	7.50	7.38	0.12
Family Satisfaction (7-Point Scale)	6.47	6.42	0.05
School Satisfaction (7-Point Scale)	5.39	5.41	-0.02
Life Satisfaction (7-Point Scale)	5.90	5.92	-0.02
True Unwell A Lot	0.397	0.403	-0.006
True Usually On Their Own	0.337	0.343	-0.006
Family Support Mostly/Always	0.788	0.796	-0.008

*p<0.05

The children who were consented for are demographically different in several ways. Children who were consented for are on average older than those not consented for, albeit this difference is relatively small. A significantly smaller proportion of children consented for have a mother with a university degree than those children not consented for. More of those not consented for live in London and the southeast of England than among consented for children. British/Irish whites constitute more and minorities are less of the consented for children compared to those not consented for. Based on these differences, the children's records available for linkage may be biased, particularly given the possible relationships between health outcomes and demographics.

Examining the results from the 10-15 year old survey, however, suggests less difference on these possibly important measures, again noting the restriction of the sample in age. The only significant differences identified in these measures both relate to internet usage. More of the children consented for access the internet daily and have a social media account than those not consented for. While internet usage may be correlated to health outcomes, many other measures possibly more related are not different across consent outcomes. Smoking rates, satisfaction measures, familial support, experience with bullying, and eating fruit and vegetables are do not differ between groupings. The lack of differences does not necessarily mean a lack of bias, particularly in the face of the identified demographic differences. However, these findings indicate the children consented for or not are similar in other important behaviours and attitudes.

Discussion and Conclusions

Requesting consent for data linkage in surveys is becoming an increasingly important tool for researchers, and work has started to examine the mechanisms of consent. Much less has been done on consent for minors, and this study employs a large, nationally representative survey to systematically analyse consent outcomes for children. By examining consent outcomes for children's health and education records and for the joint outcome of consent request for mother and children health records important factors could be identified over several requests.

Importantly, most mothers gave the same consent response for all of their children, suggesting that what are important are mother-level factors, rather than child-level factors. Consent for health records is lower than for education records, and consent for children is lower than for their mothers. These parent-child differences are contrary to the one study comparing the two outcomes, where children were consented for at higher rates (Klassen et al. 2006). A number of mothers consented for themselves and then not their children; however, a non-trivial number of mothers consented only for their children and not themselves.

Several of the mothers' characteristics are consistently related to consent, both for their children and themselves. Minorities are less likely to consent for either their children or themselves, but are apparently more opposed to consent for themselves. That minorities are less likely to consent is consistent with other findings on children consent rates (Klassen et al. 2005; Tate et al. 2006). The consistency of results across these studies as well within the analyses presented for a number of respondent characteristic indicates possible mechanisms which need deeper explanation for causal understanding.

Importantly, greater trust in strangers and being supportive of left-leaning political parties also has a consistent positive effect on the probability of consent, consistent with other studies (Sala et al. 2012). Understanding the effect of beliefs is important in studying the mechanisms as these clarify possible psychological processes in decision-making. For example, research suggests that confidentiality and salience of the request may be important reasons why people choose to consent or not (Sala et al. 2013). Conversely, knowing that data linkage will reduce their burden does not appear to influence respondents (Sakshaug et al. 2013). Given the demographic differences identified, further understanding of how these psychological factors differs across the population may also be illuminating. If such differences are found, findings may allow for question tailoring in survey design.

This article is among the first to examine survey and interviewer factors as mechanisms in consent outcomes for children. These factors are of particular importance to researchers, as unlike respondent characteristics, these factors are under researcher influence. Those harder-to-contact (and possibly more resistant to taking the survey) are more likely to refuse all consent requests. These respondents may be more uncooperative to the study generally, and feel that accepting the survey request is the extent of their willingness to participate. Improving strategies for contact, reducing survey resistance or increasing willingness to share further may be possible through interviewer strategies developed in the interviewer-respondent interaction (Groves and Couper 1998). Training interviewers strategies identified as most successful may further increase consent rates.

The impact of interviewer-respondent interaction is indicated by the finding that longer interviews lead to a greater chance of obtaining consent. Building rapport is another technique potentially trained to interviewers. However, surveys that are too long may frustrate interviewers and respondents alike. Finding an appropriate length where rapport is maximized while not fatiguing participants may increase consent rates and data quality generally (e.g. Belli et al. 2013).

Another factor identified as increasing consent is the presence of others during the survey. The cause of this is unclear. Interviewer reports suggest that the impact of any other present was minimal. Sala et al. (2012) suggest that the interview status of others present may impact consent outcomes. If the other person(s) have already taken the survey, then decisions may be influenced in the direction of consistency with other respondents. The data does not capture who else was present during the survey, so this is not testable. It may also be, for example, that the others present frequently were children being consented for, which may have some positive influence. Further examination of this effect is warranted through collection of exactly who else is present when asking for consent.

Interviewer characteristics, unlike other survey features, have no clear effect on consent. Interviewer demographics (age and sex), overall experience, and intra-survey experience and response rate had no significant effect on health records consent for mothers or children. However, greater intra-survey experience and response rate both significantly increase the chances of consent for education records. Analyses show this is not sample composition, but rather apparently request specific. Why one consent request is apparently not affected by these interviewer success measures is unclear. The impact of interviewer traits across studies is similarly inconclusive (Sakshaug et al. 2012; Sala et al. 2012; Korbmacher & Schroeder 2013). Further exploration of which, when and why interviewer traits are important is needed, which can then be used in interviewer recruitment and training.

Finally, this study examined characteristics of children based on whether they were consented for or not. There are a number of important demographic differences, indicating a potential bias in in obtained records. Using direct measurement from children ages 10-15 suggest little differences across several behaviours and attitudes, except for internet usage. While the lack of differences may be somewhat encouraging in light of the demographic differences, the best way to minimise bias is increase consent rates. The results of this study and others can be used to develop and test improved methods for obtaining consent for both adults and their children.

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Appendix A: Measures Used

Health Records Linkage

Finally, we would like to add some information from administrative health records to the answers you have given. This leaflet gives you information about what we would like to do. Please read it, ask me any questions and sign the form if you are happy for us to do this.

Child Health Records Linkage

We would also like to add further information on your child's health and use of health services. Could you read through this form and sign it if you wish to give permission.

Education Record Linkage

We would also like to add information from your education records. Here is a permission form and information leaflet. Please read this, ask me any questions and sign the form if you are happy for us to do this.

Child Education Record Linkage

We would also like to add further information on your child's education. Here is a permission form and information leaflet. Please read this, ask me any questions,
and sign the form if you wish to give permission.

Independent variables

UK Born = 1 if born in UK, 0 if born anywhere else

Receive a benefit = 1 if reported obtaining any of a list of benefits except child benefit, 0 if no or only child benefit received

Partner = 1 if reported currently cohabitating with a spouse/partner, 0 if not currently cohabitating

Age = Continuous measure of age, range 16-98

One Child = 1 if mother of one child, 0 if mother of 2 or more children

SF-12 Physical = SF-12 Physical Component Summary (PCS). This measure converts valid answers to the origin questions into a single physical functioning score, resulting in a continuous scale with a range of 0 (low functioning) to 100 (high functioning).

Risk Taking = “Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?” (0= Avoid Taking Risks, 10 = Fully prepared to take risks)

Trust in People = “Are you generally a person who is fully prepared to take risks in trusting strangers or do you try to avoid taking such risks?” (0= Avoid taking risks in trusting strangers, 10 = Fully prepared to take risks in trusting strangers)

Employed = 1 if employed (full or part-time), 0 otherwise

Unemployed=1 if indicated unemployed but in labour force, 0 otherwise

British/Irish White = 1 if white from Great Britain or Ireland, 0 otherwise

Black = 1 if Mixed African, Mixed Caribbean, African, Caribbean, or Any other black background, 0 otherwise

South Asian = 1 if Indian, Pakistani, Bangladeshi, 0 otherwise

Other Ethnicity =1 if not classified as British/Irish White, Black, or South Asian, 0 otherwise

College Degree = 1 if has University Higher Degree (e.g. MSc, PhD), First degree level qualification including foundation degrees, graduate membership of a professional Institute, PGCE, 0 otherwise

Professional = 1 if Diploma in higher education, Teaching qualification (excluding PGCE), Nursing or other medical qualification, HNC/HND, 0 otherwise

Left-leaning = 1 if favours Labour, Liberal Democrat, Scottish National Party, Plaid Cymru , Green Party, SDLP, Alliance Party, Sinn Fein, 0 otherwise

Household Size = number of members living in household, capped at 10

Southeast/London = 1 if household in southeast of England or London, 0 otherwise

Household income = Total reported household income, in thousands of GBP.

Own home = 1 if home is owned by household, 0 if not owned

Number of calls = number of calls to household until survey achieved

Others present =1 if anyone else present during interview, 0 if no one else

Interviewer length = length of interview in minutes, not including consent module

Interviewer age = Continuous measure of interviewer age, range 23-82

Interviewer female = 1 if interviewer is female, 0 if male

Years as interviewer = number of years as interviewer at research company

Number of UKHLS interviews completed = number of interviews, prior to the current one, that the interviewer has completed in the current survey

Interviewer response rate = proportion of successfully completed surveys of total outcomes (successfully completed surveys plus refusals and noncontacts at eligible households)

Youth Survey Measures

Hardly Argue w/Mother = 1 if answer “Hardly ever” to “Most children have occasional quarrels with their parents. How often do you quarrel with your mother?”. 0 if respond “Most days”, “More than once a week”, or “Less than once a week”

Use Internet Daily =1 if indicates they use the internet daily, including for games, 0 if for any frequency less than daily

Has Social Media Account = 1 if yes they belong to “ to a social web-site such as Bebo, Facebook or MySpace”, 0 if not

Smoke = 1 if ever smoke cigarettes, 0 if not

Have Own Mobile Phone = 1 if yes has own personal mobile phone, 0 if not

Ever Bullied = 1 if they indicate any amount of bullying - “Not much (1-3 times in last 6 months)”, “Quite a lot (more than 4 times in last 6 months)” or “A lot (a few times every week)” to the question “How often do you get physically bullied at school, for example getting pushed around, hit or threatened, or having belongings stolen”, 0 if responded “Never”

3+ Plus Fruit/Veg Per Day =1 if selected “5 or more portions” or “3 – 4 portions” to question “How many portions of fresh fruit or vegetables do you eat on a typical day?” , 0 is responded “1 – 2 portions” or “None”

Number of Friends = Numeric response to “How many close friends do you have – friends you could talk to if you were in some kind of trouble?”

Satisfaction questions= 7 if selected “completely happy”, 1 if selected completed “not at all happy”

True Unwell A Lot= 1 if “somewhat true” or “certainly true” that “I get a lot of headaches, stomach-aches or sickness”

True Usually On Their Own = 1 if “somewhat true” or “certainly true” that “I am usually on my own. I generally play alone or keep to myself”

Family Support Mostly/Always = 1 if responded “I feel supported by my family in most or all of the things I do” to question “Do you feel supported by your family, that is the people who live with you?”, 0 if “I feel supported by my family in some of the things I do” or “I do not feel supported by my family in the things I do