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Does Mother Know Best? Parental Discrepancies in Assessing Child Behavioral and Educational Outcomes

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Abstract:

We investigate the degree of correspondence between parents' reports on child behavioral and educational outcomes using wave four of a rich Danish longitudinal survey of children (the DALSC). All outcomes are measured at age 11 when the children are expected to be in fifth grade. Once discrepancies are detected, we analyze whether they are driven by noisy evaluations or by systematic bias, focusing on the role of parental characteristics and response heterogeneity. We then explicitly assess the relative importance of the mother's versus the father's assessments in explaining child academic performance and diagnosed mental health to investigate whether one parent is systematically a better informant of their child's outcomes than the other. Our results show that parental psychopathology, measured as maternal distress, is a source of systematic misreporting of child functioning, that the parent-child relationship matters, and that mothers are not necessarily a better informant of child functioning than fathers. This last finding should not only be valid for Denmark but also for many other countries, where the father's role in childcare has been growing.

JEL Classification: I12, J13

Keywords: Child development, informant discrepancies, reporting bias, response heterogeneity

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1 Introduction

An unusually large and extensive interdisciplinary literature has investigated the socio-economic determinants of early childhood conditions. Interest in this research area has been spurred by a growing realization that early life conditions can have a profound impact on later life. Several studies (Case et al. 2005; McLeod and Kaiser 2004; Blanden et al. 2006) suggest that characteristics measured as of age 7 can explain a great deal of the variation in educational attainment, earnings and employment probability as of early 30s. An important but less studied question in the area of child well-being is the extent to which parents know or can evaluate whether their children are functioning well. It is often taken for granted that mothers are better evaluators of their children's well-being. However, this assumption has not been systematically tested because few studies access subjective assessments of child development made both by the mother and the father together with more objective measures of child performance and well-being.¹

To shed light on parental discrepancies, the present study addresses several important research questions. First, using the fourth wave of the Danish Longitudinal Survey of Children (DALSC), we investigate the degree of correspondence between parents' reports on child outcomes. To this purpose, we use both reported behavioral outcomes (the mother and the father versions of the Strength and Difficulties Questionnaire, SDQ) and reported educational outcomes (the mother and the father versions of a set of questions about school performance). All these outcomes are measured at age 11, when the children are expected to be in fifth grade. Second, when discrepancies are detected, we analyze whether they are driven by noisy evaluations or by systematic bias, mainly focusing on the role of parental characteristics. We also explicitly investigate whether specific parent characteristics affect their way of perceiving and responding to the survey questions regarding their child, by estimating a generalized ordered probit. Finally, we assess the relative importance of the mother's versus the father's assessments in explaining child functioning, to investigate whether mothers are systematically better informants of children's outcomes than fathers, as typically assumed by clinicians (Treutler and Epkins, 2003). The findings of this study are applicable not just to Denmark, but to many countries where the father's share of childminding is on the rise. For instance, based on the Multinational Time Use Study (MTUS) consisting of more than 50 surveys from over 20 countries, it is found that in most Western industrialized countries men's share of childcare time has consistently increased since the 1960s (Kan et al. 2011). Furthermore, there is little difference between married versus cohabiting fathers in this respect (Kalenkowski, Ribar and Stratton, 2007). Yet, in many settings such as schools and the health care system it is often assumed that mothers are closer to their children than fathers, and bias remains in favor of mothers in child custody cases despite the enactment of gender neutral laws (Selfridge, 2007). More broadly, our findings also shed light on the economics literature on parental investments in children's human capital. Becker and Tomes (1986) developed a model in which the rate of return to parental human capital investments in their children depended positively on their

¹ A literature review on the use of parental subjective assessments and on the analysis of parental discrepancies is reported in the on-line appendix.

endowment of abilities. Biased reports of child “ability” (behavior or academic performance) can therefore lead to an inefficient allocation of parental investments during childhood, and such investments can have long lasting effects if parental responses magnify the effects of an early shock (Almond and Currie 2010).

2 Theoretical background

Our empirical analysis on informant discrepancies is guided by a framework which is based on theories of the influence of perspectives (Tversky and March 2000), social desirability (Silverman and Rabian 1995) and social tightness (Prendergast and Topel 1996; Prendergast 2002).

Discrepancies between a pair of observers may rise because of a difference in perspectives. Parental psychopathology frames a parent’s perspective for providing information of her/his child’s problems or negative behaviors, i.e. a perspective that influences parent recall of the more negative aspects of the child’s problems. Parental depression may decrease the threshold by which one of the two parents gauge whether a child’s behavior is problematic or not. This lower threshold may lead to one parent’s perspectives diverging from the perspectives of the other parent. Women of child-bearing age have a much higher risk of suffering post-partum depression than men. Mothers’ depression, for example, is often asserted to be a distorting variable in mother reports on child behavior, in that maternal depression is associated with reporting more negative behavior than other ratings indicate (Youngstrom et al. 1999). Furthermore, differences in perspectives may also arise because of differences in educational and ethnic background. Cultural differences in parenting practices and rules for interpersonal behavior, such as the use of physical punishment, verbal aggression or guilt and shame induction, are all likely to influence which child behaviors are considered problematic.

An alternative view is that some informants may show a systematic tendency to report less negative events and behavior than others. A type of social desirability bias may arise in over-reports of own or child abilities and achievements, for instance, to gain status within one’s circle of peers. Respondents might misrepresent and misreport child outcomes also to project a favorable impression to the surveyor (Fisher 1993). Since women have been found more disposed to social desirability response bias (Dalton and Ortegren 2011), mothers more than fathers may engage in this type of misreporting.

Finally, the relationship and social tightness between the informants and the ratee under investigation contributes to informants’ reports and to the discrepancies between informants’ reports. Firstly, both quantitative (i.e. time spent taking care of the child and doing things with the child) and qualitative (parental acceptance of the child) aspects of parental involvement may affect parents’ awareness of child behavioral and emotional problems. Thus, the parent having a more intense relationship with the child may be a more accurate informant on the child functioning than other sources.² Secondly, the degree of acquaintance between the parent and the child may affect the accuracy of the ratings. A closer social attachment between one of the

² This is especially true for internalizing or emotional problems, e.g. child anxiety and depression, which are less observable compared to the child externalizing problems, e.g. hyperactivity and oppositional behavior.

parents and the child can lead to different parental ratings even if there is no difference in true child functioning. Prendergast and Topel (1996) and Prendergast (2002) analyze subjective appraisals in economic models assuming that supervisors, while having some intrinsic preference for accurately reporting the true performance, also care for the welfare of their ratees. This leads to a basic tradeoff between accuracy and leniency and it directly results in more lenient ratings, the stronger the supervisor's social preferences toward the evaluated subordinate. Based on this reasoning, it is possible to argue that a closer social attachment between one of the parents and the child could lead to different ratings despite both parents being observers of the same symptoms. While mothers, traditionally, due to specialization in housework over market work, have had a stronger attachment to the child, this is changing in dual earner societies as fathers participate more in child-rearing. Indeed time diary studies comparing the mid-60's to the late-90's show that married fathers participate much more actively in routine and developmental child care activities than they did in the past (Sayer et al. 2004).

3 Data

The data we use is drawn from a rich survey on children's outcomes, modes of care and parental background information, known as the Danish Longitudinal Survey of Children (DALSC).³ We focus on wave four of the survey, as it is the only one containing both parents' reports of child outcomes. We only include those "intact" households in which the male respondent is the biological father, as communication issues among parents are less of a concern for this kind of families. Child outcomes are all recorded in 2007, when the child is expected to be in fifth grade and self-reported child care enrollment status is measured in 1999. The survey data have been merged to administrative registers holding information on parents' educational attainment, labor market status and income for the years 2000-2006 and the number of psychiatric diagnoses for 2005.

The following groups of explanatory variables are selected for our empirical analysis, as informed by theory. First, we measure *parent psychopathology* by including a dummy variable indicating whether the mother suffered from post-partum depression, whether parents argue every day or couple of times a week on a number of relevant topics such as financial matters, bringing up the child, and sharing the workload of the daily housework⁴, and a count measure of all psychological symptoms for which the parent reports to have recently consulted a doctor including anxiety, nervous tension, depression, sleeping problems and stress (alternatively, the average number of psychiatric symptoms for which the parent has been diagnosed in 2005).⁵ Second, we add a number of variables proxying for the *social ties* between the parent and the child: i) whether the parent

³ The DALSC is a repeated survey of the primary parent of, initially, 6,000 children born between 15 September and 31 October 1995. Five waves are available, from 1996 (6 months), 1999 (3 years), 2003 (7 years), 2007 (11 years) and 2011 (15 years). The fathers of these children were surveyed separately in 1999 and 2007.

⁴ Specifically, we include three variables summarizing the beliefs of both parents about the level of parental disagreement: whether both parents report high frequency of parental discussions, whether only the mother reports parental discussions and whether only the father reports parental arguments.

⁵ The number of psychiatric diagnoses has been collected according to the ICD-10 Classification of Mental and Behavioral Disorders (World Health Organization 1992).

has a very close relationship with the child⁶; ii) whether the parent spends time with the child engaging in activities⁷ on a daily basis and iii) the parent's labor market experience in 2006. While i) is a qualitative measure of social ties, ii)-iii) are quantitative measures.⁸ We expect that time spent doing activities with the child increases closeness while time spent physically away from the child, such as work experience, decreases closeness. Third, to control for differences in perspectives arising from cultural differences and to proxy for social desirability issues, we include information about the *parental socio-economic background*, like household disposable income (averaged over the period 2000-2006), parents' educational level, whether parents have different educational and cultural/ethnic background. We also consider the child gender, whether the child is the first one within the household, whether the child had a low birth weight and whether the mother is at least 3 years younger than the father.⁹

Our first outcome measures are parental versions of the *Strengths and Difficulties Questionnaire* (SDQ), which is a 25-item instrument for assessing social, emotional and behavioral functioning, that has become a widely used research instrument for the mental health of children (Goodman 1997). Subtracting the mother ratings from the father ratings creates difference scores used to explore levels of parental agreement about the level of child mental problems. In our sample mothers tend to report worse behavior than fathers (positive SDQ difference), with no difference according to child gender. In absolute value, the average difference in ratings is about 3 points, which is quite large considering the SDQ scale. Moreover there is clearly evidence of dissimilarity of both parents' evaluations, given that cross-respondent correlations are all below 0.7. Note that the agreement tends to be greater about externalizing behaviors, e.g. hyperactivity and conduct problems, compared to internalizing behaviors, e.g. emotional and prosocial problems. As mentioned in footnote 2, internalizing problems are more difficult to observe and are less likely to be disruptive to the family functioning and, therefore, less likely to attract the attention of both parents. The second set of outcomes measure (reported) is *child school performance*. Both parents are asked: "How well do you think your child fares academically?". The question is also asked for each subject separately, i.e. Danish, Math, Science and English.¹⁰ In our sample fathers tend to report worse academic

⁶ We include three variables summarizing the parents' closeness to the child: whether both parents report having a very close relationship with the child, whether only the mother reports having a very close relationship with the child and whether only the father reports it.

⁷ The following activities are included in the survey: cooking, reading, doing homework and playing together.

⁸ In a more complete specification, we have also included: iv) whether the father is the breadwinner⁸; v) whether the child was enrolled in a municipality provided daycare program at age 3 and vi) the hours of non-parental care. For the father to be the breadwinner, both his average labor market experience and his income over the period 2000-2006 have to be higher than those of the mother. The results from this augmented specification are reported in the on-line appendix and are very similar to the ones reported in the paper. We have decided to report the main results without these additional controls in a parsimonious specification as these characteristics may have a direct influence on the outcome of interest, i.e. child development scores.

⁹ The main descriptive statistics of all the variables used in our empirical analysis, separately by child gender and by whether disabled kids and non-intact households are included or not in the sample are reported in Tables A1 and A2 of the on-line appendix.

¹⁰ Responses range from "Very well" (coded 1) through "Badly" (coded 5), i.e. a higher score indicates worse child outcome as for the SDQ.

performance than mothers (negative difference). This corresponds to an average difference of 0.4, in absolute value.¹¹

4 Empirical strategy

4.1 Parental discrepancies

Our point of departure in exploring the between parent differences in reports of child outcomes, ΔCO_i , is to estimate a standard linear regression model:

$$\Delta CO_i = \beta_p PAR_PSYC_i + \beta_{st} SOC_TIES_i + \beta_s SEC_i + \beta_o OTHER_i + \varepsilon_i, (1)$$

where, PAR_PSYC_i is the information about the psychopathology of parents of the i^{th} child, SOC_TIES_i is a set of proxies for parent-child social ties, SEC_i is a vector of parental socioeconomic characteristics and $OTHER_i$ include additional controls such as child gender, whether the child is the first one within the household, whether the child had a low birth weight and whether the mother is at least 3 years younger than father.¹² A positive (negative) coefficient for maternal psychopathology, for example, indicates that a mother with more symptoms tends to assign her child higher (lower) scores relative to the father. This is the reverse for the father, where a positive (negative) coefficient for paternal psychopathology would indicate that fathers with more symptoms tend to rate their children lower (higher) scores relative to the mother. It should be noted that in such a “change” model any unobservable common to households (shared tastes, common views on upbringing, etc.), which could be correlated in the same way for both parents with parental reporting and its observed determinants is differenced out. However this model does not control for the component of the unobservable which differently affects mother’s and father’s evaluations.¹³

4.2 Generalized ordered probit model

A complementary way to assess whether certain parents' characteristics affect their perceptions of the child outcomes is to test the presence of systematic reporting heterogeneity. This can be done by estimating a generalized ordered probit where the thresholds are a function of the respondent characteristics (Kerkhofs and Lindeboom 1995; Lindeboom and van Doorslaer 2004; Bago d’Uva et al. 2011). This approach considers a sufficiently comprehensive set of proxy indicators of the child outcome that absorb all of the association between true child outcome and the covariates. Conditional on those indicators, any relationship between the latter and reported child outcome is attributable to reporting behavior. Assume that the underlying true child outcomes CO_i^* can be expressed as:

$$CO_i^* = X_i\beta + \xi_i (2)$$

¹¹ As in the case of the SDQ ratings, there is strong evidence of dissimilarity between mother and father evaluations in the pairwise correlations between respondents’ evaluations, as reported in Table A2 of the on-line appendix.

¹² We have also estimated equation (1) separately for girls and boys. Results are very similar to the ones reported in the paper and are available on request from the authors.

¹³ As an additional attempt to partly address the issue of unobserved heterogeneity, we also estimate equation (1) by using quantile regression techniques. The coefficients obtained from the latter can in fact be interpreted as a sort of latent “propensity” to behave differently along the distribution of parental discrepancies, which are implicitly indexed by each quantile (Doksum 1974). See table A5 of the on-line appendix.

$$CO_i = j \text{ if } \tau_i^{j-1} < CO_i^* \leq \tau_i^j, \quad j = 1, 2, 3. \quad (3)$$

where the matrix X_i includes informants' characteristics, as the socio-economic background, the level of psychopathology and the social ties with the assessed child, while CO_i is the parental categorical assessment j of the outcomes of child i . The error term ξ_i is assumed to be normally distributed with a mean zero and variance equal to 1. In the presence of systematic reporting heterogeneity, the thresholds τ are not constant and differ with respondents' characteristics, as follows:

$$\tau_i^j = \gamma^j X_i \quad (4)$$

Combining equations (2), (3) and (4) results in the following probability of observing response category j conditional on X_i :

$$P[CO_i = j | X_i] = \Phi[(\tau_i^j - \beta) X_i] - \Phi[(\tau_i^{j-1} - \beta) X_i],$$

where $\Phi(\cdot)$ is the standard normal cumulative distribution function. Identification of β separately from reporting heterogeneity, γ^j , is achieved with additional information on true child outcomes CO_i^* , via proxy indicators. These are indicators of the child outcomes, CO_i^O , that are believed to be insensitive to reporting behavior. Let $h(\cdot)$ be the density function of latent health, then reporting heterogeneity can be identified if:

$$h(CO_i^* | CO_i^O, X_i) = h(CO_i^* | CO_i^O)$$

This conditional independence assumption implies that after conditioning on the set of proxy indicators, any remaining systematic variation in self-assessed health with respect to observed characteristics X_i is solely attributable to differences in reporting behavior (Kerkhofs and Lindeboom 1995; Lindeboom and van Doorslaer 2004). Subject to this conditional independence assumption, the parameters of (4) reflect only reporting heterogeneity. Then, a model of the relationship between true child outcomes, CO_i^* , objectively proxied child outcome CO_i^O , reported child outcome CO_i and covariates X_i is given by (3), (4) and:

$$CO_i^* = g(CO_i^O) + \eta_i \quad (5)$$

where $g(\cdot)$ is a non-linear function and η_i is a random error term, which is assumed to be normally distributed with mean zero and variance equal to 1. This model is estimated by maximum likelihood. Parents' categorical assessments, CO_i , ordered on a given scale, are only available for the child school performance.¹⁴ We therefore do not apply the generalized ordered probit model to child SDQ scores, as reported by parents.

4.3 Linear factor model

Finally, we assess which parent's assessment is closest to the objective measures of a specific item of child functioning as objective proxies for both the child mental and academic functioning are available, i.e. the number of psychiatric diagnoses¹⁵, CHIPS and language scores. We do this within the framework

¹⁴ Child school performance is measured using parents' assessments of how well their child fares academically. Relatively few replied "average", "not so well" and "badly" so we combined these three categories together and proceeded with 3 categories: (1) very well, (2) well, (3) average, not so well and badly.

¹⁵ For the full list of child-specific psychiatric disorders included, see the online appendix.

of a linear factor model. Linear factor models have been used extensively in psychology and psychometrics, for instance, for inferring the relative importance (loadings) of various personality traits on task performance. They date back to the early 1900s in the work of Spearman, who used this model for studying test scores and intelligence (Spearman, 1904). Spearman's one-factor model was generalized later to the standard linear factor model by Thurstone (1931) and others. Following the recent empirical work at the intersection of economics and psychology (Borghans et al. 2008), we thus estimate the following linear factor model:

$$\begin{cases} C_i = \alpha_c + \lambda_{1c} * m_{ACA} + \lambda_{2c} * f_{ACA} + u_{ic} \\ L_i = \alpha_l + \lambda_{3l} * m_{ACA} + \lambda_{4l} * f_{ACA} + u_{il} \\ D_i = \alpha_d + \lambda_{5d} * m_{SDQ} + \lambda_{6d} * f_{SDQ} + u_{id} \end{cases} \quad (5)$$

where, C_i , L_i and D_i are respectively the CHIPS scores, the language scores and the number of psychiatric diagnoses, m_{ACA} and m_{SDQ} are the mother's assessments of respectively academic performance and child behavior, f_{ACA} and f_{SDQ} are the respective father's assessments, and λ represents the vector of factor loadings (Borghans et al. 2008). The terms u_{ic} , u_{il} , and u_{id} are assumed to be jointly normal with zero means and variance matrix Σ_{CLD} . The factor model (5) can be computed using maximum likelihood estimation and captures the notion that parental assessments are imperfect measures of true underlying child functioning, proxied by the objective measures of academic performance and mental health. A purely misreported assessment of child functioning would be associated with a zero λ coefficient.

5 Results

5.1 Results for parental discrepancies

Table 3 shows the estimates of equation (1) for parents' differences in ratings of child behavior measured by the total SDQ scores. Four different models have been estimated.¹⁶ The first three columns include results from the most parsimonious specification, including information about parental psychopathology and child gender together with the number of older siblings, to the exhaustive one, adding respectively the variables related to social ties (column 2) and those proxying parental socioeconomic background (column 3). The last column includes an alternative measure of parental psychopathology. Comparison of these four columns shows that there are no large differences between the different specifications.¹⁷ First, discrepancies in the total difficulties score of child mental problems are positively correlated with maternal psychopathology, no matter whether measured by a count of all psychological symptoms for which the mother has recently consulted a doctor or by the number of psychiatric diagnoses. Hence, mothers with poor mental health rate their children more harshly than fathers do. More specifically, an additional self-reported symptom is associated with a 0.056

¹⁶ We perform a number of robustness checks and additional analyses on all three specifications, discussed thoroughly in the on-line appendix.

¹⁷ Several diagnostics indicates that multicollinearity is not a problem in our estimations. The variance inflation factor (VIF) is, for example, around 1.5 in the most complete specification, much below the threshold suggested by Allison (1999).

standard deviation increase in the difference between parental ratings.¹⁸ This result is consistent with the hypothesis that mothers' disorders are distorting variables in mothers' reports on child behavior. The same hypothesis does not hold for fathers, as their symptoms, self-reported or objectively measured, are not statistically correlated with the level of disagreement between parents.¹⁹ Moreover mothers who (contrarily to their spouses) declare themselves as often having parental arguments tend to report more disorders compared to fathers, and the same holds for fathers.²⁰

The qualitative dimension of social ties, i.e. the quality of the relationship between parent and child, works asymmetrically for mothers and fathers. On the one hand mothers who (contrary to their spouses) declare to have a close relationship with their child do not seem to downplay child behavioral problems compared to fathers. On the other hand fathers who (contrary to their spouses) declare to have a close relationship with their child do seem to downplay child behavioral problems compared to mothers, as clearly indicated by a positive correlation between a close father-child relationship and the discrepancies in the total SDQ scores.²¹ A close father-child relationship produces, on average, a 0.066 standard deviation decrease in the difference between the mother's and the father's ratings. This result may be consistent with the hypothesis that a closer social attachment between fathers and their children leads to more lenient ratings of child behavior. Leniency can be explained by either the father's social preferences being closer toward the evaluated child or by social desirability issues, i.e. the tendency to deny or minimize socially undesirable symptoms. Thus, qualitative aspects of parental involvement may lead to greater leniency towards child behavioral problems. Another possible interpretation of the results could be that the parent, who reports to be the only one to be close to her/his child, more accurately gauges her/his child's behavioral problems. This is not, however, confirmed by other proxies of parental involvement: for example, the dummies of whether the mother or the father spends quality time with their child are never statistically significant.²²

¹⁸ This result is obtained by standardizing the dependent variable. As the mean and the standard deviation of the dependent variable are respectively 0.651 and 3.705, an additional symptom is associated with approximately an 8 percent increase in the reporting gap between parents. Not all the y-standardized coefficients are reported in the paper, but all are available on request from the authors.

¹⁹ Consistently with these findings, we find that only mother's symptoms are positively associated with their own assessments of the child behavior (see Table A9 of the on-line appendix).

²⁰ We find that parental perception of conflicts modifies both mother's and father's ratings in the same direction (see Table A9 of the on-line appendix).

²¹ We find that parental perception of the relationship to the child modifies both mother's and father's ratings in the same direction (see Table A9 of the on-line appendix). However the association of this variable with father's assessment is significantly larger compared to the one estimated on mother's side. This may explain the reason why we still observe an independent association between father's relationship to the child and the difference in parental evaluations.

²² Other results available on request also indicate that none of the variables related to the parents' socio-economic status, such as differences in educational and ethnic background or household's income, is significantly associated with the level of parental discrepancies. Finally, we generally do not find that the gender of the child, whether the child is the first one within the household, whether the child has a low birth weight, or the age difference within the couple influence parental discrepancies. The same results hold for the father's and mother's ratings separately (see Table A9 of the on-line appendix).

We then proceed by looking at the differences in parental reporting of academic performance.²³ Results reported in the on-line appendix show that a mother's psychopathology (number of reported symptoms or psychiatric diagnoses) negatively affects her ratings of child academic performance in the fuller specifications. Paternal psychopathology is, however, not correlated with the pairwise discrepancies. Social ties play a relevant role here too for fathers. A father who (contrary to his spouse) reports to have a close relationship with the child is more likely to assess positively his child's academic performance than the mother of the same child. The same does not hold for the mother, though. As in case of SDQ discrepancies, we see that the quality of the relationship with the child seems to enhance the leniency of the father's ratings. Of course another interpretation of these results could be that parents can more accurately gauge their children's ability, the closer they are to them.²⁴

5.2 Generalized ordered probit results

Table 3 reports results from the generalized ordered probit, as reported in equations (2)-(4), estimated separately for each parent.²⁵ Not surprisingly, objective measures of academic performance, measured by scores from the CHIPS and the language tests,²⁶ are positively correlated with both parents' assessment of their child overall academic performance,²⁷ as shown in the first two columns. In the threshold equation we control for some of the covariates included in equation (1), used to explain informants' discrepancies. For both parents, the "close relationship" dummy enters with a positive sign and significantly in the equation for the first threshold parameter, corresponding to the category "very good". This means that parents with a close relationship with their child have a lower standard of what constitutes a very good academic performance compared to other parents. This is consistent with the hypothesis that qualitative aspects of parental involvement can negatively affect the accuracy of ratings and favor more lenient assessments. Combined with the results reported in the previous subsection, we can argue that the "leniency" effect of a close relationship may be stronger than the "awareness" effect of the child's ability.²⁸ However, we cannot test whether this is the case, when parents have to assess their child mental functioning. Estimation of a generalized ordered probit using a parent's version of the SDQ scores is not feasible, as it is not a categorical variable ordered on a predefined scale as is the assessment of school performance.

²³ As mentioned in section 4, child academic performance is proxied by the respondent's perception of how well the child fares academically, recalling that the perception score ranges from 1 ("Very well") to 5 ("Badly") so that a positive coefficient means that mothers rate academic performance harsher than fathers.

²⁴ Looking at the probability that the mother assesses the child's academic performance worse or better than the father provides qualitatively similar results (columns 5 and 6 of Table A7 of the on-line Appendix). Furthermore, parental assessments of academic performance disaggregated by subject corroborate these findings, especially strong for Science but also for the other subjects (see Table A8 of the on-line Appendix).

²⁵ We are not able to report results by child gender as models separately estimated for boys and girls did not converge.

²⁶ Note that in all specifications we include the square and the cube of the objective measures.

²⁷ Note that the dependent variable ranges from "Very well" (coded 1) through "Badly" (coded 5). Hence a negative coefficient estimated on the objective scores is interpreted as a positive correlation.

²⁸ Very similar results are obtained for the remaining threshold, i.e., the one for the category "Well" and are reported in Table A10 of the online appendix.

Another interesting result is that parents who declare having arguments often have a lower initial threshold, i.e. they tend to rate their child's performance harsher than otherwise comparable parents. Chronic parental conflicts may work as a distorting variable in parent reports on child academic performance, in that conflicts are associated with reporting more negative assessments. As a robustness check, we estimate our generalized ordered probit model by using the parental assessments of the child academic performance in Math and in Danish, as these might be more directly related respectively to the Chips and Language scores compared to the general assessments. As reported in the remaining columns of Table 2, the results obtained from the subject-specific assessments are in line with those from the general assessments.

5.3 Linear factor model results

Finally, we try to assess the relative importance of the mother's and the father's assessments in explaining an objective proxy of the child functioning, measured in our case by the CHIPS and the language scores and the number of psychiatric diagnoses. The parameter estimates of the linear factor model (5) are given in table 3. Coefficients are also reported in standard deviation units, i.e. beta coefficients, to be able to compare the relative contributions of factors. Moreover, statistical tests of the equality of the factor loadings across parents' ratings are included at the bottom of table 3. The vector of factor loadings, λ , in the CHIPS scores equation, as reported in the first column, indicates that both parents are given fairly similar weight in explaining the child academic performance, which is proxied by our objective measures. Hypothesis testing reveals also that the loadings associated with the mother's assessments are not statistically different from the ones associated with the father's assessments.²⁹ This is also the case for the language scores and the number of psychiatric diagnoses, where the mother's assessments seem to be as relevant as those of the father's in explaining these objective measures. Overall the evidence provided by the linear factor model does not seem to support the surmise that mothers are the most accurate in reporting and assessing child functioning, as suggested in Treutler and Epkins (2003).³⁰ However these results should be interpreted with the caveat that the external measures used as objective proxies may not entirely correspond to the outcomes that the parents think they are reporting on. When for example asked about how their child fares academically, parents may be considering performance that is broader than the test scores used as objective measures. The same problem holds when we use the number of psychiatric diagnoses as an objective alternative to the SDQ measure that provides the parental report.

6 Conclusions

This study investigates the degree of correspondence between parents' reports on child cognitive and non-

²⁹ Very similar results are obtained by entering the mother's and the father's reports separately (see table A11 of the on-line appendix).

³⁰ As a robustness check, we have also checked whether this assumption holds using both parents' assessments of the child's academic performance in Math and Danish, instead of the general ones. The results from this additional analysis indicate that the mother's assessments do not receive a higher and statistically different weight in explaining child school functioning compared to those of the father's.

cognitive outcomes using wave four of the Danish Longitudinal Survey of Children (DALSC). Descriptive analysis provides clear evidence of dissimilarity in parent evaluations of child behavior, with higher disagreement levels found for internalizing behaviors, e.g. emotional and prosocial problems. High levels of discrepancies are also found where assessments of child academic performance are concerned. Once discrepancies are detected, we analyze whether they are driven by noisy evaluations or by systematic bias, focusing on the role of informants' characteristics. A few systematic factors are found to drive the differences in assessments. Our results are consistent with the hypothesis that parental psychopathology measured as mothers' mental disorders are distorting variables in their reports of child functioning. The relationship between the parent and the child which we operationalize as qualitative aspects of the parent-child relationship seem to be correlated with discrepancies of both cognitive and non-cognitive child ratings only for fathers. The analysis on response heterogeneity, specifically for cognitive child ratings, enables us to conclude that a close relationship with the child seems to enhance the leniency rather than the accuracy of the parent's ratings. Estimates from a linear factor model finally reveal that the mother may not be necessarily a better informant of either cognitive or non-cognitive child outcomes compared to the father. Thus, neglecting the father's reports may not be an efficient strategy to conduct inference on the sources of disparities in early achievement. These results can extend beyond the setting analyzed in this paper and can help inform and improve the practices of child educators, health care workers and legal and welfare service practitioners in many other countries where fathers are increasingly becoming more involved in childcare.

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Table 1: Discrepancies in ratings of child behavior (SDQ), main results

	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
Parental psychopathology				
Mother symptoms (self-reported)	0.396*** (0.136)	0.397*** (0.136)	0.392*** (0.137)	
Mother psychiatric diagnoses				0.359* (0.187)
Postpartum depression	0.049 (0.444)	0.038 (0.445)	0.030 (0.450)	0.058 (0.449)
Father symptoms (self-reported)	-0.288 (0.245)	-0.280 (0.245)	-0.266 (0.248)	
Father psychiatric diagnoses				-0.327 (0.285)
Both parents report frequent arguments	-0.179 (0.429)	-0.153 (0.423)	-0.147 (0.430)	-0.114 (0.434)
Only mother reports frequent arguments	0.750** (0.349)	0.741** (0.348)	0.752** (0.349)	0.775** (0.348)
Only father report frequent arguments	-0.804*** (0.283)	-0.773*** (0.283)	-0.804*** (0.282)	-0.825*** (0.282)
Social ties				
Both parents with a close relationship to the child		0.265 (0.212)	0.278 (0.212)	0.271 (0.212)
Only mother with a close relationship to the child		-0.197 (0.221)	-0.183 (0.221)	-0.177 (0.221)
Only father with a close relationship to the child		0.914*** (0.274)	0.924*** (0.273)	0.938*** (0.273)
Mother spending quality time with the child		0.094 (0.216)	0.107 (0.217)	0.140 (0.218)
Mother work experience		0.000 (0.011)	-0.000 (0.012)	-0.002 (0.012)
Father spending quality time with the child		-0.037 (0.147)	-0.041 (0.147)	-0.046 (0.147)
Father work experience		-0.008 (0.011)	-0.007 (0.011)	-0.007 (0.011)
N	2382	2382	2382	2382
R-sq; pseudo R-sq	0.018	0.031	0.037	0.037

Notes: The dependent variable is the difference between the mother's and the father's ratings. All regressions include the parental socioeconomic characteristics, whether the child is a girl, whether the child is the first one within the household, whether the child with a low birth weight and whether the mother at least 3 years younger than father. Significance levels: ***1%, **5%, *10%.

Table 2: Generalized ordered probit results of parental assessments of child academic performance

	General academic performance		Math performance		Danish performance	
Child academic performance	Mother	Father	Mother	Father	Mother	Father
Objective measures						
Chips score	-0.028*** (0.004)	-0.031*** (0.005)	-0.065*** (0.004)	-0.055*** (0.008)		
Language test	-0.094*** (0.005)	-0.088*** (0.006)			-0.104*** (0.005)	-0.065*** (0.010)
	Threshold for "very well"		Threshold for "very well"		Threshold for "very well"	
Parental psychopathology						
Mother symptoms	0.062 (0.039)		-0.082 (0.057)		-0.062 (0.040)	
Postpartum depression	0.003 (0.129)		-0.103 (0.125)		-0.064 (0.130)	
Father symptoms		-0.012 (0.081)		-0.107 (0.080)		-0.025 (0.083)
Parents argue frequently (mother's perception)	-0.402*** (0.084)		-0.182** (0.081)		-0.113 (0.086)	
Parents argue frequently (father's perception)		-0.269** (0.089)		-0.215** (0.085)		-0.063 (0.090)
Social ties						
Mother close relationship with the child	0.282*** (0.051)		0.074** (0.035)		0.121** (0.053)	
Mother spending quality time with the child	-0.011 (0.076)		-0.078 (0.076)		-0.060 (0.080)	
Mother work experience	-0.001 (0.004)		0.001 (0.004)		0.001 (0.004)	
Father close relationship with the child		0.260*** (0.054)		0.219*** (0.053)		0.183** (0.056)
Father spending quality time with the child		0.102* (0.054)		0.091 (0.053)		0.087 (0.056)
Father breadwinner		-0.006 (0.005)		-0.004 (0.005)		-0.004 (0.005)
Father work experience		-0.060 (0.062)		-0.033 (0.061)		-0.071 (0.065)
Municipality provided program at age 3	0.208* (0.116)	0.003 (0.134)	0.165 (0.116)	0.001 (0.131)	0.275 (0.221)	0.133 (0.138)
Hours in non parental care	-0.003 (0.003)	-0.006* (0.003)	-0.004 (0.003)	-0.006* (0.003)	-0.005 (0.003)	-0.003 (0.003)
N	2382	2382	2382	2382	2382	2382

Notes: The dependent variable is the parent's assessment of the child school performance. In the main equation we also include the square and the cube of the objective measures of school performance. The threshold equation for very well also includes the parental socioeconomic characteristics, whether the child is a girl, whether the child is the first one within the household, whether the child with low birth weight, the mother's and the father's age. Significance levels: ***1%, **5%, *10%

Table 3: Estimated coefficients for the linear factor model of child functioning

	FULL SAMPLE		GIRLS	BOYS
	CHIPS SCORES			
	(S.E.); [BETA COEFF.]			
Acaper_mother	-0.948*** (0.165) [-0.144]		-0.862*** (0.213) [-0.145]	-1.010*** (0.247) [-0.145]
Acaper_father	-1.361*** (0.165) [-0.208]		-1.022*** (0.215) [-0.170]	-1.591*** (0.245) [-0.230]
Acaper_math_mother		-1.300*** (0.210) [-0.138]		
Acaper_math_father		-1.189*** (0.204) [-0.130]		
Hypothesis tests				
Aca_mother=Acaper_father: Chi2; p-value	1.92; 0.167		0.17; 0.67	1.68; 0.19
Acaper_math_mother=Acaper_math_father: Chi2; p-value		0.09; 0.761		
	LANGUAGE TEST SCORES			
	(S.E.); [BETA COEFF.]			
Aca_mother	-1.827*** (0.148) [-0.288]		-1.749*** (0.196) [-0.296]	-1.889*** (0.219) [-0.284]
Aca_father	-1.481*** (0.148) [-0.234]		-1.263*** (0.197) [-0.213]	-1.615*** (0.217) [-0.245]
Aca_danish_mother		-2.266*** (0.199) [-0.239]		
Aca_danish_father		-2.063*** (0.190) [-0.229]		
Hypothesis tests				
Aca_mother=Acaper_father: Chi2; p-value	1.67; 0.197		1.91; 0.16	0.48; 0.49
Acaper_math_mother=Acaper_math_father: Chi2; p-value		0.34; 0.557		
	PSYCHIATRIC DIAGNOSES			
	(S.E.); [BETA COEFF.]			
Sdq_mother	0.007*** (0.001) [0.190]	0.007*** (0.001) [0.189]	0.005*** (0.001) [0.197]	0.008*** (0.002) [0.192]
Sdq_father	0.004*** (0.001) [0.101]	0.004*** (0.001) [0.098]	0.004** (0.001) [0.114]	0.005** (0.002) [0.095]
Hypothesis tests				
Sdq_mother=Sdq_father: Chi2; p-value	2.47; 0.116	2.59; 0.10	1.19; 0.29	1.39; 0.23
N	2389	2389	1130	1248
Log-likelihood	-12910.1	-12965.2	-5532.8	-7159.5

Notes: The equations for the CHIPS scores, language test scores and psychiatric diagnoses are estimated simultaneously by maximum likelihood.

Significance levels: ***1%, **5%, *10%.

Does Mother Know Best? Parental Discrepancies in Assessing Child Behavioral and Educational Outcomes

On-line Appendix with literature review and additional results

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Literature on child development and informant discrepancies

Research on early child development is in many cases forced to rely on subjective evaluations of a given category of child functioning – especially when it comes to behavioral and emotional functioning, to a lesser extent cognitive functioning¹, since not all large-scale child data sets contain standardized test measures at various ages. Very often the subjective assessments come from mothers rather than other informants (Belfield and Kelly 2012; Blau and Currie 2008; Currie and Stabile 2003; Currie et al. 2007). Clinicians and researchers, for example, view mothers as being most accurate in reporting children's eventual behavioral and emotional problems but tend to neglect fathers as possible informants of children's outcomes (Treutler and Epkins 2003). However, the reliability of the assessments of child outcomes and behavior has been generally questioned.

Firstly, there are concerns about the extent to which parent subjective measures of child outcomes are validated by more objective measures. No correspondence was found, for example, between a parent-reported measure of behavioral problems (attention, hyperactivity/impulsivity, aggression, emotional problems and learning problems) and a standard clinical test of ADHD in a clinical population of children and adolescents (Silk 2012). In terms of adult health reporting as well, Baker, Stabile, and Deri (2004) found, for example, very limited evidence on the correspondence between self-reported health measures and medical records. Secondly, respondents may have different motivations for providing ratings of children and have different thresholds or perceptions of what constitutes a normal functioning in a given child (Weisz et al. 1988). The problem of heterogeneity in reporting thresholds when individuals report their health problems is well-established (see e.g. Bago d'Uva et al. 2007; Lindeboom and van Doorslaer 2004). Finally, the very poor agreement for different informants' ratings of a given child's functioning raises concerns about the relative validity of any single source of information (e.g., Achenbach et al. 1987 found the cross-situational correlations between reports of the same underlying problem across home, school, clinic etc. to be only 0.2-0.3).

Because of this low to moderate correspondence between the information provided by different

¹Child psychologists have known for a long time that parents may not recognize or are not attentive to whether children have reached certain developmental milestones. Standardized tests of child development are usually preferred therefore (up to the age of 42 months, the Bayley test is the most recommended; at later ages, cognitive skills can be measured by the PPVT, the PIAT, Stanford-Binet, Wechsler etc.). However, few large scale data sets in social sciences research access these test scores, and furthermore, for the measurement of emotional components, testing is not ethically advisable.

informants, the literature has tried to investigate the determinants of informant discrepancies (Johnston et al. 2010). Some studies have examined how child characteristics – age, gender, ethnicity and problem type – are related to informant discrepancies (Achenbach et al. 1987; Duhig et al. 2000). Other works have focused on the role of parents’ characteristics, such as their socio-economic status (Treutler and Epkins 2003), their levels of psychopathology (Krain and Kendall 2000), and of family characteristics, like the family status, the sibling birth order, the number of siblings and the familiarity of the child to the parent (Jensen et al. 1988; Treutler and Epkins 2003). However, no clear pattern of correlation has been found between informant discrepancies and the previously mentioned characteristics. Moreover, no theoretical rationale has been provided to explain these discrepancies and, as a result, few formal tests have been conducted to examine the processes involved. Consequently, remarkably little is known about *why* parents’ ratings of children’s functioning often diverge from one and another’s. However, understanding the source of these discrepancies is extremely relevant because relying on one parent than another, or even combining assessments from both parents can lead to different conclusions regarding the determinants of children’s cognitive, emotional, social and behavioral outcomes. Johnston et al. (2010), for example, finds that using different informants’ ratings results in systematic differences in the estimated magnitude and significance of the health-income gradient. Moreover, Becker and Tomes (1986) developed a model in which the rate of return to parental human capital investments in their children depended positively on their endowment of abilities. Biased reports of child “ability” (behavior or academic performance) can therefore lead to an inefficient allocation of parental investments during childhood. Such a misallocation of resources can have long lasting effects as parental responses have been shown to either magnify or mitigate the effects of a shock in early childhood on subsequent outcomes (Almond and Currie 2010).

Full list of child-specific psychiatric disorders

We also include the following child-specific psychiatric diagnoses: specific developmental disorders of speech and language, specific developmental disorder of scholastic skills, specific developmental disorder of motor function, mixed specific developmental disorders, pervasive developmental disorders, other disorders of psychological development, unspecified disorder of psychological development, hyperkinetic disorders, conduct disorders, mixed disorders of conduct and emotions, emotional disorders with onset specific to childhood, disorders of social functioning

with onset specific to childhood and adolescence, tic disorders, other behavioral and emotional disorders, unspecified mental disorder and problems concerning social environment.

Discussion of additional results for parental discrepancies

We perform a number of robustness checks to these main results. We first estimate equation (1) by quantile regression methods to get a more complete picture of how the variables included in the main specification are associated with different quantiles of the conditional parental reporting gap distribution. As mentioned in the previous section, the propensity to behave differently along the distribution of the dependent variable can be interpreted as a natural measurement of a latent characteristic correlated with both the dependent and explanatory variables. Quantile regressions are estimated at three different quantiles (0.25; 0.50; 0.75). These additional results are shown in the first three columns of table A4 of the on-line appendix and qualitatively similar to those reported in Table 1. We then check the robustness of our results by looking at how the parents' characteristics correlate with the probability that the maternal assessments are at least two points higher or lower than the paternal ones, see the last two columns of table A4. We finally investigate whether the associations between informants' characteristics and informants' discrepancies vary between item-specific SDQ scores. It is, in fact, reasonable to expect that some informant characteristics are more strongly correlated with the ratings of internalizing behaviors than with the ratings of externalizing behaviors and vice versa. Social ties, for example, may matter less for the ratings of hyperactivity and conduct problems, which are easier to observe, compared to emotional problems. Results reported in table A5 of the on-line appendix, however, do not support this hypothesis, as the coefficients do not change much across SDQ items.

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Table A1: Descriptive statistics, selected sample

	Selected sample			
	Girls		Boys	
	Mean	sd	Mean	sd
Discrepancies variables				
Sdq_diff (mother-father)	0.633	3.558	0.630	3.754
Sdq_diff (mother-father), absolute value	2.685	2.417	2.742	2.639
Acaper_diff (mother-father)	-0.029	0.675	-0.057	0.659
Acaper_diff (mother-father), absolute value	0.413	0.534	0.388	0.536
CHIPS score	30.098	4.622	28.916	5.544
Language score	21.988	4.518	20.864	5.216
Number of psychiatric diagnoses	0.014	0.306	0.036	0.245
Parental psychopathology				
Mother symptoms (self-reported)	0.185	0.586	0.184	0.596
Mother psychiatric diagnoses (2005)	0.036	0.219	0.056	0.266
Postpartum depression	0.027	0.163	0.033	0.177
Father symptoms (self-reported)	0.067	0.352	0.056	0.313
Father psychiatric diagnoses (2005)	0.037	0.229	0.053	0.281
Both parents report frequent arguments	0.026	0.158	0.026	0.158
Only mother reports frequent arguments	0.071	0.256	0.060	0.237
Only father report frequent arguments	0.079	0.270	0.085	0.280
Social ties				
Both parents with a close relationship to the child	0.350	0.477	0.350	0.477
Only mother with a close relationship to the child	0.354	0.478	0.135	0.341
Only father with a close relationship to the child	0.124	0.330	0.343	0.475
Mother spending quality time with the child	0.895	0.306	0.852	0.355
Mother work experience (2006)	14.014	7.503	13.894	7.851
Father spending quality time with the child	0.545	0.498	0.543	0.498
Father work experience (2006)	17.842	7.938	17.936	7.763
Father breadwinner	0.548	0.498	0.580	0.494
Municipality provided program at age 3	0.852	0.355	0.919	0.273
Hours in non parental care	30.485	11.070	31.018	10.844
Parental socioeconomic background				
Mother secondary education	0.413	0.493	0.416	0.493
Mother short tertiary education	0.288	0.453	0.286	0.452
Mother medium or long tertiary education	0.083	0.277	0.094	0.292
Father secondary education	0.443	0.497	0.475	0.500
Father short tertiary education	0.204	0.403	0.187	0.390
Father medium or long tertiary education	0.121	0.326	0.129	0.336
Parents with different education	0.551	0.498	0.542	0.498
Parents with different ethnic background/nationality	0.036	0.187	0.039	0.195
Household disposable income (stated in DKK, average 2000-2006)	380840.9	166079.2	379409.5	146995.9
Other variables				
Child psychiatric diagnoses (2005)	0.013	0.130	0.048	0.308
Number of older siblings	1.129	1.321	1.118	1.311
Number of siblings	2.258	0.767	2.291	0.770
First child within the household	0.547	0.497	0.559	0.496
Child with a low birth weight	0.034	0.182	0.032	0.176
Mother non Danish	0.019	0.138	0.020	0.140
Father Non-Danish	0.041	0.199	0.043	0.202
Mother age	38.035	4.158	37.899	4.434
Father age	40.287	5.235	40.197	5.445
Mother at least 3 years younger than father	0.313	0.464	0.321	0.467
N	1175		1323	

Table A2: Descriptive statistics, general sample

	Sample including disabled kids and non-intact households			
	Girls		Boys	
	Mean	sd	Mean	sd
Discrepancies variables				
Sdq_diff (mother-father)	0.576	3.754	0.515	3.957
Sdq_diff (mother-father), absolute value	2.718	2.468	2.773	2.656
Acaper_diff (mother-father)	-0.027	0.684	-0.062	0.680
Acaper_diff (mother-father), absolute value	0.412	0.535	0.394	0.545
CHIPS score	29.713	4.768	28.523	5.806
Language score	21.565	4.806	20.404	5.393
Number of psychiatric diagnoses	0.024	0.194	0.077	0.431
Parental psychopathology				
Mother symptoms (self-reported)	0.196	0.603	0.205	0.631
Mother psychiatric diagnoses (2005)	0.051	0.275	0.062	0.280
Postpartum depression	0.029	0.169	0.037	0.188
Father symptoms (self-reported)	0.070	0.362	0.062	0.335
Father psychiatric diagnoses (2005)	0.037	0.231	0.061	0.331
Both parents report frequent arguments	0.024	0.154	0.025	0.156
Only mother reports frequent arguments	0.068	0.253	0.059	0.235
Only father report frequent arguments	0.083	0.276	0.086	0.281
Social ties				
Both parents with a close relationship to the child	0.348	0.477	0.340	0.474
Only mother with a close relationship to the child	0.352	0.478	0.348	0.477
Only father with a close relationship to the child	0.121	0.327	0.134	0.341
Mother spending quality time with the child	0.879	0.327	0.824	0.381
Mother work experience (2006)	13.178	8.084	13.289	7.849
Father spending quality time with the child	0.495	0.500	0.488	0.500
Father work experience (2006)	17.256	8.163	17.054	8.300
Father breadwinner	0.563	0.496	0.531	0.499
Municipality provided program at age 3	0.849	0.359	0.925	0.264
Hours in non parental care	30.802	11.018	31.230	10.681
Parental socioeconomic background				
Mother secondary education	0.412	0.492	0.403	0.491
Mother short tertiary education	0.279	0.449	0.274	0.446
Mother medium or long tertiary education	0.084	0.278	0.088	0.283
Father secondary education	0.414	0.493	0.450	0.498
Father short tertiary education	0.191	0.394	0.172	0.377
Father medium or long tertiary education	0.111	0.314	0.115	0.319
Parents with different education	0.547	0.498	0.545	0.498
Parents with different ethnic background/nationality	0.036	0.185	0.036	0.186
Household disposable income (stated in DKK, average 2000-2006)	356279.210	133484.449	353758.586	135854.734
Other variables				
Child psychiatric diagnoses (2005)	0.014	0.135	0.046	0.294
Number of older siblings	1.114	1.338	1.044	1.305
Number of siblings	1.118	1.311	2.291	0.770
First child within the household	0.552	0.497	0.554	0.497
Child with a low birth weight	0.037	0.191	0.034	0.182
Mother non Danish	0.017	0.128	0.018	0.133
Father Non-Danish	0.039	0.194	0.041	0.198
Mother age	38.041	4.136	37.949	4.437
Father age	40.266	5.215	40.208	5.402
Mother at least 3 years younger than father	0.310	0.463	0.317	0.466
N	1450		1671	

Table A3: Correlations between mother and father assessments of SDQ and child academic performance

	Correlations
SDQ-total	0.6584
Emotional symptoms	0.5362
Conduct problems	0.5219
Hyperactivity	0.6664
Peer problems	0.6276
Prosocial behavior	0.3777
Academic performance	0.5222

Table A4: Discrepancies in ratings of child behavior (SDQ), augmented specification

	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
Parental psychopathology				
Mother symptoms (self-reported)	0.383** (0.151)	0.315** (0.145)	0.307** (0.146)	
Mother psychiatric diagnoses				0.288* (0.151)
Postpartum depression	0.184 (0.505)	0.113 (0.511)	0.104 (0.517)	0.127 (0.516)
Father symptoms (self-reported)	-0.168 (0.260)	-0.181 (0.264)	-0.176 (0.269)	
Father psychiatric diagnoses				-0.294 (0.332)
Both parents report frequent arguments	-0.413 (0.471)	-0.490 (0.454)	-0.494 (0.468)	-0.478 (0.466)
Only mother reports frequent arguments	0.809** (0.359)	0.820** (0.368)	0.821** (0.369)	0.836** (0.369)
Only father report frequent arguments	-0.632** (0.296)	-0.668** (0.305)	-0.701** (0.303)	-0.707** (0.303)
Social ties				
Both parents with a close relationship to the child		0.181 (0.224)	0.176 (0.224)	0.175 (0.224)
Only mother with a close relationship to the child		-0.309 (0.234)	-0.294 (0.235)	-0.289 (0.234)
Only father with a close relationship to the child		0.695** (0.290)	0.696** (0.289)	0.708** (0.290)
Mother spending quality time with the child		0.137 (0.250)	0.112 (0.252)	0.088 (0.251)
Mother work experience		-0.007 (0.013)	-0.004 (0.014)	-0.005 (0.014)
Father spending quality time with the child		-0.047 (0.157)	-0.047 (0.156)	-0.049 (0.157)
Father breadwinner		-0.011 (0.194)	0.003 (0.197)	0.011 (0.198)
Father work experience		-0.011 (0.014)	-0.009 (0.014)	-0.009 (0.015)
Municipality provided program at age 3		0.188 (0.338)	0.244 (0.340)	0.213 (0.341)
Hours in non parental care		0.023** (0.009)	0.020** (0.009)	0.021** (0.009)
N	2382	2382	2382	2382
R-sq; pseudo R-sq	0.018	0.031	0.037	0.037

Notes: The dependent variable is the difference between the mother's and the father's ratings. All regressions include the parental socioeconomic characteristics, whether the child is a girl, whether the child is the first one within the household, whether the child with a low birth weight and whether the mother at least 3 years younger than father. Significance levels: ***1%, **5%, *10%.

Table A5: Discrepancies in ratings of child behavior (SDQ), additional results

	(1)	(2)	(3)	(4)	(5)
	Q25	Q50	Q75	OLS	OLS
Parental psychopathology					
Mother symptoms	-0.033 (0.168)	0.233* (0.122)	0.393** (0.177)	0.030* (0.018)	-0.012* (0.007)
Mother psychiatric diagnoses					
Postpartum depression	-0.598 (0.569)	0.230 (0.412)	0.318 (0.600)	0.077 (0.062)	0.054 (0.056)
Father symptoms	-0.436 (0.285)	-0.209 (0.206)	-0.252 (0.300)	-0.020 (0.028)	0.032 (0.028)
Father psychiatric diagnoses					
Both parents report frequent arguments	-0.642 (0.615)	-0.095 (0.445)	-0.172 (0.647)	0.035 (0.065)	0.020 (0.059)
Only mother reports frequent arguments	0.819** (0.358)	0.807*** (0.259)	0.646* (0.377)	0.065* (0.035)	-0.058* (0.035)
Only father report frequent arguments	0.250 (0.396)	-1.127*** (0.286)	-0.980** (0.417)	-0.155*** (0.042)	0.112*** (0.036)
Social ties					
Both parents with a close relationship to the child	0.379 (0.287)	0.032 (0.208)	-0.034 (0.302)	0.014 (0.029)	-0.042 (0.026)
Only mother with a close relationship to the child	-0.263 (0.285)	-0.331 (0.206)	-0.289 (0.300)	-0.019 (0.029)	0.035 (0.027)
Only father with a close relationship to the child	0.763** (0.357)	0.538** (0.258)	0.222 (0.375)	0.067* (0.037)	-0.069** (0.031)
Mother spending quality time with the child	-0.366 (0.312)	0.148 (0.226)	0.557* (0.329)	0.014 (0.032)	0.021 (0.028)
Mother work experience	0.006 (0.015)	0.000 (0.011)	-0.015 (0.016)	-0.001 (0.002)	0.000 (0.001)
Father spending quality time with the child	-0.071 (0.198)	-0.239* (0.143)	-0.357* (0.208)	-0.032 (0.020)	-0.002 (0.018)
Father breadwinner	-0.024 (0.246)	-0.006 (0.178)	0.042 (0.259)	0.013 (0.025)	0.016 (0.023)
Father work experience	-0.015 (0.017)	-0.018 (0.012)	-0.010 (0.018)	-0.002 (0.002)	0.001 (0.002)
Municipality provided program at age 3	0.632 (0.482)	0.086 (0.348)	0.196 (0.507)	-0.036 (0.047)	-0.077* (0.044)
Hours in non parental care	0.009 (0.012)	0.019** (0.009)	0.025* (0.013)	0.003*** (0.001)	-0.000 (0.001)
N	2382	2382	2382	2382	2382
R-sq; pseudo R-sq	0.027	0.028	0.028	0.029	0.031

Notes: In columns 1, 2 and 3 the dependent variable is the difference between the mother's and the father's ratings. In columns 4 and 5, the dependent variable is a dummy variable equal to 1 if the mother's ratings are at least 2 scores higher (lower) than the father's ratings. Results in columns 1, 2 and 3 are estimates from quantile regressions and the standard errors are bootstrapped (500 replications). Results in columns 4 and 5 are estimates from OLS regressions. All regressions include mother's and father's work experience, the parental socioeconomic characteristics, whether the child is a girl, whether the child is the first one within the household, whether the child with low birth weight, whether the mother at least 3 years younger than father and region dummies. Significance levels: ***1%, **5%, *10%.

Table A6: Discrepancies in ratings of child behavior, SDQ item-specific scores

	(1)	(2)	(3)	(4)	(5)
	SDQ_EMO	SDQ_CON	SDQ_HYPER	SDQ_PEER	SDQ_PROS
Parental psychopathology					
Mother symptoms (self-reported)	0.303*** (0.070)	0.030* (0.016)	-0.050 (0.063)	0.057** (0.018)	0.095* (0.050)
Postpartum depression	0.171 (0.230)	0.013 (0.126)	-0.067 (0.267)	-0.061 (0.156)	-0.006 (0.171)
Father symptoms (self-reported)	0.068 (0.109)	-0.147** (0.067)	0.050 (0.126)	-0.131 (0.087)	0.110 (0.082)
Both parents report frequent arguments	-0.267 (0.212)	0.016 (0.143)	0.022 (0.235)	-0.096 (0.146)	0.183 (0.227)
Only mother reports frequent arguments	0.107 (0.132)	0.189** (0.092)	0.290** (0.131)	0.198** (0.100)	-0.179 (0.121)
Only father report frequent arguments	-0.257* (0.135)	0.084 (0.107)	-0.456*** (0.162)	0.003 (0.128)	0.291** (0.130)
Social ties					
Both parents with a close relationship to the child	0.068 (0.100)	-0.011 (0.067)	0.086 (0.102)	0.080 (0.076)	-0.428* (0.197)
Only mother with a close relationship to the child	0.079 (0.101)	-0.176** (0.069)	-0.140 (0.108)	-0.026 (0.078)	0.061 (0.100)
Only father with a close relationship to the child	0.213** (0.108)	0.136 (0.087)	0.285** (0.131)	0.100 (0.098)	-0.590*** (0.120)
Mother spending quality time with the child	-0.016 (0.118)	0.026 (0.071)	0.098 (0.117)	0.109 (0.086)	-0.175* (0.104)
Father spending quality time with the child	-0.047 (0.071)	-0.027 (0.044)	-0.015 (0.073)	-0.003 (0.052)	-0.120* (0.063)
Father breadwinner	0.009 (0.088)	-0.021 (0.055)	-0.041 (0.092)	0.045 (0.066)	-0.049 (0.079)
Municipality provided program at age 3	0.047 (0.168)	0.004 (0.098)	0.140 (0.166)	0.154 (0.129)	-0.266* (0.155)
Hours in non parental care	0.007 (0.004)	0.002 (0.003)	0.010** (0.004)	-0.001 (0.003)	0.007* (0.004)
N	2382	2382	2382	2382	2382
R-sq	0.027	0.026	0.031	0.022	0.061

Notes: The dependent variable is the difference between the mother's and the father's ratings. All regressions include mother's and father's work experience, the parental socioeconomic characteristics, whether the child is a girl, whether the child is the first one within the household, whether the child with low birth weight, whether the mother at least 3 years younger than father and region dummies. Significance levels: ***1%, **5%, *10%.

Table A7: Discrepancies in ratings of child academic performance, main results

	(1)	(2)	(3)	(4)	(5)	(6)
	ACAPER_MF	ACAPER_MF	ACAPER_MF	ACAPER_MF	ACAPER_MF	ACAPER_MF
Parental psychopathology						
Mother symptoms (self-reported)	0.146*	0.141*	0.159**	0.156**	0.066*	-0.072
	(0.077)	(0.078)	(0.078)	(0.077)	(0.037)	(0.054)
Mother psychiatric diagnoses				0.087*		
				(0.045)		
Postpartum depression	-0.020	-0.024	-0.023		-0.007	0.010
	(0.024)	(0.024)	(0.024)		(0.013)	(0.015)
Father symptoms (self-reported)	0.027	0.035	0.032		0.036	0.039
	(0.055)	(0.055)	(0.055)		(0.028)	(0.028)
Father psychiatric diagnoses				0.177*		
				(0.092)		
Both parents report frequent arguments	0.006	0.046	0.038	0.039	-0.011	-0.062
	(0.073)	(0.074)	(0.076)	(0.076)	(0.047)	(0.049)
Only mother reports frequent arguments	0.039	0.038	0.039	0.041	0.027	-0.004
	(0.054)	(0.056)	(0.056)	(0.056)	(0.033)	(0.034)
Only father report frequent arguments	-0.071	-0.058	-0.057	-0.056	-0.012	0.063*
	(0.052)	(0.053)	(0.053)	(0.053)	(0.027)	(0.034)
Social ties						
Both parents with a close relationship to the child		-0.007	-0.004	-0.003	0.036	-0.031
		(0.042)	(0.042)	(0.042)	(0.023)	(0.025)
Only mother with a close relationship to the child		-0.059	-0.051	-0.050	-0.025	0.005
		(0.041)	(0.042)	(0.042)	(0.023)	(0.025)
Only father with a close relationship to the child		0.091**	0.096**	0.093**	-0.087***	0.024*
		(0.054)	(0.054)	(0.054)	(0.031)	(0.013)
Mother spending quality time with the child		0.058	0.047	0.052	-0.011	-0.021
		(0.045)	(0.045)	(0.045)	(0.025)	(0.028)
Father spending quality time with the child		0.023	0.027	0.027	0.012	-0.018
		(0.028)	(0.028)	(0.028)	(0.016)	(0.017)
Father breadwinner		-0.024	-0.018	-0.022	-0.002	0.015
		(0.034)	(0.034)	(0.034)	(0.019)	(0.021)
Municipality provided program at age 3		-0.113*	-0.087	-0.080	-0.009	0.071*
		(0.065)	(0.065)	(0.064)	(0.037)	(0.039)
Hours in non parental care		-0.000	-0.001	-0.001	-0.001	-0.001
		(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
N	2382	2382	2382	2382	2382	2382
R-sq	0.008	0.016	0.022	0.026	0.030	0.020

Notes: The dependent variable is the difference between the mother's and the father's ratings. In columns 7(8), the dependent variable is the mother's rating is worse (better) than the father's. All regressions include mother's and father's work experience, the parental socioeconomic characteristics, whether the child is a girl, whether the child is the first one within the household, whether the child with low birth weight, whether the mother at least 3 years younger than father and region dummies. Significance levels: ***1%, **5%, *10%.

Table A8: Discrepancies in ratings of child academic performance, subject-specific assessments

	(1)	(2)	(3)	(4)
	DANISH	MATHS	SCIENCE	ENGLISH
Parental psychopathology				
Mother symptoms (self-reported)	0.010 (0.100)	0.185** (0.091)	0.088* (0.053)	-0.080 (0.068)
Postpartum depression	-0.022 (0.032)	-0.002 (0.030)	-0.007 (0.017)	0.007 (0.018)
Father symptoms (self-reported)	0.012 (0.058)	-0.011 (0.050)	-0.006 (0.033)	-0.011 (0.030)
Both parents report frequent arguments	0.100 (0.104)	0.055 (0.114)	-0.012 (0.075)	-0.021 (0.071)
Only mother reports frequent arguments	0.111 (0.076)	0.059 (0.076)	-0.001 (0.041)	0.024 (0.049)
Only father report frequent arguments	0.025 (0.064)	0.063 (0.061)	-0.033 (0.038)	-0.039 (0.040)
Social ties				
Both parents with a close relationship to the child	-0.033 (0.052)	-0.023 (0.052)	0.002 (0.030)	-0.013 (0.032)
Only mother with a close relationship to the child	-0.010 (0.052)	-0.065 (0.052)	-0.037 (0.030)	-0.083** (0.033)
Only father with a close relationship to the child	0.106 (0.065)	0.139** (0.063)	0.107*** (0.036)	0.035 (0.041)
Mother spending quality time with the child	0.010 (0.059)	-0.031 (0.055)	0.042 (0.032)	0.025 (0.034)
Father spending quality time with the child	0.024 (0.035)	-0.007 (0.035)	0.032 (0.020)	0.030 (0.022)
Father breadwinner	0.035 (0.043)	0.068 (0.043)	0.018 (0.025)	-0.010 (0.027)
Municipality provided program at age 3	-0.032 (0.084)	0.054 (0.082)	-0.061 (0.060)	-0.024 (0.048)
Hours in non parental care	-0.001 (0.002)	-0.000 (0.002)	0.001 (0.002)	-0.001 (0.001)
N	2382	2382	2382	2382
R-sq	0.018	0.023	0.015	0.019

Notes: The dependent variable is the difference between the mother's and the father's ratings. All regressions include mother's and father's work experience, the parental socioeconomic characteristics, whether the child is a girl, whether the child is a girl, whether the child is the first one within the household, whether the child with low birth weight, whether the mother at least 3 years younger than father and region dummies. Significance levels: ***1%, **5%, *10%.

Table A9: Parental characteristics and parents' assessments of child behavior (SDQ) and academic performance.

	(1)	(2)	(3)	(4)
	SDQ (Mother)	SDQ (Father)	ACA (Mother)	ACA (Father)
Parental psychopathology				
Mother symptoms	0.873*** (0.193)		0.143*** (0.030)	
Postpartum depression	0.914 (0.610)		-0.068 (0.095)	
Father symptoms		0.159 (0.081)		0.029 (0.055)
Parents argue frequently (mother perception)	1.961*** (0.367)		0.226*** (0.061)	
Parents argue frequently (father perception)		1.086*** (0.292)		0.151*** (0.052)
Social ties				
Mother close relationship with the child	-0.733*** (0.209)		-0.065* (0.035)	
Mother spending quality time with the child	-0.415 (0.309)		0.028 (0.053)	
Mother work experience	-0.024 (0.016)		0.002 (0.003)	
Father close relationship with the child		-1.483*** (0.166)		-0.163*** (0.032)
Father spending quality time with the child		-0.351** (0.166)		-0.089*** (0.033)
Father breadwinner		0.065 (0.183)		0.039 (0.037)
Father work experience		0.007 (0.016)		0.005* (0.003)
Municipality provided program at age 3	-0.955** (0.441)	-1.200*** (0.412)	-0.142* (0.081)	-0.039 (0.086)
Hours in non parental care	0.064*** (0.012)	0.040*** (0.011)	0.004** (0.002)	0.004* (0.002)
Parental socioeconomic background				
Mother secondary education	0.240 (0.252)		0.010 (0.048)	
Mother short tertiary education	-0.557** (0.261)		-0.128*** (0.049)	
Mother medium or long tertiary education	-0.388 (0.395)		-0.236*** (0.065)	
Father secondary education		-0.175 (0.217)		0.006 (0.044)
Father short tertiary education		-0.633** (0.259)		-0.176*** (0.051)
Father medium or long tertiary education		-0.263 (0.291)		-0.265*** (0.057)
Log of household disposable income	-1.447*** (0.383)	-1.128*** (0.312)	-0.167*** (0.065)	-0.142** (0.063)
N	2382	2382	2382	2382
R-sq	0.018	0.023	0.015	0.019

Notes: The dependent variable in the first (second) and third (fourth) columns is the mother's (father's) ratings. All regressions include whether the child is a girl, whether the child is the first one within the household, whether the child with low birth weight, the mother's and father's age, whether the mother (father) is non-Danish and region dummies. Significance levels: ***1%, **5%, *10%.

Table A10: Estimated coefficients of the threshold “well”, generalized ordered probit model.

	Mother	Father	Mother	Father	Mother	Father
	Threshold	for "well"	Threshold	for "well"	Threshold	for "well"
Parental psychopatology						
Mother symptoms	✓ -0.005		✓ -0.151		✓ -0.026	
	✓ (0.046)		✓ (0.092)		✓ (0.078)	
Postpartum depression	✓ -0.127		✓ 0.145		✓ 0.079	
	✓ (0.146)		✓ (0.268)		✓ (0.293)	
Father symptoms		✓ -0.117		-0.305**		✓ -0.230
		(0.092)		(0.110)		(0.143)
Parents argue frequently (mother's perception)	-0.332***		-0.392**		-0.051	
	✓ (0.093)		✓ (0.135)		✓ (0.182)	
Parents argue frequently (father's perception)		✓ -0.128		✓ -0.286		✓ -0.179
		(0.102)		(0.174)		(0.170)
Social ties						
Mother close relationship with the child	✓ 0.053		0.192*		0.004	
	✓ (0.061)		✓ (0.100)		✓ (0.115)	
Mother spending quality time with the child	✓ -0.111		✓ -0.016		✓ -0.211	
	✓ (0.096)		✓ (0.151)		✓ (0.194)	
Mother work experience	✓ -0.001		✓ 0.009		✓ 0.001	
	✓ (0.005)		✓ (0.008)		✓ (0.009)	
Father close relationship with the child		0.312***		0.286**		0.207*
		✓ (0.067)		✓ (0.111)		✓ (0.116)
Father spending quality time with the child		0.100		0.082		0.082
		✓ (0.066)		✓ (0.106)		✓ (0.114)
Father breadwinner		✓ -0.005		✓ -0.006		✓ -0.009
		(0.006)		(0.010)		(0.010)
Father work experience		-0.137*		-0.082		-0.098
		✓ (0.077)		✓ (0.125)		✓ (0.131)
Municipality provided program at age 3	✓ 0.192	0.097	0.272	0.053	0.159	-0.250
	✓ (0.136)	✓ (0.152)	✓ (0.220)	✓ (0.281)	✓ (0.246)	✓ (0.304)
Hours in non parental care	✓ -0.008	✓ -0.003	✓ -0.012	✓ -0.006	✓ -0.005	✓ -0.009
	✓ (0.005)	✓ (0.004)	✓ (0.008)	✓ (0.007)	✓ (0.006)	✓ (0.007)
N	2382	2382	2382	2382	2382	2382

Table A11: Estimated coefficients for the linear factor model of child functioning, alternative specification.

	CHIPS SCORES	LANGUAGE TEST SCORES	PSYCHIATRIC DIAGNOSES
	(S.E.); [BETA COEFF.]		
Acaper_mother	-0.417*** (0.037) [-0.064]	-0.608*** (0.053) [-0.096]	0.0009*** (0.0002) [0.021]
Acaper_father	-0.403*** (0.037) [-0.062]	-0.577*** (0.054) [-0.091]	0.0006*** (0.0002) [0.015]
Hypothesis tests			
Aca_mother=Acaper_father: Chi2; p-value	0.20; 0.656	0.39; 0.532	1.10; 0.294
N		2389	
Log-likelihood		-6784.2	