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The influence of parental divorce, parental temporary separation and parental relationship quality on children's school readiness

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Abstract:

We use the first three waves of the Millennium Cohort Study (MCS), a longitudinal and representative UK survey, to explore the interrelationship between parental divorce, parental temporary separation and parental relationship quality on cognitive abilities and psychological dimensions of the children at age five. By using an appropriate imputation method, we apply the augmented inverse propensity weighted estimator to test the hypothesis that parental divorce may be a positive experience for children with parents in high-distress unions, while the dissolution of low-distress unions may have a negative effect. Overcoming some of the limitations of previous research, we find that the dissolution of high-quality parental unions has the most harmful effects on children, especially concerning conduct problems. We also find that children who experienced parental temporary separation - which has been absent in most previous research - have more conduct and hyperactivity problems than children from stable or divorced families.

Key words: children's school readiness, parental divorce, parental temporary separation, missing values, parental relationship quality, robust estimator.

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1. Introduction

Parental divorce (PD)^a and union dissolution is an increasingly common experience for children in all developed countries. Many parents who are considering divorce may ask themselves whether they should stay together for the sake of the children; however, answering this question is not always straightforward (Yu et al., 2010). For this reason, research over the last forty years has placed strong emphasis on this social concern and the most common approach used has been to determine whether the effects of divorce on children's well-being are, on average, causal or not. It has often been argued that the existence of parental conflict preceding divorce is responsible of the negative effects of the latter on children's well-being. Because of this, one of the main concerns of this approach has been to control for parental relationship quality (RQ) and conflict prior to separation and many social surveys and various statistical methods have been used to achieve this (Amato, 2010). This approach has limitations, as it does not take into account the fact that parental conflict does not always precede separation and, therefore, assumes that there is only one answer to this question for all parents, independent of children's family experience prior to separation. For this reason, a much less developed line of research has tried to offer a more nuanced approach, exploring in which ways divorce affects different children, either positively or negatively. Studies on the heterogeneity of PD by parental RQ have found that divorce may be a positive experience for children from highly distressed marriages, while the dissolution of marriages with less previous distress may have negative effects (Amato et al., 1995; Booth and Amato, 2001). In other words, this research suggests that divorce may be beneficial for some children while for others not. Moreover, these findings are important, since the divorce of low distressed couples, which is potentially the most harmful for children, has been increasing in recent decades (e.g., Gähler and Palmatag, 2015).

Despite the significant ramifications of these results, only nine studies have examined the heterogeneity of the consequences of PD by the level of parental RQ (Amato et al., 1995; Booth and Amato, 2001; Fomby and Osborne, 2010; Hanson, 1999; Jekielek, 1998; Kalmijn, 2015; Morrison and Coiro, 1999; Strohschein, 2005; Yu et al., 2010). All these studies present limitations regarding the characteristics of the samples and/or the methods and the dependent and independent variables used, some of which include

^a See Table A4 in the Appendix for full list of acronyms.

the following: a) only two of the nine are based on non-US data, and few use nationally representative samples or methods to infer causality; b) they have only consistently analyzed children's psychological well-being while evidence on other children's outcomes is scarce; c) the most of them focus solely on children in middle childhood or older, and only consider married parents, not cohabiting unions - only Fomby and Osborne (2010) take into account young children and both married and cohabiting couples.

For all these reasons, considering the few number of existing studies on this topic and the limitations that they present, it is not possible to affirm conclusively that PD may be beneficial for children from high-distressed families, and detrimental for children from low-distressed families. This is why Amato (2010), in his most recent review of the literature, encouraged more research concerning this issue.

By using the first three waves of the Millennium Cohort Study (MCS), a nationally representative longitudinal study of a cohort of British children born in 2000 and 2002, this paper moves forward from previous work and contributes in fourth respects to assess the interrelationships between family disruption (FD), parental RQ and children's well-being. First, we test whether the hypothesis that the positive or negative effects of PD are related to the level of RQ that children experienced prior to their parent's separation is also valid for non-American children or whether it is country specific. There is some evidence that divorce from high distressed marriages is only beneficial for mothers who are out of poverty but not for mothers in poverty (Liu and Chen, 2006). Therefore, the interrelationships between parental RQ, disruption and children's outcomes may also diverge depending on whether the family lives in poverty or not before and after separation. Considering that the percentage of families in poverty diverge by country and that UK family policies, even if these are not very generous, provide more support to families than US ones (see, among others Gauthier, 2006, OECD, 2014), we do not expect to find a negative effect of parental divorce on children whose parents experienced a poor level of RQ prior to separation in this European country.

Second, as mentioned above, only Fomby and Osborne (2010) account in their study for very young children; moreover, they do not find evidence of heterogeneity of divorce by parental RQ. For this reason, we aim to assess whether this hypothesis is also true for young children. Furthermore, we specifically focus on a salient period of children's lives, namely transition to school. It is well-demonstrated that children who enter school without the necessary cognitive or socio-emotional skills have greater

academic and behavioral difficulties during their school years and beyond than their more “school-ready” counterparts (Duncan et al., 2007; Entwisle et al., 2005; Romano et al., 2010). For this reason, several countries have developed early intervention programs aimed at reducing differences in children’s school readiness (such as, for example, the Sure Start Programme in the UK, Melhuish et al., 2010).

Third, we aim to assess the heterogeneity hypothesis by improving and extending the methodological and analytical approach proposed in the literature. We focus on a broader array of children’s outcomes rather than just on one or two. We analyze the following multiple dimensions of children’s school readiness: three different cognitive abilities (verbal, problem-solving and spatial abilities) and five psychological dimensions (conduct, hyperactivity, internalizing and peer problems, and pro-social behavior). Unlike previous research on PD, we use the augmented inverse propensity weighted estimator in order to yield robust estimates of the effect of interest (Robins et al., 1994) and an imputation method that is based on the statistical methodology of chained equations (Raghunathan et al., 2001), which allows us to jointly impute missing data for the different types of variables.

Furthermore, in previous research on the interplay between PD, parental RQ and children’s outcomes, the fact that a significant proportion of parents separate only temporarily was not considered. Little is known about the level of RQ of these parents before separation and the risks children experience when faced with this type of family disruption (FD) (Kiernan et al. 2011; Nepomnyaschy and Teitler 2013).

In sum, by using cohort data similarly to Fomby and Osborne (2010), we aim to test the following three hypotheses: i) parental RQ and FD are unrelated processes that have independent effects on children (the independent hypothesis); ii) the apparent effect of FD is explained according to parental RQ (the selection hypothesis); and iii) the effect of FD on children depends on the quality of their parents’ relationship (the heterogeneity hypothesis).

2. Background

2.1. Average effects of family disruption on children well-being

It has repeatedly been demonstrated that children from divorced families are disadvantaged in different domains of their well-being compared to children from intact families (Amato 2001, Amato and Keith, 1991). Some argue that the negative association between PD and children’s well-being is due to the consequences of divorce itself, such as the decline in household income, parents’ psychological problems,

ineffective parenting, loss of contact with the non-resident father, post-divorce parental conflict, and poor cooperative co-parenting behavior (see Amato, 2010). Others attribute the association to the differences between parents who divorce and parents who remain together (Sigle-Rushton and McLanahan, 2004). Couples who subsequently divorce are different from couples who remain together for some observed and unobserved factors, especially concerning family relations, that are important in predicting PD and negative children's outcomes (Bhrolcháin, 2001). Research shows that the RQ of parents predicts the likelihood of divorce: parents who subsequently divorce have, on average, a poorer RQ than those that do not divorce (Hanson, 1999), and a poor parental RQ per se has negative effects on children's well-being (Cummings and Davies, 2011).

Studies on divorce effects using ordinary least squares (OLS) and logistic models show that part of this effect is spurious; it is only partially explained by parental RQ (e.g., Cherlin et al., 1991; Hanson, 1999). However, with these methods, it is not possible to determine the causal effect of divorce on child well-being (McLanahan et al., 2013). Since the late 1990s, several studies have used more innovative research designs to identify the independent effects of PD and father absence, including lagged dependent variable models, growth curve models, individual and sibling fixed effects models, natural experiments and instrumental variables, and propensity score matching. McLanahan et al. (2013) review these studies and find consistent evidence that PD exerts negative effects on the well-being of offspring. They also show that evidence of this is stronger for children's socio-emotional development – especially in externalizing problems – than for children's cognitive ability. Nevertheless, they present the following restrictions: i) 31 studies that analyze the effect of father absence and PD on cognitive development are based on US samples, with the sole exception of Cherlin et al. (1991) which employs a UK sample; ii) most of the 27 studies on children's mental health likewise use data from the USA. Additionally, although the effect of PD seems stronger in younger children than children in the middle childhood or older, very few studies focus on children who experience PD in early childhood; iii) only one (Strohschein, 2005) explores the heterogeneity of divorce effects by the quality of the parents' relationship prior to separation.

Another weakness of existing research is that it does not take into account parents who separate only temporarily. Recent studies observe that a non-negligible proportion of parents separate for a short time period and then re-partner with the same person (Cross-Barnet et al., 2011; Nepomnyaschy and Teitler, 2013; Roy et al., 2008). However, as

stated by Nepomnyaschy and Teitler (2013: 3), “in most studies, this family ‘type’ is usually classified as either intact or separated (depending on when cohabitation status is ascertained), but it may differ in many respects from both of those groups”. The reason this type of FD is scarcely considered in previous research is that most studies only use two waves of survey data, and at least three waves are necessary to detect it. Nevertheless, there are few studies on the characteristics of parents who separate only temporarily. These illustrate that such couples are substantially different from those with continuously intact relationships: they are younger and more disadvantaged economically, have more psychological problems, and are more likely to have children with other partners who are mainly non-white (Kiernan et al., 2011; Kiernan and Mensah, 2010; Nepomnyaschy and Teitler, 2013). Research also shows that partners who experience periods of separation report lower relationship satisfaction than those in stable relationships (see also Vennum et al., 2014). To our knowledge, only Kiernan et al. (2011) and Nepomnyaschy and Teitler (2013) analyze the consequences of temporary separation on children’s well-being, and they find evidence of a negative effect even controlling for several socio-demographic characteristics. However, these studies do not account for parent RQ.

How does temporary parental separation affect children's development? For a period of time, children whose parents separate and reunite suffer the same circumstances as those children whose parents separate permanently, namely a decline in the quality of parenting and in financial resources. Additionally, these children experience family reconfiguration at least twice: once when their parents separate and again when they reunite. This implies changes in the roles and routines of the parents and the family as a whole (Nepomnyaschy and Teitler, 2013). Although children may benefit from returning to live with both parents, a new change of family dynamics may be a source of stress for both parents and children. Halpern-Meehin and Turney (2016) show that churning couples’ parenting stress, which is a predictor of children’s well-being, is greater than that of their counterparts who are together stably and similar to the stress of those who permanently separate.

2.2. Heterogeneity of the effects of parental divorce by parental relationship quality

2.2.1. Conceptual framework

Previous research has developed two main explanations regarding the heterogeneity of PD effects by parental RQ. One is the stress relief hypothesis (Wheaton, 1990), which

concerns the consequences of transitions in life roles. Wheaton (1990: 210) stated that "...instead of being stressful, life events may at times be either non-problematic or even beneficial, offering escape from a chronically stressful role situation – creating the apparent paradox of more 'stress' functioning as stress relief". According to this perspective, the stressful event of PD may be beneficial for children whose parents' relationship prior to divorce has been poor, as it takes them away from an aversive and stressful home environment. After divorce, these children should enjoy an improvement in their well-being since they no longer experience the parental conflict (Booth and Amato, 2001; Strohschein, 2005).

By contrast, the dissolution of low-distress parental relationships may be detrimental to children's development. Children from relatively harmonious families may not benefit from divorce, since it is unlikely that they experience this event as stress relief. For these children, divorce may instead give rise to stressful situations such as a decline in their standard of living, moving to a poorer neighborhood, changing schools, and losing contact with the non-custodial parent (Amato, 2000). Children from non-dysfunctional families may also begin to experience parental discord after separation, since issues such as custody, childrearing, visitation, and child support are potentially conflictual (Booth and Amato, 2001).

In addition to changes in stress, children's understanding and perceptions of divorce depend on the level of their parents' pre-divorce relationship problems, another factor related to children's adjustment after separation. Children who have witnessed parental disputes may anticipate their parents' divorce and attribute it to external reasons – such as parental conflict - as argued by Booth and Amato (2001). For children from low-distress families, by contrast, divorce might come as more of a surprise and they might see divorce as a threat to their happiness. Booth and Amato (2001) give possible reasons as to how an unexpected divorce may adversely impact on children. First, for these children, it is more difficult to comprehend and accept the reasons for their parents' separation. As Maes et al. (2012) state: "if children do not understand why their parents have divorced, they make up their own story around things they do know, increasing the danger that children will blame themselves". Second, children who do not anticipate PD may feel that they have little control over events in their lives (Booth and Amato, 2001). Children's self-blame and locus of control are, in turn, negatively related to their adjustment after divorce (Bussell, 1996; Healy et al., 1993; Kim et al., 1997; Sandler et al., 2000).

Are these theories useful in explaining the heterogeneity of PD for very young children? Research shows that infants and very young children are sensitive to parental RQ which is related to their well-being (Fitzgerald, 2010; Graham et al., 2013). Therefore, they can perceive stress relief when their parents divorce from a conflictual relationship. However, the other explanation used by previous research - children's understanding and perceptions of divorce - is unlikely to be valid for very young children due to the fact that the kind of reasoning needed for children to be able to anticipate this event and blame themselves for it is beyond that typically exhibited by children at that age.

Nevertheless, another possible explanation for why the effects of PD may diverge by parental RQ is that the latter may also modify the effects of divorce on parental well-being. To our knowledge, this explanation has not been mentioned by previous research but it is reasonable to suggest that it can be applied to very young children since it has been largely demonstrated that parents' emotional adjustment after divorce is an important predictor of children's well-being (Amato, 1993) and that parents' emotional problems are also clearly associated with adverse children's outcomes during infancy and early childhood (Kiernan and Huerta, 2008; Petterson and Albers 2001). In addition to that, there are reasons in favor of the heterogeneity of the effects of divorce on adults. Even partners who are unhappy together may consider the breakup of their relationship a failure and experience distress and disappointment as a consequence (Waite et al., 2009). They may also suffer a decline in their resources after divorce. However, the relief that they experience may be greater than any inconveniences associated with this event and, therefore, their emotional well-being may improve after divorce (Wheaton, 1990). For parents who have a poor RQ, divorce may be seen as a solution rather than a problem and, as Ye, and Longmore (2017) sustain, "divorce can be a self-protective action that people can take to assist in getting away from a toxic relationship". In contrast, for people who experienced high RQ prior to separation, divorce signifies a crisis, the ending of a supportive partnership and the loss of resources; leading to a decline in emotional well-being (Kalmijn and Monden 2006). The few empirical studies that have focused on this topic predominantly show that people who enjoyed a high RQ prior to divorce suffer the most harmful negative effects on their emotional well-being (Aseltine and Kessler, 1993; Booth and Amato, 2001; Johnson and Wu, 2002; Kalmijn and Monden, Waite et al., 2009; Wheaton, 1990; Williams, 2003; Ye, DeMaris and Longmore 2017). For people with low levels of RQ, the findings are mixed. Some studies give support to the hypothesis that divorce is beneficial for the emotional well-being of people in highly conflictual or unsatisfactory relationships (Amato and

Hohmann-Marriott, 2007; Wheaton, 1990; Williams, 2003; Ye et al. 2017). Others find evidence that people in unsatisfactory relationships experience fewer declines in well-being after divorce than those in satisfactory relationships but that the latter also experience the negative effects of divorce on well-being (e.g. Kalmijn and Monden, 2006; Waite et al., 2009).

2.2.2. Limitations of previous research and current proposal

One of the main problems in the literature regarding the heterogeneity of divorce effects by parental RQ concerns the characteristics of the sample and the models that are used. First, confidence in research findings increases when studies are based on a nationally representative sample with a large sample size. Most studies have less than 300 cases in the divorce group, and only three (Hanson, 1999; Kalmijn, 2015; Strohschein, 2005) use nationally representative surveys. Second, as mentioned, since the majority of samples are based on American children – with the exception of Kalmijn (2015) and Strohschein (2005) – there is not enough evidence to conclude that the hypothesis of heterogeneity of divorce effects is valid in all Western countries. Third, with the exception of Fomby and Osborne (2010), all relevant studies examine only children whose parents are married; they exclude the large and increasing proportion of children who are living with their biological cohabiting parents (McLaren E., 2014; Perelli-Harris, 2014). Four, all studies are based on OLS or logistic regressions with the exception of Strohschein (2005), which uses growth models. OLS and logistic models allow researchers to control for multiple background characteristics but do not take into account unobservable variables affecting both the family structure and the child well-being. As Lee and McLanahan (2015: 6) remark in their study assessing racial/ethnic and gender differences in the effects of FD, “most of our knowledge about population heterogeneity is based on associational studies, which likely obscure family instability effects and selection effects”.

Another limitation is related to the characteristics of the outcome and focal variables employed in the analysis. Seven of the nine studies in this field used the psychological well-being of offspring; there is less consistent evidence of variation in divorce effects in other important outcomes such as educational achievement. Although a large number of studies on the average effects of PD take into account educational achievement, among those concerning the heterogeneity of divorce, only one (Hanson, 1999) does. For this reason, with the existing research, it is not possible to say whether the

hypothesis about the heterogeneity of divorce effects is valid for most children's outcomes, or only for psychological ones. In fact, it is plausible to argue that among children from high-distress families, PD could have positive effects on psychological well-being, but negative effects on other outcomes such as educational achievement, since it is strongly related to family economic well-being (Gershoff et al., 2007; Mayer, 2002), which decreases after separation (Andress and Hummelsheim, 2009). Turning to our explicative variable, most research only analyzes one area of parental RQ, namely parental conflict, as measured by frequency of disagreements. Several studies show that other dimensions of parental RQ, such as conflict, communication, affection, and emotional support, also affect children's well-being (Heinrichs et al., 2010). Nevertheless, to our knowledge only two studies on the heterogeneity of divorce effects, namely Fomby and Osborne (2010) and Strohschein (2005), employ a more comprehensive measure of parental RQ.

In addition, existing research does not focus on a specific stage of children's development. Instead, samples are used with great variation in the children's ages at the time of divorce, and the age when dependent variables are measured. First, most studies look at children who experienced PD over a wide range of ages (e.g., Booth and Amato, 2001; Hanson, 1999; Kalmijn, 2015). In some of them, divorce occurred any time from when the children were born to when they were adults. Only Fomby and Osborne (2010) focus on a specific stage of children's development namely PD that occurs before age 3, and the dependent variable is measured at age 3. Second, studies finding evidence in favor of the heterogeneity hypothesis analyze children's outcomes measured during middle childhood and/or adolescence (Hanson, 1999; Jekielek, 1998; Morrison and Coiro, 1999; Strohschein, 2005) or adulthood (Amato et al., 1995; Booth and Amato, 2001; Kalmijn, 2015; Yu et al., 2010). The only paper that does not support this hypothesis focuses on outcomes in very young children (Fomby and Osborne, 2010). These contradictory results may suggest that the effects of divorce only vary by parental RQ for children in middle childhood or older. However, with only one study on very young children, there is not enough evidence to conclude that whether divorce effects are heterogeneous depending on the age of the child at the time of divorce and/or the age when the outcomes were measured.

In sum, we will add evidence regarding the consequences of parental temporary separation and PD and about the importance of taking into account the heterogeneity of PD effects. Moreover, our study contributes to the methodological aspects of the

literature on divorce by applying a recently-developed statistical approach that addresses treatment selection bias in a robust and conservative manner. We analyze data from a United Kingdom (UK) representative on going survey by which we can disentangle a reasonable number of respondents in each of the three family situations of interest, namely stable, temporarily separated and divorced. We can account for correct measures related to the child well-being recorded at the early childhood. Then, after applying Multiple Imputation (MI, Rubin, 1996, 2002) to deal with missing cases on the focal and control variables we use a statistical method which is based on a robust estimator that is also efficient when the treatment model is mis-specified once the design weights are properly defined.

3. Materials and Methods

3.1. Data

The data corresponds to the first three waves of Millennium Cohort Study (MCS) which is a high-quality profile survey representative for the UK (Hansen et al. 2001; Hansen and Joshi, 2007; Plewis, 2007; Plewis et al. 2000). The first sweep (MCS1) was carried out between September 2000 and January 2002. It contains information on 18,819 babies from 18,533 families from the UK, collected from the parents when the babies were 9-11 months old. The families were contacted again when the children were aged 3 and 5 years. The response rates achieved for the second (2004/05) and third (2006) waves were 78% and 79% of the target sample, respectively. More than two-thirds of the total sample (68.8%, which representing 13,234 families) responded in all three waves (Ketende, 2010). The MCS sample design allowed for over-representation of families living in areas with high rates of child poverty and/or high proportions of ethnic minorities. Survey methods were used to take account of the initial sampling design, and adjustments were made for non-response in the recruitment of the original sample and sample attrition over the follow-up period to age 5. Details on the survey – its origins, objectives, and sampling, as well as the content of the survey waves – are contained in the documentation attached to the data deposited at the UK Data Archive at Essex University.

3.2. Variables

3.2.1. Dependent variables

The variables of interest are measured when children are 5 years old, at the third wave.

The Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997) assesses children's behavioral adjustment and is answered by the mother. The SDQ is made up of five subscales assessing emotional symptoms, conduct problems, hyperactivity or inattention problems, peer problems, and pro-social behavior. Each subscale has five items with scores ranging from 0 to 2. Children's cognitive development is assessed by using the British Ability Scales Second Edition (BAS II) (Elliott et al., 1997). The following BAS subscales were used to measure different domains of cognitive development: the naming vocabulary test, which assesses expressive language; the picture similarities test, which measures pictorial reasoning; and the pattern construction test, which assesses spatial ability. These were conducted the interviewer at home. The three tests assess the three most significant information-processing skills: verbal reasoning, non-verbal reasoning and spatial abilities (Hill, 2005). A standardized score adjusted for age (T-score) is computed for each cohort member according to his/her age band considered every three months.

3.2.2. Focal variables

We use the first three waves of the survey to create the following three main family situations and we report the total number of cases in each one: children that experience PD are those whose parents were together (married or cohabiting) until they were at least 9 months old, but who divorced when they were aged between 9 months and 5 years (1,177); children that experience parental temporary separation (PtS) are those whose parents were together (married or cohabiting) when they were born and when they were 9 months and 5 years old (277); however, on one or more occasions, their parents spent more than one month living apart; children in stable families (SF) are those whose parents remained in stable married or cohabiting unions from their birth until age 5 (9,001).

Partnership quality was derived from the Golombok Rust Inventory of Marital State (GRIMS, Rust et al., 1990) which is a psychometric instrument for the assessment of marital discord and the overall quality of a couple's relationship. We only used the GRIMS scale for responses from the mother, as the fathers' questionnaire showed a high percentage of missing cases. We use this scale at the first wave (9 months) since it has seven items, as opposed to four items in the subsequent waves.

The following four items, the responses to which were collected at the first wave assess the negative aspects of RQ: 1) "my partner doesn't seem to listen to me"; 2) "sometimes I feel lonely even when I am with my partner"; 3) "I wish there was more warmth and

affection between us”; and 4) “I suspect we may be on the brink of separation”. The other three items assess the positive aspects of RQ: 1) “my partner is usually sensitive to and aware of my needs”; 2) “our relationship is full of joy and excitement”; and 3) “we can always make up quickly after an argument”. The item responses consist of the following: strongly agree (0); agree (1); neither agree nor disagree (2); disagree (3); strongly disagree (4) and can’t say (5). “Can’t say” responses were considered as missing information. To create an ordinal scale, we included both the positive and the negative items, which involved reversing the answers to the positive items. For these items the answers were: strongly disagree (0); disagree (1); neither agree nor disagree (2); agree (3); strongly agree (4). We then added up respondents’ answers to the seven items, which produced a scale with a minimum of 0 and a maximum of 28.

Most studies (with the exception of Fomby and Osborne, 2010) also due to few observed divorced couples, take into account the heterogeneity of divorce by accounting for an interaction in the linear regression model between PD and the continuous variable measuring parental RQ. They assume that the magnitude and sign of the interaction effect is the same across any value of the RQ and they do not allow the extent to which the effect of PD diverges in according to the intensity of the relation to be examined. Only Fomby and Osborne, (2010: 8) create a binary variable for the quality of the relation by considering the first quartile of the observed variable on RQ. These authors only look for a low RQ (below the 25th percentile of the sample distribution) and a high RQ (at or above the 25th percentile for the sample distribution). As they mention, “relationships in the top 75th percentile are not of equal quality, and may not at all be “high quality” ”. To overcome this limitation, in this study we consider four quartiles of the empirical distribution of our measure of RQ and we obtain four ordered categories of decreasing union quality. We choose this specification to obtain a more accurate portrayal of children who experience the extreme RQ levels.

In order to consider the heterogeneity of PD, we reconstructed the family structure history and exposure to RQ measured at the beginning of the survey by using a binary variable for each combination of the above: stable union (or divorce) with highest RQ; stable union (or divorce) with high RQ; stable union (or divorce) with low RQ; stable union (or divorce) with the lowest RQ. Disposing of multiple control groups is also useful for dealing with possible confounding variables (Rosenbaum, 1987). Temporary separation is not considered due to the few children experiencing this type of FD.

3.2.3. Control variables

In Table 3 illustrates the control variables.

Table 3

They highlight the selected covariates when the children were 9 months old (at the first wave of the survey), namely before parental separation takes place. They take into account several socio-demographic characteristics related to FD and children well-being, which are good candidates for detecting the treatment effect, as suggested by the following authors: Amato and Hohmann-Marriott, 2007; Amato and Rogers, 1997; Booth and Amato, 1991; Booth and Amato, 2001; Brooks-Gunn et al., 2010; Brown, 2004; Idstad et al., 2015; Karraker and Latham, 2015; Kiernan, 2004; Kiernan and Huerta, 2008; Kiernan and Mensah, 2009; Muluk et al., 2014; Knoester and Booth, 2000; Oláh and Gähler, 2014; Sabates and Dex, 2015; Timmer and Veroff, 2000; and Wilson and Waddoups 2002. To guide the inclusion of variables aimed at controlling for the selection into FD, we draw on the Social Exchange Theory (Levinger, 1976). This theory argues that the decision to leave a relationship is based on to what extent the perceived rewards are greater than the perceived costs of that relationship, the legal, moral, and economic barriers to divorce, and the available alternatives to this partnership (singlehood or alternative partners). Rewards may include love, status, goods, services, support, security and everyday assistance, while costs reflect negative aspects of the relationship. The rewards and costs considered are the following: family income, housing tenure, mother's educational attainment and ethnicity, mother's health (depression and longstanding illness) and the presence of half- or step-siblings at home. We also take into account barriers that discourage FD, which, as Levinger (1976) state, can be financial strains, social support and pressures from influential people, moral constraints and poor alternatives (e.g., the lack of a desirable new partner, low likelihood of financial independence). We consider in our models the following variables as barriers to FD: paid work status of the mother; whether the mother lived with someone else as a couple before living with the father of the child; type of parental union (married directly, cohabitation before marriage, or cohabitation); year that parents began living together as a couple; whether parents grew up in a non-stable family and mother's attitudes to single-parent upbringing. The social support is measured by the following response: "If I had financial problems, I know my family would help if they could". Finally, another group of control variables is related to the division of unpaid work, which is associated with the probability of divorce: who is

mostly responsible for household tasks and who is generally with and looking after the children.

3.3. Analytical strategy and statistical method

We consider the framework of counterfactual reasoning or potential outcomes (POs) to evaluate PD (or PtS) on children's outcomes. Therefore, we need to compare scores on the cognitive and psychological dimensions both when the same child experiences FD and when he/she lives in a SF. The Average Treatment Effect (ATE) is conceived as the difference between the POs of the treated and of the control group. For example, a child would have a particular level of psychological and cognitive development at age 5 if he/she had experienced PD (or PtS), and the same child would have the same or a different level of development at that age if he/she had not experienced FD. To evaluate the ATE of PD and the ATE of PtS, the outcome for the same children in both situations, PD versus SFs (and PtS versus SFs), has to be considered. The ATE provides a more appropriate and attractive interpretation between the realized developmental outcomes for children of divorce or temporary separation and the counterfactual outcomes for these children had their parents remained together (Kim, 2011).

Therefore, the effect of FD on children's outcomes is not easily assessed when non-experimental studies are considered, since each child belongs to the treatment or to the control group (one PO is always not realized). That is, a child can experience PD or can live in a SF from 9 months to age 5; he/she cannot experience both family situations at the same time. The solution to this problem of causal inference is the random assignment to the treatment or control group, since it ensures that cases in both groups are identical. However, research shows that the children experiencing FD are not randomly selected, and that the family characteristics that determine the FD are likely to also affect the child's well-being through other pathways (McLanahan et al., 2013). The treatment decision such as PD is influenced by a variety of factors which may be unmeasured and also unknown to the researcher. For this reason, the propensity score (PS, Rosenbaum and Rubin, 1983) is a statistical tool which allows us to take into account the observed pre-treatment covariates in order to properly compare those receiving or not the treatment. The PS evaluate the conditional probability of the treatment (the probability of experiencing PD or PtS) given the observed covariates. The estimator of the Average Causal Effect (ATE) is then properly considered conditional to the estimated propensity score.

Of the PS methods, we apply the Augmented Inverse Propensity Weighted (AIPW) estimator (Robins et al., 1994) where each response to the item defining the outcome (dependent variable) is weighted according to the inverse of the probability of receiving the treatment actually received (the PS for the treated and the 1-PS for the untreated). The estimator is augmented by a term to correct for mis-specifications in the treatment model and it is statistically more robust with respect to the inverse probability of treatment weights (IPTW or inverse propensity weighted estimator IPW, Robins et al., 2000). As also assessed by Glynn and Quinn, (2010) it possesses the so-called “double robustness”, allowing for miss-specifications in the parametric form and improving the precision of the estimators (see also Cao et al., 2009). Moreover, it is more stable with respect to the IPTW estimator mainly when the PS assumes extreme values, in which case it prevents that some units (treated contrary to the prediction) becoming highly influential. This method combines the PS regression model and the PO model. The resulting estimator is a consistent estimator of the ATE when the PS is correctly specified or the model for the outcome is correct. Therefore, within the AIPW estimator, the effect of PD (or PtS) on children’s outcomes is controlled by the PS obtained with the PS regression model to predict the treatment status, which is the probability of being exposed to divorce or temporary separation. The children’s outcomes are then evaluated under the PO model.

We consider the three hypotheses illustrated in Section 1 and we show the results according to the three steps of the analysis. First, we estimate the ATEs of PD and PtS using the PS with the variables shown in Table 3 but without parental RQ. In order to make a parsimonious PO model, only the variables most directly related to the children’s living conditions have been selected on subject matter knowledge. These include the following: sex of the child; number of children at home; mother’s education, ethnicity and labor force participation; household income; housing tenure; mother’s longstanding illness and depression; and type of parental union. Second, we evaluate the selection hypothesis by using the parental RQ within the PS model and PO model. Third, we evaluate the heterogeneity only for PD by estimating the model for each quartile of the variable RQ. As mentioned, at the third step we do not consider the analysis of heterogeneity for those children who experience PtS due to the limited number of children.

3.4. Sample and missing data

We restrict the analysis to children whose parents provide information about their family structure in all three waves of the MCS. The sample includes only singleton children and families where the mother is the main respondent at the first wave. The number of children whose parents were stably married or cohabiting from the birth of the child until the child was 9-11 months old is 10,455 (wave 1). When we include all the predictor variables, the number of complete cases falls to 9,222, indicating that 12% of the sample is missing. From the missing data analysis, we observe that the missing cases of the predictor variables are not random, since they are associated with the family situation and with the parental RQ. We also observe that the covariates most likely to be missing are parental RQ and income. We rely on the missing at random assumption (MAR) which states that the probability of data to be missing conditional on the observed data does not depend on the unobserved data for each possible value of the model parameter. Under this assumption we apply Multiple Imputation based on Chained Equations (MICE, White et al.) to deal with the observed non-monotonic pattern of missing cases. As suggested by literature on the missing values we do not impute the outcomes variables.

MICE is a conditional approach to the observed data and jointly accounts for the mixing quality of the available covariates which are continuous, categorical, ordinal and nominal. It has been shown that MI performs better than single imputation in handling missing covariates (see, among others, White et al., 2011). Moreover, it is more robust with respect to miss-specifications of the imputation model and the assumed missing mechanism. The Bayesian approach, on which the method is based, allows us to predict the missing values according to the posterior distribution of the variable, which is simultaneously regressed on all the other variables, as well as on the survey weights (we consider the overall weights which are given by the sampling weights times the attrition weights determined at wave 3 of the survey) and on the outcomes. We generate multiple versions of the complete data (up to five) and each model is estimated iteratively by checking the convergence of the algorithm. The procedure ensures high precision for the estimates of the missing values since we dispose of multiple predictions for each missing value. The choice of five imputed datasets is considered according to the percentage of missing values and by evaluating the Monte Carlo error of the results (the standard deviations of the estimates across the repeated runs of the procedure). They are necessary to provide reliable standard errors for the ATE of interest.

The AIPW estimator was applied to each of the eight dependent variables. The sample of children with data on conduct problems numbered 9,860; the sample for hyperactivity/inattention problems 9,564; emotional problems 9,760; inattention and peer problems 8,916; and pro-social behavior 9,870. For cognitive measures, the sample of children with vocabulary test scores numbered 10,327; the picture similarities test sample numbered 10,314; and the pattern construction test sample numbered 10,293. It is important to note that the cognitive test scores have fewer missing responses than psychological variables since they were administered by the interviewer, whereas the questions regarding children's psychological well-being were answered by the mother.

4. Results

4.1. Main descriptive differences between family situations

Table 1 shows the average scores for the dependent variables stratified according to the family situation at age 5. Children experiencing PtS or PD shows lightly more psychological problems and lower scores for cognitive development with respect to children with SFs.

Table 1

Table 2

Table 2 shows the descriptive statistics of parental RQ according to the family situation. In the sample 86% belong to SFs, 11% experience PD and 2.6% experience PtS. The percentages of those reporting different levels of RQ are quite similar: 28% reported high quality relationships and 20% low quality relationships. The data reveal that parents who remained together from wave 1 (children were 9 months old) to wave 3 (children were 5 years old) had better RQ on average than those who divorced or experienced some period of separation. Comparing the two types of FD, parents who subsequently divorce exhibit worse RQ than those who only temporarily separate. At wave 1, around 17.72% of parents in SFs reported the lowest RQ compared with 32.49% of those who later separated temporarily and 39.42% of those who later divorced. Hence, in accordance with the selection hypothesis, a large number of children with divorced parents were exposed to poor union quality before parental separation. However, contrary to this hypothesis, Table 2 also shows that a considerable proportion of parents who divorced had not experienced poor RQ prior to ending their relationship. Among children whose parents divorced, 17.08% and 21.92% belonged to families with the highest (q_1) and high (q_2) RQ, respectively. It is important to

acknowledge that children whose parents had the highest RQ at wave 1 could experience poor parental RQ after this wave and prior to their parents' divorce since this event occurs between wave 1 and wave 3 of the survey.

Although the column percentages show that a large proportion of divorced parents reported the lowest level of RQ before separation, the row percentages demonstrate that the majority of parents with poor-quality relationships do not separate. Approximately three-quarters (73.40%) of mothers with the lowest level of RQ at wave 1 remained in a relationship with the father of their child four years later.

Even prior to parental separation Table 3 shows that differences between stable and disrupted families are not restricted to RQ. Relative to SFs, couples who went on to divorce faced socio-demographic disadvantages even before they separated. First, divorced families had less privileged socio-economic conditions than SFs. The mothers in divorced families show a lower educational level than their counterpart in SFs. Income level is lower in divorced families with respect to SFs. Another important difference is observed for the type of parental union. Second, mothers who remained with their partner had better physical and mental health than mothers who subsequently divorced. Third, the majority of mothers who subsequently will experience family disruption agree with the statement that a single parent can bring up children just as well as a couple. In all family situations, the mother was the main person responsible for household tasks or looking after the children, but mothers who subsequently divorced were even more likely than other mothers to carry out these responsibilities. Fourth, mothers who subsequently divorced experienced more instability in their family as children or adults than mothers who remained in a stable relationship. A higher proportion of mothers who subsequently divorced did not live with both biological parents during childhood, were more likely to have lived with someone else as a couple before living with the child's father, and had started their relationship with their child's father more recently than mothers remaining in SFs. Parents who permanently separated were more likely to be cohabiting than parents in SFs, and the number of step- or half-siblings was higher in divorced than in SFs.

Parents who separate only temporarily are more similar to those who divorce than to those who remain in a stable relationship for most socio-demographic characteristics analyzed. Although these parents are together again when the children's school readiness outcomes are measured, descriptive results on RQ and socio-demographic

characteristics clearly show that families that experience periods of separation should not be classified as SFs, as categorized by some studies.

Overall, considering only results from Tables 2 and 3, we cannot say whether the observed differences on school readiness between children from different family situations are explained by differences in family characteristics pre-dating the experience of FD.

4.2. Average effects of family disruption on children's school readiness

Table 4 reports the AIPW estimates for the eight scores on the psychological and cognitive measures.

Table 4

As mentioned, in order to evaluate the i) independent and ii) selection hypothesis, we compare Model 1, which only includes control variables, and Model 2, which also takes into account parental RQ in both the outcome and treatment model. As expected, the variable parental RQ is significant in predicting the probability of PD and PtS for all the eight measures. In the appendix, for the conduct test, we report the estimated values and standard errors for Model 2 (Table A1) and the estimates related to the variables included in the PO in the PS model (Tables A2, A3^b). The estimated effect of PD (ATE) is significant for all the psychological dimensions and for the cognitive dimensions except for the picture similarity test in Model 1. However, when parental RQ is introduced among the control variables (Model 2), the effect of PD is not significant for internalizing problems and peer problems. For conduct and hyperactivity problems, the magnitude of the effect of PD is considerably reduced when parental RQ is included (Model 2), but remains significant. For conduct problems, PD increases the average score of 0.244 points (Model 1) with respect to the score of children in SFs but this average score decreases to 0.162 when parental RQ is included (Model 2). For hyperactivity, the effect of PD is 0.407 in Model 1 and 0.241 in Model 2. Parental RQ reduces this effect by around 33.60% for conduct problems and around 40.78% for hyperactivity problems. Unexpectedly, the effect of PD on pro-social behavior becomes significant in Model 2. Unlike the results for the most psychological variables, when parental RQ is included (Model 2), the effect of PD does not decrease for the pattern construction test, and even increases slightly for the vocabulary test.

^b The results relating to the remaining dependent variables are available from the authors upon request.

The effect of PtS is not significant in any model for internalizing and peer problems, pro-social behavior, pattern construction and vocabulary test. The effect of PtS is only significant in Model 1 for the picture similarity test. In contrast, PtS has a significant negative effect on children's hyperactivity and conduct in both models. In contrast to our observations for PD, parental RQ does not reduce the effect of PtS in any of these psychological dimensions. It is also important to point out that for conduct and for hyperactivity problems, the magnitude of the effect of PtS is greater than the effect of PD. The results of Model 2 indicate that the estimated PO mean for the conduct scores of children in SFs is 1.287. PtS increases this score by an average of 0.384 while PD increases it by an average of 0.162. In other words, the effect of PtS increases conduct problems by around 30% while PD only increases this by around 16%^c. Similar differences result for hyperactivity problems.

4.3. Heterogeneous effects of parental divorce according to the parent relationship quality

Table 5 illustrates the estimated values of the proposed estimator on the quartiles of RQ to evaluate hypothesis iii).

Table 5

With regard to the conduct problems related to PD, two ATE are significant: those related to children that had lived with parents experiencing the extreme levels of RQ. Among children whose parents reported the highest (q_1) RQ, the PO mean in SF is 0.960, with PD increasing it by 0.349. In other words, children from PD experiencing (q_1) RQ show 36.34%^d more of conduct problems than children in from SFs. The difference in percentage is lower, standing at 12.81%^e among children whose parents had the lowest level of RQ (q_4).

For hyperactivity problems, the effect of PD is only significant in the lowest RQ quartile (q_4). Children with PD experiencing the lowest level of RQ (q_4) among parents, have a higher probability of reported hyperactivity problems compared to children with SFs; the difference in percentage is 11%.

As can be seen, for internalizing problems the average effect of PD is not significant once parental RQ is taken into account. However, when this effect is analyzed

^c This percentage is calculated by considering the estimated ATE multiplied by 100 and divided by the estimated PO referred to SF.

^d The percentages are calculated as explained in previous footnote.

^e The percentages are calculated as explained in previous footnote.

according to the quartiles of parental RQ, we get similar results with the conduct problems. The effect of PD is significant in the extreme quartiles of PD: within the group of children whose parents showed the highest RQ, those who experience PD have a higher probability of manifesting internalizing problems compared to children from SFs; the difference in percentage is 19.77%^f. Within the group of children whose parents had the lowest level of RQ, the difference in percentage is lower, at 11.68%^g. For peer problems, the effect of PD is only significant for children whose parents had a high (q_2) RQ and, for pro-social behavior, the effect is only significant for those with low RQ (q_3). With regard to the cognitive dimensions of children's school readiness, although the average effect of PD on the picture similarity tests is not significant (Table 4), the results are different in Table 5. The effect of PD is significant and equal to -1.326 among children with parents reporting the lowest level of RQ (q_4). The effect of PD in the group with the highest RQ (q_1) is not significant; however the magnitude of this effect is similar to that in the lowest group. For the vocabulary test, it is interesting to note that the effect of PD is significant and negatively large for those children exposed to the highest RQ (q_1). In this quartile, PD decreases the score of the vocabulary test by an average of 3.319 points. It is also significant but lower in magnitude for those with low RQ (q_3). For the pattern construction test the effect is significant and negative for children experiencing low and moderate RQ. See also Figures 1 and 2 in the Appendix for a straight comparison between the PO estimated for the conduct problems and the vocabulary test.

5. Discussion

This work is an attempt to elucidate the interrelationships between FD and parental RQ by testing the following three main hypotheses: i) parental RQ and FD are unrelated processes that have independent effects on children (the independent hypothesis); ii) the apparent effect of FD is explained according to the parental RQ (the selection hypothesis); and iii) the effect of FD on children depends on the quality of their parental relationship (the heterogeneity hypothesis). In this study, we advance on previous research in four ways. First, we evaluate the importance of these hypotheses using a comprehensive view of child development rather than focusing on a single outcome. We analyze multiple domains of children's school readiness: cognitive, social and

^f The percentages are computed as explained in the previous footnote.

^g The percentages are computed as explained in the previous footnote.

emotional well-being. Second, we focus on very young children who are at a key point of their development, namely the transition to school, while most research focuses on children in middle childhood or older. Third, thanks to the longitudinal nature of our data, we are able to analyze a type of FD scarcely covered in previous literature: children whose parents temporarily separate. Fourth, unlike most previous research, our study examines the heterogeneity of divorce effects by parental RQ in a non-American country by using the UK's MCS, a nationally representative sample. The augmented inverse propensity weighted estimator is also proposed to make a causal inference jointly with a proper statistical tool to handle missing values for survey data.

We find mixed support for the i) independent and the ii) selection hypotheses, obtaining a different pattern for each outcome variable and type of FD. The selection hypothesis is supported by the PO models regarding the average effect of PD on pro-social behavior, internalizing and peer problems. Nevertheless, there is evidence in favor of the independent hypothesis in five of the eight outcomes. Using a statistical method not previously used in research into divorce, our findings are in accordance with most existing studies. Although some studies have found that parental RQ before divorce entirely explains the effect of PD entirely (Cherlin et al., 1991; Fomby and Osborne, 2010), the majority also report that divorce has an independent effect (e.g., Averdijk et al., 2012; Hanson, 1999; Kim, 2011; Potter, 2010).

In addition, we find that the importance of parental RQ in explaining the association between PD and children's outcomes is totally different for cognitive and psychological outcomes. For psychological outcomes, parental RQ explains all or a substantial part of the divorce effect. In contrast, the effect of divorce on test scores is totally unrelated to parental RQ. Considering that research shows that family economic conditions are more important for cognitive than for psychological outcomes (Gershoff et al., 2007; Mayer, 2002), this finding suggests that family circumstances after divorce, such as the decline of income, may play a more important role in explaining the effect of divorce effect on test scores than parents' pre-divorce RQ. However, with the exception of Hanson (1999), who does not find a different pattern for educational outcomes or psychological outcomes, previous studies have not analyzed this issue since they only focus on a single dimension of children's well-being.

Second, parents who were together when their child was 5 years old but who experienced periods of temporary separation are more similar to those from divorced families than those from SFs, in terms of both socio-demographic characteristics and parental RQ. Parental temporary separation has a significant effect only on conduct and

hyperactivity problems; however, the magnitude of the effect of this type of FD is greater than the magnitude of the effect of divorce. Halpern-Meekin and Turney (2016) suggest that unlike stable separation, multiple transitions with the same partner may affect the establishment of family routines; moreover, and there is a strong relationship between such routines and early conduct problems (Deater-Deckard et al., 2009). These results indicate that, although children experiencing PtS have been invisible in most previous research and family policies, they are also at risk, and more research on this type of FD is needed (Halpern-Meekin and Turney, 2016; Nepomnyaschy and Teitler, 2013).

With regard to the third hypothesis related to the heterogeneity of divorce effects, this study shows that the average independent effects mask the substantial variation of the effect of PD. First, we find that a non-negligible proportion of children from divorced families did not experience parental relationship problems. For this group of children, the idea that the negative effects of PD are explained by parental RQ is not valid. In addition, our findings clearly support the hypothesis that the dissolution of high-quality parental unions has the most harmful effects on children's lives. We find that among children whose parents had the highest RQ, there are substantial differences between those whose parents divorce and those that remain together in six of the eight analyzed dimensions of school readiness. In four outcomes, the effect of PD is greater for this quartile with respect to the others.

Our findings for children from non-distressed families are in accordance with the existing literature on the heterogeneity of divorce effects based on children in middle childhood, adolescence or adulthood using US and Canadian samples. However, it is important to point out that our results based on children at age 5 clearly diverge from those obtained by Fomby and Osborne (2010) with children at age 3, which find that PD is not harmful for children in high- and low-conflict families. This discrepancy is probably due to the fact that these authors categorize three-quarters of the unions as high-quality (all those above the 25th percentile), while we consider high-quality only those unions above the 75th percentile (highest RQ) of the sample distribution since one of our aims was to analyze those unions that show a very "high quality" relationship. How can we explain this finding in very young children? As mentioned, research shows that infants and very young children are sensitive to parental RQ (Fitzgerald, 2010; Graham et al., 2013) and those whose parents had a high RQ, do not benefit from divorce, since they are removed from a relatively quiet home environment and this event sets into motion a series of stressful circumstances such as decline of family

income..Nevertheless, a very reasonable explanation for why the effects of PD diverge by parental RQ among very young children comes from the literature on the heterogeneity of the effects of divorce on adults. As mentioned, this research consistently shows that the most harmful negative effects of divorce on adults emotional well-being can be seen among those who had satisfactory relationships prior to separation. Moreover, it has also been shown that parents emotional problems are also clearly associated with adverse children's outcomes during infancy and early childhood (Kiernan and Huerta, 2008; Pettersen and Albers 2001). For these reasons, future studies should empirically assess the possible mechanisms that explain this fairly consistent evidence that divorce is harmful for those children with parents showing a very good relationship before divorce.

In contrast to most previous research (e.g., Booth and Amato, 2001; Hanson, 1999), we do not find any evidence that corroborates the hypothesis that the effect of PD is positive for children who experienced poor parental RQ. In fact, our results show that the effect of PD is negative in the lowest quartile of parental RQ in four dimensions of children's school readiness and in the low quartile in three dimensions. It is also important to acknowledge that we do not expect to obtain this finding in a country such as the UK where fewer children are living in poor families compared to the US (OECD, 2014). However, similarly to Kalmijn (2015), the magnitude of the effect of PD is lower for children with the lowest level of parental RQ than for children with the highest level. Therefore, for those children who experienced poor parental RQ, it appears that the benefits of a reduction in stress do not fully compensate for the negative consequences of the decline in resources that follows parental separation.

Why do we find these contradictory results? First as Fischer, et al (2005) highlight, the stress relief hypothesis assumes that the problems children face when their parents are together do not continue after divorce. As Cummings and Davies (2011: 18) ascertain, "although some parents are able to reduce conflict after divorce, divorce as a means of escape from conflict may not be effective". Research shows that there is a positive correlation between pre-divorce and post-divorce parental conflict (Fischer et al., 2005), and that post-divorce parental conflict is detrimental to children's adjustment following divorce (Elam et al., 2015). If parents' relationship problems continue after divorce, children may be negatively affected independently of the couple separation (McLanahan and Sandefur, 1994). This could explain why divorce is not beneficial for this group of children since they continue to suffer parental conflict and, furthermore, they experience additional sources of stress as a consequence of divorce such as a

decline in family income. Therefore, another line of further research should be devoted to studying the interplay between PD and parental RQ before and after separation in more depth.

Second, as mentioned earlier, most previous studies on the heterogeneity of divorce effects use a continuous measure of parental RQ and they observe the interaction effect between PD and parents RQ. With this specification, they cannot really appreciate to what extent the effect of divorce differs between the extremes – the highest and the lowest level – of quality intensities. Third, another possible explanation suggested by Jekielek (1998) is that it takes time for any children, independently of their parents relationship problems, to recover from the event of divorce due to the series of stressful circumstances that follows it and therefore, the benefit gained from being removed from a high-distress union may not be apparent for several years or until adulthood. Fourth, the literature on the heterogeneous effects of divorce on adults also gives us another possible explanation since some studies find similar results for adults to those obtained here for children. They show that spouses in unsatisfactory relationships experience weaker declines in emotional well-being after divorce than those in highly distressed marriages but that the latter also experience the negative effects of divorce on well-being (e.g. Kalmijn and Monden, 2006; Waite, Luo and Lewin, 2009). It is also conceivable, as suggested by Hanson (1999), that for parents and children from highly distressed families that the exposure to this level of distress may reduce children's and parents' capacity to cope with divorce. For this group of children, literature on the cumulative risk effects may partially explain these results since it suggests that dealing with two negative family experiences is more harmful than just having one (Gerard and Buehler, 2004).

In addition, some of the limitations of our study may also explain this finding. Most research focuses on parental conflict measured in terms of frequency of disagreements, rather than a measure of overall marital discord and quality; however the MCS does not provide a direct measure of the disagreement among parents. For this reason, we cannot rule out the possibility that with a variable of parental conflict, we may have found positive effects of PD for children in disharmonious families. Our variable of parental RQ is only answered by the mother and not by the father. Therefore, it may be insufficient to capture the overall level of RQ that children experience at home since there are important gender differences in the reporting of marital quality (Amato et al., 2003).

It is important to highlight that we find a non-linear pattern with some of our outcomes, since children whose parental relationship lay in the extreme quartiles (highest or lowest RQ) are those most affected by divorce while children whose parental relationship was moderately high are the least affected. This is an advancement over previous studies since their model specifications were not appropriate to observe this non-linear pattern. As a consequence of that, past research has not developed any theoretical argument for children with a moderately high level of parental RQ. We hypothesize that children whose parents had this level of RQ show better post-divorce circumstances than those whose parental RQ was either the highest or the lowest. First, parents' emotional adjustment after divorce may be greater among those who showed a moderately high level of RQ than among those whose relationship level was the highest before this event. In fact, Williams (2003) showed that at moderate-high levels of RQ, divorce has no or very few negative effects on partners' depression or life satisfaction while the effects are greater among those with the highest level of RQ. Second, considering the positive correlation between pre-divorce and post-divorce parental relationship problems, children whose parents enjoyed a moderately high level of RQ should experience a lower level of post-divorce family problems than those whose parents had the worst level of RQ. In addition to that, another possible explanation for the differences between these two groups is the fact that, as mentioned, children's exposition to elevated levels of parental distress may reduce their ability to cope with divorce (Hanson, 1999). It is reasonable to argue that children whose parents had moderately high level of RQ did not experienced damaging levels of it and, therefore, may have a reasonable capacity to cope with divorce. However, this finding for this group of children should be replicated and confirmed in future work. Although the fact that our research used a PO approach to consider the effect of PD, our conclusions should be interpreted with caution, since there may be other unobserved factors that might also affect the results. Another limitation is that for married and cohabiting couples alone the number of cases of children who experience PtS or PD in each quartile of parental RQ is considerably reduced and the effect cannot be assessed. Future research should overcome limitations of this study by exploring more accurately the differences between married and cohabiting families. Finally, our findings also indicate that although the consequences of PD vary by levels of RQ, most children are affected by divorce, since there is at least one negative effect as a result of it in each of the four quartiles of this variable.

We suggest that for every country the best policies to be implemented are those that favor what is referred to in the literature as “human flourish”. For the definition and implication of this concept, we recall the recent work of Allin and Hand (2017) which who discuss the well-being in the UK (see also Diener et al., 2010).

6. Conclusion

We have extended previous research on the topic of parental relationship quality, family disruption and children well-being by analyzing the data from the first three waves of the Millennium Cohort Study. We propose a conservative counterfactual model based on the augmented inverse propensity weighted estimator. By applying the multiple imputation by chained equations, the robust estimator for the effect of family disruption under a potential outcome model is based on the propensity weighting to assure balance between children from different families. The present study reports that at a critical point in child development, namely transition to school, parental temporary separation, which is a type of family disruption that is generally ignored, has detrimental effects for children. We also find that for children whose parents enjoyed the highest parental relationship quality prior to separation, parental divorce exerts the most harmful effect mainly on conducts. According with our findings, the type of divorce that is most harmful to children is the type that is on the rise, since family disruption in non-distressed relationships is increasing nowadays.

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Tables

Table 1. Descriptive statistics of eight children's outcomes according to family situation.

	SF		PtS		PD	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Conduct problems	1.29	1.33	1.75	1.56	1.83	1.63
Hyperactivity problems	3.00	2.22	3.60	2.44	3.82	2.44
Internalizing problems	1.29	1.47	1.54	1.79	1.52	1.64
Peer problems	1.04	1.30	1.46	1.57	1.35	1.40
Pro-social behavior	8.44	1.58	8.20	1.67	8.33	1.69
Vocabulary test	36.25	10.67	32.16	10.60	33.77	9.80
Pattern construction test	31.63	9.68	30.28	9.14	29.52	9.99
Picture similarity test	36.01	9.83	35.68	10.57	34.62	9.80

Note: SF is Stable Family; PtS is Parental temporary Separation; PD is Parental Divorce. The score varies between 0-10 for the psychological variables and from 0-60 for the cognitive variables.

Table 2. Descriptive statistics of parental relationship quality according to family situation.

		SF	PtS	PD	Total
Highest RQ (q_1)	<i>N</i>	2987	69	201	3257
	<i>%row</i>	91.71	2.12	6.17	100.00
	<i>%col</i>	33.19	24.91	17.08	31.15
High RQ (q_2)	<i>N</i>	2634	66	258	2958
	<i>%row</i>	89.05	2.23	8.72	100.00
	<i>%col</i>	29.26	23.83	21.92	28.29
Low RQ (q_3)	<i>N</i>	1785	52	254	2091
	<i>%row</i>	85.37	2.49	12.14	100.00
	<i>%col</i>	19.83	18.77	21.58	20.00
Lowest RQ (q_4)	<i>N</i>	1595	90	464	2149
	<i>%row</i>	74.22	4.19	21.59	100.00
	<i>%col</i>	17.72	32.49	39.42	20.55
Total	<i>N</i>	9001	277	1177	10455
	<i>%row</i>	86.09	2.65	11.26	100.00

Note: **RQ**, Relationship Quality; q_1 indicates the quartile in reverse order; SF, is Stable Family; PtS, Parental temporary Separation; PD, Parental Divorce.

Table 3. Descriptive statistics of socio-demographic characteristics according to family situation.

		SF* (%)	PtS (%)	PD (%)	Total (%)
Household income	<i>q</i> ₁ Highest income	26.89	11.34	13.13	24.85
	<i>q</i> ₂	22.37	12.71	14.98	21.24
	<i>q</i> ₃	25.35	16.49	27.10	25.32
	<i>q</i> ₄	17.94	33.33	28.11	19.55
	<i>q</i> ₅ Lowest Income	7.46	26.12	16.68	9.04
Mother's education	NVQ* level 3 or less	58.15	72.07	75.50	60.56
	NVQ level 4 or more	41.85	27.93	24.50	39.44
Housing tenure	Own	79.36	39.52	54.06	75.32
	Rent privately	5.36	13.40	10.44	6.17
	Rent from LA/HA*	11.89	42.96	32.10	15.09
	Other	3.39	4.12	3.40	3.41
Paid work status of the mother	Currently in paid work	56.45	38.28	46.68	54.82
	In paid job but in leave	2.46	2.76	2.24	2.44
	Has worked in the past but not now	37.27	47.24	46.60	38.64
	Never had a job	3.82	11.72	4.48	4.11
Number of children in the household	1	39.64	38.49	40.26	39.68
	2	38.59	35.05	35.94	38.19
	3	15.35	17.18	15.22	15.39
	4 or more	6.42	9.28	8.58	6.75
Mother's ethnicity	White	90.65	84.19	92.81	90.73
	Indian or Pakistani	6.14	8.59	3.48	5.89
	Black	1.37	4.47	2.17	1.55
	Other	1.84	2.75	1.55	1.83
Mother ever diagnosed with depression	Yes	20.56	28.87	35.32	22.52
Mother's longstanding illness	Yes	27.76	42.96	42.27	29.88
Type of parents' union	Marriage no cohabitation	24.08	19.31	13.61	22.72
	Marriage and cohabitation before marriage	53.64	33.79	40.37	51.56
	Cohabitation without marriage	22.27	46.90	46.02	25.72
Year parents started living together	Average Year	1995	1996	1996	1995
Mother ever lived with someone else as couple	Yes	25.15	37.80	33.31	26.45
Cohort child has half- or step-siblings in the household	No half- or step-sibling	90.64	78.97	84.00	89.55
	Half- or step-sibling	9.36	21.03	16.00	10.45
Alternative original family situation	Stable family	74.81	58.97	61.13	72.78
	Alternative original family situation	25.19	41.03	38.87	27.22

Table 3. Descriptive statistics of socio-demographic characteristics by family situation (continued).

		SF* (%)	PtS (%)	PD (%)	Total (%)
Single parent parent can bring up children just as well as a couple can	Strongly agree	12.12	21.72	25.14	13.91
	Agree	35.88	39.66	40.22	36.49
	Neither agree nor disagree	25.57	20.34	18.87	24.64
	Disagree	20.50	13.79	12.37	19.36
	Strongly disagree	3.31	3.10	2.09	3.16
	Can't say	2.62	1.38	1.31	2.43
Who is mostly responsible for the following tasks: cleaning the home, laundry and ironing or cooking the main meal?	Mother does all tasks most of the time	47.60	46.90	49.10	47.70
	Father does all tasks most of the time or mother and father share one task.	26.00	25.30	24.10	25.80
	Father does two tasks most of the time or mother and father share two tasks.	12.90	11.60	13.80	13.00
	Father does three tasks most of the time or mother and father share three tasks.	6.10	10.10	8.10	6.50
	Someone else does it	7.40	6.10	4.80	7.10
Who is generally being with and looking after the children?	Mother does most of it	60.90	60.30	64.20	61.30
	Father does most of it or mother and father share more or less equally	39.10	39.70	35.80	38.70
If I had financial problems, I know my family would help if they could.	Strongly agree	51.90	51.60	48.80	51.60
	Agree	35.90	32.20	36.00	35.80
	Neither agree nor disagree/ Disagree/ Strongly disagree/ Can't say	12.20	16.20	15.20	12.70
Sex of the cohort child	Male	50.9	49.5	50.6	50.8
	Female	49.1	50.5	49.4	49.2

Note: *SF, Stable Family; PtS, Parental temporary Separation; PD, Parental Divorce; q_1 is the first quintile indicating the highest income; NVQ, National Vocational Qualification; LA, Local Authorities, HA, Housing Association.

Table 4. Estimated Average Causal Effect (ATE) and Potential-outcome mean (PO) for each dependent variable.

		Model 1			Model 2		
Effect		ATE	ATE	PO	ATE	ATE	PO
		PtS	PD	SF	PtS	PD	SF
Conduct problems	Coef.	0.374	0.244	1.273	0.384	0.162	1.287
	P> t	0.003	0.000	0.000	0.003	0.001	0.000
Hyperactivity problems	Coef.	0.277	0.407	2.978	0.320	0.241	3.000
	P> t	0.110	0.000	0.000	0.066	0.004	0.000
Internalizing problems	Coef.	-0.156	0.101	1.232	-0.175	0.031	1.241
	P> t	0.171	0.078	0.000	0.132	0.600	0.000
Peer problems	Coef.	0.065	0.123	0.924	0.028	0.015	0.932

	P> t	0.552	0.006	0.000	0.808	0.742	0.000
Pro-social behavior	Coef.	-0.071	0.172	8.460	-0.032	0.175	8.459
	P> t	0.570	0.002	0.000	0.795	0.001	0.000
Vocabulary test	Coef.	-0.708	-1.165	36.036	-0.868	-1.249	36.019
	P> t	0.308	0.000	0.000	0.202	0.001	0.000
Pattern construction test	Coef.	-1.333	-1.043	31.494	-0.444	-1.043	31.494
	P> t	0.544	0.002	0.000	0.733	0.004	0.000
Picture similarity test	Coef.	1.381	-0.579	35.873	1.303	-0.168	35.867
	P> t	0.088	0.121	0.000	0.122	0.710	0.000

Note: Model 1 includes all the control variables; Model 2 also includes parental **RQ** for the model outcome and the treatment. In **bold** the values which are significantly different from zero. SF, Stable Family; PtS, Parental temporary Separation; PD, Parental Divorce; ATE, Average Treatment Effect; PO, Potential Outcome.

Table 5. Estimated Average Causal Effect (ATE) of parental divorce and Potential-Outcome (PO) mean according to the quartile of the variable parents' relationship quality.

Effect of PD		Highest RQ (q_1)		RQ (q_2)		RQ (q_3)		Lowest RQ (q_4)	
		ATE	PO	ATE	PO	ATE	PO	ATE	PO
Conduct problems	Coef.	0.349	0.960	-0.013	1.232	0.053	1.399	0.210	1.639
	P> t	0.002	0.000	0.916	0.000	0.513	0.000	0.013	0.000
Hyperactivity problems	Coef.	0.288	2.507	0.025	2.970	0.207	3.137	0.403	3.538
	P> t	0.156	0.000	0.898	0.000	0.116	0.000	0.003	0.000
Internalizing problems	Coef.	0.200	1.013	0.087	1.254	0.156	1.308	0.174	1.487
	P> t	0.099	0.000	0.535	0.000	0.235	0.000	0.068	0.000
Peer problems	Coef.	-0.048	0.746	-0.183	0.853	treatment overlap assumption has been violated		0.076	1.467
	P> t	0.678	0.000	0.061	0.000			0.407	0.000
Pro-social behavior	Coef.	0.037	8.775	0.088	8.440	0.426	8.283	-0.025	8.181
	P> t	0.776	0.000	0.429	0.000	0.000	0.000	0.798	0.000
Vocabulary test	Coef.	-3.319	37.312	-0.099	36.053	-1.895	35.347	-0.636	34.991
	P> t	0.000	0.000	0.895	0.000	0.005	0.000	0.285	0.000
Pattern construction test	Coef.	-1.867	31.909	-0.587	31.466	-1.360	31.638	-0.786	30.913
	P> t	0.012	0.000	0.403	0.000	0.035	0.000	0.150	0.000
Picture similarity test	Coef.	1.366	36.409	-0.791	35.985	-0.701	35.313	-1.326	35.574
	P> t	0.246	0.000	0.292	0.000	0.306	0.000	0.016	0.000

Note: PD, parental divorce; q_1 is the first quartile indicating the highest level of RQ; q_2 indicates a high RQ; q_3 indicates a low RQ and q_4 indicates the lowest RQ; ATE, Average treatment effect; PO, Potential Outcome. In bold, the values which are significantly different from zero. In **bold** the values which are significantly different from zero. Note that the overlap assumption requires that there are enough observed values for the covariates for both control and treated units, otherwise inference is not feasible for the two groups.

Appendix

Table A.1. Estimated Average Causal Effect (ATE) and Potential-Outcome mean (PO) and estimated standard errors for conduct problem test (Model 2).

	Coef. ATE	Coef. PO	Std. Err.
PtS	0.384***	-	0.128
PD	0.162***	-	0.051
SF	-	1.287***	0.015

*Note: SF, Stable Family; PtS, Parental temporary Separation; PD, Parental Divorce; ATE, Average Treatment Effect; PO, Potential Outcome. The significant levels are: *significant at 10%, **at 5%; ***at 1%.*

Table A.2. Estimated regression coefficients and standard errors for the potential outcome (PO) equations related to children's conduct problems by family situation.

Variables	Categories	SF		PtS		PD	
		Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Intercept		0.865***	0.049	1.668***	0.461	1.197***	0.193
Quartiles of RQ (q_1)	q_2	0.222***	0.035	0.313	0.289	-0.223	0.155
	q_3	0.364***	0.033	0.596**	0.284	0.135	0.137
	q_4	0.516***	0.043	0.105	0.259	0.297**	0.136
Household income (q_1)	q_2	0.018	0.039	-0.191	0.365	-0.045	0.146
	q_3	0.047	0.040	-0.117	0.379	0.199	0.132
	q_4	0.103*	0.052	0.244	0.387	0.329**	0.160
	q_5	0.192*	0.077	0.132	0.406	0.540***	0.192
Mother's education (NVQ level 3 or less)	NVQ level 4 or more	-0.145***	0.029	-0.295	0.247	-0.153	0.101
Housing tenure (own)	Rent privately	0.213***	0.070	-0.048	0.317	0.157	0.145
	Rent from LA/HA	0.338***	0.053	-0.199	0.304	0.451***	0.118
	Other	0.152*	0.085	-0.569	0.501	-0.126	0.259
Paid work status of the mother (currently in paid work)	In paid job but in leave	0.049	0.096	0.045	0.603	-0.438*	0.258
	Has worked in the past but not now	-0.013	0.030	-0.156	0.242	-0.057	0.098
	Never had a job	0.238*	0.104	-0.166	0.398	0.313	0.318
Number of children in the household (1 child)	2 children	0.197***	0.031	-0.209	0.247	0.338***	0.106
	3 children	0.078*	0.042	-0.101	0.331	0.052	0.131
	4+ children	0.056	0.065	-0.191	0.333	0.193	0.174
Mother's ethnicity (white)	Indian or Pakistani	0.160*	0.073	0.160	0.479	0.028	0.334
	Black	-0.322***	0.101	-0.296	0.489	-0.165	0.301
	Other	-0.165***	0.098	0.007	0.686	0.067	0.285
Mother ever diagnosed with depression (No)	Yes	0.143***	0.036	0.510**	0.227	0.082	0.098
Mother's longstanding illness (No)	Yes	0.109***	0.035	-0.317	0.221	0.043	0.110
Type of parents' union (marriage no cohabitation)	Marriage and cohabitation before marriage	0.063*	0.034	0.073	0.361	0.039	0.131
	Cohabitation without marriage	0.196***	0.043	0.256	0.419	0.247*	0.138
Sex of the cohort child (male)	Female	-0.276***	0.027	-0.186	0.204	-0.406***	0.088

*Note: SF is Stable Family, PtS is Parental temporary Separation and PD is Parental Divorce; RQ is relationship quality; q₁ is the highest income quintile, NVQ is National Vocational Qualification, LA is Local Authorities and HA is Housing Association. In parenthesis the reference value, q₁ is the first quantile indicating the highest level. The significant levels are: *significant at 10%, **at 5%; ***at 1%.*

Table A.3. Estimates regression coefficients and standard errors for the propensity score weights of the PO model related to the children' conduct problems.

Variables	Categories	PtS*		PD*	
		Coef.	Std. Err.	Coef.	Std. Err.
Intercept		-105.168**	43.492	-117.649***	19.860
Quartiles of RQ (q_1)	q_2	0.270	0.193	0.344***	0.114
	q_3	0.104	0.186	0.744***	0.098
	q_4	0.812***	0.193	1.447***	0.101
Household income (q_1)	q_2	0.277	0.276	0.121	0.121
	q_3	0.153	0.277	0.399***	0.113
	q_4	0.827***	0.269	0.418***	0.126
	q_5	1.250***	0.309	0.766***	0.151
Mother's education (NVQ level 3 or less)	NVQ level 4 or more	0.177	0.169	-0.293***	0.080
Housing tenure (own)	Rent privately	1.119***	0.225	0.519***	0.124
	Rent from LA/HA	1.255***	0.176	0.640***	0.098
	Other	0.366	0.354	0.029	0.202
Paid work status derived (currently in paid work)	In paid job but in leave	-	-	0.083	0.211
	Has worked in the past but not now	-	-	-0.052	0.077
	Never had a job	-	-	-0.317	0.200
Mother's ethnicity (white)	Indian or Pakistani	0.304	0.335	-0.367*	0.218
	Black	1.045***	0.330	0.307	0.256
	Other	0.327	0.407	-0.090	0.260
Mother ever diagnosed with depression (no)	Yes	0.093	0.148	0.323***	0.074
Mother's longstanding illness (no)	Yes	-0.154	0.159	0.133*	0.076
Types of parents' unions (marriage no cohabitation)	Marriage and cohabitation before marriage	-0.080	0.214	0.158	0.110
	Cohabitation without marriage	0.380*	0.206	0.522***	0.119
Year that started their relationship		0.050**	0.022	0.057***	0.010
Mother ever lived with someone else as couple (no)	Yes	0.360**	0.153	0.118	0.080
Cohort child has half- or step-siblings in the household (no half- or step-sibling)	Half- or step-sibling	0.085	0.184	-0.250**	0.109
Alternative original family situation (stable family)	Alternative original family situation	0.381***	0.125	0.245***	0.071
Single parent can bring up children just as well as a couple can (strongly agree)	Agree	-0.086	0.180	-0.317***	0.091
	Neither agree nor disagree	-0.136	0.202	-0.570***	0.110
	Disagree	-	-	-0.528***	0.123
	Strongly disagree	-	-	-0.547**	0.253
	Can't say	-	-	-1.084***	0.300
Who is mostly responsible for the following tasks: cleaning	Father does one task most of the time or	0.355**	0.156	0.039	0.088

the home, laundry and ironing or cooking the main meal? (mother does all tasks most of the time)	mother and father share one task				
	Father does two tasks most of the time or mother and father share two tasks	-0.063	0.222	0.135	0.112
	Father does three tasks most of the time or mother and father share three tasks	-	-	0.359***	0.136
	Someone else does it	-	-	0.191	0.160
Who is generally being with and looking after the children? (women do most of it)	Father do most of it or mother and father share more or less equally	-0.068	0.147	-0.016	0.077
If I had financial problems, I know my family would help if they could (no)	Yes	-0.012	0.098	-0.144***	0.050

*Note: SF is Stable Family, PtS is Parental temporary Separation and PD is Parental Divorce; RQ is Relationship Quality; q_1 is the highest income quintile, NVQ is National Vocational Qualification, LA is Local Authorities and HA is Housing Association. In parenthesis the reference value, q_1 is the first quantile indicating the highest level. The number of children at home is not included in the PS model since it is strongly correlated with the variable that measures the presence of half- or step-siblings at home (*significant at 10%, **at 5%; ***at 1%).*

Table A.4. List of acronyms.

Words	Acronym
Average Treatment Effect	ATE
Augmented Inverse Propensity Weighted	AIPW
British Ability Scales	BAS
Housing Association	HA
Inverse Probability of Treatment Weights	IPTW
Inverse Propensity Weighted estimator	IPW
Family Disruption	FD
Golombok Rust Inventory of Marital State	GRIMS
Local Authorities	LA
Millennium Cohort Study	MCS
Missing at Random	MAR
Multiple imputation by Chained Equations	MICE
Ordinary Least Squares	OLS
Organisation for Economic Co-operation and Development	OECD
Parental Divorce	PD
Parental temporary Separation	PtS
Potential Outcome	PO
Propensity Score	PS
Stable Family	ST
Strengths and Difficulties Questionnaire	SDQ
Relationship Quality	RQ
National Vocational Qualification	NVQ
United Kingdom	UK
United States	US

Fig. A.1. Comparisons between parental divorce and stable families on the estimated effects related to conduct problems according to the quartiles from the highest RQ (q_1) of the parent relationship quality.



Fig. A.2. Comparison between parental divorce and stable families on the estimated effects for vocabulary test according to the quartiles, from the highest RQ (q_1), of the parent relationship quality.

