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## Children Born Through Reproductive Donation: A Longitudinal Study of Psychological Adjustment

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### Abstract

**Background**—Parenting and children’s adjustment were examined in 30 surrogacy families, 31 egg donation families, 35 donor insemination families, and 53 natural conception families.

**Methods**—Parenting was assessed at age 3 by a standardized interview designed to assess quality of parenting and by questionnaire measures of anxiety, depression and marital quality. Children’s adjustment was assessed at ages 3, 7 and 10 using the Strengths and Difficulties Questionnaire (SDQ).

**Results**—Although children born through reproductive donation obtained SDQ scores within the normal range, surrogacy children showed higher levels of adjustment difficulties at age 7 than children conceived by gamete donation. Mothers who had kept their child’s origins secret showed elevated levels of distress. However, maternal distress had a more negative impact on children who were aware of their origins.

**Conclusions**—The absence of a gestational connection to the mother may be more problematic for children than the absence of a genetic link.

### Keywords

surrogacy; egg donation; psychological adjustment; parenting

### Introduction

In the relatively short period of time between the birth of the first baby through *in vitro* fertilization [IVF] in 1978 and the present, more than 4.5 million children have been born through assisted reproductive technologies, a number that is growing exponentially each year (International Committee for Monitoring Assisted Reproductive Technologies, 2009). When the mother’s egg and father’s sperm are used in IVF and the mother undergoes the pregnancy, the parents have both a genetic and gestational link to the child in the same way as parents of naturally conceived children. However, a growing number of children are being born through reproductive donation, i.e. by the donation of sperm (whereby the child lacks a genetic relationship with the father), eggs (resulting in the absence of a genetic link with the mother), or surrogacy (the hosting of a pregnancy for another woman) (Richards, Pennings & Appleby, 2012). It has been suggested that the creation of families by reproductive donation may have negative consequences for children’s psychological adjustment, resulting either from the absence of a genetic and/or gestational connection between one or both parents and the child or from secrecy about the child’s biological origins.

Other family types in which social parenthood is dissociated from biological parenthood are adoptive families in which both parents are biologically unrelated to the child, and stepfamilies in which one parent lacks a biological link. In adoptive families, increased rates of child psychological problems have been identified in comparison with non-adoptive families (Palacios & Brodzinsky, 2010), largely related to factors associated with the adoption, such as children's experience of abusive or neglectful parenting and multiple caretakers in the years before the adoption, rather than the absence of a biological connection between the parents and the child (Dozier & Rutter, 2008). Stepfamilies are also associated with raised levels of psychological problems for children (Dunn, Davies, O'Connor, & Sturgess, 2000; Hetherington & Clingempeel, 1992). Once again, these difficulties appear to result from associated factors, such as the disruption of the relationship with an existing parent and the acquisition of new family members, rather than the absence of a biological link.

With respect to secrecy, the majority of donor conception parents have not told their children about their genetic origins. In the European Study of Assisted Reproduction Families, not one set of parents from a representative sample of more than 100 donor insemination families had disclosed the donor conception to their child by early school age (Golombok, Brewaeys, Cook, Giavazzi, Guerra, Mantovani et al., 1996), and less than 10% had done so by early adolescence (Golombok, Brewaeys, Giavazzi, Guerra, MacCallum & Rust, 2002). Investigations in the United States produced comparable findings (Leiblum & Aviv, 1997; Nachtigall, Becker, Quiroga & Tschann, 1997). In contrast, parents of children born through surrogacy do not experience pregnancy and thus are required to be open from the start. The concern about secrecy in families created by gamete donation has arisen from research on adoption which has shown that adopted children benefit from information about their biological parents (Brodzinsky, 2005; Grotevant, Perry & McRoy, 2005). The family therapy literature also points to the potentially adverse effects of secrecy regarding a child's biological origins (Imber-Black, 1998; Papp, 1993).

Only two previous studies have investigated the psychological consequences of reproductive donation for children. The European study found no differences in emotional or behavioral problems between children conceived by either sperm donation (Golombok et al., 1996; Golombok et al., 2002), or egg donation (Golombok, Murray, Brinsden & Abdallah, 1999), and comparison groups of IVF, naturally conceived and early-adopted children. However, as reported above, almost all of these children were unaware of their donor conception. Similarly, in a study that compared sperm donation, egg donation, embryo donation and surrogacy families with families created by assisted reproduction using the parents' own gametes, no differences in child adjustment were found (Shelton, Boivin, Hay, van den Bree, Rice, Harold, et al., 2009). Although no information was obtained on the proportion of children who were aware of the nature of their conception, most had been born in the 1990s and thus were unlikely to have been told.

The aim of the present investigation was to obtain in-depth data from infancy onward on the quality of parenting and children's psychological adjustment in families created by egg donation, donor insemination and surrogacy. The children were born at the millennium, by which time a substantial proportion of parents intended to tell their child about the nature of their conception thus enabling a longitudinal investigation of the consequences of secrecy versus disclosure to be conducted for the first time. Phase 1 was conducted at age 1 (Golombok, Lycett, MacCallum, Jadva, Murray, Rust, et al., 2004a; Golombok, Murray, Jadva, MacCallum & Lycett, 2004b), Phase 2 at age 2 (Golombok, Jadva, Lycett, Murray & MacCallum, 2005; Golombok, MacCallum, Murray, Lycett & Jadva, 2006a), Phase 3 at age 3 (Golombok, Murray, Jadva, Lycett, MacCallum & Rust, 2006b), Phase 4 at age 7 (Golombok, Readings, Blake, Casey, Mellish, Marks, et. al., 2011a; Golombok, Casey,

Readings, Blake, Marks & Jadva, 2011b) and Phase 5 at age 10. The present paper focuses on the psychological adjustment of the children at ages 3, 7 and 10.

Three hypotheses were tested: (i) that children born through reproductive donation would show higher levels of psychological problems than naturally conceived children due to the absence of a genetic and/or gestational connection to their parents. In addition, surrogacy children were predicted to show greater problems than gamete donation children due to the absence of a gestational link with the mother, and egg donation children were predicted to show greater problems than donor insemination children due to the absence of a genetic link with the mother. (ii) that higher levels of psychological problems would be shown by children whose parents had not disclosed their biological origins, and (iii) that there would be a stronger relationship between negative parenting and child adjustment problems in non-disclosing than disclosing families

## Method

### Participants

The study initially recruited 42 surrogacy families, 51 egg donation families, 50 donor insemination families and a comparison group of 80 natural conception families with a 1-year-old child, representing 61%, 75%, 50% and 73% of the families who were invited to participate. The egg donation and donor insemination families were obtained through 9 fertility clinics in the United Kingdom. All two-parent heterosexual families with a child aged between 9 months and 1 year old were asked to participate. The exclusion criteria were severe congenital abnormalities and multiple births. The natural conception families were selected through maternity ward records on the basis of stratification to maximize comparability with the assisted reproduction samples. The selection criteria were that the child resulted from a singleton birth with a minimum of 30 weeks gestation, the child had no congenital abnormalities, the mother was at least 30 years of age and married to, or cohabiting with, the child's father, the child was the mother's first or second child and the pregnancy had been planned (Golombok et al., 2004a). A representative sample of surrogacy families was recruited through the UK Office of National Statistics and the surrogacy agency COTS (Golombok et al., 2004b). When the child was aged 3, the study included 34 families with a child born through surrogacy, 41 families with a child born through egg donation, 41 families with a child conceived by donor insemination and 67 families with a naturally conceived child, representing 81% of those who participated at age 1. By age 10, the study included 33 surrogacy families, 30 egg donation families, 34 donor insemination families and 55 natural conception families, representing 68% of the original sample with no significant difference in retention between family types. Rather than actively withdrawing, the majority of those lost to follow-up could not be traced. The present paper is based on the 30 surrogacy, 31 egg donation, 35 donor insemination and 53 natural conception families for whom data were available at a minimum of two time-points.

Little's MCAR tests were conducted to establish whether there were differences in child adjustment, mother's age, socio-economic status, number of siblings, or variables relating to maternal positivity, maternal negativity and maternal distress between families with child adjustment data at all three time-points and those for whom this was available for only two. The only difference identified was for marital quality,  $\chi^2(9) = 19.92, p < .05$ , showing that mothers with greater marital problems were more likely to have missing data. Little's MCAR tests were repeated for disclosing and non-disclosing families. Non-disclosing families with lower levels of maternal distress were more likely to have missing data,  $\chi^2(9) = 17.26, p < .05$ , which contradicts the suggestion that mothers who were most distressed about keeping their child's origins secret would be least likely to remain in the study.

Whereas only 5% of mothers and 7% of children had some missing data, data were unavailable for around 25% of teachers.

There was no difference between family types for children's age or sex. A significant difference was found for mother's age,  $F = 12.77$ ,  $p < .001$ , such that egg donation and surrogacy mothers were older than donor insemination and natural conception mothers. The family types differed in socio-economic status,  $\chi^2(6) = 22.50$ ,  $p < .01$ , with a lower proportion of donor insemination families than surrogacy, egg donation and natural conception families in higher ranking occupations (OPCS and Employment Department Group, 1991). The large majority of families were middle-class, with more than 85% of parents in each family type in professional, managerial or technical occupations. There was a significant difference between family types for number of siblings,  $\chi^2(6) = 28.84$ ,  $p < .001$ , reflecting a lower proportion of surrogacy, egg donation and donor insemination children than natural conception children with siblings. Mother's age, socio-economic status and number of siblings were entered into the analyses as covariates.

## Procedure

A psychologist trained in the study techniques visited the families at home when the child was aged 3, 7 and 10 years. Written informed consent to participate in the investigation was obtained from the mother at each assessment and from the children's teachers. Ethical approval for the study was granted by the Ethics Committee of City University, London for the age 3 assessment, and from the University of Cambridge Psychology Research Ethics Committee for the age 7 and age 10 assessments.

## Measures

**Child psychological adjustment**—The presence of child psychological problems was assessed with the Strengths and Difficulties Questionnaire [SDQ] (Goodman, 1994 & 1997) administered to the mother when the child was 3, 7 and 10 years old and the teacher at age 7 and 10. The SDQ produces a total score of the child's adjustment, with higher scores representing greater difficulties. The SDQ has been shown to have good internal consistency, test-retest reliability and inter-rater reliability (Goodman, 1994, 1997, 2001; Stone, Otten, Engels, Vermulst & Janssens, 2010). The SDQ discriminates well between psychiatric and non-psychiatric samples, and evidence for concurrent validity comes from the high correlations between the total score of the SDQ and other assessments of child psychiatric disorder (Goodman, 1994, 1997, 2001; Stone et al., 2010).

**Quality of parenting**—The mothers were interviewed when the child was 3-years-old using an adaptation of an investigator-based interview designed to assess quality of parenting that has been validated against observational ratings of mother-child relationships in the home (Quinton & Rutter, 1988). Detailed accounts are obtained of the child's behavior and the mother's response to it, with particular reference to mother-child interactions relating to warmth and control. A flexible style of questioning is used to elicit sufficient information in order that each variable can be rated by the researcher according to a standardized coding scheme. The researchers had all been trained in the administration and coding of the interview.

The following variables were coded: (1) *warmth* from 0 (none) to 5 (high) taking account of the mother's tone of voice and facial expressions in addition to her verbal report of her relationship with her child (2) *interaction* from 0 (very low) to 4 (very high) assessing the extent to which the mother and child spent time together, engaged in joint activities and enjoyed each other's company (3) *sensitivity* from 0 (none) to 4 (high) representing the mother's ability to recognize and respond appropriately to her child's needs (4) *level of*

*battle* from 0 (none) to 3 (major) assessing the severity of mother-child conflict (5) *frequency of battle* from 0 (never/rarely) to 3 (frequent) assessing the frequency of mother-child conflict, and (6) *resolution* from 0 (full) to 2 (none). To establish inter-rater reliability, 47 randomly selected interviews were coded by a second interviewer who was “blind” to family type. Intraclass correlation coefficients ranged from 0.50 to 0.80 (Golombok et al., 2011a).

Mothers completed the Golombok Rust Inventory of Marital State (GRIMS) (Rust, Bennun & Golombok, 1990), a questionnaire assessment of the quality of the marital relationship with higher scores indicating poorer marital quality. Split-half reliability was .91 for men and .87 for women, and the GRIMS has been shown to discriminate between couples who are about to separate and those who are not. The Trait Anxiety Inventory (Spielberger, 1983) and the Edinburgh Depression Scale (Thorpe, 1993) were completed by mothers to assess anxiety and depression respectively. Both of these instruments, for which higher scores represent greater difficulties, have been shown to have good reliability and to discriminate well between clinical and non-clinical groups.

Confirmatory Factor Analysis using Mplus (Muthén & Muthén, 2008–2010) was applied to the mothers’ data to create factor scores of maternal positivity, maternal negativity, and maternal distress. A model was specified in which the mothers’ interview variables of warmth, interaction and sensitivity loaded onto a latent variable of maternal positivity; the mothers’ interview variables of level of battle, frequency of battle, and resolution loaded onto a latent variable of maternal negativity; and the mothers’ scores on the anxiety, depression and marital quality questionnaires loaded onto a latent variable of maternal distress. The WLSMV estimator was used to deal with missing data and the categorical nature of some of the indicators. The model was over-identified with 23 *df* and  $\chi^2 = 38.29$ ,  $p = .02$ . The fit indices suggested good model fit: CFI = .95, TLI = .92, RMSEA = .07, 90% CI [.03, .11]. Fully standardized parameter estimates indicated that all the items loaded significantly on their respective factors:  $\beta = .52$ ,  $z = 4.37$ ,  $p < .01$ , and there was significant variance around the mean for all three maternal functioning components:  $Var = .27$ ,  $z = 2.18$ ,  $p < .05$ . Cronbach’s alpha for maternal positivity, maternal negativity, and maternal distress respectively was .70, .54 and .83, indicating good reliability for positivity and distress and moderate reliability for negativity.

## Results

### Family Type

As shown in Table 1, mothers’ SDQ scores at age 3, age 7 and age 10 were entered into a MANCOVA with family type as an independent variable. Wilks’s  $\lambda$  was significant  $F(9,265) = 2.07$ ,  $p < .05$ , indicating an overall difference in SDQ scores between family types. Helmert contrasts showed this difference to reflect significantly higher SDQ scores for surrogacy children than for gamete donation children at age 7 (S vs. GD,  $p < .01$ ). This difference was not found at age 3 or age 10, and there was no difference between the egg donation and donor insemination children at any age. Teachers’ SDQ scores at age 7 and age 10 were also entered into a MANCOVA with family type as an independent variable. Wilks’s  $\lambda$  was not significant.

The parenting variables of maternal positivity, maternal negativity and maternal distress were entered into a MANCOVA with family type as an independent variable. Wilks’s  $\lambda$  was not significant showing that parenting quality did not differ between family types.

## Disclosure

When the child was aged 7, systematic information was obtained from the mothers of children born through reproductive donation about whether or not they had told their child about their origins. Of the 96 mothers, 51 (53%) had told their child (30 surrogacy, 11 egg donation and 10 donor insemination) and 45 (47%) had not told (0 surrogacy, 20 egg donation and 25 donor insemination). Almost all of the parents who had disclosed had begun this process before the child was 4 years old, and none reported that their child had become distressed (Blake, Casey, Readings, Jadva, & Golombok, 2010).

Mothers' SDQ scores at age 3, age 7 and age 10 were entered into a MANCOVA with disclosure as an independent variable. Wilks's  $\lambda$  was significant,  $F(3, 68) = 3.47, p < .05$ , indicating an overall difference in SDQ scores between disclosing and non-disclosing families. One-way ANCOVAs identified a significant difference between disclosing and non-disclosing families at age 7,  $F(1, 64) = 6.24, p < .05$ . This reflected higher scores among 7-year-old children who had been told about their biological origins than those who had not. There was no difference in SDQ scores according to disclosure status at age 3 or age 10 (see Table 2).

As all of the surrogacy parents had been open with their children whereas this was true of only half of the gamete donation parents, mean SDQ scores for disclosing and non-disclosing egg donation and donor insemination families were inspected to establish whether the more negative outcomes for children who were aware of their biological origins was associated with surrogacy or disclosure. It was found that the highest scores were obtained by surrogacy children (7.63), with children in disclosing and non-disclosing egg donation families obtaining similar scores to each other (6.27 and 5.39 respectively), and children in disclosing donor insemination families obtaining lower scores (4.60) than those in non-disclosing donor insemination families (5.88). Moreover, a comparison between disclosing and non-disclosing egg donation and donor insemination families did not produce a significant main effect for disclosure or a significant interaction between disclosure and family type. Thus it appears that the raised level of child adjustment problems in families where children had been told about their origins resulted from the high proportion of surrogacy families among the disclosing families.

With respect to parenting, a MANCOVA was carried out with disclosure as an independent variable and maternal positivity, maternal negativity and maternal distress as dependent variables. Wilks'  $\lambda$  was significant  $F(3, 83) = 2.67, p = .05$ , indicating an overall difference in parenting quality between disclosing and non-disclosing families. One-way ANCOVAs showed a significant difference for maternal distress,  $F(1, 64) = 7.36, p < .01$ , with non-disclosing mothers reporting higher levels of distress than disclosing mothers. There was no difference in maternal positivity or maternal negativity according to disclosure status (see Table 2).

### Disclosure, distress and child adjustment

Hierarchical multiple regression analysis was used to test the moderating role of disclosure status in the relationship between maternal distress and child adjustment. In the first step, potential confounding effects were taken into account by entering family type, mother's age, socio-economic status and number of siblings. In the second step, main effects were examined by entering disclosure and distress. In the third step, the interaction effect was tested by entering the product of disclosure status and maternal distress. No main effects were found. However, elevated levels of child difficulties at age 7 were significantly predicted by the interaction between maternal distress and disclosure, showing that high

maternal distress when the child was aged 3 predicted adjustment problems at age 7 in families where parents had disclosed the child's biological origins (see Table 3 & Figure 1).

## Discussion

Although children born through reproductive donation did not differ overall from naturally conceived children, a difference was found according to type of reproductive donation used. Surrogacy children showed higher levels of adjustment problems than children conceived by gamete donation at age 7, suggesting that the absence of a gestational connection between parents and their child may be more problematic for children than the absence of a genetic relationship. Interestingly, there was no difference between children born through egg and sperm donation; it seems that children were no more at risk from the absence of a genetic connection to their mother than to their father, with both types of donor conceived children showing similar levels of adjustment to naturally conceived children. Although elevated levels of child adjustment problems were also found in families where parents had told their child about their biological origins, this resulted from the preponderance of surrogacy parents who had disclosed. Thus the hypothesis that children who were unaware of their biological origins would show higher levels of adjustment problems was not supported by the findings of the study. In fact, contrary to expectations, it was children who were aware of the circumstances of their birth and whose mothers were distressed who showed greater adjustment difficulties, conceivably because they felt less secure when faced with their mother's emotional problems.

A number of factors associated with surrogacy that are not present with gamete donation may explain the higher levels of adjustment problems among the surrogacy children (Golombok et al., 2004b). Children in surrogacy families are not only born to a third party but also the surrogate mother may remain in contact with the family as the child grows up (Jadva, Blake, Casey & Golombok, in press). This may undermine family relationships, especially where the surrogate mother is also the genetic mother of the child. It is important to point out, however, that the children in surrogacy families were generally well-adjusted, with the mean SDQ score for surrogacy children lying within the normal range and similar to the UK population mean for 7-year-old children (Green, McGinty, Meltzer, Ford & Goodman, 2000). Thus the difference in adjustment that was identified for surrogacy children was not indicative of psychological disorder.

Regarding the quality of parenting, no differences between surrogacy, egg donation, donor insemination and natural conception families were found for maternal positivity, maternal negativity, or maternal distress. However, a higher level of distress was shown by mothers who had not told their child about their biological origins, indicating that non-disclosure is associated with mothers' more negative mental state. The greater distress shown by mothers who had not informed their children of their biological origins is consistent with research on adoptive mothers who had kept the adoption secret (Brodzinsky & Pinderhughes, 2002).

The finding that difficulties for children were identified at age 7 is of particular interest as it is by this age that children show an understanding of biological inheritance (Gregg, Solomon, Johnson, Zaitchik & Carey, 1996; Williams & Smith, 2010) and adopted children understand the meaning of the absence of a biological connection to their parents (Brodzinsky & Pinderhughes, 2002). The results of a study of infant-placed 7-year-old internationally adopted children (Stams, Juffer, Rispen & Hoksbergen, 2000) add weight to this finding. In this longitudinal study, the adopted children showed significantly higher levels of behavior problems than a matched comparison group of non-adopted children. Interestingly, the adopted children's behavior problems had reduced by adolescence (Juffer & Van IJzendoorn, 2005), as had the behavior problems of the surrogacy children in the

present study by age 10. Juffer & Van IJzendoorn (2005) suggested that internationally adopted children struggle with identity issues earlier than domestically adopted children due to their difference in appearance from their parents. This may also be true of surrogacy children who similarly have to face up to being different at an early age.

Although the sample sizes were not large and thus small differences between family types may not have been detected, an advantage of the study was that data were collected before the children were aware of their biological origins, allowing the consequences of secrecy versus openness about the nature of their birth to be examined prospectively. A limitation of the study is that parents who were most concerned about secrecy may have been less likely to participate. In addition, children's difficulties may have been under-reported by reproductive donation mothers, who may have wished to present their children in a positive light as a reaction to the stigma associated with these somewhat controversial routes to parenthood. Although fewer teachers than mothers completed the SDQ, with no differences identified according to family type, it is interesting to note that surrogacy children obtained the highest mean score and the natural conception children the lowest, with the gamete donation children falling between the two, providing tentative independent corroboration of the mothers' reports.

The view that the absence of biological ties between parents and children has adverse consequences for children's psychological adjustment has arisen from investigations of adoptive families and stepfamilies. Families formed through reproductive donation enable the consequences of the lack of a biological relationship between parents and children to be investigated in the absence of the negative factors often experienced by adoptees and stepchildren. The findings of the present study add to the growing body of research suggesting that biological relatedness between parents and children is not essential for positive child adjustment.

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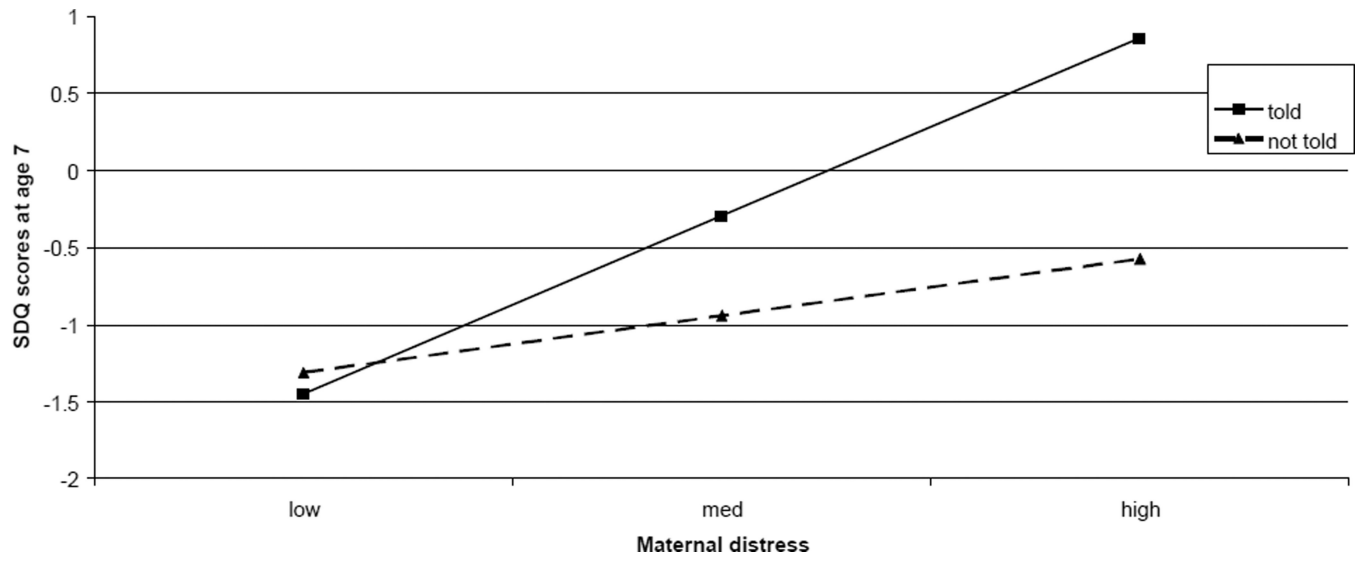


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### Key points

- An increasing number of children are being born through reproductive donation, i.e. by the donation of gametes (sperm or eggs), embryos, or the hosting of a pregnancy for another woman (surrogacy).
- Children born through egg donation, sperm donation and surrogacy were found to be well-adjusted, although surrogacy children showed elevated levels of adjustment difficulties at age 7.
- The children who were aware of the circumstances of their birth were more vulnerable to the effects of maternal distress.
- The absence of a genetic connection to either the mother or the father is not associated with adjustment difficulties but the lack of a gestational connection may place children at increased psychological risk.



**Figure 1.**  
Interaction Effects of Disclosure and Maternal Distress on Mothers' Strengths and Difficulties Questionnaire (SDQ) Scores at Age 7

Means, SDs, F and p Values for Comparisons of Mothers' and Teachers' Strengths and Difficulties Questionnaire (SDQ) Scores between Family Types

**Table 1**

	Naturally Conceived		Surrogacy		Egg Donation		Donor Insemination		Contrasts						
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F	p	NC vs RD	S vs GD	ED vs DI	p	p
SDQ Mother															
Age 3	6.53	3.61	6.79	2.91	8.00	4.11	7.55	3.50	2.07	.03	.48	.34	.57		
Age 7	5.02	3.60	7.63	3.73	5.48	3.69	5.58	3.10			.77	<.01	.81		
Age 10	4.88	4.84	5.95	4.24	6.00	3.93	5.32	3.68			.49	.82	.72		
SDQ Teacher															
Age 7	4.66	4.72	7.25	4.76	6.54	4.80	5.73	4.06	0.96	.86	.49	.44	.66		
Age 10	5.28	4.49	7.30	74.69	7.38	5.70	4.68	4.59			.71	.42	.67		

**Table 2**

Means, SDs, F and p Values for Comparisons of Mothers' and Teachers' Strengths and Difficulties Questionnaire (SDQ) Scores and Parenting between Non-Disclosed and Disclosed Families

	Not disclosed		Disclosed		F	p
	Mean	SD	Mean	SD		
SDQ - Mother					3.47	.02
Age 3	7.47	3.42	7.54	3.74	.44	.50
Age 7	5.61	3.29	6.49	3.75	6.24	.01
Age 10	5.78	4.27	5.64	3.52	.05	.81
SDQ - Teacher					0.98	.65
Age 7	7.14	4.34	6.03	4.56	.84	.36
Age 10	6.59	6.04	6.06	4.23	.37	.54
Parenting					2.67	.05
Positivity	-.01	.60	.11	.64	1.30	.25
Negativity	.08	.39	-.10	.43	2.34	.13
Distress	2.24	6.73	-1.64	5.67	7.36	<.01

**Table 3**

Interaction Effects of Disclosure and Maternal Distress on Mothers' Strengths and Difficulties Questionnaire (SDQ) Scores

Variable	SDQ scores Age 3	SDQ scores Age 7	SDQ scores Age 10
Step 1: Control variables			
Family type	-0.74 (0.65)	0.95 (0.58)	0.51 (0.74)
Mother's age	0.09 (0.08)	0.02 (0.07)	0.01 (0.09)
Socio-economic status	1.50* (0.69)	2.71** (0.61)	-0.06 (0.79)
Number of siblings	0.16 (0.71)	0.17 (0.63)	0.60 (0.81)
Step 2: Main effects			
Disclosure (-1 = no; 1 = yes)	0.80 (0.54)	0.65 (0.47)	-0.17 (0.61)
Maternal distress	0.10 (0.06)	0.05 (0.06)	0.09 (0.07)
Step 3: Disclosure × Distress			
	0.04 (0.07)	0.12* (0.06)	0.03 (0.07)
Constant	3.91	-0.94	3.65
Final model $R^2$	.12	.30	.04

*Note.* Unstandardized betas are presented, with standard errors in parentheses.

\*  
 $p < .05$ .

\*\*  
 $p < .01$ .