

Surrogacy families: parental functioning, parent–child relationships and children’s psychological development at age 2

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Background: Findings are presented of the second phase of a longitudinal study of families created through surrogacy. **Methods:** At the time of the child’s 2nd birthday, 37 surrogacy families were compared with 48 egg donation families and 68 natural conception families on standardised interview and questionnaire measures of the psychological well-being of the parents, parent–child relationships and the psychological functioning of the child. **Results:** The surrogacy mothers showed more positive parent–child relationships, and the surrogacy fathers reported lower levels of parenting stress, than their natural conception counterparts. The surrogacy children did not differ from the natural conception children with respect to socio-emotional or cognitive development. **Conclusions:** Surrogacy does not appear to impact negatively on parenting or child development in families with 2-year-old children. **Keywords:** Surrogacy, egg donation, parent–child relationships, child development.

Of the many ways in which families have been created in recent years, the involvement of a surrogate mother to host a pregnancy for another woman is perhaps the most contentious. Much of the criticism of surrogacy has arisen from religious, moral and sociological standpoints. For example, there has been disquiet about the potential for exploitation inherent in a situation where economically disadvantaged women have babies for women who are more affluent than themselves, particularly in cases where the decision to enter into a surrogacy arrangement has been driven largely by payment. From a psychological perspective, concerns have been raised about the potentially adverse consequences of surrogacy for the resultant family. In particular, it has been suggested that the involvement of a third party in the birth may lead to difficulties in parenting and, consequently, psychological problems for the child (MacCallum, Lycett, Murray, Jadva, & Golombok, 2003). There are two types of surrogacy, genetic (partial surrogacy) and non-genetic (full surrogacy). In the case of genetic surrogacy, the commissioning father and the surrogate mother are the genetic parents, and conception takes place through self-insemination by the surrogate mother with the father’s sperm. With non-genetic surrogacy, the commissioning parents are the genetic parents of the child and conception takes place through *in vitro* fertilisation (IVF).

It is well established that the security of a child’s attachment to parents is associated with the quality of the relationship between the parent and the child (Bowlby, 1982; Ainsworth, Bleher, Waters, & Wall, 1978). Central to Bowlby’s theory is the concept of internal working models, i.e., the mental representations of attachment relationships that are built up

through experiences with attachment figures and that influence expectations of, and behaviour toward, them. It is increasingly being acknowledged that parents may also develop representations of their relationship with their child (Bowlby, 1982; Solomon & George, 1996; George & Solomon, 1999). These parental representations are believed to influence thoughts and feelings in relation to the child, and thus affect parenting behaviour and child outcomes (Bowlby, 1982; Slade et al., 1999). Slade, Belsky, Aber, & Phelps (1999) empirically identified joy, anger and guilt as three distinct dimensions of maternal representations of their relationship with their child, and demonstrated an association between representations of joy and positive mothering behaviour. Other studies have also found an association between maternal representations of the parent–child relationship and mother–child interaction (George & Solomon, 1996; Hartmann, 1999; Steinberg, 2000; Sayre, Pianta, Marvin, & Saft, 2001).

It has been suggested that an important influence on parental representations of parent–child relationships is the social context of the family (George & Solomon, 1999). In families created through a surrogacy arrangement, the circumstances of the child’s birth may impact negatively on parents’ representations of their child. For the commissioning couple, the transition to parenthood differs in a number of ways from that of parents who conceived their child naturally. Firstly, the absence of a pregnancy may alter the experience of prenatal bonding, a process that has been associated with more positive parent–child relationships (Cranley, 1981; Grace, 1989; Laxton-Kane & Slade, 2002). To the extent that parents develop representations of the child as they

prepare for parenthood (Slade et al., 1999), this process may be adversely affected by the involvement of a third party in the pregnancy and the possibility that the surrogate mother may not relinquish the child. Second, the child may lack a genetic link with the commissioning mother. Third, the surrogate mother may remain in contact with the family after the birth of the child. This may have an undermining effect on mothers' and fathers' feelings of entitlement as parents, especially if the surrogate mother is also the genetic mother of the child. Fourth, commissioning couples sometimes experience disapproval from family, friends and their wider social world. Each of these factors has the potential to interfere with the development of positive parental representations of the child.

In the first phase of the present investigation, designed to assess quality of parenting when the child was 1 year old, mothers and fathers in surrogacy families showed lower levels of stress associated with parenting, higher levels of warmth, and higher levels of attachment-related behaviour as assessed by the Attachment Questionnaire (Condon & Corkindale, 1998) than a comparison group of natural conception parents (Golombok, Murray, Jadva, MacCallum, & Lycett, 2004a). The focus of the present study was on the quality of parent-child relationships and the psychological development of the child at age 2 years once attachment relationships had been fully established. Age 2 is also an important transitional period in relation to children's cognitive and emotional development, as demonstrated by the emergence of new behaviours and capabilities including autonomy from parents, emotional regulation and a sense of place as a member of a family (Edwards & Liu, 2002; Carter, Briggs-Gowen, & Davis, 2004). In addition, the increase in resistant and angry behaviour in children of this age, often described as 'the terrible twos', has been associated with parenting difficulties (Belsky, Woodworth, & Crnic, 1996; Carter et al., 2004).

Data on parent-child relationships were obtained using the Parent Development Interview [PDI] (Aber, Slade, Berger, Bresgi, & Kaplan, 1985; Slade et al., 1999) designed to assess parents' internal relationships of their relationship with their child and of themselves as parents, using the coding scheme developed by Steele, Henderson, and Hillman (2000). It was predicted that commissioning couples in surrogacy families would show higher levels of negative representations and lower levels of positive representations of the parent-child relationship than parents of naturally conceived children. To the extent that difficulties in parent-child relationships are a feature of surrogacy families, psychological problems may be expected for the child. Children's psychological adjustment was assessed using the BITSEA (Briggs-Gowen & Carter, 2002; Briggs-Gowen, Carter, Irwin, Wachtel, & Cicchetti, in press) and cognitive development was assessed using the

Bayley Scales of Infant Development (Bayley, 1993). As parenting may be influenced by parents' psychological well-being (Golombok, 2000), and parents of children conceived by assisted reproduction may be vulnerable to psychological problems (Golombok, 2000), data were also obtained on parental psychological state.

Materials and methods

Participants

Thirty-seven families created through a surrogacy arrangement participated in the study, representing 88% of the representative sample of surrogacy families who took part in the first phase of this investigation. The surrogacy families were studied in comparison with samples of 48 families with a child conceived by egg donation and 68 families with a naturally conceived child, representing 94% of the egg donation families and 85% of the natural conception families who participated in phase one. Excluding non-participants who had moved abroad or could not be traced, the cooperation rate for surrogacy, egg donation and natural conception families was 95%, 96% and 92% respectively. The egg donation families were included as a comparison group in addition to the natural conception families in order to control for the experience of female infertility and the involvement of a third party in the birth of the child. The target child in each family was around 1 year old at the time of recruitment to phase one of the study, and the inclusion criteria for the natural conception families were as follows: singleton birth with a minimum of 30 weeks' gestation, no congenital abnormalities, mother aged at least 30 years, first- or second-born child, mother cohabiting with father and planned pregnancy. A detailed description of the original sampling procedures employed in this investigation is presented in Golombok et al. (2004a).

As shown in Table 1, there were similar proportions of boys and girls in each family type, and the age of the children did not differ between groups. There was a significant group difference in the age of the mothers $F(2,150) = 20.12, p < .001$. The surrogacy and egg donation mothers were the oldest with mean ages of 40 years and 42 years respectively, and the natural conception mothers were aged 36 years. There was a significant difference in social class $\chi^2 = 16.95, p < .01$, as assessed by the occupation of the parent with the highest-ranking position according to a modified version of the Registrar General's Classification (OPCS and Employment Department Group, 1991) ranging from 1 (professional/managerial) to 6 (unskilled). This resulted from a lower proportion of natural conception than surrogacy or egg donation families in less skilled occupations. The number of siblings in the family also differed between family types $\chi^2 = 34.21, p < .001$, reflecting a higher number of children with siblings in the natural conception than the surrogacy and egg donation families. As significant differences between groups were found for mother's age, social class and number of siblings in the family, these variables were entered into the statistical analyses as covariates.

Table 1 Sociodemographic information by family type

	Surrogacy		Egg donation		Natural conception		<i>F</i>	<i>p</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>		
Age of child (months)	24.19	1.33	25.15	3.96	24.49	.81	1.88	Ns
Age of mother (years)	40.43	5.52	41.54	6.14	36.21	2.84	20.12	<.001
	<i>N</i>		<i>N</i>		<i>N</i>		χ^2	<i>p</i>
Child's sex								
Boy	20		28		32		1.49	ns
Girl	17		20		36			
Social class								
Professional	25		28		55		16.95	<.01
Managerial/technical	6		11		10			
Skilled non-manual	1		7		2			
Skilled manual	5		2		1			
Partly skilled	0		0		0			
Unskilled	0		0		0			
No. of siblings								
None	21		34		16		34.21	<.001
One	14		9		49			
Two	2		5		3			

Researchers trained in the study techniques visited the families at home. Data were obtained from the mother and the father separately by tape-recorded interview and questionnaire. Interviews were conducted with 98% of mothers and 58% of fathers. Questionnaire data were obtained from 79% of mothers and 64% of fathers. Fewer fathers than mothers were available for interview due to employment commitments. However, some of the fathers who were not interviewed completed questionnaires. The fathers who participated did not differ from those who did not with respect to age or social class. Ninety-four percent of the children were administered the Bayley Scale, and BITSEA data were obtained for 97% of the children.

Measures

Parental psychological state. The short form of the Parenting Stress Index (PSI/SF) (Abidin, 1990), a standardised assessment of stress associated with parenting, was administered to mothers and fathers separately to produce a total score for each parent, with higher scores reflecting greater parenting stress. Test-retest reliability for the total score was reported to be .96 over a 1–3-month interval and .65 over one year. Concurrent and predictive validity have been demonstrated for the full-length questionnaire, and the short form has been reported to correlate very highly with the full-length version. In addition, the Vulnerable Child Scale (Perrin, West, & Culley, 1989) was administered to mothers only to provide an assessment of anxiety regarding the child's susceptibility to medical problems, with a higher score representing a greater sense of vulnerability. Test-retest reliability was reported to be .95 over a 4-week period, and the scale was found to discriminate between parents of formerly sick premature infants and parents of healthy full-term infants when the child was 3 years old. The Trait Anxiety Inventory (Spielberger, 1983) and the Edinburgh Depression Scale (Thorpe, 1993) were completed by both mothers and fathers 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.

The quality of the marital relationship was assessed by interview using a semi-structured, standardised procedure for which predictive validity with marital breakdown has been demonstrated (Quinton, Rutter, & Rowlands, 1976; Quinton & Rutter, 1988). The interviewers were trained in the use of this assessment instrument by one of the authors (David Quinton). The following ratings from the narrative responses of the parents were made for mothers and fathers separately (1) *relationship quality* was rated on a 4-point scale from 1 (a great deal) to 4 (none) and was based on the enjoyment both partners experience in shared activities, (2) *confiding* was rated on a 5-point scale from 1 (all important matters discussed adequately) to 5 (no communication about matters of importance) and took account of the ease of discussing important issues together, (3) *arguments* was rated on a 4-point scale from 0 (none or occasional) to 3 (more than 1 per month) and measured the frequency of conflicts involving shouting and/or violence, and/or denigration of each other or of each other's families, and/or not speaking after a difference for more than one hour. Pearson product-moment inter-rater reliability coefficients for *relationship quality*, *confiding* and *arguments* as rated by the same research team with the same families in the first phase of this investigation were .58, .64 and .73 respectively (Golombok et al., 2004a, 2004b). Mothers and fathers also completed the Golombok Rust Inventory of Marital State (GRIMS) (Rust et al., 1988), a questionnaire assessment of the quality of the marital relationship with higher scores indicating poorer marital quality. Split-half reliability is .91 for men and .87 for women, and the GRIMS has been shown to discriminate significantly between couples who are about to separate and those who are not.

The interview with mothers also obtained data on demographic characteristics of the family and the child's

attendance at daycare. In addition, data were obtained on the mother's perception of the father's contribution to parenting as follows: *father's help in childcare* assessed the extent to which the mother viewed the father as a help or a hindrance in parenting and was rated from 0 'passive/unhelpful' to 5 'takes major responsibility', and *father's load taking* assessed the extent to which the father took care of the child to allow the mother time for other activities or to rest and was rated from 0 'none' to 4 'takes major load'. Pearson product-moment inter-rater reliability coefficients for *father's help in childcare* and *father's load taking* were .83 and .53 respectively (Golombok et al., 2004a, 2004b). The interview with fathers obtained frequency data on the *number of weekday hours* and the *number of weekend hours* the father spent at home while the child was awake.

Parent-child relationships. The mothers and fathers were interviewed separately using the Parent Development Interview [PDI] (Aber et al., 1985; Slade et al., 1999), an interview technique designed to assess the nature of the emotional bond between the parent and child, using the coding scheme developed by Steele et al. (2000). The researchers were trained in the administration and coding of the PDI by Miriam Steele. Parents are asked not simply to describe their child but instead to describe their own and their child's experience in moments of interaction and relatedness. For example, the parent is asked to describe the child's reactions to normal separations, routine upsets and parental unavailability, followed by questioning that addresses the parent's behavioural and emotional responses to these situations. In this way, the parents' experiences and representations of the dynamics of the relationship between themselves and their child may be evaluated. Data are scored according to well-defined coding criteria, taking account of the parent's affective tone and coherence in addition to the content of the response. The PDI produces variables relating to both the affective experience of the parent and the parent's view of the affective experience of the child. The variables used in the present study that related to the parent's affective experience were *degree of anger* (rated from 1 'none/minimal anger' to 4 'considerable anger'), *acknowledgement of support needed* (for mothers only, rated from 1 'minimal feelings of needing support' to 4 'very strong feelings of needing support'), *satisfaction with support available* (for mothers only, rated from 1 'very dissatisfied' to 4 'highly satisfied'), *guilt* (rated from 1 'none/minimal guilt' to 4 'considerable guilt'), *joy/pleasure* (rated from 1 'minimal acknowledgement of joy or pleasure' to 4 'high/significant acknowledgement of joy or pleasure'), *competence* (rated from 1 'low competence' to 4 'high competence'), *level of child focus* (rated from 1 'low level of child focus' to 4 'high level of child focus'), *disappointment with child* (rated from 1 'none/minimal disappointment to 4 'high disappointment'), *parental hostility* (rated from 1 'none/minimal hostility' to 4 'high hostility'), *over-protectiveness* (rated from 1 'none/minimal over-protectiveness' to 4 'high over-protectiveness'), *disciplinary over-indulgence* (rated from 1 'average' to 4 'indulgent') and *clingy behaviour* (rated from 1 'none/minimal clinging' to 4 'high clinging'). The variables that related to the child's affective experience were *child aggression/anger* (rated

from 1 'no anger' to 4 'high/extreme anger'), *child happiness/contentment* (rated from 1 'minimal happiness' to 4 'considerable happiness'), *child controlling/manipulating* (for mothers only, rated from 1 'none/minimal controlling' to 4 'high controlling'), *child affection* (rated from 1 'no/minimal affection' to 4 'highly affectionate') and *child rejecting* (rated from 1 'no/minimal rejection' to 4 'high rejection'). In order to calculate inter-rater reliabilities, a second interviewer coded 39 randomly selected interviews. Percentage agreement within one scale point for *degree of anger*, *acknowledgement of support needed*, *satisfaction with support available*, *guilt*, *joy/pleasure*, *competence*, *level of child focus*, *disappointment with child*, *parental hostility*, *over-protectiveness*, *disciplinary over-indulgence*, *clingy behaviour*, *child aggression/anger*, *child happiness/contentment*, *child controlling/manipulating*, *child affection* and *child rejecting* ranged from 92% to 100%, and more than 60% of the variables showed an exact agreement rate of over 60%.

Children's psychological development. Children's psychological adjustment was assessed using the Brief Infant Toddler Social and Emotional Assessment (BITSEA) (Briggs-Gowen & Carter, 2002; Briggs-Gowen et al., in press), a questionnaire measure of social-emotional problems and competencies in 1-3-year-olds adapted from the Infant Toddler Social and Emotional Assessment (ITSEA) (Briggs-Gowen & Carter, 1998; Carter, Garrity-Rokous, Chazan-Cohen, Little, & Briggs-Gowen, 2001). The questionnaire was completed by the child's mother. The BITSEA produces two scores, a Problem Scale score and a Competence Scale score, with higher scores representing greater problems and greater competence respectively. Good test-retest reliability has been demonstrated with intraclass correlations of .82 for the Problem Scale and .72 for the Competence Scale. The BITSEA has been validated against the ratings of independent assessors and the Child Behavior Checklist (Achenbach & Rescorla, 2000), and has also been shown to correlate with parents' reports of parental worry, stress and interference in family life.

To assess cognitive development, the children were tested on the Mental Scale of the Bayley Scales of Infant Development Second Edition (BSID II) (Bayley, 1993) at the time of their second birthday. The Mental Scale includes items that assess memory, habituation, problem solving, early number concepts, generalisation, classification, vocalisations, language and social skills. The raw score for each child is transformed to produce an age-standardised Mental Development Index, and developmental delay was defined as a Mental Development Index of less than 85. Inter-rater reliability for the Mental Development Index was reported to be .96, and test-retest reliability at age 2 years was .91. The BSID II has been demonstrated to have high content, construct, predictive and discriminant validity.

Results

Family characteristics

All of the children were living with both parents with the exception of one child in the natural conception

group whose parents had separated. Using chi square analyses, no group difference was found in the number of mothers who were employed outside the home, with between 10–12% of mothers in each family type in full-time employment. Neither was there a difference between family types in the proportion of children who were looked after outside the home by a non-relative or attended daycare. The families did not differ with respect to the father’s involvement with the child. The variables *father’s help in childcare* and *father’s load taking* were entered into a MANCOVA and Wilks’ λ was not significant. In addition, the *number of weekday hours* and the *number of weekend hours* the father spent at home were entered into a MANCOVA and Wilks’ λ was not significant.

In order to examine the association between different types of surrogacy arrangement and maternal representations of the parent–child relationship, comparisons were conducted according to whether or not the surrogate mother was a relative or friend of the commissioning couple (known vs. unknown) and the type of surrogacy (non-genetic vs. genetic). Thirty-three percent of surrogate mothers were previously known to the commissioning couple whereas 67% were previously unknown, and 42% of commissioning couples had engaged in a non-genetic surrogacy arrangement whereas 58% had taken part in genetic surrogacy. The *parent affective experience* variables and the *child affective experience* variables of the Parent Development Interview were entered into a MANCOVA. There were no significant differences for the parent affective experience variables or the child affective experience variables between families with previously known and unknown surrogate mothers, or between non-genetic and genetic surrogacy.

Parenting and child development

Multivariate analyses of covariance (MANCOVAs) were conducted for mothers and fathers separately for the questionnaire variables relating to parental psychological state, the marital relationship variables, and for the parent affective experience, child affective experience and global variables of the Parent Development Interview. In addition, a MANCOVA was conducted for the BITSEA subscales and an ANCOVA was conducted for the Bayley Scale. The covariates were mother’s age, number of siblings and social class. Where a MANCOVA was significant, one-way analyses of covariance (ANCOVAs) were then carried out for each variable included in the MANCOVA. Where a significant group difference was found for an individual variable, the following contrast analyses were carried out to address specific questions: (1) surrogacy versus natural conception (S vs. NC) and (2) surrogacy versus egg donation (S vs. ED) to establish whether the surrogacy families differed from the natural conception families and the egg donation families respectively.

Of the eight MANCOVAs conducted on the parent data, three were significant: the parent affective experience and child affective experience variables of the Parent Development Interview for mothers, and fathers’ psychological state (see Table 2).

Regarding the mothers’ parent affective experience variables of the PDI, one-way ANCOVAs found a significant difference between family types for *degree of anger* representing lower levels of anger among surrogacy than natural conception mothers. Surrogacy mothers also differed from natural conception mothers with respect to *guilt* and *joy/pleasure*, reflecting lower levels of guilt and higher levels of joy/pleasure among surrogacy than natural conception mothers. In addition, a significant difference between family types was found for *competence*. In this case, surrogacy mothers obtained higher ratings on competence than both the natural conception and egg donation mothers. There was also a significant difference for *disappointment with child*, reflecting a lower level of disappointment with the child by surrogacy than natural conception mothers.

For the child affective experience variables for mothers, one-way ANCOVAs showed a significant difference between family types for *child aggression/anger*, indicating lower levels of child aggression in surrogacy than natural conception families. There was also a significant difference between family types for *child controlling/manipulating*. However, neither the contrast between surrogacy and natural conception families nor the contrast between surrogacy and egg donation families reached statistical significance. A significant difference between family types was found for *child affection* reflecting higher levels of child affection in surrogacy families than in both natural conception and egg donation families (see Table 3).

With respect to fathers’ psychological state, one-way ANCOVAs identified a significant difference between family types for the Parenting Stress Index, indicating lower levels of parenting stress among the surrogacy fathers than both the natural conception and egg donation fathers (see Table 3).

Table 2 Wilks’ lambda, *F*, *df* and *p* values for MANOVAs between family types

	Wilks’ lambda	<i>F</i>	Hypothesis <i>df</i>	Error <i>df</i>	<i>p</i>
Mothers					
Psychological state	.90	1.56	8	230	Ns
Marital relationship	.95	.63	8	220	Ns
Parent affective experience	.75	1.70	24	266	<.05
Child affective experience	.80	3.26	10	280	<.01
Fathers					
Psychological state	.83	2.93	6	182	<.01
Marital relationship	.92	.63	8	126	Ns
Parent affective experience	.77	1.00	20	146	ns
Child affective experience	.86	1.45	8	158	Ns
Children					
BITSEA	.95	1.59	4	284	Ns

Table 3 Means, SD, *F* and *p* values for comparisons of parental functioning between family types

	Surrogacy		Egg donation		Natural conception		<i>F</i>	<i>P</i>	Contrasts	
	Mean	SD	Mean	SD	Mean	SD			S vs. NC	S vs. ED
Mothers										
Psychological state										
Parenting Stress Index	56.82	10.01	62.98	13.06	63.50	13.36				
Vulnerable Child Scale	54.87	5.75	53.25	5.08	56.09	3.59				
Trait Anxiety Inventory	32.90	6.49	36.05	8.28	35.55	8.22				
Edinburgh Depression Scale	4.57	3.11	5.61	3.83	5.15	3.82				
Marital relationship										
GRIMS	23.83	9.53	24.17	11.24	20.69	10.16				
Relationship quality	1.74	.61	1.76	.70	1.92	.65				
Confiding	1.74	.66	1.76	.67	1.81	.73				
Arguments	1.00	1.07	.87	1.02	1.22	1.10				
Parent affective experience										
Degree of anger	1.64	.63	1.73	.70	2.09	.73	5.74	<.01	<.01	ns
Acknowledgement of support	1.67	.67	1.92	.79	1.98	.69	1.52	ns		
Satisfaction with support	3.56	.60	3.37	.89	3.32	.80	3.00	ns		
Guilt	1.67	.47	1.92	.64	2.05	.68	3.75	<.05	<.01	ns
Joy/pleasure	3.56	.60	3.54	.58	3.29	.54	5.23	<.01	<.01	ns
Competence	3.39	.54	3.10	.42	3.09	.60	3.85	<.05	<.05	<.05
Level of child focus	3.06	.79	2.98	.69	2.98	.69	.16	ns		
Disappointment with child	1.08	.28	1.10	.30	1.20	.43	3.15	<.05	<.05	ns
Parental hostility	1.11	.31	1.13	.33	1.24	.49	1.79	ns		
Over-protectiveness	1.61	.59	1.65	.72	1.38	.57	.07	ns		
Disciplinary over-indulgence	1.47	.69	1.58	.79	1.45	.58	.81	ns		
Clingy behaviour	1.78	.86	1.50	.71	1.67	.77	2.51	ns		
Child affective experience										
Child aggression/anger	1.75	.69	1.88	.60	2.12	.66	7.57	<.01	<.001	ns
Child happiness/contentment	3.44	.50	3.40	.57	3.38	.54	.17	ns		
Child controlling/manipulating	1.97	.65	1.77	.69	1.92	.77	4.47	.05	ns	ns
Child affection	3.67	.47	3.29	.54	3.45	.56	5.07	.01	<.05	<.01
Child rejecting	1.11	.31	1.21	.41	1.18	.42	1.05	ns		
Fathers										
Psychological state										
Parenting Stress Index	56.24	11.49	64.04	12.54	71.77	14.85	8.26	<.001	<.001	<.05
Trait Anxiety Inventory	31.65	8.39	35.48	7.27	35.29	8.95	2.21	ns		
Edinburgh Depression Scale	3.34	3.54	5.35	3.92	5.04	4.43	1.99	ns		
Marital relationship										
GRIMS	27.18	10.53	24.81	10.88	24.82	8.56				
Relationship quality	2.05	.94	1.80	.66	1.76	.49				
Confiding	1.95	.75	1.80	.71	1.76	.69				
Arguments	1.05	1.05	1.17	1.14	1.21	.97				
Parent affective experience										
Degree of anger	1.38	.66	1.45	.50	1.61	.68				
Guilt	1.52	.68	1.55	.50	1.39	.49				
Joy/pleasure	3.62	.49	3.42	.67	3.25	.55				
Competence	3.24	.43	3.03	.60	3.00	.47				
Level of child focus	2.90	.88	2.90	.87	2.94	.58				
Disappointment with child	1.05	.21	1.03	.18	1.11	.31				
Parental hostility	1.00	.00	1.00	.00	1.08	.28				
Over-protectiveness	1.24	.43	1.29	.64	1.14	.35				
Disciplinary over-indulgence	1.71	.71	1.39	.49	1.33	.53				
Clingy behaviour	1.33	.48	1.23	.49	1.17	.44				
Child affective experience										
Child aggression/anger	1.81	.68	1.81	.54	1.97	.65				
Child happiness/contentment	3.57	.50	3.45	.50	3.31	.52				
Child affection	3.24	.53	3.42	.56	3.28	.56				
Child rejecting	1.29	.56	1.26	.51	1.33	.53				
Children										
BITSEA problem	12.41	6.17	14.33	7.58	13.83	6.80				
BITSEA competence	18.52	2.19	17.22	2.54	17.53	2.93				

The MANCOVA for the BITSEA subscales was not significant. In addition, chi square tests found no difference according to family type in the proportion of children who obtained scores above cut-off for the

Problem Scale, nor in the proportion of children who obtained scores below cut-off for the Competence Scale. Scores above cut-off for the Problem Scale represented scores above the 75th percentile, and

scores below cut-off for the Competence Scale represented scores below the 25th percentile, in a representative community sample. Regarding the Bayley Scale, there was no difference in the Mental Development Index between family types. In line with this finding, a chi square test found no difference between family types in the proportion of children showing developmental delay, with 6%, 9% and 10% of children in surrogacy, egg donation and natural conception families respectively obtaining a Mental Development Index of less than 85.

Discussion

In spite of their unconventional route to parenthood, the surrogacy mothers appeared to show more positive representations of their relationship with their child than did their natural conception counterparts. This was indicated by their significantly higher levels of joy/pleasure and competence, and significantly lower levels of anger, guilt and disappointment with the child, as assessed by the parent affective experience scales of the Parent Development Interview, and by the significantly higher levels of affection, and significantly lower levels of aggression/anger, as assessed by the child affective experience scales. Interestingly, the differences that were found tended to be more associated with affective experiences than with parent or child behaviour. This suggests that actual parenting behaviour may not differentiate the groups, even when differences in affective experience are found, a finding that is consistent with previous studies of assisted reproduction families that showed greater warmth and emotional involvement but no difference in parent-child interaction between assisted reproduction and natural conception mothers (Golombok et al., 1995, 2002b, 2004a, 2004b).

Fathers in surrogacy families reported lower levels of stress associated with parenting than the natural conception fathers. This may stem from their difficulties in, and eventual appreciation of, becoming parents. However, no differences were found for the parent or child affective experience scales of the Parent Development Interview for fathers. Whereas the difference in the pattern of findings between mothers and fathers may reflect a greater involvement in parenting by assisted reproduction mothers than fathers, the possibility that this may have resulted from the lower response rate among fathers than mothers cannot be ruled out.

The more positive representations shown by the surrogacy mothers is perhaps surprising given the potential risks associated with surrogacy for parent-child relationships. The unexpected nature of this finding raises the question of whether this is a genuine effect or a result of interviewer or interviewee bias. From a theoretical perspective, parents' representations of their relationship with their child are

believed to influence parenting behaviour such that more positive representations are associated with a higher quality of parenting (Bowlby, 1982; George & Solomon, 1999; Slade et al., 1999). Although it may be expected that surrogacy would result in more negative representations of the relationship with their child due to the absence of a gestational, and sometimes genetic, link and the involvement of a third party, it is conceivable that surrogacy may instead lead to more positive outcomes. Couples whose children have been born through a surrogacy arrangement have gone to great lengths to have a child and are thus likely to be highly motivated and committed parents, a finding that has been demonstrated among parents of other types of assisted reproduction children, including those born through in vitro fertilisation (IVF), donor insemination and egg donation (Golombok et al., 1995; van Balen, 1996; Gibson, Ungerer, Tennant, & Saunders, 2000; Golombok et al., 2002a; Golombok, MacCallum, Goodman, & Rutter, 2002b). Thus a strong desire for a child among surrogacy parents may result in more positive representations of the relationship and a higher quality of parenting than among parents whose children were naturally conceived. Many of these women had known from adolescence that they would be unable to have a child themselves because they did not have a uterus, and thus were overjoyed to become mothers through surrogacy. Although a selection criterion for the natural conception families was that the pregnancy had been planned, couples who pursue assisted reproduction in order to have a child are likely to have a stronger desire for children than couples who are able to give birth without medical intervention or the involvement of a third party. It should also be pointed out that in the attachment literature, mothers of securely attached children are characterised as having balanced representations of their relationship with their child that acknowledge negative as well as positive aspects (Bowlby, 1979; Steele & Steele, in press). Thus it cannot necessarily be assumed that the more positive representations of the surrogacy mothers are entirely indicative of more functional relationships.

Alternatively, in reaction to the widespread disapproval of surrogacy, commissioning parents may tend to emphasise the positive aspects of their relationship with their child and underplay the negative thus giving a false impression of the nature of family relationships. They may feel the need to present their family as highly functioning in order to prove themselves as suitable parents to the outside world. Although this possibility cannot be ruled out, the Parent Development Interview (Aber et al., 1985; Slade et al., 1999) is a lengthy and in-depth procedure that has been designed to tap below the surface to assess emotional aspects of the relationship between the parent and the child. The interview procedure takes account of the way in which parents respond in addition to the content of their responses,

and is less easy to simulate than factual reporting of behavioural aspects of the parent–child relationship. In addition, defensive responding was assessed by the interviewers at the end of each interview (rated on a 5-point scale ranging from ‘not at all defensive’ to ‘extremely defensive’ according to well-defined coding criteria) and there was no difference in defensive responding between family types. Similarly, there was no difference between family types in the defensive responding subscale of the Parenting Stress Inventory.

In addition to the potential for socially desirable responding by the surrogacy parents, the interviewers themselves may have introduced bias to the results, either through the interview procedure or through the coding of the interview material. It was not possible for the interviewers to be ‘blind’ to family type as parents of children conceived by assisted reproduction inevitably refer to the method of their child’s conception in reporting their experiences of parenting. However, to the extent that interviewer bias occurred, it is conceivable that this would have operated in the opposite direction to the findings in that more negative outcomes were expected for the surrogacy than the natural conception families. Moreover, the interview data were rated according to very detailed coding criteria, which is likely to have minimised interviewer bias.

In spite of the concerns that have been raised regarding the increased risk of psychological problems among children born through a surrogacy arrangement, the children in the present investigation did not differ from the naturally conceived children with respect to socio-emotional or cognitive development. Instead, the more positive representations of the child among the surrogacy than the natural conception mothers leads to the expectation that the surrogacy children would show more positive adjustment than their naturally conceived counterparts. However, the well-established relationship between quality of parenting and children’s psychological development is most apparent when the quality of parenting is poor and results in adverse outcomes for the child, for example in the case of marital conflict (Grych & Fincham, 1990; Cummings & Davies, 1994) or parental psychiatric disorder (Downey & Coyne, 1990). In the present study, the natural conception mothers obtained ratings on the Parent Development Interview that were within the normal range, and the surrogacy mothers obtained even higher, i.e., more optimal, ratings. As demonstrated in previous studies of both naturally conceived children (Roberts, 1986; Roberts & Strayer, 1987) and assisted reproduction children (Colpin, Demyttenaere, & Vandemeulebroecke, 1995; Golombok et al., 1995; Cederblad et al., 1996; Golombok et al., 2002a, 2002b; Gibson, Ungerer, Leslie, Saunders, & Tennant, 1998), elevated parenting quality does not appear to result in raised levels of psychological adjustment in the child.

The general lack of difference between the egg donation families and the surrogacy families indicates that the key factor that distinguishes surrogacy from egg donation, i.e., the involvement of a surrogate mother to host the pregnancy, does not, in itself, appear to influence parenting or child development. Rather, it is the characteristics that surrogacy and egg donation have in common, such as the experience of infertility and the use of assisted reproduction, that seem to be associated with the more positive outcomes for these families. The exceptions were for the variables relating to competence and child affection from the Parent Development Interview, with the surrogacy mothers obtaining higher ratings of competence and child affection than the egg donation mothers. This suggests either that women who can withstand the more difficult and demanding process of surrogacy are more competent as parents and perceive their much-wanted children as more affectionate, or that they feel they must justify their more controversial route to parenthood by presenting themselves as highly competent mothers with extremely loving children. Although both processes may have been operating, the surrogacy mothers appeared to be more relaxed in their attitude to parenting; in comparison with the stresses associated with the surrogacy process, coping with a 2-year-old was viewed as relatively unproblematic. In addition, it is likely that women who can endure the challenges of a surrogacy arrangement are highly tolerant of stressful situations generally. The only difference identified between the surrogacy and the egg donation fathers was the lower level of parenting stress reported by the surrogacy fathers, a finding that again may be explained by the comparative ease of parenting a 2-year-old in relation to the experience of surrogacy.

The findings of the present study conducted when the children were aged 2 years old are in line with the findings of the first phase of the investigation when the children were aged 1 year. These findings suggest that a gestational or genetic bond with the child is less important for positive maternal representations of the mother–child relationship than a strong desire for parenthood. Pregnancy, it seems, is not a prerequisite. Although no studies have yet been published of adoptive parents’ representations of their relationship with their child (a family situation that is similar to surrogacy to the extent that the parents lack a genetic and gestational link with their child), these findings are consistent with studies of early-adopted children’s security of attachment to their parents. It has been shown, for example, that a similar proportion of infants in adoptive families and non-adoptive families are classified as securely attached (Singer, Brodzinsky, Ramsay, Steir, & Waters, 1985). It is important to emphasise, however, that the surrogacy children in the present study were not yet aware of the nature of their birth.

It is not until they grow older and acquire an understanding of their unusual family situation that the impact of surrogacy for parents and children can be fully understood.

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References

- Aber, J., Slade, A., Berger, B., Bresgi, I., & Kaplan, M. (1985). *The Parent Development Interview*. Unpublished manuscript, City University, New York.
- Abidin, R. (1990). *Parenting Stress Index Test Manual*. Charlottesville, VA: Pediatric Psychology Press.
- Achenbach, T., & Rescorla, L. (2000). *Manual for the ASEBA preschool forms and profiles*. Burlington, VT: University of Vermont.
- Ainsworth, M., Bleher, M., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the Strange Situation*. Hillsdale, NJ: Erlbaum.
- Bayley, N. (1993). *Bayley Scales II*. London: The Psychological Corporation.
- Belsky, J., Woodworth, S., & Crnic, K. (1996). Trouble in the second year: Three questions about family interaction. *Child Development*, 67, 556–578.
- Bowlby, J. (1979). *The making and breaking of affectional bonds*. London: Routledge.
- Bowlby, J. (1982). *Attachment and loss*. Volume 1: Attachment (2nd edn). New York: Basic Books.
- Briggs-Gowen, M.J., & Carter, A.S. (1998). Preliminary acceptability and psychometrics of the Infant-Toddler Social and Emotional Assessment (ITSEA): A new adult-report questionnaire. *Infant Mental Health Journal*, 19, 422–445.
- Briggs-Gowen, M.J., & Carter, A.S. (2002). *Brief Infant-Toddler Social and Emotional Assessment (BITSEA): Manual*. Version 2.0. New Haven, CT: Yale University.
- Briggs-Gowen, M.J., Carter, A.S., Irwin, J., Wachtel, K., & Cicchetti, D. (in press). The Brief Infant-Toddler Social and Emotional Assessment: Screening for social-emotional problems and delays in competence. *Journal of Pediatric Psychology*.
- Carter, A.S., Briggs-Gowen, M.J., & Davis, N.O. (2004). Assessment of young children's social-emotional development and psychopathology: Recent advances and recommendations for practice. *Journal of Child Psychology and Psychiatry*, 45, 109–134.
- Carter, A.S., Garrity-Rokous, F.E., Chazan-Cohen, R., Little, C., & Briggs-Gowen, M.J. (2001). Maternal depression and comorbidity: Predicting early parenting, attachment security, and toddler social-emotional problems and competencies. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40, 18–26.
- Cederblad, M., Friberg, B., Ploman, F., Sjoberg, N.O., Stjernqvist, K., & Zackrisson, E. (1996). Intelligence and behaviour in children born after in-vitro fertilization treatment. *Human Reproduction*, 11, 2052–2057.
- Colpin, H., Demyttenaere, K., & Vandemeulebroecke, L. (1995). New reproductive technology and the family: The parent-child relationship following in vitro fertilization. *Journal of Child Psychology and Psychiatry*, 36, 1429–1441.
- Condon, J.T., & Corkindale, C.J. (1998). The assessment of parent-to-infant attachment: Development of a self-report questionnaire instrument. *Journal of Reproductive and Infant Psychology*, 16, 57–76.
- Cranley, M.S. (1981). Development of a tool for the measurement of maternal-fetal attachment during pregnancy. *Nursing Research*, 30, 281–284.
- Cummings, E.M., & Davies, P. (1994). *Children and marital conflict: The impact of family dispute and resolution*. New York: Guilford Press.
- Downey, G., & Coyne, J.C. (1990). Children of depressed parents: An integrative review. *Psychological Bulletin*, 108, 50–76.
- Edwards, C.P., & Liu, W. (2002). Parenting toddlers. In M.H. Bornstein (Ed.), *Handbook of parenting* (vol. 1, pp. 45–72). New Jersey: Lawrence Erlbaum Associates.
- George, C., & Solomon, J. (1996). Representational models of relationships: Links between caregiving and attachment. *Infant Mental Health Journal*, 17, 198–216.
- George, C., & Solomon, J. (1999). Attachment and caregiving: The Caregiving Behavioral System. In J. Cassidy & P.R. Shaver (Eds.), *Handbook of attachment: Theory research and clinical applications*. New York: Guilford Press.
- Gibson, F.L., Ungerer, J.A., Leslie, G.I., Saunders, D.M., & Tennant, C.C. (1998). Development, behaviour and temperament: A prospective study of infants conceived through in-vitro fertilization. *Human reproduction*, 13, 1727–1732.
- Gibson, F.L., Ungerer, J.A., Tennant, C.C., & Saunders, D.M. (2000). Parental adjustment and attitudes to parenting after in vitro fertilization. *Fertility and Sterility*, 73, 565–574.
- Golombok, S. (2000). *Parenting: What really counts?* London: Routledge.

- Golombok, S. (2002). Parenting and contemporary reproductive technologies. In M. Bornstein (Ed.), *Handbook of parenting* (vol. 3, pp. 339–360). Lawrence Erlbaum: Hove UK.
- Golombok, S., Brewaeys, A., Giavazzi, M., Guerra, D., MacCallum, F., & Rust, J. (2002a). The European study of assisted reproduction families: The transition to adolescence. *Human Reproduction*, *17*, 830–840.
- Golombok, S., Cook, R., Bish, A., & Murray, C. (1995). Families created by the new reproductive technologies: Quality of parenting and social and emotional development of the children. *Child Development*, *66*, 285–298.
- Golombok, S., Lycett, E., MacCallum, F., Jadva, V., Murray, C., Rust, J., Abdalla, H., Jenkins, J., & Margara, R. (2004b). Parenting infants conceived by gamete donation. *Journal of Family Psychology*, *18*, 443–452.
- Golombok, S., MacCallum, F., Goodman, E., & Rutter, M. (2002b). Families with children conceived by donor insemination: A follow-up at age 12. *Child Development*, *73*, 952–968.
- Golombok, S., Murray, C., Jadva, V., MacCallum, F., & Lycett, E. (2004a). Families created through a surrogacy arrangement: Parent–child relationships in the first year of life. *Developmental Psychology*, *40*, 400–411.
- Grace, J.T. (1989). Development of maternal–fetal attachment during pregnancy. *Nursing Research*, *38*, 228–232.
- Grych, J.H., & Fincham, F.D. (1990). Marital conflict and children's adjustment: A cognitive-contextual framework. *Psychological Bulletin*, *108*, 267–290.
- Hartmann, A.H. (1999). Links between maternal representations of the child, observed maternal behaviors, and the quality of dyadic engagement in play at 28 months. *Dissertation Abstracts International: Section B: the Sciences and Engineering*, *59*.
- Laxton-Kane, M., & Slade, P. (2002). The role of maternal prenatal attachment in a woman's experience of pregnancy and implications for the process of care. *Journal of Reproductive and Infant Psychology*, *20*, 253–266.
- MacCallum, F., Lycett, E., Murray, C., Jadva, V., & Golombok, S. (2003). Surrogacy: The experience of commissioning couples. *Human Reproduction*, *18*, 1334–1342.
- OPCS and Employment Department Group. (1991). *Standard Classification of Occupations*. London: HMSO.
- Perrin, E.C., West, P.D., & Culley, B.S. (1989). Is my child normal yet? Correlates of vulnerability. *Pediatrics*, *83*, 355–363.
- Quinton, D., & Rutter, M. (1988). *Parenting breakdown: The making and breaking of intergenerational links*. Aldershot, UK: Avebury Gower Publishing.
- Quinton, D., Rutter, M., & Rowlands, O. (1976). An evaluation of an interview assessment of marriage. *Psychological Medicine*, *6*, 577–586.
- Roberts, W. (1986). Non-linear models of development. *Child Development*, *57*, 1168–1184.
- Roberts, W., & Strayer, J. (1987). Parents responses to the emotional distress of their children: Relationships with children's competence. *Developmental Psychology*, *23*, 415–422.
- Rust, J., Bennum, I., Crowe, M., & Golombok, S. (1988). The Golombok Rust Inventory of Marital State (GRIMS). In D. Milne (Ed.), *Assessment: A mental health portfolio*. London: NFER-NELSON.
- Sayre, J.M., Pianta, R.C., Marvin, R.S., & Saft, E.W. (2001). Mothers' representations of relationships with their children: Relations with mother characteristics and feeding sensitivity. *Journal of Pediatric Psychology*, *26*, 375–384.
- Singer, L., Brodzinsky, D., Ramsay, D., Steir, M., & Waters, E. (1985). Mother–infant attachment in adoptive families. *Child Development*, *56*, 1543–1551.
- Slade, A., Belsky, J., Aber, J.L., & Phelps, J.L. (1999). Mothers' representations of their relationships with their toddlers: Links to adult attachment and observed mothering. *Developmental Psychology*, *35*, 611–619.
- Solomon, J., & George, C. (1996). Defining the caregiving system: Towards a theory of caregiving. *Infant Mental Health Journal*, *17*, 183–197.
- Spielberger, C. (1983). *The handbook of the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Steele, M., Henderson, K., & Hillman, S. (2000). *Handbook of the Experience of Parenting Interview (ExPI)*. London: Anna Freud Centre.
- Steele, H., & Steele, M. (in press). On the importance of understanding and resolving emotional conflict: Findings from the London Parent–child Project. In K. Grossman, K. Grossmann, & E. Waters (Eds.), *The power and dynamics of longitudinal attachment research*. New York: Guilford Press.
- Steinberg, L. (2000). We know some things: Parent–adolescent relations in retrospect and prospect. *Journal of Research on Adolescence*, *11*, 1–19.
- Thorpe, K. (1993). A study of the use of the Edinburgh Postnatal Depression Scale with parent groups outside the postpartum period. *Journal of Reproductive and Infant Psychology*, *11*, 119–125.
- van Balen, F. (1996). Child-rearing following in vitro fertilization. *Journal of Child Psychology and Psychiatry*, *37*, 687–693.