UvA-DARE (Digital Academic Repository)

The importance of genetic parenthood for infertile men and women

Hendriks, S.; Peeraer, K.; Bos, H.; Repping, S.; Dancet, E.A.F.

Link to publication

human reproduction

ORIGINAL ARTICLE *Psychology and counselling*

The importance of genetic parenthood for infertile men and women

S. Hendriks[1], K. Peeraer[2], H. Bos[3], S. Repping[1], and E.A.F. Dancet[1,4,5,*]

[1]Center for Reproductive Medicine, Academic Medical Center, University of Amsterdam, Meibergdreef 9, 1105 AZ Amsterdam, The Netherlands [2]Leuven University Fertility Centre, Leuven University Hospital, Herestraat 49, 3000 Leuven, Belgium [3]Faculty of Social and Behavioral Sciences, Research Institute of Child Development and Education, University of Amsterdam, Nieuwe Achtergracht 127, 1018 WS Amsterdam, The Netherlands [4]Leuven University Fertility Clinic, Department of Development and Regeneration, KU Leuven-University of Leuven, Herestraat 49, 3000 Leuven, Belgium [5]Research Foundation Flanders, Brussel, Belgium

*Correspondence address: Leuven University Fertility Clinic, Department of Development and Regeneration, KU Leuven-University of Leuven, Herestraat 49, 3000 Leuven, Belgium. E-mail: eline.dancet@kuleuven.be

STUDY QUESTION: Do men and women beginning to attend a fertility clinic prefer genetic over non-genetic parenthood?

SUMMARY ANSWER: Nearly, all infertile men and women prefer genetic parenthood.

WHAT IS KNOWN ALREADY: Clinicians assume that all infertile couples prefer genetic parenthood over non-genetic parenthood and, therefore, consider treatments with donor gametes an option of last resort. Previous studies of the desire for parenthood identified 30 motivations for genetic parenthood, and 51 motivations for which having a genetically related child is not strictly necessary but might be deemed required. The exact strength of the preference of infertile men and women for genetic parenthood remains unclear, as does the importance of the various motivations.

STUDY DESIGN, SIZE, DURATION: A questionnaire was developed based on a literature review. It was assessed by professionals and pilot tested among patients. The coded paper–pencil questionnaire was disseminated among both partners of 201 heterosexual infertile couples after their first consultation at one of two Belgian fertility clinics between October 2015 and May 2016.

PARTICIPANTS/MATERIALS, SETTING, METHODS: The survey addressed: (i) the preference for genetic parenthood for themselves and for their partner, (ii) the importance of 30 motivations for genetic parenthood and (iii) the importance of 51 other motivations for parenthood and whether these motivations require being the genetic parent of their child to be fulfilled. To simplify presentation of the results, all 81 motivations were grouped into reliable categories of motivations using psychometric analyses.

MAIN RESULTS AND THE ROLE OF CHANCE: The survey was completed by 104 women and 91 men (response rate: 49%). Almost all respondents (98%) favored genetic over non-genetic parenthood for both their partner and themselves. One-third of the respondents stated they only wanted to parent their own genetically related child. Achieving genetic parenthood for their partner was considered significantly more important than achieving genetic parenthood for themselves. Within couples, men had a stronger preference for genetic parenthood ($P = 0.004$), but this was not significant after correction for educational level, which was significantly associated with the preference of both men and women. The 30 motivations for becoming a genetic parent clustered into 11 categories of which 'to experience a natural process' was deemed most important. The 51 motivations for becoming a parent for which having a genetically related child is not strictly necessary clustered into 14 categories of which 'to contribute to a child's well-being' and 'to experience the love of a child' were most important. Respondents deemed they would need to be the genetic parent of their child to fulfill nearly all their motivations for parenthood.

LIMITATIONS REASONS FOR CAUTION: We included couples that visited the fertility clinic for the first time, and the preference for genetic parenthood might change throughout a fertility treatment trajectory. Moreover, what prospective parents expect to be important for their future well-being might not really define parents' well-being.

WIDER IMPLICATIONS OF THE FINDINGS: The presumed preference of couples for genetic parenthood was confirmed. Resistance against using donor gametes is more likely among lower educated individuals. Researching whether non-genetic parents actually feel they cannot fulfill the 51 motivations for parenthood, could be a basis for developing patient information.

STUDY FUNDING/COMPETING INTEREST(S): Funded by the Parkes Foundation, the University of Amsterdam and the Leuven University Hospital. No conflict of interest.

Introduction

One in 10 heterosexual couples trying to conceive are faced with infertility (Boivin et al., 2007). Infertile couples are mainly treated with their own gametes leading to genetic parenthood and donor gametes are only used in a minority (<10%) of fertility treatment cycles (Kupka et al., 2016). The limited use of donor gametes is partially due to the scarcity of donors but might also be explained by the value attached to genetic parenthood (Hens et al., 2015).

The importance of a genetic link between parents and children has a rich history, where in western societies sociolegal and cultural definitions of parenthood have traditionally placed high value on marital and 'blood' ties (Schneider, 1980; Freeman et al., 2014). The importance of genetic parenthood has been both strengthened and challenged by societal change (e.g. decline of marriage) as well as novel fertility treatments (allowing genetic parenthood for more couples as well as allowing new family constructions with non-genetic parenthood) (Nordqvist, 2012; Freeman et al., 2014). The proportion of the general public that considers a genetic tie between parents and their children important seems to vary. For example, in Sweden 35% of the general public found a genetic tie important while in Canada this was 78% (Miall, 1993; Svanberg, 2003). A study in the USA showed that infertile couples value genetic parenthood more than the general public (importance score of 4.1/5 versus 3.6/5, $P = 0.01$) (Gurmankin et al., 2005). Fertility staff discussing the option of using donor gametes with infertile couples would benefit from knowing whether demographic characteristics such as gender, age or educational level are associated with the preference for genetic over non-genetic parenthood.

In addition, it would be interesting for fertility staff to understand infertile couples' motivations for genetic parenthood as they will have to participate in the decision on whether to use donor or own gametes. Qualitative studies identified motivations for genetic parenthood (e.g. Jennings et al., 2014). Thirteen surveys investigated the relative importance of only a subset of all these motivations for genetic parenthood (Langridge et al., 2000).

Finally, it would be interesting for fertility staff to understand whether infertile couples' motivations for parenthood (e.g. experiencing the love of a child) require being the genetic parent of their child, as this has been implied but has yet to be studied (e.g. van Balen and Trimbos-Kemper, 1995; Langridge et al., 2000).

The current study aimed to examine if men and women turning to a fertility clinic prefer genetic over non-genetic parenthood and if so, what their motivations are.

Materials and Methods

Questionnaire development

Searches on PubMed, psychINFO and CINAHL were conducted using various (MeSH-)terms referring to (genetic) parenthood, assisted reproduction and motivations (Supplementary Figure S1). We sifted 2.359 English publications, and checked the reference lists of eligible studies. Finally, 154 (qualitative or quantitative) studies on motivations for (genetic) parenthood were included.

Content analysis was used to extract 1234 meaningful units of text from these studies and group them into (i) motivations for genetic parenthood and their overarching categories and (ii) motivations for parenthood (i.e. for which a genetic tie between the parents and their child is not strictly necessary but might be deemed required), and their overarching categories (Graneheim and Lundman, 2004). Finally, 30 motivations for genetic parenthood (e.g. 'I do not want to suffer from the social stigma of having a child that is not genetically mine') and 51 motivations for parenthood (e.g. 'I do not want to suffer from the social stigma of childlessness') were identified.

A questionnaire including all these motivations was developed and reviewed by clinicians and a psychologist. It was subsequently pilot tested during cognitive interviews with 19 infertile patients and adjusted until proven feasible (Willis, 2004).

The final questionnaire consisted of five parts. Part I included nine demographic questions. Part II questioned the strength of the preference for genetic over non-genetic parenthood for both themselves and for their partner (Fig. 1). Parts III and IV asked respondents to rate the importance of respectively: the 30 motivations for genetic parenthood and the 51 motivations for parenthood on a four-point Likert scale (Fig. 1). Part IV additionally asked them to indicate whether each of the motivations for parenthood could be fulfilled if respondents were not the genetic parent of their child (Fig. 1). Part V inquired for motivations for (genetic) parenthood that were not previously addressed.

Data collection

The participating infertile couples were recruited between October 2015 and May 2016 from a secondary and a tertiary Belgian fertility clinic, which granted ethical approval for the study (S58128).

All 201 heterosexual infertile couples were surveyed within a month after their first consultation. The study package was sent by post and included a consent form, a refusal form, a coded questionnaire for each partner and a pre-stamped return envelope. Partners were requested to fill out the questionnaire independently. Non-responders were sent two reminders.

Statistical analysis

Data were analyzed with the Statistical Package for the Social Sciences (SPSS 22.0).

The validity and reliability of the categories of motivations

To simplify presentation of the results, all 81 motivations were grouped into reliable categories of motivations using psychometric analyses. These analyses were performed separately for the motivations for genetic parenthood and for the motivations for parenthood, based on the importance ratings of all respondents. The validity and reliability of the grouping of motivations in categories based on content analysis was checked. More specifically, if principal component analysis indicated that a motivation might fit better into another than its initial category, the motivation was transferred if this improved the Cronbach's alpha coefficients and item-total correlations (ITCs) of its original and its new category. This resulted

Questions on the extent to which genetic parenthood is preferred over non-genetic parenthood
How important is it to you that your child would be genetically your own?
☐ Crucial, I only want a child that is genetically mine
☐ Important, I do not think I would want a child that is not genetically mine
☐ Preferable, but if genetic parenthood would not be possible, I would also consider having a child that is not genetically my own
☐ Not important, I do not care if my child is genetically my own
How important is it to you that your child would be genetically related to your partner?
☐ Crucial, I only want a child of whom my partner is the genetic parent
☐ Important, I do not think I would want a child of whom my partner is not the genetic parent
☐ Preferable, but if genetic parenthood would not be possible, I would also consider having a child of whom my partner is not the genetic parent
☐ Not important, I do not care whether my partner is the genetic parent of my child
Example of a question on a motivation for genetic parenthood
I want to carry on my genes and bloodline
To which extent is this motivation important for your preference for genetic parenthood?
☐ Not important
☐ Slightly important
☐ Important
☐ Of the utmost importance
Example of a question on a motivation for parenthood
I want to experience the love of a child
To which extent is this motivation important for your wish for a child?
☐ Not important
☐ Slightly important
☐ Important
☐ Of the utmost importance
Can this motivation be attained by a child that is not genetically yours?
☐ Yes
☐ Partially
☐ No
☐ I do not know

Figure I Example questions and response scales.

in the transfer of eight motivations for genetic parenthood and nine motivations for parenthood from one category to another. Finally, the 30 motivations for genetic parenthood were grouped in 11 overarching categories and the 51 other motivations for parenthood were grouped in 14 overarching categories (Table I). All categories of motivations were reliable (Cronbach's alpha > 0.7 and ITC > 0.3; Table I) (Field, 2005). The adapted categories were re-interpreted and re-named by two researchers. Content analysis of the inquiry for missing motivations for (genetic) parenthood, revealed no new motivations, confirming the questionnaire's face-validity.

The preference for genetic over non-genetic parenthood

As partners may not be independent (Kenny *et al.*, 2006) and will have to take treatment decisions together we performed an univariate ordinal regression analysis on their preference. This confirmed that the preference for genetic over non-genetic parenthood of an individual was associated with the preference of his/her partner ($P < 0.001$). Therefore, the responses from men and women were analyzed separately and clustering within couples was taken into account, when examining the effect of gender on respondents' preference for genetic over non-genetic parenthood.

The preference for genetic over non-genetic parenthood for both one-self and their partner was described with proportions. A chi-square test compared wanting genetic parenthood for oneself and one's partner.

Multivariate ordinal regression analyses examined whether the preference for genetic parenthood was associated with demographic characteristics. A Wilcoxon Signed-rank test compared the preference for genetic parenthood within couples, in whom both partners responded (Holter *et al.*, 2014). In addition, two-way repeated measures ANOVA, assessed whether partners differed in their preference for genetic parenthood after correction for background characteristics, which were associated with the importance of genetic parenthood for both men and women.

The motivations for preferring genetic over non-genetic parenthood

The importance score per category of motivations for genetic parenthood was the mean of the importance of its motivations. For this purpose, the answers per motivation on the four-point Likert scale were first transformed to end up with a 0–10 score ('not important'= 0, 'somewhat important'= 3.33, 'important'= 6.67 and 'of the utmost importance'= 10).

The importance of each category of motivations for parenthood for respondents, for whom genetic parenthood was required to fulfill these motivation, was described with the same 0–10 score. To calculate this score, the importance ratings of respondents who shared that all motivations of that category could be fulfilled by a non-genetically related child were excluded from analysis.

A Mann–Whitney *U*-test examined differences in importance scores per category between men and women.

The categories of motivations were grouped into classes of importance, by considering the importance to differ if the 95% CIs did not overlap.

Results

Respondents

The questionnaire was completed by 195 respondents (response rate: 49%). This included 90 couples (both partners filling out their own questionnaire), and 15 individuals (1 man and 14 women; Table II). Most

Table I Categories of motivations for genetic parenthood and parenthood.

Category of motivation	Specific motivations questioned[a]	References[b]	Reliability measures of category	
			Cronbach's alpha	Range of ITCs
Motivations for genetic parenthood				
To experience a natural process	I want to be certain genetic parenthood is not possible before I'll entertain other options ($n = 3$)	1–3	0.7	0.5–0.6
	I feel it is natural to take care of my own offspring ($n = 3$)	4–6		
	I want my child to represent the union between me and my partner (my child should also be my partner's genetic child) ($n = 8$)	4, 7–13		
	I want to conceive my child through sexual intercourse with my partner ($n = 4$)	8, 14–16		
To ensure sovereignty	I do not want any potential legal uncertainty concerning my status as a parent ($n = 12$)	17–28	0.8	0.7
	I do not want to risk third party involvement from the genetic parent(s) in child-rearing ($n = 15$)	5, 17, 18, 21, 23, 27, 29–37		
To protect my relationship from third parties	I think genetic parenthood is important for my partner ($n = 8$)	14, 18, 21, 24, 38–41	0.7	0.4–0.7
	I do not want to risk friction between me and my partner due to only one of us being the genetic parent (e.g. when using donor sperm or oocytes) ($n = 7$)	10, 18, 42–46		
	I already have a genetic child and I do not want any differences between my children ($n = 3$)	39, 47, 48		
	I do not want to use donor sperm or oocytes as it would feel like adultery ($n = 6$)	4, 24, 33, 35, 49, 50		
To procreate my genes	I want to carry on my genes and bloodline ($n = 28$)	7, 8, 12, 18, 22, 27, 29, 31, 35, 51–69	0.8	0.4–0.6
	I want to maintain my ethnic group ($n = 2$)	29, 52		
	I think a child with my genes can provide a valuable contribution to society ($n = 3$)	7, 44, 70		
	I want to recognize myself in my child ($n = 7$)	6, 7, 10, 18, 26, 43, 61		
	I want to know I am fertile ($n = 11$)	7, 8, 23, 26, 35, 51, 52, 61, 71–73		
To bond with the child	I doubt whether I could view a child as my own if I am not the genetic parent ($n = 17$)	4, 13, 15, 18, 23, 28, 30, 31, 35, 38, 43, 46, 49, 74–77	0.8	0.6–0.8
	I do not want to risk raising a child who would not to view me as his/her parent because of a lack of a genetic tie ($n = 7$)	23, 24, 29, 33, 46, 74, 78		
	I think I would have a better bond with a child of whom I am the genetic parent ($n = 15$)	13, 15, 18, 23, 24, 28, 32, 38, 39, 41, 75, 76, 79–81		
	I do not want to risk having to raise a child that is not genetically mine, who has behavior problems ($n = 14$)	2, 5, 23, 24, 26–29, 34, 46, 50, 74, 75, 79, 82		
To enter into known territory	I do not know enough about options for having a child that is not genetically my own ($n = 1$)	34		
To ensure the child's well-being	I do not want to risk my child to have inherited diseases from his/her unknown genetic parents ($n = 3$)	26, 50, 76	0.7	0.5–0.6
	I think it is important for a child to know his/her genetic parents ($n = 3$)	24, 50, 83		
	I think it is important for a child to be raised by his/her genetic family ($n = 4$)	46, 49, 74, 76		

Continued

Table I *Continued*

Category of motivation	Specific motivations questioned[a]	References[b]	Reliability measures of category	
			Cronbach's alpha	**Range of ITCs**
	I do not want to risk that my child is not accepted into the family because of a lack of a genetic link (n = 10)	18, 20–23, 46, 76, 84–86		
	I do not want to risk that my child will suffer from social stigma of not being genetically mine (n = 8)	4, 18, 35, 64, 74, 76, 79, 87		
To prevent third party exploitation	I do not want to risk exploitation of vulnerable individuals (e.g. mothers giving up their child for adoption in a developing country) (n = 2)	18, 88		
To relieve the burden of infertility	I do not want to endure the pain of knowing I am infertile (n = 8)	18, 19, 24, 27, 43, 50, 75, 89		
To prevent secrecy	I would want to keep it a secret if I am not the genetic parent, and I think that would be difficult (n = 4)	18, 31, 43, 83		
To prevent social stigma	I do not want to risk not being acknowledged as my child's parent by my social circle because of I am not the genetic parent (n = 2)	78, 89	0.9	0.6–0.8
	I do not want to suffer from the social stigma of having a child that is not genetically mine (n = 14)	14, 18, 23, 27, 31, 34, 35, 43, 46, 47, 50, 74, 79, 83		
	I hold cultural/religious/moral values that do not support having children that are not genetically your own (n = 15)	2, 14, 23, 24, 26, 35, 38, 43, 45, 46, 49, 50, 61, 69, 89		
Motivations for parenthood				
To contribute to a child's well-being	I think I could be a good parent (n = 9)	8, 12, 67, 70–72, 90–92	0.8	0.6–0.8
	I want to provide for a child's needs (n = 13)	7, 8, 11, 12, 15, 59, 65, 71, 92–96		
	I want to give a child love and affection (n = 27)	6–8, 11, 12, 15, 29, 40, 51, 52, 54, 61, 65–68, 73, 87, 90, 93, 95, 97–102		
To experience the love of a child	I want to experience the love of a child (n = 19)	8, 11, 12, 51, 52, 61, 66–68, 73, 90, 98–100, 103–107	0.9	0.7
	I want to experience that special bond between a child and its parent (n = 21)	11, 16, 57, 58, 66–68, 71, 73, 90, 91, 98–100, 105, 106, 108–112		
To enjoy parenthood	I would enjoy having a child (n = 38)	7, 8, 11, 12, 29, 51, 52, 57, 58, 61, 63, 65–68, 71, 87, 89–93, 97–100, 102, 104–106, 108–111, 113–116	0.8	0.6–0.7
	I want to be proud of my child (n = 14)	51, 52, 57, 61, 65–67, 73, 90, 100, 102, 104–106		
	I want to feel the fulfillment of parenthood (n = 31)	7, 10, 11, 25, 27, 52, 54, 55, 65, 67, 68, 71–73, 87, 93, 97, 98, 100, 104–110, 114, 117–120		
	I think parenthood would give profound meaning to my life (n = 51)	6–8, 11, 12, 15, 23, 32, 39, 40, 52–56, 65, 67, 70–73, 83, 88, 90, 92, 94, 97–102, 104–106, 108, 110–114, 117, 120–128		
To follow my natural instincts	I have a natural instinct to have children (n = 16)	7, 11, 15, 23, 51–54, 65, 70, 71, 90, 93, 108, 110, 129	0.7	0.5
	I feel motherhood/fatherhood is part of my identity as a woman/man (n = 40)	6, 8, 10, 12, 15, 16, 21, 23, 35, 38, 40, 49, 51–55, 61, 67, 70, 71, 73, 84, 90, 97, 99, 105, 106, 108, 124, 128–137		
To contribute to society	I want to pass on important traits, values and knowledge to help shape a child's development (n = 23)	8, 11, 12, 15, 23, 52, 53, 61, 65, 67, 68, 71, 73, 90, 93, 95, 97, 105, 106, 109, 113, 120	0.8	0.7

Category	Item	References		
	I want to contribute to society through my child (n = 11)	8, 11, 12, 52, 61, 68, 71, 73, 92, 97, 132		
To create a legacy	I want carry on my family name and traditions (n = 22)	8, 11, 52–54, 58, 61, 63, 66–68, 72, 73, 93, 102, 105, 106, 108, 110, 111, 122, 138	0.7	0.5
	I want a part of myself to continue living after I die (n = 21)	7, 10, 13, 19, 21, 52, 61, 65–68, 71, 97, 100, 105, 106, 108–110, 113, 114		
To complete my family	I want my child to have a sibling (n = 14)	7–9, 29, 48, 52, 58, 83, 90, 94, 97, 102, 115, 139	0.7	0.5
	I want to have grandchildren someday (n = 3)	52, 70, 103		
To strengthen my relationship	I feel having a child is the natural next step in my relationship (n = 17)	5, 38, 49, 52–54, 58, 68, 70–73, 90, 101, 113, 128, 129	0.9	0.5–0.7
	I want to express the love I share with my partner (n = 10)	7, 8, 53, 67, 70, 71, 97, 100, 122, 126		
	I want to improve my sexual relationship with my partner (n = 6)	8, 54, 56, 71, 128, 133		
	I want to strengthen the bond with my partner (n = 31)	7, 8, 11, 12, 22, 42, 52, 53, 56, 65, 67, 70–73, 84, 90, 98, 99, 102, 104–106, 108, 110, 114, 116, 125, 129, 130, 140		
	I want to fulfill my partner's wish for a child (n = 18)	9, 11, 12, 16, 19, 39, 52, 58, 63, 72, 73, 90, 95, 117, 122, 131, 137, 141		
	I want to legitimize my relationship (n = 14)	4, 7, 22, 38, 42, 52, 53, 57, 71, 84, 113, 117, 122, 123		
	I want to have a family of my own (n = 31)	7, 10–12, 15, 27, 34, 38, 48, 49, 52–54, 58, 61, 65, 67, 68, 73, 83, 85, 95, 97–100, 104, 109, 115, 129, 130		
To experience new life-events	I think parenthood will help me further develop myself as a person (n = 21)	7, 8, 15, 51, 52, 61, 65–67, 71–73, 91, 98–100, 104–106, 109, 125	0.7	0.5–0.6
	I want to experience pregnancy, child birth and breastfeeding (n = 28)	6, 8, 17, 18, 21, 23, 31, 36, 38, 41, 49, 53, 72–74, 76, 80, 85, 92, 96, 97, 105, 106, 108, 110, 111, 113, 142		
	I think parenthood will allow me to step into adulthood (n = 13)	7, 8, 15, 52, 53, 61, 65, 67, 68, 95, 103, 110, 139, 143		
To prevent negative emotions	I want to prevent regrets (n = 16)	2, 4, 6, 38, 39, 71, 82, 91, 107, 123, 135, 141, 144–147	0.9	0.4–0.8
	I feel having children is my next natural stage of life (n = 17)	6, 8, 58, 61, 65, 67, 95, 100, 101, 103, 108, 110, 113, 117, 121, 130, 144		
	I do not want to endure the pain of childlessness (n = 15)	7, 14, 16, 21, 27, 34, 38, 49, 51, 57, 59, 71, 128, 137, 148		
	I want to fill the emptiness left behind after losing a previous child (n = 6)	83, 90, 113, 120, 122, 139		
	I think parenthood will raise my sense of self-worth (n = 15)	10, 24, 25, 38, 40, 55, 56, 70, 71, 118, 123, 124, 128, 136, 146		
	I want to exert control over a child (n = 3)	61, 67, 68		
To protect my relationship from childlessness	I want to remove the friction childlessness causes in my relationship (n = 16)	19–22, 49, 51, 54–57, 62, 103, 123, 128, 133, 136	0.8	0.4–0.7
	I do not want to risk my partner committing adultery to conceive a child (n = 16)	19–22, 25, 29, 40, 56, 57, 62, 89, 113, 136, 138, 143, 149		
	I do not want to risk my relationship ending due to childlessness (n = 24)	6, 19, 21, 25, 29, 38, 40, 54–58, 83, 84, 86, 103, 113, 128, 136, 138, 143, 146, 148, 150		
	I fear I will not be able to attract a partner if I cannot have children (n = 4)	59, 103, 120, 148		
To relieve social pressures	Many others in my social circle are having children (n = 16)	8, 12, 14, 21, 29, 54, 58, 71, 72, 90, 97, 100, 108, 110, 124, 151	0.7	0.4–0.7
	I feel pressured by my family (in law) (n = 32)	6, 8, 9, 11, 12, 20, 29, 40, 52, 54, 57–60, 62, 63, 67, 71–73, 89, 94, 103, 123, 128, 132, 136, 137, 143, 149, 152, 153		
	I feel pressured by my friends and colleagues (n = 20)	8, 12, 52, 54, 57, 58, 63, 67, 71, 72, 82, 108–110, 113, 123, 128, 132, 138, 154		
To position myself in society	I want to meet cultural/societal expectations (n = 17)	8, 16, 35, 38, 52, 57, 63, 65, 70, 104, 106, 122–124, 137, 145, 153	0.9	0.5–0.8
	I want to improve my social status (n = 26)	2, 8, 22, 25, 46, 52–56, 61, 66, 68, 73, 94, 100, 103, 104, 108, 112, 113, 120, 127, 138, 148, 149		
	I do not want to suffer from the social stigma of childlessness (n = 32)	6, 8, 10, 14, 19, 21, 22, 25, 34, 35, 38, 40, 52, 54–58, 70, 74, 84, 103, 107, 128, 132, 133, 136, 137, 143, 148–150		

Continued

Table I Continued

Category of motivation	Specific motivations questioned[a]	References[b]	Reliability measures of category — Cronbach's alpha	Range of ITCs
	I want to strengthen the relationship with my family (in law) (n = 16)	8, 20, 22, 42, 53, 58, 60, 66, 87, 93, 98, 99, 103, 114, 148, 149		
	I hold cultural/religious/moral values that support having children (n = 28)	8, 11, 12, 15, 20, 21, 48, 51–53, 57, 58, 62, 65–68, 73, 83, 84, 100, 107, 116, 122, 128, 137, 143, 149		
	I do not want to be excluded from certain social activities (n = 11)	22, 29, 38, 55–58, 71, 108, 110, 150		
	I do not want to be vulnerable for physical abuse (n = 11)	14, 21, 22, 25, 40, 55, 56, 103, 136, 143, 150		
To warrant a security (for old-age)	I want the financial advantages of parenthood (n = 10)	2, 52, 53, 61, 66, 67, 71, 93, 103, 132	0.9	0.7–0.8
	I want a child to help me with my household chores in old age (n = 12)	12, 29, 52, 61, 63, 65–67, 93, 102, 103, 143		
	I want a child to take care of me in old age (n = 29)	7, 8, 11, 12, 21, 25, 52, 57, 58, 61, 63, 65–67, 73, 91, 93–95, 100, 102, 103, 108, 110, 111, 114, 132, 139, 148		
	I want a child to help me financially in old age (n = 23)	12, 21, 29, 46, 52, 55, 56, 58, 61–63, 65, 67, 91, 93, 95, 97, 100, 102, 105, 106, 148, 154		

ITCs, item-total correlations.
[a]The n values refer to the number of references that mention the motivation in question.
[b]Numbers indicate the appropriate reference (see Supplementary file I).

respondents had a Western-European ethnic background, were in their mid-thirties and had a university degree. Half of the respondents were religious (mostly Catholic), but on average attributed little importance to religion. Of the 36% of respondents who had children, half were raising a child of which they and/or their current partner were not the genetic parent. The respondents had been trying to conceive for 2.5 years on average. Half of them were still in the diagnostic work-up, and almost all assumed they would be able to become genetic parents.

The preference for genetic over non-genetic parenthood

Almost all respondents (99% of men and 97% of women) preferred having a child that is genetically related to their partner and themselves (Table III). About one-third even stated they only wanted a child genetically related to them and their partner. Achieving genetic parenthood for their partner was considered more important by both men and women than achieving genetic parenthood for themselves ($P < 0.001$).

Not having a university degree was associated with attaching more importance to genetic parenthood for both themselves and their partner in women and with attaching more importance to genetic parenthood for themselves in men. Furthermore, assuming that they could achieve genetic parenthood was associated with attaching more importance to genetic parenthood for themselves in women.

Within couples in whom both partners responded, men considered acquiring genetic parenthood for both themselves and their partner more important than their female partner ($P = 0.004$). After correction for having a university degree (the only characteristic associated with the preference of both men and women), men no longer valued genetic parenthood for either themselves or their partner more than their female partner did ($P = 0.56$ and $P = 0.44$).

Motivations for genetic over non-genetic parenthood

The importance of the 11 categories of motivations for genetic parenthood did not differ between men and women ($P \geq 0.14$, Table IV). 'To experience a natural process' was the most important category of motivations for genetic parenthood (i.e. first class of importance). The following two categories made up the second class of importance: 'to ensure sovereignty' and 'to protect my relationship'. The third class of importance was made up by six categories: 'to procreate my genes', 'to bond with the child', 'to remain on known territory', 'to ensure the child's well-being', 'to prevent third party exploitation' and 'to relieve the burden of infertility'. Finally, 'to prevent secrecy' and 'to prevent social stigma' were considered the least important.

Influence of genetic parenthood on motivations for parenthood

For 12 of the 14 categories of motivations for parenthood, the majority (>50%) of respondents indicated that genetic parenthood was required to fulfill at least one motivation (Table IV). Compared to men, women who considered genetic parenthood required attached more importance to three categories of motivations for parenthood. More specifically (i) 'to experience new life-events'; (ii) 'to prevent negative emotions' and (iii) 'to relieve social pressures'. The ranking of

Table II Respondents.

Background characteristics		Women (n = 104)	Men (n = 91)
Age		**31** ± 5	**35** ± 7
Western-European ethnic background		88/101 (**87**%)	82/90 (**91**%)
University degree		70/104 (**67**%)	43/91 (**47**%)
Type of religion	None	51/104 (**49**%)	47/91 (**52**%)
	Catholic	45/104 (**43**%)	36/91 (**40**%)
	Other religion, including Islam	8/104 (**8**%)	8/91 (**9**%)
Importance religion (0 = not important, 10 = of the utmost importance)		**1.9** ± 3.0	**1.8** ± 2.9
Having children	Genetically related to both the respondent and his/her current partner	19/104 (**18**%)	17/91 (**19**%)
	Genetically related to respondent, not his/her current partner	5/104 (**5**%)	12/91 (**13**%)
	Not genetically related to respondent but genetically related to his/her current partner	11/104 (**11**%)	4/91 (**4**%)
	Not genetically related to the respondent or his/her current partner	1/104 (**1**%)	2/91 (**2**%)
	No children	68/104 (**65**%)	56/91 (**62**%)
Years of actively trying to conceive		2.5 ± 1.6	2.6 ± 1.6
Cause of infertility	Currently being diagnosed	51/102 (**50**%)	43/88 (**49**%)
	Respondent infertile	16/102 (**16**%)	15/88 (**17**%)
	Respondent's partner infertile	16/102 (**16**%)	12/88 (**14**%)
	Both respondent and partner infertile	9/102 (**9**%)	9/88 (**10**%)
	Unexplained infertility	10/102 (**10**%)	9/88 (**10**%)
No reasons to assume genetic parenthood is impossible		97/102 (**95**%)	84/89 (**94**%)

For categorical variables n (%) are presented. For continuous variables mean ± SD is presented.

the categories into classes of importance did not differ between men and women. The most important categories of motivations for parenthood that they expect can only be fulfilled with a genetically related child were 'to contribute to a child's well-being' and 'to experience the love of a child' (i.e. first class of importance). The second class of importance included: 'to enjoy parenthood', 'to follow my natural instincts', and 'to contribute to society'. The third class of importance included: 'to create a legacy', 'to complete my family', 'to strengthen my relationship', 'to experience new life-events' and 'to prevent negative emotions'. Finally, four categories of motivations were considered least important: 'to protect my relationship from childlessness', 'to relieve social pressures', 'to position myself in society' and 'to warrant a security (for old-age)'.

Discussion

This study confirmed that heterosexual men and women turning to fertility clinics prefer genetic parenthood over non-genetic parenthood. They consider genetic parenthood for their partner more important than genetic parenthood for themselves. Men attached more importance to genetic parenthood than their partners but this difference was strongly associated with their lower educational level. The data suggest that the preference for genetic parenthood is not only driven by motivations, which can only be achieved by genetic parenthood, but also by motivations that do not strictly require genetic parenthood. Besides listing and grouping all motivations for genetic parenthood, we ranked them for importance and showed that men and women do not differ in this respect.

Strengths and limitations

Studying if and why genetic parenthood is important to infertile couples is timely. Donor conception proved not to affect the long-term well-being and family relationships of parents and their children (Bos and van Balen, 2010). At the same time, new knowledge about genetics and new options allowing genetic parenthood are affecting how genetic parenthood is perceived and are creating novel challenges for intending parents to manage (Donovan, 2006; Nordqvist, 2012).

This study included patients who had just begun to attend a fertility clinic. Women who assumed that they might be unable to become genetic parents attached less importance to genetic parenthood, indicating the preference for genetic parenthood might change throughout a fertility treatment trajectory.

Our face-valid questionnaire addressed all potential motivations for preferring genetic parenthood identified by literature review. The questionnaire had to be newly developed for three reasons. First, previously used questionnaires addressed half or less of the 30 motivations for genetic parenthood identified by qualitative research (Bell et al., 1985; de Zoeten et al., 1987; Newton et al., 1992; Owens et al., 1993; Daniels, 1994; Sundby, 1997; Langdridge et al., 2000; Bruffaerts et al., 2001; vanden Akker, 2000, 2001; Urdapilleta et al., 2001; Onah and Ogbuokiri, 2002; Mosalanejad et al., 2014). Second, our questionnaire also addressed all 51 motivations for parenthood (i.e. motivations which could strictly speaking apply to having a genetically or non-genetically related child), and questioned whether these actually motivated patients to prefer genetic parenthood. Finally, most (9/13) previous questionnaires did not assess questionnaire reliability.

Table III Preference for genetic over non-genetic parenthood.

Genetic parenthood for respondent or partner	Preference for genetic over non-genetic parenthood			Significant determinants		Difference woman–man within couple	
	Response options	Women *n* (%)	Men *n* (%)	Women (OR; 95% CI; *P*-value)	Men (OR; 95% CI; *P*-value)	Un-adjusted *P*-value	Adjusted *P*-value for education
Genetic parenthood for respondent him/herself	Crucial: I only want a child that is genetically mine	31/104 (**30**%)	38/91 (**42**%)	Having a university degree: OR = 3.19 (1.22–8.33; *P* = 0.02) Not having a reason to assume that they could not achieve genetic parenthood: OR = 12.06 (1.49–97.73; *P* = 0.02)	Having a university degree: OR = 2.60 (1.07–6.35; *P* = 0.04)	0.004	0.56
	Important: I do not think I would want a child that is not genetically mine	33/104 (**32**%)	28/91 (**31**%)				
	Preferable, but genetic parenthood would not be possible, I would also consider having a child that is not genetically my own	37/104 (**36**%)	24/91 (**26**%)				
	Not important: I do not care if my child is genetically my own	3/104 (**3**%)	1/91 (**1**%)				
Genetic parenthood for the respondents' partner	Crucial: I only want a child that is genetically his/hers	37/104 (**36**%)	46/90 (**51**%)	Having a university degree: OR = 3.04 (1.15–8.02; *P* = 0.03)		0.004	0.44
	Important: I do not think I would want a child that is not genetically his/hers	33/104 (**32**%)	23/90 (**26**%)				
	Preferable, but genetic parenthood would not be possible, I would also consider having a child that is not genetically his/hers	31/104 (**30**%)	20/90 (**22**%)				
	Not important: I do not care if my child is genetically his/hers	3/104 (**3**%)	1/90 (**1**%)				

Table IV Importance of motivations for genetic parenthood.

Category of motivation	Mean importance score (MIS) [95% CI]	P-value difference in MIS between men and women	Proportion for whom genetic parenthood was required to fulfill at least one motivation of this category [range per motivation]	Class of importance based on overlapping CI intervals
The importance of the categories of motivations for genetic over non-genetic parenthood to all respondents				
To experience a natural process	**6.1** [5.8–6.5]	0.36	NA	1
To ensure sovereignty	**4.4** [4.0–4.8]	0.63	NA	2
To protect my relationship	**4.3** [3.9–4.7]	0.89	NA	
To procreate my genes	**3.5** [3.2–3.8]	0.45	NA	3
To bond with the child	**3.5** [3.1–3.8]	0.99	NA	
To remain on known territory	**3.4** [2.9–3.9]	0.93	NA	
To ensure the child's well-being	**3.3** [3.0–3.6]	0.83	NA	
To prevent third party exploitation	**3.2** [2.7–3.7]	0.50	NA	
To relieve the burden of infertility	**2.7** [2.3–3.2]	0.14	NA	
To prevent secrecy	**1.4** [1.0–1.7]	0.50	NA	4
To prevent social stigma	**1.0** [0.7–1.3]	0.84	NA	
The importance of the categories of motivations for parenthood to respondents for whom genetic parenthood was required to fulfill this motivation				
To contribute to a child's well-being	**7.9** [7.5–8.3]	0.93	**47**% (81/172) [29–43%]	1
To experience the love of a child	**7.8** [7.4–8.2]	0.38	**49**% (79/161) [36–45%]	
To enjoy parenthood	**7.1** [6.7–7.4]	0.15	**62**% (99/161) [34–55%]	2
To follow my natural instincts	**6.5** [6.1–6.9]	0.06	**74**% (120/162) [57–69%]	
To contribute to society	**5.8** [5.4–6.3]	0.62	**62**% (104/167) [33–60%]	
To create a legacy	**4.5** [4.0–5.0]	0.57	**77**% (125/162) [65–71%]	3
To complete my family	**4.5** [4.0–5.0]	0.25	**86**% (85/99) [54–67%]	
To strengthen my relationship	**4.5** [4.1–4.8]	0.18	**88**% (141/160) [48–74%]	
To experience new life-events	**4.1** [3.7–4.5]	0.01*	**74**% (112/152) [46–65%]	
To prevent negative emotions	**3.7** [3.4–4.0]	0.01*	**96**% (133/138) [52–73%]	
To protect my relationship from childlessness	**1.5** [1.1–1.8]	0.76	**88**% (128/146) [74–80%]	4
To relieve social pressures	**1.1** [0.9–1.4]	0.04*	**77**% (110/143) [65–72%]	
To position myself in society	**1.0** [0.7–1.2]	0.10	**77**% (112/145) [64–67%]	
To warrant a security (for old-age)	**0.7** [0.5–0.9]	0.53	**70**% (101/144) [61–65%]	

*Women valued more than men: (i) 'to experience new life-events' (MIS 4.5 and 3.6, respectively); (ii) to prevent negative emotions' (MIS 4.0 and 3.4, respectively) and (iii) 'to relieve social pressures' (MIS 1.3 and 0.9, respectively).

In line with three previous surveys on the motivations for genetic parenthood we structured the motivations in reliable categories (Bell et al., 1985; Bruffaerts et al., 2001; Newton et al., 1992).

Our response rate of 49% is acceptable, especially as we included men, who are less responsive (Curtin et al., 2000). Selection bias is likely but we lack consent of non-responders to access their demographics.

We questioned a group of men and women, of whom most did not yet have children whether they expected they needed genetic parenthood to fulfill their motivations for parenthood. These expectations might not reflect the real experiences once they are parents as people are known to overestimate their affective reactions to negative events (Wilson and Gilbert, 2003).

We asked partners to each fill out their own questionnaire as reflecting on the emotional and economic utility of having children is an individual rather than a couple experience (Thomson, 1983). As partners' attitudes may be correlated (Luo and Klohnen, 2005), and understanding couples' treatment decisions requires knowing how partners' affect each other's preference for genetic parenthood, we tested and confirmed that partners' preferences for genetic parenthood were associated. Considering both partnership and determining demographics in the same analysis, allowed reliably assessing the effect of gender on the preference for genetic parenthood (Holter et al., 2014). We did not focus on how partners influence each other's motivations as making treatment decisions does not require agreeing on personal motivations. In exploring gender differences in motivations, we did not perform a correction for multiple testing, which might result in false positives.

Our questionnaire generated information on the absolute importance of genetic parenthood, but not on its importance relative to, for example, pregnancy rates.

Findings in the context of the literature

The preference for genetic parenthood of infertile patients has previously been reported by qualitative studies (Schover *et al.*, 1996; Busch, 2001; Kleinpeter, 2002; Glover *et al.*, 2009; Turner and Nachtigall, 2010) and one quantitative survey (Gurmankin *et al.*, 2005). This preference corresponds to the preference for genetic parenthood of the general public (Miall, 1993; Gurmankin *et al.*, 2005). In addition, our findings reinforce the previous finding that patients value genetic parenthood for their partner more than genetic parenthood for themselves (Schover *et al.*, 1996). The latter may relate to patients overestimating the importance of genetic parenthood for their partner or, may for example, reflect a desire to ensure their partners' continued investment in the family. The fact that oocyte donation allows a gestational link may (partly) explain why women consider genetic parenthood for their partner more important, but this does not explain why men also consider genetic parenthood for their partner more important (Ravin *et al.*, 1997).

Our finding that a difference in education level rather than gender is most strongly associated with a preference for genetic parenthood might explain why two previous studies found no gender differences (Miall, 1993; Gurmankin *et al.*, 2005), whereas another concluded that men value genetic parenthood more (Svanberg, 2003). None of these studies corrected for education level but depending on their sampling method their responding Western women might have been higher educated than their partner (Esteve *et al.*, 2012). An association between educational level and the importance of genetic parenthood was not previously found (Gurmankin *et al.*, 2005). It does, however, correspond to the association between lower education and valuing parenthood (Hoffman *et al.*, 1978; van Balen and Trimbos-Kemper, 1995).

As reported previously, gender did not affect the importance of the majority of motivations for (genetic) parenthood (Bell *et al.*, 1985; Langridge *et al.*, 2000; Newton *et al.*, 1992). With respect to the only three identified differences, women attached more importance than men to motivations for parenthood, corresponding to infertile women valuing parenthood more (Halman *et al.*, 1994; van Balen, 2005).

The importance of the motivation for genetic parenthood 'to experience a natural process' was previously reported (Langridge *et al.*, 2000). It may be seen in context of the Euro-American kinship discourse stipulating the process of sexual reproduction, and material substance (blood/genes) connecting family members (Schneider, 1980). Wanting to contribute to society and a child's well-being had previously been reported (Langridge *et al.*, 2000) and fits the role of the 'giving parent' (Purewal and vanden Akker, 2007). In contrast to previous studies, motivations relating to the social utility of children were rated as unimportant, which may reflect changes through time and/or differences between (sub)cultures, which are both (partially) due to unconscious influence of one's socio-cultural context (Hoffman *et al.*, 1978; van Rooij *et al.*, 2006).

In comparison to previous studies implying but not investigating this (Langridge *et al.*, 2000), we documented that genetic parenthood is important to motivations for parenthood for which a genetic link is not strictly required. The documented importance scores suggest that the idea that genetic parenthood is required to fulfill parenthood motivations may have more impact on the reproductive choices of infertile couples than their specific motivations for preferring genetic over non-genetic parenthood. Still, considering genetic parenthood to be required to fulfill motivations for parenthood does not necessary imply considering these motivations important as revealed by the low importance scores of a number of motivations.

Implications

This study shows that responding heterosexual men and women newly referred to fertility clinics prefer genetic over non-genetic parenthood, thereby confirming the existing assumptions of clinicians. Fertility clinic staff addressing using donor gametes can anticipate more resistance among lower educated individuals. Improved insight into patients' motivations for genetic parenthood may allow clinicians to be sensitive discussing non-genetic parenthood and to reach a shared decision. Researching and informing patients on whether non-genetic parents actually feel they cannot fulfill the 51 motivations for parenthood, might be of additional benefit. Future studies may also discover the reason(s) why patients feel they need genetic parenthood.

The importance of genetic parenthood should be examined relative to other treatment characteristics, such as pregnancy rates. This may also assist in determining the acceptability of new reproductive technologies (Hendriks *et al.*, 2015). Furthermore, examining why patients value genetic parenthood for their partner more than for themselves would be interesting. Finally, this face-valid and reliable questionnaire may be used to gain insight into the importance of genetic parenthood across cultures and over the course of treatment.

Supplementary data

Supplementary data are available at *Human Reproduction* online.

Acknowledgements

Authors' roles

Funding

Conflict of interest

None declared.

References

Bell JS, Bancroft J, Philip A. Motivation for parenthood: a factor analytic study of attitudes towards having children. *J Comp Fam Stud* 1985;**16**: 111–119.

Boivin J, Bunting L, Collins JA, Nygren KG. International estimates of infertility prevalence and treatment-seeking: potential need and demand for infertility medical care. *Hum Reprod* 2007;**22**:1506–1512.

Bos H, van Balen F. Children of the new reproductive technologies: social and genetic parenthood. *Patient Educ Couns* 2010;**81**:429–435.

Bruffaerts R, Enzlin P, Helsen S, Vervaeke M, D'Hooghe T, Vanderschueren D, Demyttenaere K. Early construction stages of the Child Wish Questionnaire: factors concerning child wish and reproductive motives. *Reprod Technol* 2001;**10**:218–223.

Busch S. Chasing a miracle: why infertile women continue to stay in treatment. *The ABNF J* 2001;**12**:116–120.

Curtin R, Presser S, Singer E. The effects of response rate changes on the index of consumer sentiment*. *Public Opin Q* 2000;**64**:413–428.

Daniels KR. Adoption and donor insemination: factors influencing couples' choices. *Child welfare* 1994;**73**:5–14.

de Zoeten MJ, Tymstra T, Alberda AT. The waiting-list for IVF. The motivations and expectations of women waiting for IVF treatment. *Hum Reprod* 1987;**2**:623–626.

Donovan C. Genetics, fathers and families: exploring the implications of changing the law in favour of identifying sperm donors. *Soc Leg Stud* 2006;**15**:494–510.

Esteve A, García-Román J, Permanyer I. The gender-gap reversal in education and its effect on union formation: the end of hypergamy? *Popul Dev Rev* 2012;**38**:535–546.

Field A. *Discovering Statistics Using SPSS*, 2 edn. London: Sage, 2005.

Freeman T, Graham S, Entehaj F, Richards M. *Relatedness in Assisted Reproduction. Families, Origins, and Identities*. UK: Cambridge press, 2014.

Glover L, McLellan A, Weaver SM. What does having a fertility problem mean to couples? *J Reprod Infant Psychol* 2009;**27**:401–418.

Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today* 2004;**24**:105–112.

Gurmankin AD, Ubel PA, Banger E, McGee G. Medical study: aspiring parents, genotypes and phenotypes: the unexamined myth of the perfect baby. *Albany Law Rev* 2005;**68**:1097–1111.

Halman LJ, Andrews FM, Abbey A. Gender differences and perceptions about childbearing among infertile couples. *J obstetr Gynecol Neonatal nurs* 1994;**23**:593–600.

Hendriks S, Dondorp W, de Wert G, Hamer G, Repping S, Dancet EA. Potential consequences of clinical application of artificial gametes: a systematic review of stakeholder views. *Hum Reprod Update* 2015;**21**:297–309.

Hens K, Dondorp W, de Wert G. A leap of faith? An interview study with professionals on the use of mitochondrial replacement to avoid transfer of mitochondrial diseases. *Hum Reprod* 2015;**30**:1256–1262.

Hoffman LW, Thornton A, Manis JD. The value of children to parents in the United States. *J Populat Behav Soc Environ Issues* 1978;**1**:91–131.

Holter H, Sandin-Bojo AK, Gejervall AL, Wikland M, Wilde-Larsson B, Bergh C. Patient-centred quality of care in an IVF programme evaluated by men and women. *Hum Reprod* 2014;**29**:2695–2703.

Jennings S, Mellish L, Tasker F, Lamb M, Golombok S. Why adoption? gay, lesbian, and heterosexual adoptive parents' reproductive experiences and reasons for adoption. *Adopt Q* 2014;**17**:205–226.

Kenny DA, Kashy DA, Cook WL. *Dyadic Data Analysis*. New York: The Guilford Press, 2006.

Kleinpeter CB. Surrogacy: the parents' story. *Psychol Rep* 2002;**91**:201–219.

Kupka MS, D'Hooghe T, Ferraretti AP, de Mouzon J, Erb K, Castilla JA, Calhaz-Jorge C, De Geyter C, Goossens V. Assisted reproductive technology in Europe, 2011: results generated from European registers by ESHRE. *Hum Reprod* 2016;**31**:233–248.

Langridge D, Connolly K, Sheeran P. Reasons for wanting a child: a network analytic study. *J Reprod Infant Psychol* 2000;**18**:321–338.

Luo S, Klohnen EC. Assortative mating and marital quality in newlyweds: a couple-centered approach. *J Pers Soc Psychol* 2005;**88**:304–326.

Miall CE. The regulation of reproduction: the relevance of public opinion for legislative policy formation. *Int J Law Policy Family* 1993;**7**:18–39.

Mosalanejad L, Parandavar N, Abdollahifard S. Barriers to infertility treatment: an integrated study. *Glob J Health Sci* 2014;**6**:181–191.

Newton CR, Hearn MT, Yuzpe AA, Houle M. Motives for parenthood and response to failed in vitro fertilization: implications for counseling. *J Assist Reprod Genet* 1992;**9**:24–31.

Nordqvist P. Origins and originators: lesbian couples negotiating parental identities and sperm donor conception. *Cult Health Sex* 2012;**14**: 297–311.

Onah HE, Ogbuokiri CM. The knowledge and attitude of fertile and infertile Nigerians regarding adoption. *Int J Gynaecol Obstet* 2002;**79**:279–280.

Owens DJ, Edelmann RE, Humphrey ME. Male infertility and donor insemination: couples' decisions, reactions and counselling needs. *Hum Reprod* 1993;**8**:880–885.

Purewal S, vanden Akker O. The socio-cultural and biological meaning of parenthood. *J Psychosom Obstet Gynaecol* 2007;**28**:79–86.

Ravin AJ, Mahowald MB, Stocking CB. Genes or gestation? Attitudes of women and men about biologic ties to children. *J Women's Health* 1997; **6**:639–647.

Schneider DM. *American Kinship: A cultural account*, 2nd edn. Chicago: The University of Chicago Press, 1980.

Schover LR, Thomas AJ, Miller KF, Falcone T, Attaran M, Goldberg J. Preferences for intracytoplasmic sperm injection versus donor insemination in severe male factor infertility: a preliminary report. *Hum Reprod* 1996;**11**:2461–2464.

Sundby J. Infertility in the Gambia: traditional and modern health care. *Patient Educ Couns* 1997;**31**:29–37.

Svanberg AS. Public opinion regarding oocyte donation in Sweden. *Hum Reprod* 2003;**18**:1107–1114.

Thomson E. Individual and couple utility of children. *Demography* 1983;**20**: 507–518.

Turner D, Nachtigall RD. The experience of infertility by low-income immigrant latino couples: attitudes toward adoption. *Adopt Q* 2010;**13**:18–33.

Urdapilleta L, Chillik C, Fernandez D. Do fertile and infertile people think differently about ovum donation? *J Assist Reprod Genet* 2001;**18**:1–7.

van Balen F. Late parenthood among subfertile and fertile couples: motivations and educational goals. *Patient Educ Couns* 2005;**59**:276–282.

van Balen F, Trimbos-Kemper TC. Involuntarily childless couples: their desire to have children and their motives. *J Psychosom Obstet Gynaecol* 1995;**16**:137–144.

van Rooij FB, van Balen F, Hermanns JM. Migrants and the meaning of parenthood: involuntary childless Turkish migrants in The Netherlands. *Hum Reprod* 2006;**21**:1832–1838.

vanden Akker O. The importance of a genetic link in mothers commissioning a surrogate baby in the UK. *Hum Reprod* 2000;**15**:1849–1855.

vanden Akker OB. Adoption in the age of reproductive technology. *J Reprod Infant Psychol* 2001;**19**:147–159.

Willis GB Cognitive Interviewing: A Tool for Improving Questionnaire Design, 2004. Research Triangle Institute.

Wilson TD, Gilbert DT. Affective forecasting. *Adv Exp Soc Psychol* 2003; **35**:345–411.