

Adolescents Born through Assisted Reproduction

Subjects: Psychology

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Assisted reproduction techniques (ARTs) are employed by single individuals and couples who are not otherwise able to conceive spontaneously. The use of ARTs is increasing, research is lacking on the attempts made by adolescent offspring conceived via ARTs to integrate their ART conception into their identity and negotiate a connection with, and autonomy from, their parents.

Keywords: assisted reproduction ; parent–child relationship ; adolescent development

1. Introduction

An increasing number of single individuals and couples of diverse genders, gender identities, and sexual orientations (e.g., heterosexual couples, single men and women, trans* individuals, lesbian women, and gay men) are having children through assisted reproduction techniques (ARTs (Note that the acronym may vary across countries worldwide. Here researchers used the US acronym of Assisted Reproduction Techniques)) ^[1]. ARTs include both homologous and donor-dependent reproductive techniques. *Homologous reproductive techniques* (i.e., involving the egg and sperm of the intended parents) include *in vitro fertilization* (IVF), wherein the egg is fertilized in vitro; and *intracytoplasmic sperm injection* (ICSI), wherein the sperm is injected into an egg. ARTs involving donated gametes include *donor insemination* (i.e., the male gametes are donated), *egg donation* (i.e., an egg donor is used), and *embryo donation* (i.e., both sperm and egg are donated). Finally, *surrogacy* describes an arrangement in which a woman carries the pregnancy with the intention of handing over the resulting child to the intended parent(s).

It is estimated that, worldwide, more than 9 million infants have been born as a result of ART procedures since 1978 ^[2]. In parallel, the last two decades have seen the establishment of equal marriage legislation in 30 countries ^[3]. Such legislation has provided sexual-minority couples with important legal protection ^[4] and symbolic recognition of the validity of their families, and in some cases has opened previously unavailable routes to parenthood.

Although ART conception can bring great joy to individuals who may not otherwise be able to achieve parenthood, many concerns have been raised about certain characteristics of the intended parents (e.g., older age, unpartnered, nonheterosexual orientation) and the practical consequences of ART techniques (e.g., reproductive tourism) ^[5]. Further concerns have been raised that parents (particularly heterosexual-parent families formed via gamete donation) may have no intention of disclosing (or may postpone disclosure of) the assisted conception to their child ^[6]. Additionally, some perspectives caution that a child's lack of a genetic relationship with their mother (in the case of egg donation) or father (in the case of donor insemination), or both parents (in the case of embryo donation) may be problematic (for a discussion, see Golombok, 2020) ^[1].

From a psychological perspective, it remains that, regardless of the intended parent(s)' characteristics, the most salient aspect of the use of ARTs is that it often requires parents to face hard decisions and emotionally charged experiences, which may later be reflected in the adjustment of their child. In this regard, the European Society for Human Reproduction and Embryology (ESHRE) has recommended mandatory assessment and counseling for intended parent(s), focusing “on the best interest of the child” ^[7].

The past few decades have seen a growing research interest in the medical outcomes of children born through ARTs ^[8]. However, relatively few studies have examined the psychological effects of ART conception on parents and their children, and most of these have focused on infancy and childhood (for an exception, see Ilioi and Golombok, 2015 ^[9]). Overall, these studies have shown that families formed via ARTs show good family functioning when children are in infancy and childhood, with well-adjusted and competent parents and healthy children ^[1].

In a similar vein, the extensive literature on lesbian-mother families created by donor insemination and the smaller (but growing) literature on gay-father families created by surrogacy with preschool- and school-age children suggests that parenting quality and child adjustment are unrelated to parents' sexual orientation in these developmental periods [10][11]. Rather, parenting quality and child adjustment relate to family processes (e.g., family communication, the couple relationship) and external events (e.g., stigmatization) [12][13]. In some cases, preschool and school-age children of sexual-minority parents have been found to demonstrate better psychological adjustment than their peers in heterosexual-parent families [14][15][16].

There has been little focus on parenting and child development in single- and trans*-parent families created by ARTs, though the preliminary evidence on children in early and middle childhood indicates that neither the number of parents nor parents' gender identities result in negative outcomes [17][18][19][20][21]. However, some studies have shown that a single-father family structure created by surrogacy and parental gender identity are, in some cases, relevant to parents' and children's external experiences, including their exposure to microaggressions and negative attitudes from others [22][23].

It remains unknown whether all of these findings pertaining to families of diverse parent number, gender, gender identity, and sexual orientation are maintained as children enter adolescence. Evidence to this effect would be particularly relevant for determining whether some aspects of parenting quality and child adjustment might differ across children's developmental stages and/or family types. In light of the aforementioned knowledge gaps, an overview of adolescent development and the parent-child relationship in diverse family forms created by ARTs, according to current empirical research. To this end, the attachment, identity development, and emotional distance regulation frameworks are introduced to provide a theoretical explanation of key processes involved in ART families during adolescence.

2. Adjustment of Adolescents Born through Assisted Reproduction

A number of studies have focused on the physical health, cognitive development, and socioemotional competencies of children conceived through ARTs. Two literature reviews [24][25] considering some important confounders (e.g., multiple births, prematurity) have found that IVF children do not differ from spontaneously conceived children in physical health. However, further and longitudinal research is needed to confirm these findings.

With regard to neuropsychological and cognitive development, no differences have been found in psychomotor abilities, social competencies, language progress, and behavioral development between children born through ARTs and spontaneously conceived children [26]. Moreover, a recent review underlined the importance of considering single versus multiple births in the evaluation of cognitive development in children born through ARTs [26]. Although some studies have found that ART conception has some negative influence on cognitive development (e.g., lower intellectual quotient) [27], the differences between children conceived via ARTs and spontaneously conceived controls have been found to disappear when only single children are considered [28][29]. For instance, the association between attention deficit hyperactivity disorder (ADHD) and IVF conception has been shown to disappear when only single children are analyzed [30]. Additionally, no higher risks for being on the autism spectrum or emotional and behavioral disorders have been found in children born through ARTs compared to spontaneously conceived children [28][31].

In relation to behavioral and psychological outcomes in middle childhood, a recent study observed no differences between children born to gay or heterosexual single fathers through surrogacy, gay partnered fathers through surrogacy, and heterosexual partnered fathers through IVF [18]. Furthermore, a systematic review of psychological adjustment among adolescents conceived through ARTs and raised in heterosexual- or lesbian-parent families summarized the evidence according to whether the parents used their own gametes or reproductive donation [9]. The results indicated that, regardless of their family type, adolescents born through ARTs seemed equally well-adjusted, relative to spontaneously conceived adolescents and standardized normative samples.

Following the same distinction criterion (i.e., use of homologous vs. donation-based ARTs), previous research has reported no differences between IVF adolescents and spontaneously conceived controls in terms of cognitive ability and school performance [32][33]. However, a recent systematic review [32] found that studies on ICSI children have not been consistent, and that most previous studies have suffered from important methodological limitations and been too heterogeneous in their assessment of cognitive outcomes; thus, there is a limit to the generalizations that can be drawn. Other studies have found that IVF adolescents do not display differences in behavioral problems [34], peer problems [35], and emotional functioning [36], even when considering both single and twin IVF adolescents [37].

With regard to reproductive-donation families, a nationwide registry-based cohort study in Denmark found that adolescent offspring showed good academic achievement [38][39]. Similarly, a UK study by Golombok et al. [40] found that adolescents

conceived via ARTs showed healthy psychological adjustment. More specifically, the UK study found that, when offspring were aged 14 years, mothers in surrogacy families showed less negative parenting and reported greater acceptance of their adolescent children and fewer problems in family relationships, compared with gamete-donation mothers [40]. Additionally, less positive relationships were found between mothers and adolescents in egg-donation families than in donor-insemination families. However, there were no differences in adolescent adjustment problems, psychological well-being, and self-esteem between donor-insemination, egg-donation, surrogacy, and spontaneous-conception families.

In a recent study conducted in Western Australia by Wijs et al. [41], ART-conceived offspring reported fewer externalizing problems at ages 14 and 17 relative to their spontaneously conceived counterparts. Additionally, at both ages, no differences in internalizing behavior emerged from adolescent or clinical reports, with their scores being below the clinical cut-off; however, parents of ART-conceived adolescents reported more internalizing problems in offspring. The higher percentage of ART-conceived adolescents with clinical depression at age 14 was no longer apparent at age 17. An explanation for these findings may stem from the tendency for parents who conceive through ARTs to be overprotective, see their children as precious, and have higher expectations of their children, which in turn can affect their children's behavior [36]. Two further underlying mechanisms for these differences in health outcomes may be the higher prevalence of obstetric complications in ART pregnancies [42] and the epigenetic alterations that occur around the susceptible window of conception during the ART process [43][44][45]. In more detail, the epigenetic changes that alter the fetal programming of endocrine and metabolic processes may lead to altered activity of the hypothalamic–pituitary–adrenal axis, which is involved in the regulation of stress and arousal, and thereby the regulation of emotion and behavior [36].

Another relevant theme for ART families and adolescent adjustment is the disclosure of assisted conception [6]. While sexual-minority and single parents are unlikely to conceal their use of reproductive donation due to the presence of same-gender parents or the absence of a second parent, respectively, heterosexual couples may find it easier to do so. Previous studies in the UK have not found negative effects of secrecy on donor-conceived adolescents' psychological adjustment [46][47]. However, a more recent UK study [48] underlined that children who are told about their origins at a young age are better psychologically adjusted and report higher family relationship quality in adolescence.

The few studies on sexual-minority parents with adolescent offspring have been mainly conducted by the National Longitudinal Lesbian Family Study (NLLFS) group [49], showing that the psychological adjustment of the adolescent offspring of lesbian mothers seems unaffected by the disclosure of their conception method [12][50][51][52]. In fact, one study comparing the adolescent offspring of lesbian mothers conceived through donor insemination and the adolescent offspring of heterosexual parents conceived through spontaneous conception in the Netherlands found the former to demonstrate higher levels of self-esteem and fewer conduct problems relative to the latter [53]. In a similar vein, the only study on children born to single fathers through surrogacy was conducted in Italy when children were aged 6–12 years [18]; the findings showed that it was not disclosure, per se, that was associated with children's behavioral adjustment, but children's weaker understanding of surrogacy, lower satisfaction with their contact with the gestational carrier, and lower comfort with their family arrangement. It is unknown whether these findings might also apply to gay-father families created by surrogacy.

To the best of the knowledge, very little research has been conducted on possible protective or risk factors in the disclosure process in families formed by ARTs. From an attachment perspective [54], ART-conceived children and adolescents with secure attachment might be expected to manage the disclosure in a less distressing way, due to the interiorization of their parents' availability in case of need and vulnerability. Attachment security would also imply that these offspring may feel more comfortable and less constrained in asking their parents questions about the donor or surrogate, because they have internalized their parents as a secure base from which to explore their ART origins, without risking the emotional bond with their parents [55][56][57]. Thereby, insecurely attached children or adolescents may have more difficulty processing their ART conception following disclosure. On the one hand, offspring with an *avoidant attachment pattern* may be more likely to perceive mistrust in relation to others and react to disclosure with a hypoactivation of the attachment system, feeding an idea of others as unreliable and of the self as not worthy. On the other hand, offspring with a *preoccupied attachment pattern* may be curious about their donor or surrogate, but feel guilty exploring this due to entangled or role-reversed relationships with their parents.

Preliminary confirmation of these hypotheses derives from three studies of lesbian and single mothers with children conceived through donor insemination in the USA and the UK [56][57], respectively and gay fathers with children born through surrogacy in Italy [55]. Overall, these studies have indicated that in middle childhood [55] and adolescence [56][57], offspring's attachment security is associated with a greater interest in exploring their ART conception. In addition, adolescent offspring with higher levels of disorganized attachment to their single and lesbian mothers are more likely to perceive their sperm donor—and donor conception in general—negatively [56][57], and offspring of lesbian mothers with a

dismissive attachment pattern are less likely to express curiosity ^[56]. These findings suggest that attachment theory may be able to provide unique explanations for peculiar family dynamics in ART families. However, further research from this perspective is needed.

3. The Parent—Adolescent Relationship in Families Formed through Assisted Reproduction

No prior research on parent–adolescent relationship quality has been conducted with ICSI families. However, some studies have examined this factor among IVF families created using homologous reproduction. In their systematic review, Ilioi and Golombok ^[9] reported that most studies have not found differences in the parent–adolescent relationship between IVF and spontaneously conceived families, particularly with respect to warmth and conflict ^{[35][58]}. While a more indulgent education style and lower maternal sensitivity have been reported for IVF families ^[58], these seem to be related to the experience of infertility, and not to the type of ART used ^[59]. Furthermore, some differences have been described according to the type of ART used, with parent and child gender, child age, and disclosure representing key mediators of the parent–adolescent relationship in families created via donor insemination ^[9].

While a positive relationship has been found between lesbian mothers and their adolescent offspring conceived through donor insemination ^[60], most studies on the parent–adolescent relationship have been conducted with heterosexual-parent families created by reproductive donation. In relation to these families, research has examined whether the child's lack of genetic relation to a parent may determine a change in the parent's feelings or behavior towards that child, and whether this, in turn, may influence the child's adjustment and identity formation in adolescence (for a discussion, see ^[9]). In particular, fathers of children conceived through donor insemination have been shown to keep a greater distance from their children compared to fathers of children conceived through spontaneous conception ^{[61][62]}.

The issue of disclosure raises further concerns, as many heterosexual ART parents feel uncertain about whether and when to disclose the lack of a biological link with their ART-conceived children ^[6]. Discomfort over the secrecy surrounding heterosexual-parent families created using ARTs has been the topic of clinical and research attention, due to its potential interference with family relationship quality and child development ^{[61][63]}. Regarding this, a UK study of donor-insemination families found no difficulties in the mother–adolescent relationship between IVF, adoptive, and spontaneous-conception families ^[58]. Of note, although the two offspring in the study who had been told of their donor conception in middle childhood found the disclosure upsetting at the time, they no longer experienced distress at 18 years of age.

In general, the literature indicates that the age at which children are told or discover that they were born through ART influences their feelings about the circumstances of their birth, with those who are told later (i.e., from adolescence onwards) or who discover accidentally experiencing a greater likelihood of psychological distress ^{[64][65]}. Currently, disclosure about donor conception is recommended, since research has found lower levels of conflict between mothers and adolescent sons who are aware of their origins, even compared to mothers and adolescent daughters ^[66].

The empirical evidence on family functioning in heterosexual-parent families created by egg donation comes almost exclusively from two longitudinal studies of children conceived via anonymous egg donation and assessed at the ages of 3–8 and 12 years in the first study ^{[47][67]}, and 1, 2, 3, 7, 10, and 14 years in the second study (for a review, see ^[1]). Both studies found egg-donation families to be functioning well in terms of parenting quality and child adjustment. A more recent UK study of families who conceived using identity-release egg donation found a lower quality of mother–infant relationship within egg-donation families compared to IVF families; however, these differences disappeared when twins were excluded from the sample ^[68].

With regard to adolescents conceived through egg donation, one study found that egg-donation mothers were as sensitive to their adolescents' needs as IVF mothers ^[47], though less emotionally involved compared to donor-insemination mothers. In contrast, another study found that egg-donation mothers and their adolescent offspring reported a less positive relationship quality compared to donor-insemination mothers and their adolescent offspring, though this difference did not bear out in the observational assessment ^[40]. Furthermore, age of disclosure about the method of conception has been shown to play an important role in child adjustment in families created by reproductive donation ^[48]. It is noteworthy that since the infertility stigma has been found to affect women more than men ^[69], this aspect may be relevant to explore with mothers of children conceived through egg donation in future research.

In relation to the use of surrogacy in heterosexual-parent families, a few studies have focused on the parent–adolescent relationship, finding a more positive mother–adolescent relationship in surrogacy families compared to gamete-donation families when children are aged 14 years. More specifically, mothers in surrogacy families have been found to show lower

levels of negative parenting and greater acceptance towards their adolescents, and surrogacy families have been found to have better overall relationship functioning [40]. A longitudinal study by Golombok et al. [70] showed that surrogacy had no detrimental effect on parenting quality during childhood; rather, higher levels of maternal and paternal adaptation to parenthood were found [71]. To the best of the knowledge, no study has focused on the parent–adolescent relationship in gay-father families through surrogacy.

References

1. Golombok, S. *We Are Family: The Modern Transformation of Parents and Children*; Hachette UK: Paris, France, 2020.
2. ESHRE. ART Fact Sheet, Data 2016. 2020. Available online: <https://www.eshre.eu/Press-Room/Resources> (accessed on 28 October 2022).
3. Pew Research Center. Same-Sex Marriage around the World. Fact Sheet. 2020. Available online: <https://www.pewresearch.org/religion/fact-sheet/gay-marriage-around-the-world/> (accessed on 28 October 2022).
4. Kazyak, E.; Woodell, B.; Scherrer, K.; Finken, E. Law and Family Formation Among LGBQ-Parent Families. *Fam. Court. Rev.* 2018, 56, 364–373.
5. Greenfeld, D.A. Effects and outcomes of third-party reproduction: Parents. *Fertil. Steril.* 2015, 104, 520–524.
6. Tallandini, M.A.; Zanchettin, L.; Gronchi, G.; Morsan, V. Parental disclosure of assisted reproductive technology (ART) conception to their children: A systematic and meta-analytic review. *Hum. Reprod.* 2016, 31, 1275–1287.
7. Including, E.T.F.O.E.A.L.; Pennings, G.; De Wert, G.; Shenfield, F.; Cohen, J.; Tarlatzis, B.; Devroey, P. ESHRE Task Force on Ethics and Law 13: The welfare of the child in medically assisted reproduction. *Hum. Reprod.* 2007, 22, 2585–2588.
8. Djuwantono, T.; Aviani, J.K.; Permadi, W.; Achmad, T.H.; Halim, D. Risk of neurodevelopmental disorders in children born from different ART treatments: A systematic review and meta-analysis. *J. Neurodev. Disord.* 2020, 12, 33.
9. Ilioi, E.C.; Golombok, S. Psychological adjustment in adolescents conceived by assisted reproduction techniques: A systematic review. *Hum. Reprod. Updat.* 2015, 21, 84–96.
10. Fedewa, A.L.; Black, W.W.; Ahn, S. Children and Adolescents with Same-Gender Parents: A Meta-Analytic Approach in Assessing Outcomes. *J. GLBT Fam. Stud.* 2015, 11, 1–34.
11. Patterson, C.J. Parents' Sexual Orientation and Children's Development. *Child Dev. Perspect.* 2017, 11, 45–49.
12. Bos, H.M.W.; Gartrell, N.K. Lesbian-mother families formed through donor insemination. In *LGBTQ-Parent Families: Innovations in Research and Implications for Practice*, 2nd ed.; Goldberg, A.E., Allen, K.R., Eds.; Springer: Berlin/Heidelberg, Germany, 2020; pp. 25–44.
13. Miller, B.G.; Kors, S.; Macfie, J. No differences? Meta-analytic comparisons of psychological adjustment in children of gay fathers and heterosexual parents. *Psychol. Sex. Orientat. Gend. Divers.* 2017, 4, 14–22.
14. Carone, N.; Baiocco, R.; Manzi, D.; Antonucci, C.; Caricato, V.; Pagliarulo, E.; Lingiardi, V. Surrogacy families headed by gay men: Relationships with surrogates and egg donors, fathers' decisions over disclosure and children's views on their surrogacy origins. *Hum. Reprod.* 2018, 33, 248–257.
15. Green, R.-J.; Rubio, R.J.; Rothblum, E.D.; Bergman, K.; Katuzny, K.E. Gay fathers by surrogacy: Prejudice, parenting, and well-being of female and male children. *Psychol. Sex. Orientat. Gend. Divers.* 2019, 6, 269–283.
16. Shenkman, G.; Carone, N.; Mouton, B.; D'Amore, S.; Bos, H.M.W. Assisted Conception Socialization Self-Efficacy Among Israeli Lesbian, Gay, and Heterosexual Parent Families and its Association with Child Externalizing Problems. *J. Child Fam. Stud.* 2022.
17. Carone, N.; Baiocco, R.; Lingiardi, V.; Barone, L. Gay and Heterosexual Single Father Families Created by Surrogacy: Father–Child Relationships, Parenting Quality, and Children's Psychological Adjustment. *Sex. Res. Soc. Policy* 2020, 17, 711–728.
18. Carone, N.; Barone, L.; Lingiardi, V.; Baiocco, R.; Brodzinsky, D. Factors associated with behavioral adjustment among school-age children of gay and heterosexual single fathers through surrogacy. *Dev. Psychol.* 2021, 57, 535–547.
19. Carone, N. Family Alliance and Intergenerational Transmission of Coparenting in Gay and Heterosexual Single-Father Families through Surrogacy: Associations with Child Attachment Security. *Int. J. Environ. Res. Public Health* 2022, 19, 7713.
20. Golombok, S.; Zadeh, S.; Freeman, T.; Lysons, J.; Foley, S. Single mothers by choice: Parenting and child adjustment in middle childhood. *J. Fam. Psychol.* 2021, 35, 192–202.

21. Imrie, S.; Zadeh, S.; Wylie, K.; Golombok, S. Children with Trans Parents: Parent–Child Relationship Quality and Psychological Well-being. *Parenting* 2021, 21, 185–215.
22. Carone, N.; Lingiardi, V.; Baiocco, R.; Barone, L. Sensitivity and rough-and-tumble play in gay and heterosexual single-father families through surrogacy: The role of microaggressions and fathers' rumination. *Psychol. Men Masculinities* 2021, 22, 476–487.
23. Zadeh, S.; Ilioi, E.C.; Jadva, V.; Golombok, S. The perspectives of adolescents conceived using surrogacy, egg or sperm donation. *Hum. Reprod.* 2018, 33, 1099–1106.
24. Williams, C.; Sutcliffe, A. Infant outcomes of assisted reproduction. *Early Hum. Dev.* 2009, 85, 673–677.
25. Wilson, C.L.; Fisher, J.R.; Hammarberg, K.; Amor, D.J.; Halliday, J.L. Looking downstream: A review of the literature on physical and psychosocial health outcomes in adolescents and young adults who were conceived by ART. *Hum. Reprod.* 2011, 26, 1209–1219.
26. Bergh, C.; Wennerholm, U.-B. Long-term health of children conceived after assisted reproductive technology. *Upsala J. Med. Sci.* 2020, 125, 152–157.
27. Knoester, M.; Helmerhorst, F.M.; Vandenbroucke, J.P.; van der Westerlaken, L.A.; Walther, F.J.; Veen, S. Cognitive development of singletons born after intracytoplasmic sperm injection compared with in vitro fertilization and natural conception. *Fertil. Steril.* 2008, 90, 289–296.
28. Bay, B.; Mortensen, E.L.; Hvidtjørn, D.; Kesmodel, U.S. Fertility treatment and risk of childhood and adolescent mental disorders: Register based cohort study. *BMJ* 2013, 347, f3978.
29. Strömberg, B.; Dahlquist, G.; Ericson, A.; Finnström, O.; Köster, M.; Stjernqvist, K. Neurological sequelae in children born after in-vitro fertilisation: A population-based study. *Lancet* 2002, 359, 461–465.
30. Källén, A.B.; Finnström, O.O.; Lindam, A.P.; Nilsson, E.M.; Nygren, K.-G.; Olausson, P.M.O. Is there an increased risk for drug treated attention deficit/hyperactivity disorder in children born after in vitro fertilization? *Eur. J. Paediatr. Neurol.* 2011, 15, 247–253.
31. Sandin, S.; Nygren, K.-G.; Iliadou, A.; Hultman, C.M.; Reichenberg, A. Autism and Mental Retardation Among Offspring Born After In Vitro Fertilization. *JAMA* 2013, 310, 75.
32. Rumbold, A.R.; Moore, V.M.; Whitrow, M.J.; Oswald, T.K.; Moran, L.J.; Fernandez, R.C.; Barnhart, K.T.; Davies, M.J. The impact of specific fertility treatments on cognitive development in childhood and adolescence: A systematic review. *Hum. Reprod.* 2017, 32, 1489–1507.
33. Wagenaar, K.; Ceelen, M.; Van Weissenbruch, M.M.; Knol, D.L.; De Waal, H.A.D.-V.; Huisman, J. School functioning in 8-to 18-year-old children born after in vitro fertilization. *Eur. J. Pediatr.* 2008, 167, 1289–1295.
34. Colpin, H.; Bossaert, G. Adolescents conceived by IVF: Parenting and psychosocial adjustment. *Hum. Reprod.* 2008, 23, 2724–2730.
35. Golombok, S.; Owen, L.; Blake, L.; Murray, C.; Jadva, V. Parent–child relationships and the psychological well-being of 18-year-old adolescents conceived by in vitro fertilisation. *Hum. Fertil.* 2009, 12, 63–72.
36. Wagenaar, K.; van Weissenbruch, M.M.; Knol, D.L.; Cohen-Kettenis, P.T.; de Waal, H.A.D.-V.; Huisman, J. Behavior and socioemotional functioning in 9–18-year-old children born after in vitro fertilization. *Fertil. Steril.* 2009, 92, 1907–1914.
37. Anderson, K.; Connor, J.; Koerner, A.; Rueter, M. Twins conceived using IVF: A follow-up of the family environment and psychosocial adjustment in adolescence. *Hum. Reprod.* 2016, 31, 2765–2771.
38. Spangmose, A.; Malchau, S.; Schmidt, L.; Vassard, D.; Rasmussen, S.; Loft, A.; Forman, J.; Pinborg, A. Academic performance in adolescents born after ART—A nationwide registry-based cohort study. *Hum. Reprod.* 2017, 32, 447–456.
39. Spangmose, A.; Malchau, S.; Henningsen, A.; Forman, J.; Rasmussen, S.; Loft, A.; Schmidt, L.; Pinborg, A. Academic performance in adolescents aged 15–16 years born after frozen embryo transfer compared with fresh embryo transfer: A nationwide registry-based cohort study. *BJOG Int. J. Obstet. Gynaecol.* 2019, 126, 261–269.
40. Golombok, S.; Ilioi, E.; Blake, L.; Roman, G.; Jadva, V. A longitudinal study of families formed through reproductive donation: Parent-adolescent relationships and adolescent adjustment at age 14. *Dev. Psychol.* 2017, 53, 1966–1977.
41. Wijs, L.A.; Doherty, D.A.; Keelan, J.A.; Burton, P.; Yovich, J.L.; Robinson, M.; Hart, R.J. Mental health and behavioural problems in adolescents conceived after ART. *Hum. Reprod.* 2022, 37, 2831–2844.
42. Bhutta, A.; Cleves, M.A.; Casey, P.H.; Cradock, M.M.; Anand, K.J.S. Cognitive and Behavioral Outcomes of School-Aged Children Who Were Born Preterm. *JAMA* 2002, 288, 728–737.
43. Fleming, T.P.; Watkins, A.J.; Velazquez, M.A.; Mathers, J.C.; Prentice, A.M.; Stephenson, J.; Barker, M.; Saffery, R.; Yajnik, C.S.; Eckert, J.J.; et al. Origins of lifetime health around the time of conception: Causes and consequences. *Lancet* 2018, 391, 1842–1852.

44. Jiang, Z.; Wang, Y.; Lin, J.; Xu, J.; Ding, G.; Huang, H. Genetic and epigenetic risks of assisted reproduction. *Best Pr. Res. Clin. Obstet. Gynaecol.* 2017, 44, 90–104.
45. Roseboom, T.J. Developmental plasticity and its relevance to assisted human reproduction. *Hum. Reprod.* 2018, 33, 546–552.
46. Freeman, T.; Golombok, S. Donor insemination: A follow-up study of disclosure decisions, family relationships and child adjustment at adolescence. *Reprod. Biomed. Online* 2012, 25, 193–203.
47. Murray, C.; MacCallum, F.; Golombok, S. Egg donation parents and their children: Follow-up at age 12 years. *Fertil. Steril.* 2006, 85, 610–618.
48. Illoi, E.; Blake, L.; Jadva, V.; Roman, G.; Golombok, S. The role of age of disclosure of biological origins in the psychological wellbeing of adolescents conceived by reproductive donation: A longitudinal study from age 1 to age 14. *J. Child Psychol. Psychiatry* 2017, 58, 315–324.
49. Gartrell, N. Overview of the 35-year U.S. National Longitudinal Lesbian Family Study and Its 92% Retention Rate. *J. G LBT Fam. Stud.* 2021, 17, 197–213.
50. Carone, N.; Gartrell, N.K.; Rothblum, E.D.; Koh, A.S.; Bos, H.M. The stability of psychological adjustment among donor-conceived offspring in the U.S. National Longitudinal Lesbian Family Study from childhood to adulthood: Differences by donor type. *Fertil. Steril.* 2021, 115, 1302–1311.
51. Gartrell, N.; Bos, H. US National Longitudinal Lesbian Family Study: Psychological Adjustment of 17-Year-Old Adolescents. *Pediatrics* 2010, 126, 28–36.
52. Gartrell, N.; Bos, H.M.W.; Peyser, H.; Deck, A.; Rodas, C. Adolescents with Lesbian Mothers Describe Their Own Lives. *J. Homosex.* 2012, 59, 1211–1229.
53. Bos, H.; Van Gelderen, L.; Gartrell, N. Lesbian and Heterosexual Two-Parent Families: Adolescent–Parent Relationship Quality and Adolescent Well-Being. *J. Child Fam. Stud.* 2015, 24, 1031–1046.
54. Bowlby, J. *Attachment and Loss*; Basic Books: New York, NY, USA, 1969; Volume 1.
55. Carone, N.; Barone, L.; Manzi, D.; Baiocco, R.; Lingiardi, V.; Kerns, K. Children's Exploration of Their Surrogacy Origins in Gay Two-Father Families: Longitudinal Associations With Child Attachment Security and Parental Scaffolding During Discussions About Conception. *Front. Psychol.* 2020, 11, 112.
56. Slutsky, J.; Jadva, V.; Freeman, T.; Persaud, S.; Steele, M.; Steele, H.; Kramer, W.; Golombok, S. Integrating donor conception into identity development: Adolescents in fatherless families. *Fertil. Steril.* 2016, 106, 202–208.
57. Zadeh, S.; Jones, C.; Basi, T.; Golombok, S. Children's thoughts and feelings about their donor and security of attachment to their solo mothers in middle childhood. *Hum. Reprod.* 2017, 32, 868–875.
58. Owen, L.; Golombok, S. Families created by assisted reproduction: Parent–child relationships in late adolescence. *J. Adolesc.* 2009, 32, 835–848.
59. Golombok, S.; MacCallum, F.; Goodman, E. The "Test-Tube" Generation: Parent-Child Relationships and the Psychological Well-Being of In Vitro Fertilization Children at Adolescence. *Child Dev.* 2001, 72, 599–608.
60. Getrajdman, C.; Lee, J.A.; Copperman, A.B. Co-IVF for Same-Sex Female Couples. *Semin. Reprod. Med.* 2017, 35, 415–419.
61. Baran, A.P.R.; Pannor, R. *Lethal Secret*; Amistad: New York, NY, USA, 1993.
62. Snowden, R.; Snowden, E. Families created through donor insemination. In *Donor Insemination: International Social Science Perspectives*; Daniels, K., Haines, E., Eds.; Cambridge University Press: Cambridge, UK, 1998; pp. 33–52.
63. McWhinnie, A. Gamete donation and anonymity. *Hum. Reprod.* 2001, 16, 807–817.
64. Jadva, V.; Freeman, T.; Kramer, W.; Golombok, S. Experiences of offspring searching for and contacting their donor siblings and donor. *Reprod. Biomed. Online* 2010, 20, 523–532.
65. Turner, A.; Coyle, A. What does it mean to be a donor offspring? The identity experiences of adults conceived by donor insemination and the implications for counselling and therapy. *Hum. Reprod.* 2000, 15, 2041–2051.
66. Golombok, S.; Brewaeys, A.; Giavazzi, M.; Guerra, D.; MacCallum, F.; Rust, J. The European study of assisted reproduction families: The transition to adolescence. *Hum. Reprod.* 2002, 17, 830–840.
67. Golombok, S.; Murray, C.; Brinsden, P.; Abdalla, H. Social versus Biological Parenting: Family Functioning and the Socioemotional Development of Children Conceived by Egg or Sperm Donation. *J. Child Psychol. Psychiatry* 1999, 40, 519–527.
68. Imrie, S.; Jadva, V.; Fishel, S.; Golombok, S. Families Created by Egg Donation: Parent-Child Relationship Quality in Infancy. *Child Dev.* 2019, 90, 1333–1349.

69. Goldberg, A.E.; Kinkler, L.A.; Hines, D.A. Perception and Internalization of Adoption Stigma among Gay, Lesbian, and Heterosexual Adoptive Parents. *J. GLBT Fam. Stud.* 2011, 7, 132–154.
 70. Golombok, S.; MacCallum, F.; Murray, C.; Lycett, E.; Jadv, V. Surrogacy families: Parental functioning, parent-child relationships and children's psychological development at age 2. *J. Child Psychol. Psychiatry* 2006, 47, 213–222.
 71. Golombok, S.; Murray, C.; Jadv, V.; MacCallum, F.; Lycett, E. Families Created Through Surrogacy Arrangements: Parent-Child Relationships in the 1st Year of Life. *Dev. Psychol.* 2004, 40, 400–411.
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